# tested...

igus.com ...cables in e-chains®...




...chainflex® cables ...motion plastics®...

# chainflex®

# chainflex® works: worldwide No. 1 in terms of testing.

**... large selection ... with 4-year guarantee ... with over 25 years of experience ...**

**Available from stock. Ready to ship from 24hrs, earlier upon request.**
The delivery times indicated are the average time until the ordered goods are dispatched.

**No minimum order value. No surcharges.**
No minimum order value with igus®. Just order the amount you need - No cutting charges (up to 10 cuts of the same type).

**From 1ft**
Since chainflex® are high quality cables, you should only order the length you need. We welcome orders from 1ft.

**4-year guarantee**
We provide a service life guarantee of up to 100 million cycles within the first four years of service for every chainflex® cable. Thanks to extensive testing in the largest test lab in the industry, we are the only supplier that can offer a completely reliable service life guarantee for moving cables.

**“8 to 6“ service**
Monday to Friday 8.00am to 6.00pm

**Order hotline**
Phone 800-521-2747

**Online shop www.igus.com/chainflex**
Our entire product range, including product finder, service life calculator, live chat and much more. Order around-the-clock!

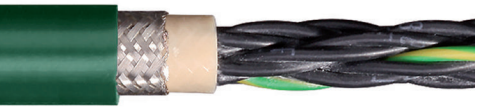
**Service life calculator www.igus.com/chainflexlife**
With the chainflex® service life calculator, you can easily and quickly calculate the expected service life of chainflex® cables specifically for your application.

**Do you have any questions?**
If you have any questions, simply call us or use our online tools at
www.igus.com/chainflex

www.igus.com/chainflex



Tested, tested, tested
chainflex® test lab
from page 16



chainflex®
Control cables
from page 20



chainflex®
Data/Coax cables
from page 114



chainflex®
Bus cables
from page 154



chainflex®
Fiber Optic Cables
from page 184



chainflex®
Measuring system cables
from page 204



chainflex®
Servo cables
from page 242



chainflex®
Motor cables
from page 252



chainflex® CFROBOT
Twistable cables
from page 358



chainflex®
Special cables
from page 398



chainflex® CFCLEAN elements
For cleanroom applications
from page 422




chainflex®
Pneumatic hoses
from page 438

chainflex® selection

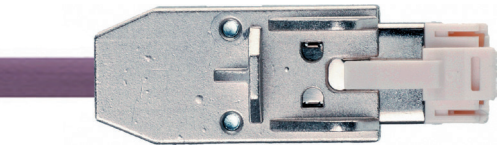
# according to "Class"

| chainflex® series | Basic require-ments | Travel distance | Oil resistance | Torsion |
|---|---|---|---|---|
| CF880 | 3 | 1 | 1 | 1 |
| CF881 | 3 | 1 | 1 | 1 |
| CFLG88 | 3 | 1 | 1 | 1 |
| CF884 | 3 | 1 | 1 | 1 |
| CF885 | 3 | 1 | 1 | 1 |
| CF885.PE | 3 | 1 | 1 | 1 |
| CF886 | 3 | 1 | 1 | 1 |
| CF887 | 3 | 1 | 1 | 1 |
| CF888 | 3 | 1 | 1 | 1 |
| CF890 | 3 | 1 | 3 | 1 |
| CF891 | 3 | 1 | 3 | 1 |
| CF894 | 3 | 1 | 3 | 1 |
| CF895 | 3 | 1 | 3 | 1 |
| CF896 | 3 | 1 | 3 | 1 |
| CF897 | 3 | 1 | 3 | 1 |
| CF898 | 3 | 1 | 3 | 1 |
| CF210.UL New | 4 | 2 | 2 | 1 |
| CF210.UL (motor) New | 4 | 2 | 2 | 1 |
| CF211 (measuring) New | 4 | 2 | 2 | 1 |
| CF220.UL.H | 4 | 2 | 2 | 1 |
| CF111.D New | 4 | 2 | 3 | 1 |
| CF270.UL.D New | 4 | 2 | 3 | 1 |
| CF270.UL.D (motor) New | 4 | 2 | 3 | 1 |
| CF280.UL.H New | 4 | 2 | 3 | 1 |
| CFBUS.PVC | 4 | 3 | 2 | 1 |
| CFBUS.PUR | 4 | 3 | 3 | 1 |
| CF140.UL New | 4 | 4 | 1 | 1 |
| CF130.UL New | 4 | 4 | 1 | 2 |
| CF240 | 4 | 4 | 2 | 1 |
| CF240.PUR | 4 | 4 | 3 | 1 |
| CF150.UL New | 4 | 4 | 3 | 2 |
| CF160.UL | 4 | 4 | 3 | 1 |
| CF77.UL.D (robot) | 5 | 1 | 3 | 3 |
| CFLK | 5 | 3 | 3 | 1 |
| CFTHERMO New | 5 | 4 | 3 | 1 |
| CF6 | 5 | 5 | 2 | 1 |
| CF21.UL | 5 | 5 | 2 | 1 |
| CF211 (data) | 5 | 5 | 2 | 1 |
| CF31 New | 5 | 5 | 2 | 1 |
| CF5 | 5 | 5 | 2 | 2 |
| CF30 New | 5 | 5 | 2 | 2 |
| CF78.UL | 5 | 5 | 3 | 1 |
| CF211.PUR (data) New | 5 | 5 | 3 | 1 |
| CF77.UL.D | 5 | 5 | 3 | 3 |

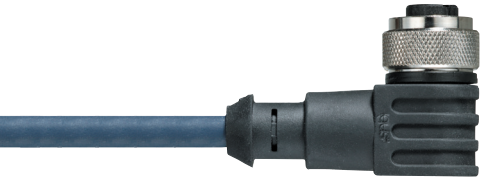
| chainflex® series | Basic require-ments | Travel distance | Oil resistance | Torsion |
|---|---|---|---|---|
| CFROBOT2 | 6 | 1 | 3 | 3 |
| CFROBOT3 | 6 | 1 | 3 | 3 |
| CFROBOT4 | 6 | 1 | 3 | 3 |
| CFROBOT7 | 6 | 1 | 3 | 3 |
| CFROBOT9 | 6 | 1 | 3 | 3 |
| CFROBOT8.PLUS | 6 | 1 | 3 | 4 |
| CFROBOT | 6 | 1 | 4 | 3 |
| CFROBOT5 | 6 | 1 | 4 | 3 |
| CFROBOT6 | 6 | 1 | 4 | 3 |
| CF2 | 6 | 5 | 3 | 1 |
| CF112 | 6 | 5 | 3 | 1 |
| CFLG.LB.PUR | 6 | 5 | 3 | 1 |
| CF113.D | 6 | 5 | 3 | 1 |
| CF27.D | 6 | 5 | 3 | 1 |
| CF27.D (motor) New | 6 | 5 | 3 | 1 |
| CFCRANE New | 6 | 6 | 3 | 1 |
| CFCRANE.PUR | 6 | 6 | 3 | 1 |
| CF10.UL | 6 | 6 | 4 | 1 |
| CF11 | 6 | 6 | 4 | 1 |
| CF12 | 6 | 6 | 4 | 1 |
| CFKoax | 6 | 6 | 4 | 1 |
| CFBUS | 6 | 6 | 4 | 1 |
| CF11.D | 6 | 6 | 4 | 1 |
| CF35.UL New | 6 | 6 | 4 | 1 |
| CF310.UL | 6 | 6 | 4 | 1 |
| CF9.UL | 6 | 6 | 4 | 2 |
| CF34.UL.D New | 6 | 6 | 4 | 2 |
| CF300.UL.D | 6 | 6 | 4 | 2 |
| CFPE | 6 | 6 | 4 | 2 |
| CFSOFT1 | 7 | 1 | 2 | 2 |
| CFSOFT2 | 7 | 1 | 2 | 2 |
| CFLG.G | 7 | 4 | 4 | 1 |
| CFLG.LB New | 7 | 5 | 4 | 1 |
| CF99.PLUS | 7 | 5 | 4 | 1 |
| CFFLAT | 7 | 5 | 4 | 1 |
| CF98.PLUS | 7 | 5 | 4 | 2 |
| CFBUS.LB | 7 | 6 | 4 | 1 |
| CF10 | 7 | 6 | 4 | 1 |
| CF29.D | 7 | 6 | 4 | 1 |
| CF38 New | 7 | 6 | 4 | 1 |
| CF340 New | 7 | 6 | 4 | 1 |
| CF9 | 7 | 6 | 4 | 2 |
| CF37.D New | 7 | 6 | 4 | 2 |
| CF330.D New | 7 | 6 | 4 | 2 |



readycable®
## Video/vision/bus technology
from page 448



readycable®
## Network/Ethernet/Fieldbus
from page 450



readycable®
## Sensor cables/ actuator cables
from page 454



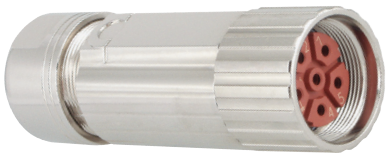
readycable®
## Cables with industrial connectors
from page 460



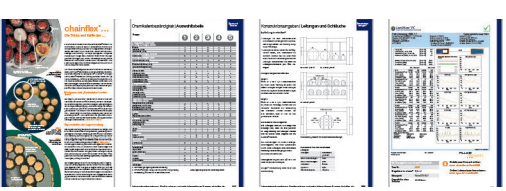
readycable®
## Harnessed dress packs and cables
from page 464



readycable®
## Cables for drive technology
from page 466

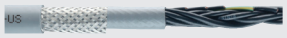


igus®
## Connectors
from page 474

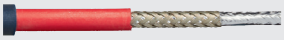


Facts, figures and data
## Technical appendix
from page 480

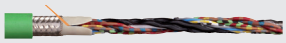
# Control cables

| | chainflex® cables | Jacket | Shield | Bend radius min., e-chain® [factor xd] | Temperature e-chain® from/to [°F] | Price index | Page |
|---|---|---|---|---|---|---|---|
| **Control cables** | | | | | | | |
|  | **CF880** | PVC | | 12.5 | +41/+158 | | 26 |
|  | **CF881** | PVC | ● | 12.5 | +41/+158 | | 30 |
|  | **CF130US** | PVC | | 8 | +41/+176 | | 34 |
|  | **CF140US** | PVC | ● | 10 | +41/+176 | | 38 |
|  | **CF130.UL New** | PVC | | 7.5 | +41/+158 | | 42 |
|  | **CF140.UL New** | PVC | ● | 7.5 | +41/+158 | | 46 |
|  | **CF150.UL New** | PVC | | 7.5 | +41/+158 | | 50 |
|  | **CF160.UL** | PVC | ● | 7.5 | +41/+158 | | 54 |
|  | **CF5** | PVC | | 6.8 | +41/+158 | | 58 |
|  | **CF6** | PVC | ● | 6.8 | +41/+158 | | 62 |
|  | **CFSOFT1** | PVC | | 5 | +41/+158 | | 66 |
|  | **CFSOFT2** | PVC | ● | 5 | +41/+158 | | 68 |
|  | **CF890** | iguPUR | | 12.5 | -4/+176 | | 70 |
|  | **CF891** | iguPUR | ● | 12.5 | -4/+176 | | 74 |
|  | **CF77.UL.D** | PUR | | 6.8 | -13/+176 | | 78 |
|  | **CF78.UL** | PUR | ● | 6.8 | -13/+176 | | 82 |
|  | **CF2** | PUR | ● | 5 | -4/+176 | | 86 |
|  | **CF9.UL** | TPE | | 5 | -31/+212 | | 90 |
|  | **CF10.UL** | TPE | ● | 5 | -31/+212 | | 94 |
|  | **CF9** | TPE | | 5 | -31/+212 | | 98 |
|  | **CF10** | TPE | ● | 5 | -31/+212 | | 102 |
|  | **CF98.PLUS** | TPE | | 3 | -35/+90 | | 106 |
|  | **CF99.PLUS** | TPE | ● | 3 | -35/+90 | | 110 |

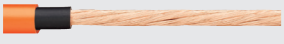
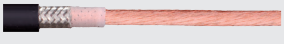
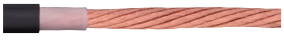
# Data cables/Bus cables/Fiber Optic cables

| | chainflex® cables | Jacket | Shield | Bend radius min., e-chain® [factor xd] | Temperature e-chain® from/to [°F] | Price index | Page |
|---|---|---|---|---|---|---|---|
| **Data cables** | | | | | | | |
|  | CF240 | PVC | ● | 10 | +41/+158 | ●●● | 118 |
|  | CF240.PUR | PUR | ● | 10 | -13/+176 | ●●● | 122 |
|  | CF211 | PVC | ● | 7.5 | +41/+158 | ●●● | 126 |
|  | CF211.PUR New | PUR | ● | 7.5 | -13/+176 | ●●● | 130 |
|  | CF11 | TPE | ● | 6.8 | -31/+212 | ●●● | 134 |
|  | CF112 | PUR | ● | 10 | -13/+176 | ●●● | 138 |
|  | CF12 | TPE | ● | 10 | -31/+212 | ●●● | 142 |
| **Coax cables** | | | | | | | |
|  | CFKoax | TPE | ● | 10 | -31/+212 | ●●● | 144 |
| **Bus cables** | | | | | | | |
|  | CF888 | PVC | ● | 15 | +41/+158 | ●●● | 156 |
|  | CFBUS.PVC | PVC | ● | 12.5 | +41/+158 | ●●● | 160 |
|  | CF898 | iguPUR | ● | 15 | -4/+176 | ●●● | 164 |
|  | CFBUS.PUR | PUR | ● | 12.5 | -4/+176 | ●●● | 168 |
|  | CF14US | PUR | ● | 12.5 | -4/+158 | ●●● | 172 |
|  | CFBUS | TPE | ● | 10 | -31/+158 | ●●● | 174 |
|  | CFBUS.LB | TPE | ● | 7.5 | -31/+158 | ●●● | 180 |
| **Fiber Optic cables** | | | | | | | |
|  | CFLK | PUR | | 12.5 | -4/+140 | ●●● | 188 |
|  | CFLG88 | PVC | | 7.5 | +41/+158 | ●●● | 190 |
|  | CFLG.LB.PUR | PUR | | 5 | -13/+176 | ●●● | 192 |
|  | CFLG.LB New | TPE | | 5 | -31/+176 | ●●● | 196 |
|  | CFLG.G | TPE | | 10 | -40/+176 | ●●● | 200 |

# Measuring system cables/Servo cables

| | chainflex® cables | Jacket | Shield | Bend radius min., e-chain® [factor xd] | Temperature e-chain® from/to [°F] | Price index | Page |
|---|---|---|---|---|---|---|---|
| **Measuring system cables** | | | | | | | |
|  | **CF884** | PVC | ● | 15 | +41/+158 | ◐○○ | 210 |
|  | **CF211 New** | PVC | ● | 10 | +41/+158 | ◐○○ | 214 |
|  | **CF894** | iguPUR | ● | 15 | -4/+176 | ◐○○ | 220 |
|  | **CF111.D New** | PUR | ● | 10 | -13/+176 | ◐○○ | 224 |
|  | **CF113.D** | PUR | ● | 7.5 | -13/+176 | ●●○ | 230 |
|  | **CF11.D** | TPE | ● | 6.8 | -31/+194 | ●●○ | 236 |
| **Servo cables** | | | | | | | |
|  | **CF887** | PVC | ● | 15 | +41/+158 | ◐○○ | 250 |
|  | **CF210.UL New** | PVC | ● | 10 | +41/+158 | ●○○ | 252 |
|  | **CF21.UL** | PVC | ● | 7.5 | +41/+158 | ●○○ | 256 |
|  | **CF897** | iguPUR | ● | 15 | -4/+176 | ◐○○ | 260 |
|  | **CF270.UL.D New** | PUR | ● | 10 | -13/+176 | ◐○○ | 262 |
|  | **CF27.D** | PUR | ● | 7.5 | -13/+176 | ●◐○ | 266 |
|  | **CF29.D** | TPE | ● | 6.8 | -31/+212 | ●●○ | 270 |
| **Hybrid servo cables** | | | | | | | |
|  | **CF220.UL.H** | PVC | ● | 10 | +41/+158 | ◐○○ | 272 |
|  | **CF280.UL.H New** | PUR | ● | 10 | -13/+176 | ◐○○ | 276 |

# Motor cables

| | chainflex® cables | Jacket | Shield | Bend radius min., e-chain® [factor xd] | Temperature e-chain® from/to [°F] | Price index | Page |
|---|---|---|---|---|---|---|---|
| **Motor cables** | | | | | | | |
|  | CF885 | PVC | | 15 | +41/+158 | ●○○ | 290 |
|  | CF886 | PVC | ● | 15 | +41/+158 | ●○○ | 292 |
|  | CF210.UL New | PVC | ● | 10 | +41/+158 | ●○○ | 294 |
|  | CF30 New | PVC | | 7.5 | +41/+158 | ●○○ | 296 |
|  | CF31 New | PVC | ● | 7.5 | +41/+158 | ●○○ | 300 |
|  | CF895 | iguPUR | | 15 | -4/+176 | ●○○ | 304 |
|  | CF896 | iguPUR | ● | 15 | -4/+176 | ●○○ | 306 |
|  | CF270.UL.D New | PUR | ● | 10 | -13/+176 | ●○○ | 308 |
|  | CF27.D New | PUR | ● | 7.5 | -13/+176 | ●○○ | 312 |
|  | CF34.UL.D New | TPE | | 7.5 | -31/+194 | ●●◐ | 316 |
|  | CF35.UL New | TPE | ● | 7.5 | -31/+194 | ●●◐ | 320 |
|  | CF37.D New | TPE | | 7.5 | -31/+194 | ●●◐ | 324 |
|  | CF38 New | TPE | ● | 7.5 | -31/+194 | ●●◐ | 328 |
| **Spindle cables/Single cores** | | | | | | | |
|  | CF885 | PVC | | 15 | +41/+158 | ●○○ | 332 |
|  | CF885.PE | PVC | | 15 | +41/+158 | ●○○ | 334 |
|  | CF886 | PVC | ● | 15 | +41/+158 | ●○○ | 336 |
|  | CF270.UL.D | PUR | ● | 10 | -13/+176 | ●●○ | 338 |
|  | CF300.UL.D | TPE | | 7.5 | -31/+194 | ●●○ | 340 |
|  | CFPE | TPE | | 7.5 | -31/+194 | ●●○ | 344 |
|  | CF310.UL | TPE | ● | 7.5 | -31/+194 | ●●○ | 346 |
|  | CF330.D New | TPE | | 7.5 | -31/+194 | ●●○ | 350 |
|  | CF340 New | TPE | ● | 7.5 | -31/+194 | ●●○ | 352 |
| **Medium voltage cables** | | | | | | | |
|  | CFCRANE.PUR | PUR | ● | 10 | -4/+176 | ●●○ | 354 |
|  | CFCRANE New | igupren | ● | 10 | -4/+176 | ●●● | 356 |

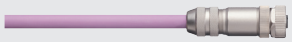
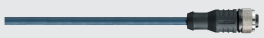
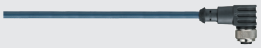
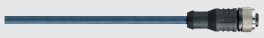
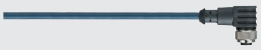
# Twistable cables for Robots

| | chainflex® cables | Jacket | Shield | Bend radius min., e-chain® [factor xd] | Torsion angle [°/m] | Temperature e-chain® from/to [°F] | Price index | Page |
|---|---|---|---|---|---|---|---|---|
| **Twistable cables** | | | | | | | | |
|  | **CF77.UL.D** | PUR | | 6.8 | ±180 | -13/+176 | ●○○ | 364 |
|  | **CFROBOT2** | PUR | ● | 10 | ±180 | -13/+176 | ●●◐ | 368 |
|  | **CFROBOT3** | PUR | ● | 10 | ±180 | -13/+176 | ●●◐ | 370 |
|  | **CFROBOT4** | PUR | ● | 10 | ±180 | -13/+176 | ●●○ | 372 |
|  | **CFROBOT5** | TPE | | 10 | ±180 | -31/+176 | ●●○ | 376 |
|  | **CFROBOT6** | PUR | | 10 | ±180 | -13/+176 | ●●◐ | 378 |
|  | **CFROBOT7** | PUR | ● | 10 | ±180 | -13/+176 | ●●◐ | 380 |
|  | **CFROBOT** | TPE | ● | 10 | ±180 | -31/+194 | ●●◐ | 384 |
|  | **CFROBOT8** | PUR | ● | 10 | ±180 | -13/+158 | ●○○ | 386 |
|  | **CFROBOT8.PLUS** | PUR | ● | 10 | ±360 | -13/+158 | ●◐○ | 390 |
|  | **CFROBOT9** | PUR | ● | 10 | ±180 | -13/+176 | ●●○ | 394 |

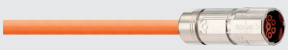
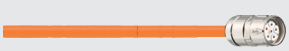
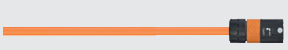
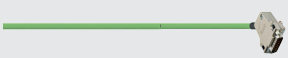
# Special cables/CFCLEAN elements

| | chainflex® cables | Jacket | Shield | Bend radius min., e-chain® [factor xd] | Temperature e-chain® from/to [°F] | Price index | Page |
|---|---|---|---|---|---|---|---|
| **Special cables** | | | | | | | |
|  | **CFTHERMO New** | PUR | ● | 12.5 | -13/+176 | ●●○ | 402 |
|  | **CFFLAT** | TPE | | 5 | -31/+194 | ●●○ | 404 |
|  | **CFSPECIAL.182** | PUR | ● | 10 | -13/+176 | ●●○ | 406 |
|  | **CFSPECIAL.192** | PUR | ● | 10 | -13/+176 | ●●○ | 408 |
|  | **CFSPECIAL.532** | PUR | ● | 10 | -13/+176 | ●◐○ | 410 |
|  | **CFSPECIAL.562.PE** | PUR | | 10 | -13/+176 | ●◐○ | 412 |
|  | **CFSPECIAL.572** | PUR | ● | 10 | -13/+176 | ●◐○ | 414 |
|  | **CFSPECIAL.592** | PUR | ● | 10 | -13/+176 | ●◐○ | 416 |
|  | **CFSPECIAL.792** | PUR | ● | 10 | -13/+176 | ◐○○ | 418 |
| **CFCLEAN elements for cleanroom applications** | | | | | | | |
|  | **CFCLEAN1** | | ● | 70 | +14/+176 | ●●◐ | 426 |
|  | **CFCLEAN2** | | ● | 70 | +14/+176 | ●●◐ | 428 |
|  | **CFCLEAN3** | | ● | 70 | +14/+176 | ●●◐ | 430 |
|  | **CFCLEAN4** | | ● | 70 | +14/+176 | ●●◐ | 432 |
|  | **CFCLEAN7** | | ● | 70 | +14/+176 | ●●◐ | 434 |
|  | **CFCLEAN8** | | ● | 70 | +14/+176 | ●●◐ | 436 |

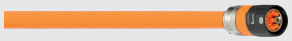
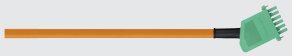
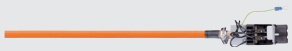
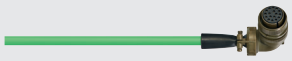
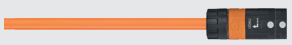
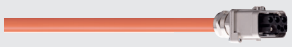
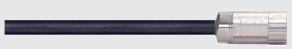
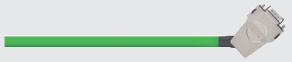
# Video ... Network ... Sensor/Actuator ... Industry ... Robotics

| | Cable type | | Jacket | Page |
|---|---|---|---|---|
| **Camera/Video/Bus technology** | | | | |
|  | Harnessed Bus and Coax cables | | PVC/PUR/TPE | 449 |
|  | Harnessed Fiber Optic cables for video | | TPE | 449 |
| **Network** | | | | |
|  | Harnessed Ethernet cables | | PVC/PUR/TPE | 452 |
|  | Harnessed Profibus cables | | PVC/PUR/TPE | 452 |
|  | Harnessed Profinet cables | | PVC/PUR/TPE | 452 |
|  | Harnessed DeviceNet cables | | TPE | 452 |
|  | Harnessed Fiber Optic Cables for network | | TPE | 453 |
| **Sensor/Actuator** | | | | |
|  |  | CF9 - CF.INI | TPE | 456 |
|  |  | CF10 - CF.INI | TPE | 457 |
|  |  | CF98 - CF.INI | TPE | 457 |
|  |  | chainflex® cables for actuator/ sensor distribution box | TPE | 458 |
| **chainflex® cables with industrial connectors** | | | | |
|  | HARTING Han 6B | | PVC/PUR/TPE | 462 |
|  | HARTING Han 10B | | PVC/PUR/TPE | 462 |
|  | HARTING Han 16B | | PVC/PUR/TPE | 462 |
|  | HARTING Han 24B | | PVC/PUR/TPE | 463 |
| **Robot** | | | | |
|  | Harnessed cables for robots | | | 465 |
|  | Cables according to AIDA specifications | | | 465 |

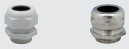
# Drive technology

| | Selection according to manufacturer | | Jacket | Page |
|---|---|---|---|---|
| **Harnessed cables for drive technology** | | | | |
|  | **Allen Bradley** | Motor cables, Servo cables, Hybrid Servo cables, Brake cables, Feedback cables, Adapter cables (Transition cable) | PVC/PUR/TPE | 470 |
|  | **B&R** | Motor cables, Servo cables, EnDat cables, Encoder cables, Resolver cables, Bus cables | PVC/PUR/TPE | 470 |
|  | **Baumer Thalheim** | Encoder cables | PVC/PUR/TPE | 470 |
|  | **Baumüller** | Servo cables, Resolver cables, Pulse Encoder cables SpeedTec: Servo cables, Resolver cables, Pulse Encoder cables | PVC/PUR/TPE | 470 |
|  | **Beckhoff** | Motor cables, Servo cables, Hybrid Servo cables, Encoder cables, Thermal protection cables, Resolver cables, Network cables, EtherCat | PVC/PUR/TPE | 470 |
|  | **Berger Lahr** | Servo cables, Resolver cables | PVC/PUR/TPE | 470 |
|  | **Bonfiglioli** | Servo cables | PVC/PUR | 470 |
|  | **Bosch Rexroth** | Motor cables, Servo cables, Hybrid Servo cables, Encoder cables | PVC/PUR/TPE | 470 |
|  | **Control Techniques/ Nidec Drives** | Motor cables, Servo cables, Encoder cables | PVC/PUR/TPE | 470 |
|  | **Danfoss** | Servo cables | PVC/PUR | 470 |
|  | **Delta** | Measuring system cables, Servo cables, Motor cables | PVC/PUR/TPE | 470 |
|  | **ELAU/ Schneider Electric** | Servo cables, Hybrid Servo cables, Encoder cables | PVC/PUR/TPE | 471 |
|  | **FAGOR** | Path Measuring cables | PUR/TPE | 471 |
|  | **FANUC** | Motor cables, Servo cables, Brake cables, Signal cables | PVC/PUR/TPE | 471 |
|  | **Festo** | Servo cables, Control cables, Encoder cables, Data cables, Bus cables | PVC/PUR/TPE | 471 |
|  | **Harmonic Drive** | Measuring system cables, Servo cable | PVC/PUR/TPE | 471 |
|  | **Heidenhain** | Servo cables, Adapter cables | PVC/PUR/TPE | 471 |
|  | **Heidrive** | Data cables, Servo cables | PVC/PUR | 471 |
|  | **Hengstler** | Measuring system cables | PVC/PUR | 471 |
|  | **Jetter** | Motor cables, Servo cables, Resolver cables | PVC/PUR/TPE | 471 |

# Drive technology

| | Selection according to manufacturer | | Jacket | Page |
|---|---|---|---|---|
| **Harnessed cables for drive technology** | | | | |
|  | **KEB** | Measuring system cables, Servo cable | PVC/PUR | 471 |
|  | **KEBA** | Data cables, Servo cables | PVC/PUR/TPE | 471 |
|  | **Koco Motion** | Data cables, Servo cables | PVC/PUR | 471 |
|  | **Kollmorgen/ Danaher Motion** | Motor cables, Servo cables, Signal cables | PVC/PUR/TPE | 472 |
|  | **Lenze** | Servo cables, Fan cables, Decoder cables, Encoder cables, Feedback cables, Resolver cables | PVC/PUR/TPE | 472 |
|  | **LinMot** | Motor cables, Servo cables | PVC/PUR | 472 |
|  | **LTiDRiVES** | Servo cable, Encoder cables | PVC/PUR/TPE | 472 |
|  | **Mitsubishi** | Motor cables, Control cables, Encoder cables | PVC/PUR | 472 |
|  | **Moog** | Data cables, Servo cables | PVC/PUR/TPE | 472 |
|  | **Motor Power Company** | Servo cables | PVC/PUR | 472 |
|  | **NUM** | Power cables, Servo cables, Fan cables, Encoder cables | PVC/PUR/TPE | 472 |
|  | **Omron** | Motor cables, Control cables, Encoder cables | PVC/PUR/TPE | 472 |
|  | **Panasonic** | Servo cables, Motor cables, Control cables, Data cables | PVC/PUR/TPE | 472 |
|  | **Parker** | Motor cables, Resolver cables | PVC/PUR/TPE | 472 |
|  | **Schunk** | Bus cables, Data cables, Control cables | PVC/PUR/TPE | 472 |
|  | **SEW-EURODRIVE** | Motor cables, Servo cables, Hybrid Servo cables, Control cables, Encoder cables | PVC/PUR/TPE | 473 |
|  | **Siemens** | Power cables, Servo cables, Signal cables, Signal cables DriveCliq; Speedtec: Power cables, Servo cables, Signal cables | PVC/PUR/TPE | 473 |
|  | **Sigmatek** | Servo cables, Encoder cables | PVC/PUR/TPE | 473 |
|  | **Stöber** | Servo cable, Encoder cables | PVC/PUR/TPE | 473 |
|  | **Wittenstein** | Servo cables, Motor cables, Measuring system cables, Data cables | PVC/PUR/TPE | 473 |

# Connector ... technical appendix


| | | Page |
|---|---|---|
| **Connectors** | | |
|  | Connector | 478 |
|  | Glands | 479 |
|  | Tools/accessories and connector packs | 479 |
|  | igus® ibow | 479 |
|  | Module Connect | 479 |

| | Page |
|---|---|
| **Tested, tested, tested** | |
| Unique: 4-year guarantee for moving cables | 14 |
| The chainflex® test lab | 16 |
| **The tricks and features of the chainflex® design** | |
| Know-how from testing | 482 |
| Results from the tests | 484 |
| Construction and sectional views through the chainflex® cable types | 486 |
| **Data** | |
| DIN 47100 color code/copper wire dimensions according to AWG numbers | 488 |
| Calculation of the copper surcharge | 489 |
| Load-carrying capacity of cores | 490 |
| Chemical resistance | 494 |
| **Designing with igus®** | |
| Cables and hoses - General rules for cables and hoses in e-chains® | 498 |
| Cables and hoses - Separation in e-chains® | 499 |
| Cables and hoses - Further information on the separation of cables | 500 |
| Electrical round cables | 501 |
| Electrical round cables - Information on assembly and strain relief of round electrical cables | 502 |
| Pneumatic hoses | 503 |
| **Information** | |
| Approvals and standards | 504 |
| General conditions | 510 |
| User information, disclaimer, KTG, Product illustrations | 510 |
| Technical notes | 511 |
| Table of contents according to part number | 514 |
| **igus® contacts** | |
| igus® worldwide - International map | 512 |

# Unique: 4 years guaranteed




The unique chainflex® guarantee is now being extended to a maximum of four years. With clear statements on the guaranteed service life, customers gain additional planning security. The reason is that functional reliability is essential, both from an operational-functional and legal-financial point of view. Plant and machine manufacturers must make binding statements on operational safety and reliability. However, a guarantee statement to the end customer always involves a considerable risk. The unique chainflex® guarantee on igus® cables in e-chains® not only makes this risk more calculable, but also reduces it considerably.

With the unique and now extended guarantee of up to four years on every chainflex® cable in our catalogue, we assume part of the responsibility and create valuable planning reliability for the manufacturer.

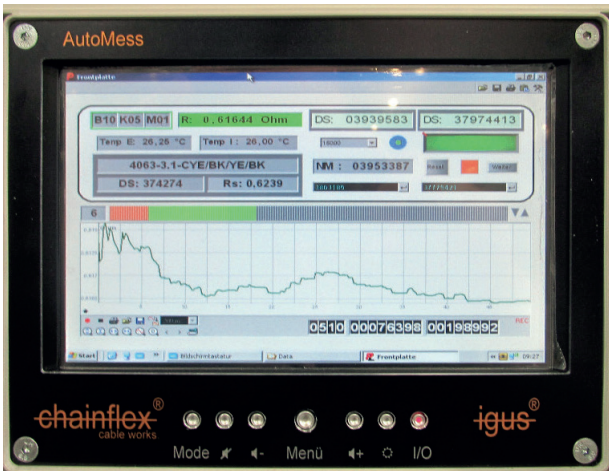
This is only possible because igus® has amassed more than 30 years of experience and an enormous amount of test data in the largest laboratory for cables and e-chains® with a 59,2041ft² floor area. This enables the generation of reliable statements about the durability and service life of chainflex® cables.

**Guarantee instead of just warranty or defects liability expands the assurance in legal terms**

The assurance of a guarantee is done voluntarily by the manufacturer, and goes beyond the mandatory assurance or warranty by the seller. For the customer not only receives the promise to obtain a defect-free product, but also the ability to function over a certain period.

"**In case of guarantee the buyer is entitled to the rights under the guarantee as per the terms set down in the guarantee statement vis-à-vis the person who has given the guarantee, regardless of the legal claims (§ 443 I BGB).**"

In Germany, quality and durability guarantees are used. The latter in particular is of great importance for many customers. A mere extension of the guarantee is not enough for them, they want binding statements on the durability. The chainflex® guarantee based on the reliable data from laboratory and field experience, was created precisely for this purpose.




**Analysis of the measured data: igus® "AutΩMeS" system**




# Overview of the service life using the "cycles" selection tables

For each chainflex® series you will find a selection table called "Cycles - guaranteed service life" This gives the technical parameters for using the respective chainflex® cable.
If the cable is operated in accordance with the operating conditions specified in the selection table, a guaranteed service life of 5, 7.5 or 10 million cycles is applicable depending on the application. The service life itself, measured by the number of possible cycles, can even be significantly higher.

**1 Temperature, from/to [°F]**

**2 Cycles guaranteed**

**3 Minimum bend radius [x d]**

Guaranteed service life (details see page 14-15)

| Cycles* | 2 5 million | 2 7.5 million | 2 12.5 million |
|---|---|---|---|
| 1 Temperature, from/to [°F] | R min. [factor x d] 3 | R min. [factor x d] 3 | R min. [factor x d] 3 |
| -31/-13 | 6.8 | 7.5 | 8.5 |
| -13/+194 | 5 | 6 | 7 |
| +194/+212 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

**Example: Selection table "Guaranteed service life" for CF9**

**Example:**
A cable with a diameter of 12mm in an energy chain with a radius of 100mm results in a bending factor of 8.3 (100mm/12mm). In order to determine the guaranteed durability, you set the technical conditions from the data ranges 1 & 2.
In data range 3, you can now see that (with an assumed temperature range of -13/+194°F) with 8.3 x d the effective bending factor is above the minimum limit of 7 and therefore for that cable you have a guaranteed operation of 10 million cycles. Should the temperature become higher or lower, the necessary factor for this guarantee level would be 8.5, meaning that the number of guaranteed cycles is reduced to 7.5 million. This very clear statement provides reliability and planning safety for your machine and can be further refined with the **online service life calculator**.

**Calculate service life online:**
www.igus.com/chainflexlife

Specific tests for specific requirements

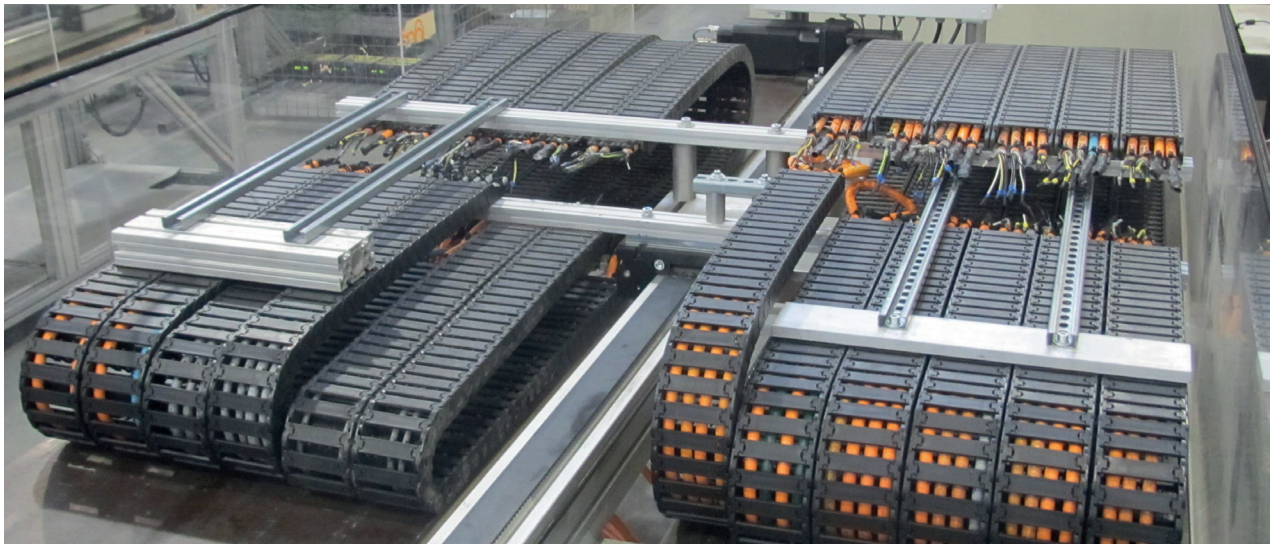
# Over 30 years of testing experience in the chainflex® laboratory

The chainflex® laboratory specializes in tests which, apart from just theoretical procedures, also investigate real applications as they would occur in the real world of mechanical and production engineering. For more than 30 years, specific data has been collected in the largest test laboratory for moving cables, which is indispensable for determining service life and function. On a laboratory floor area of 59,201ft$^2$, 800 tests are currently running in parallel, which help to constantly monitor and improve the interplay of e-chains® and cables in dynamic applications. The combination of e-chains® and chainflex® cables on the one hand, and of e-chains® and other cables that are sold as "chain-compatible" by a large number of cable providers on the market on the other. However, it is here that questions arise for the customer as to the extent to which these cables are actually suitable for use in energy chains and what is the expected service life. The conventional standard tests give generalized answers to generalized questions. The customer, however, wants a concrete answer and solution for their specific problem, which is often not, or only partially, addressed by the normal standards. It is precisely these individual customer requirements that the igus® laboratory devotes itself to. A further consequence of our intensive research and laboratory activities is the development of standard tests and production standards for chainflex® cables for long-term use in e-chains®.

In principle, there are five main focus areas:

**1. Tests of materials**

In line with customer requirements, new materials for the conductors, insulation and outer jackets are developed. Differences arise that are significant but not obvious, particularly in the case of conductor and jacket materials. To this end, up to eight different chainflex® standards are used in the tests.



**Linear chain tests of all chainflex® cables with different radii and travels**



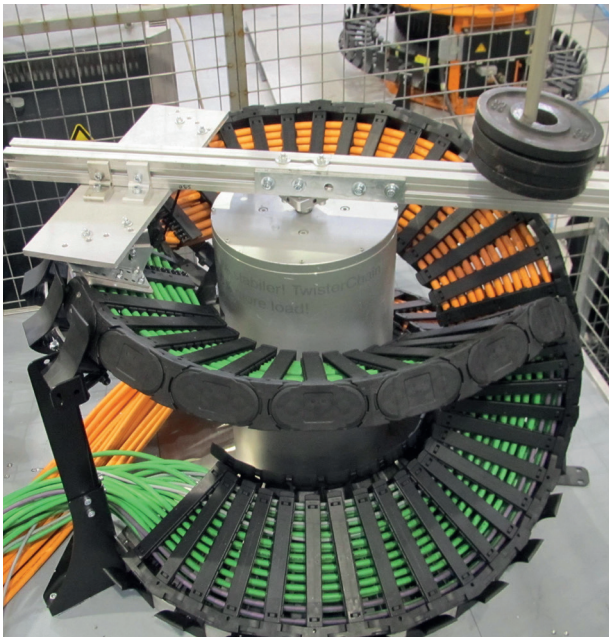
In practice, chainflex® cables must also prove themselves under extreme conditions

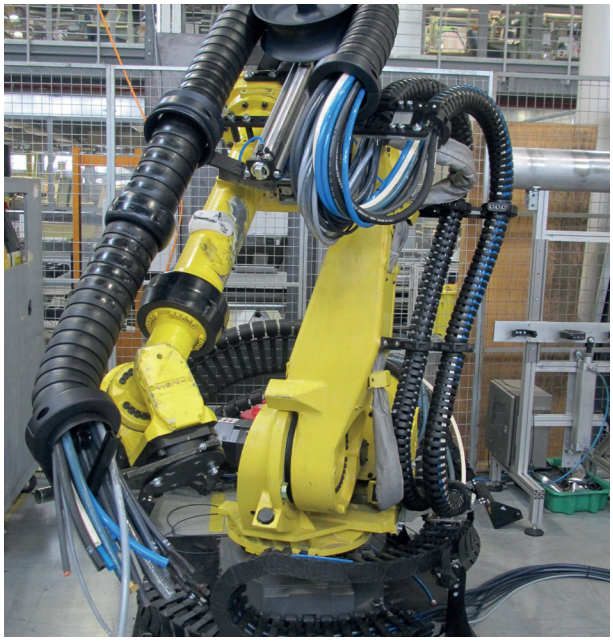
**2. Tests of the technical design**
These tests systematically evaluate new designs, manufacturing methods and the associated influences on service life. As the studies have shown, tiny differences in manufacturing processes can lead to significantly different outcomes in moving applications.

**3. Quality tests during production**
After production, a random number of cables are subjected to the VDE or UL standard tests, as well as other special igus® tests according to certain selection criteria. The laboratory batch tests up to 20% of all finished cables in a continuous bending test and then carries out the necessary structural examinations afterwards.

**4. Long-time tests of service life**
These tests have to be carried out over a period of up to 5 years and investigate the actual maximum service life of the selected cables. The focus here is on a continuous monitoring of the electrical and mechanical parameters in order to detect a failure.

**5. Customer-specific applications**
A special service is offered for customer-specific tests according to the igus® standard. This type of test is based on the customer-specific movement sequences and offers the significant advantage of test-defined limits and the potential for optimization before the start of mass production.


Rotary movement tests in very demanding chain applications using igus® twisterchain®


Test for complex movements by simulating multi-axis applications on robots

# The largest test lab for moving cables worldwide

## ... 59,201ft² test laboratory with over 65 test stations, two climatic containers (40 feet each), and 656ft of outdoor testing facilities ...





## 2 billion test strokes every year

Anyone who wants to carry out systematic, comparative and reproducible tests for more than 2 billion cycles and 1.4 million electrical measurements must invest in the necessary space and resources. On a total of 65 test stations, various test series are carried out according to the igus® test standards. The laboratory team is made up of technically qualified employees who test and monitor thousands of measuring points in e-chains® and cables over a wide range of travel lengths, in horizontal or vertical applications and always under the most real-life conditions possible. Multi-axis e-chains® such as the triflex® series from the robot range are also tested for torsional strength on special test rigs.

## 250 million cycles in batch testing per year

**Special test equipment for special applications**
In addition to the normal service life and quality tests, special test rigs are also available for custom tests. For example, abrasion and media tests for materials are carried out under more demanding experimental conditions than carried out according to UL or VDE standards for storage and aging. The optimum matching of igus® cable outer jacket materials to the energy supply system materials is vital. The influence of thermal factors on moving cables can be analyzed in two special 40 foot climatic containers covering a temperature range of -40°F to +140°F. Both are equipped with a 6m long travel, which can be operated with different radii and e-chains®. In contrast to the standard VDE winding mandrel test, one can test the aging in very different temperature profiles during continuous motion in e-chains®.

# ... UL verified ...

## ... qualified monitoring of laboratory & manufacturing with UL ... Certified chainflex® guarantee promise ...




## 4-year guarantee

**Consistent monitoring and accurate test documentation**
A necessary condition for successful and meaningful testing is the systematic monitoring and documentation of the results. Here, monitoring systems developed by igus® are used which, in addition to offering constant online monitoring, ensure documentation with a very high accuracy. In this way wear can also be detected before failure. This early detection - without a destructive test - allows design modifications to be made. After each test, all the cables are dissected into their elements, examined in detail and their properties documented.

**Because of these test programs, good quality data on all chainflex® cables are available and offer the user planning reliability for their cable selection.**

## Facts and figures

- The industry‘s largest test lab for moving cables
- 30 years of experience
- 59,201ft$^2$ test area
- 65 test stations
- 800 tests conducted in parallel
- 2 billion cycles a year
- 1.4 million electric measurements per year
- Audited and certified by Underwriter Laboratories (UL)

chainflex®

# Control cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

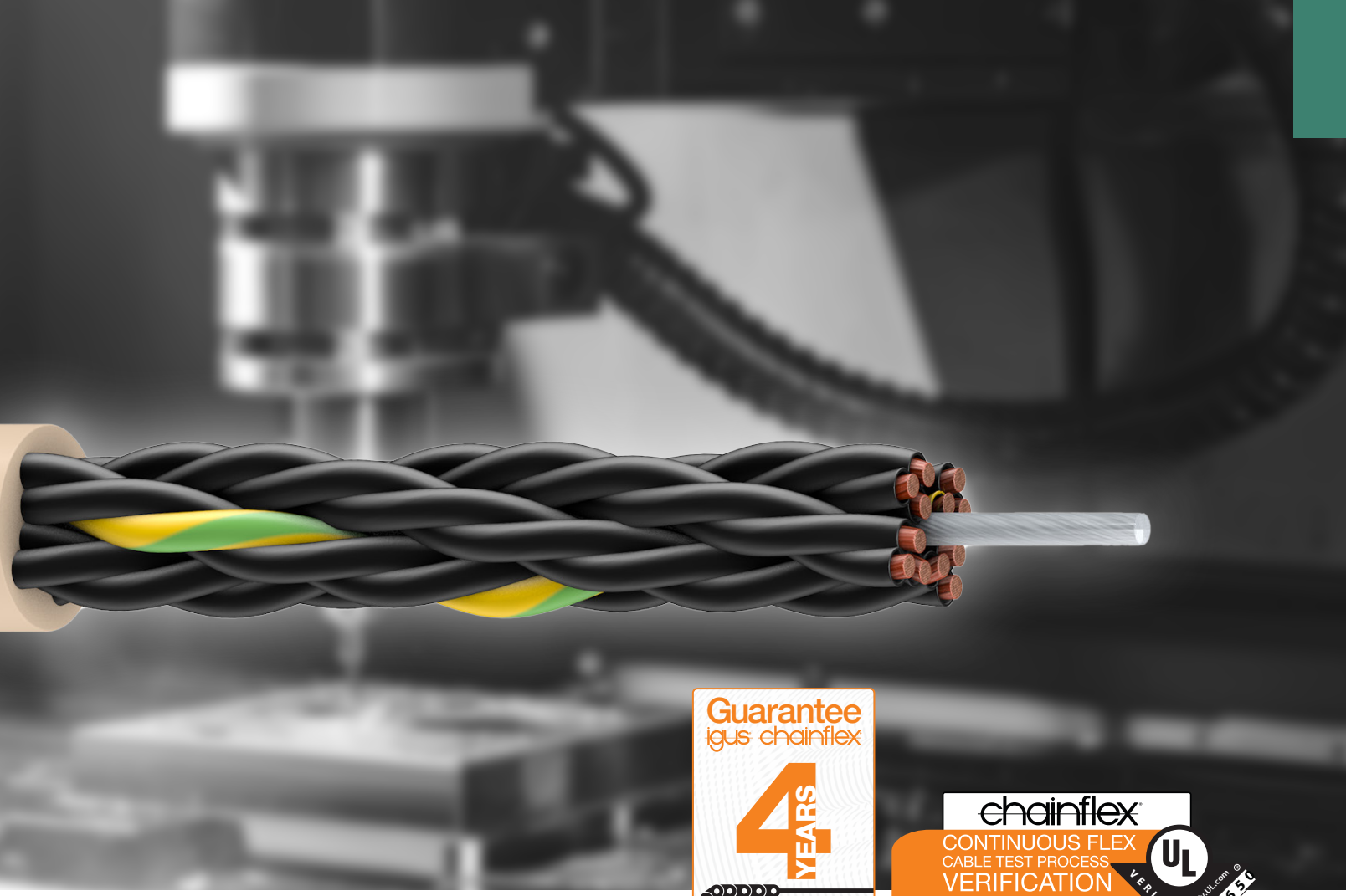
chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29350

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

## Control cables for energy chains®

Specially designed for use in e-chains®, for small bend radii (up to 3 x d). Unshielded or shielded cables, each in different mechanical stress classes and with different outer sheath materials (PVC, PUR and TPE). Tested with a chainflex® guarantee of up to 4 years.

- Cores wound in bundles for long travel in moving applications in e-chains®
- With 6 different outer jacket materials, always find the most cost-effective Control cable that is guaranteed to work in your application
- Tested in the industry's largest test laboratory (59,201 ft²)
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment
- Calculate the exact service life online:
  igus.com/chainflexlife




The unique chainflex® guarantee.

# Planning reliability when selecting cables

**With a four-year guarantee on chainflex® cables, igus® is the only supplier that can offer genuine planning reliability when it comes to selecting cables.**

This is only possible because igus® has amassed more than 30 years of experience and an enormous amount of test data in the largest test laboratory for cables and e-chains® with a 59,201ft² floor area. It is at the heart of our quality and guarantee promise and ensures a comprehensive data base to provide our customers with such a unique guarantee promise.

The largest test laboratory in the industry carries out special tests under realistic conditions and collects data from over two billion test cycles with more than 1.4 million electrical measurements every year. Continuous monitoring and documentation are carried out on 65 test systems with professionally qualified personnel.

This basis of practical experience and test laboratory made the unique chainflex® guarantee possible. In addition, the exact service life of the selected chainflex® cable in the individual application can be determined using the chainflex® service life calculator online. The test laboratory also provides the relevant database for this.




In a complex certification process, the chainflex® guarantee promise was certified together with the corresponding laboratory processes by the US institute "Underwriters Laboratories" (UL). This makes igus® the first company to have the veracity of its guarantee statement confirmed.

# Seven reasons for our chainflex® cable

**In the course of cable developments over the past few decades, seven principles have evolved that ensure a high-quality, long-lasting cable in an e-chain®. At igus®, we call these findings the "seven reasons".**

We developed the flexible chainflex® cables in 1985 to last and not to fail after just a few strokes. In doing so, we recognized that cables used in motion have special mechanical design requirements. That is why we developed the chainflex® seven reasons, which we use in as many chainflex® cables as possible. Each of these seven reasons describes a mechanical feature that makes the cable durable in moving applications.

**1. Strain-relieving center**

Clear space is created in the center of a cable according to the number of cores and the cross section of each cable. This center should be filled, as far as possible, with a genuine center cord (and not, as frequently the case, with fillers or dummy cores consisting of waste materials).
These measures will then efficiently protect the structure and prevent it from wandering into the middle of the cable.

**2. Movement-optimized stranded wires**

Several test series have helped to determine which combination of wire diameter, pitch length and direction optimizes bending resistance in cables optimized for movement. Although very flexible cables can be made using very thin individual wires, these tend towards extreme formation of kinks.

**3. Core insulation**

The insulation materials must be made so that they do not stick to one another within the cable. Furthermore, the insulation is also required to support the stranded individual wires of the conductor. Accordingly, only the highest-quality, high-pressure-extruded PVC or TPE materials that have proved their tested reliability in millions of core kilometers are then used in e-chains® applications.




**4. Structure**

The structure must be wound around a stable, tension-proof center with an optimized short pitch length. However, due to the insulating materials being used, this wound structure should still used. Starting from a quantity of 12 cores, a bundled design should be used.

**5. Inner jacket**

A gusset-filling extruded inner jacket must be used instead of inexpensive fleeces, fillers or accessory fillers. This measure ensures that the core structure is efficiently guided in longitudinal direction. Moreover, the wound structure cannot fall apart or wander off. Hence, the inner jacket serves as solid foundation for the shield.

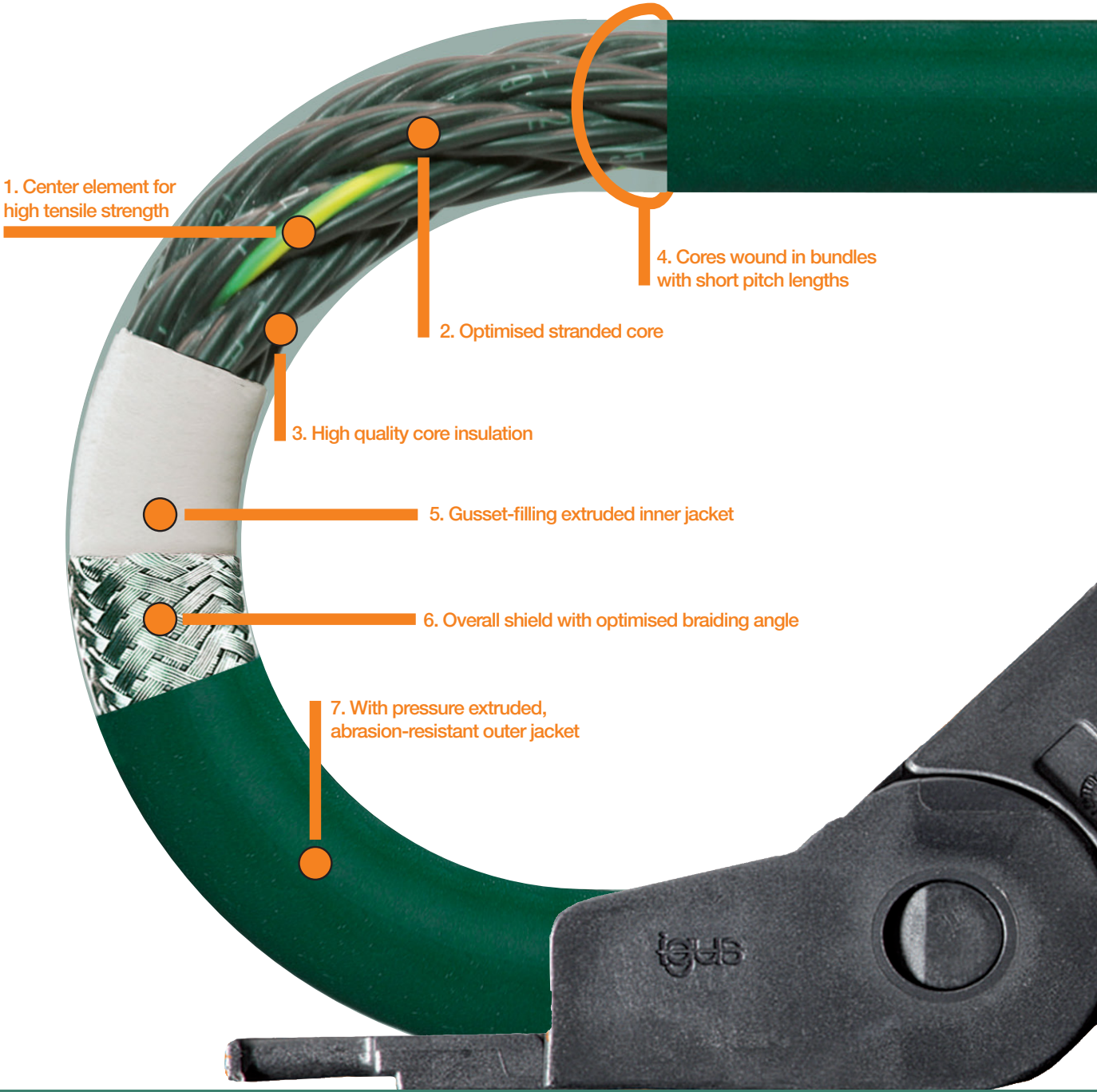
**6. Shielding**

The overall shield should be made tight using an optimized shield braiding angle over an extruded inner jacket. Loose open braids or wrapped stranding reduce the EMC protection considerably and can fail very quickly due to shield

wire breakage. A tight total braid shield also has a torsion protection effect on the wound structure.

**7. Outer jacket**
An external jacket made of PVC, PUR or TPE can meet a wide range of specifications: from UV resistance through low-temperature flexibility and oil resistance to cost effectiveness. But these outer jackets must have one thing in common: A jacket material must be highly abrasion-resistant but not be allowed to stick to anything. It must be flexible but also provide a supporting function. In any case, the jacket should also be extruded under pressure (gusset-filling).

In over 2 billion test cycles per year, we have acquired unique expertise in the field of e-chains® at the igus® chainflex® laboratory (59,201ft²). This expertise forms the basis for the rules we have developed for extremely durable cables.



Selection table

# chainflex® Control cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] | | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | unsupported | gliding | | | |
| CF880 | PVC | | 12.5 | +41/+158 | 9.84 | - | 65.6 | ≤ 32.8 | 26 |
| CF881 | PVC | ● | 12.5 | +41/+158 | 9.84 | - | 65.6 | ≤ 32.8 | 30 |
| CF130US | PVC | | 8 | +41/+176 | 9.84 | 6.56 | 65.6 | ≤ 29.5 | 34 |
| CF140US | PVC | ● | 10 | +41/+176 | 9.84 | 6.56 | 65.6 | ≤ 29.5 | 38 |
| CF130.UL New | PVC | | 7.5 | +41/+158 | 9.84 | 6.56 | 65.6 | ≤ 164.1 | 42 |
| CF140.UL New | PVC | ● | 7.5 | +41/+158 | 9.84 | 6.56 | 65.6 | ≤ 164.1 | 46 |
| CF150.UL New | PVC | | 7.5 | +41/+158 | 9.84 | 6.56 | 65.6 | ≤ 164.1 | 50 |
| CF160.UL | PVC | ● | 7.5 | +41/+158 | 9.84 | 6.56 | 65.6 | ≤ 164.1 | 54 |
| CF5 | PVC | | 6.8 | +41/+158 | 32.81 | 16.41 | 262.5 | ≤ 328.1 | 58 |
| CF6 | PVC | ● | 6.8 | +41/+158 | 32.81 | 16.41 | 262.5 | ≤ 328.1 | 62 |
| CFSOFT1 | PVC | | 5 | +41/+158 | 32.81 | 16.41 | 262.5 | ≤ 16.4 | 66 |
| CFSOFT2 | PVC | ● | 5 | +41/+158 | 32.81 | 16.41 | 262.5 | ≤ 16.4 | 68 |
| CF890 | iguPUR | | 12.5 | -4/+176 | 9.84 | - | 65.6 | ≤ 32.8 | 70 |
| CF891 | iguPUR | ● | 12.5 | -4/+176 | 9.84 | - | 65.6 | ≤ 32.8 | 74 |
| CF77.UL.D | PUR | | 6.8 | -13/+176 | 32.81 | 16.41 | 262.5 | ≤ 328.1 | 78 |
| CF78.UL | PUR | ● | 6.8 | -13/+176 | 32.81 | 16.41 | 262.5 | ≤ 328.1 | 82 |
| CF2 | PUR | ● | 5 | -4/+176 | 32.81 | 16.41 | 262.5 | ≤ 328.1 | 86 |
| CF9.UL | TPE | | 5 | -31/+212 | 32.81 | 19.69 | 328.1 | > 1,312 | 90 |
| CF10.UL | TPE | ● | 5 | -31/+212 | 32.81 | 19.69 | 328.1 | > 1,312 | 94 |
| CF9 | TPE | | 5 | -31/+212 | 32.81 | 19.69 | 328.1 | > 1,312 | 98 |
| CF10 | TPE | ● | 5 | -31/+212 | 32.81 | 19.69 | 328.1 | > 1,312 | 102 |
| CF98.PLUS | TPE | | 3 | -31/+194 | 32.81 | 19.69 | 328.1 | ≤ 328.1 | 106 |
| CF99.PLUS | TPE | ● | 3 | -31/+194 | 32.81 | 19.69 | 328.1 | ≤ 328.1 | 110 |

## Approvals/Resistance

| chainflex® cables | Approvals and standards | | | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | oil | | PTFE FREE | UL | c UL LISTED | UL LISTED | c UL us | | nec | NFPA | C UL A | DNV | REACH | RoHS | clean-room | dry chainroom | DESINA | CE | |
| CF880 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 26 |
| CF881 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 30 |
| CF130US | ● | ● | ● | ● | | | | | | ● | | | | ● | | | | ● | 34 |
| CF140US | ● | | ● | ● | | | | | | ● | | | | ● | | | | ● | 38 |
| CF130.UL New | | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 42 |
| CF140.UL New | | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 46 |
| CF150.UL New | ● | ● | ● | | ● | ● | ● | | ● | ● | | | ● | ● | | | | ● | 50 |
| CF160.UL | ● | | ● | | ● | ● | ● | | ● | ● | | | ● | ● | | | | ● | 54 |
| CF5 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 58 |
| CF6 | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 62 |
| CFSOFT1 | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 66 |
| CFSOFT2 | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 68 |
| CF890 | ● | | ● | | | | ● | | | | | | ● | ● | | | | ● | 70 |
| CF891 | ● | | ● | | | | ● | | | | | | ● | ● | | | | ● | 74 |
| CF77.UL.D | ● | ● | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | 78 |
| CF78.UL | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | 82 |
| CF2 | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 86 |
| CF9.UL | ● | ● | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | 90 |
| CF10.UL | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | 94 |
| CF9 | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | | ● | 98 |
| CF10 | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | | ● | 102 |
| CF98.PLUS | ● | ● | ● | | | | | | | | | | ● | ● | ● | ● | | ● | 106 |
| CF99.PLUS | ● | | ● | | | | | | | | | | ● | ● | ● | ● | | ● | 110 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] for travel distance | | Bending radius min. [factor x d] for travel distance | | Bending radius min. [factor x d] for travel distance | | Page |
|---|---|---|---|---|---|---|---|---|
| | | < 32.81 ft | ≥ 32.81 ft | < 32.81 ft | ≥ 32.81 ft | < 32.81 ft | ≥ 32.81 ft | |
| | | 5 million (1 million) cycles * | | 7.5 million (3 million) cycles * | | 10 million (5 million) cycles * | | |
| CF880 | +41 / +59 | 15 | - | 16 | - | 17 | - | |
| | +59 / +140 | 12.5 | - | 13.5 | - | 14.5 | - | 26 |
| | +140 / +158 | 15 | - | 16 | - | 17 | - | |
| CF881 | +41 / +59 | 15 | - | 16 | - | 17 | - | |
| | +59 / +140 | 12.5 | - | 13.5 | - | 14.5 | - | 30 |
| | +140 / +158 | 15 | - | 16 | - | 17 | - | |
| CF130US | +23 / +59 | 10 | - | 12 | - | 13 | - | |
| | +59 / +140 | 8 | - | 10 | - | 12 | - | 34 |
| | +140 / +176 | 10 | - | 12 | - | 13 | - | |
| CF140US | +23 / +59 | 12 | - | 13 | - | 15 | - | |
| | +59 / +140 | 10 | - | 12 | - | 13 | - | 38 |
| | +140 / +176 | 12 | - | 13 | - | 15 | - | |
| CF130.UL New | +41 / +59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| | +59 / +140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | 42 |
| | +140 / +158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| CF140.UL New | +41 / +59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| | +59 / +140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | 46 |
| | +140 / +158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| CF150.UL New | +41 / +59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| | +59 / +140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | 50 |
| | +140 / +158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| CF160.UL | +41 / +59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| | +59 / +140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | 54 |
| | +140 / +158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| CF5 | +41 / +59 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | |
| | +59 / +140 | 6.8 | 7.5 | 7.8 | 8.5 | 8.8 | 9.5 | 58 |
| | +140 / +158 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | |
| CF6 | +41 / +59 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | |
| | +59 / +140 | 6.8 | 7.5 | 7.8 | 8.5 | 8.8 | 9.5 | 62 |
| | +140 / +158 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 | |
| | | 10 million | | 15 million | | 20 million | | |
| CFSOFT1 | +41 / +59 | 6.8 | - | 7.5 | - | 8.5 | - | |
| | +59 / +140 | 5 | - | 6 | - | 7 | - | 66 |
| | +140 / +158 | 6.8 | - | 7.5 | - | 8.5 | - | |
| CFSOFT2 | +41 / +59 | 6.8 | - | 7.5 | - | 8.5 | - | |
| | +59 / +140 | 5 | - | 6 | - | 7 | - | 68 |
| | +140 / +158 | 6.8 | - | 7.5 | - | 8.5 | - | |
| | | 5 million (1 million) cycles * | | 7.5 million (3 million) cycles * | | 10 million (5 million) cycles * | | |
| CF890 | -4 / +14 | 15 | - | 16 | - | 17 | - | |
| | +14 / +158 | 12.5 | - | 13.5 | - | 14.5 | - | 70 |
| | +158 / +176 | 15 | - | 16 | - | 17 | - | |
| CF891 | -4 / +14 | 15 | - | 16 | - | 17 | - | |
| | +14 / +158 | 12.5 | - | 13.5 | - | 14.5 | - | 74 |
| | +158 / +176 | 15 | - | 16 | - | 17 | - | |
| CF77.UL.D | -13 / +5 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| | -5 / +158 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 | 78 |
| | +158 / +176 | 7.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| CF78.UL | -13 / +5 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| | -5 / +158 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 | 82 |
| | +158 / +176 | 7.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| CF2 | -4 / +14 | 6.8 | | 7.5 | | 8.5 | | |
| | +14 / +158 | 5 | | 6.8 | | 7.5 | | 86 |
| | +158 / +176 | 6.8 | | 7.5 | | 8.5 | | |
| CF9.UL | -31 / -13 | 6.8 | | 7.5 | | 10 | | |
| | -13 / +194 | 5 | | 6 | | 7 | | 90 |
| | +194 / +212 | 6.8 | | 7.5 | | 10 | | |
| CF10.UL | -31 / -13 | 6.8 | | 7.5 | | 8.5 | | |
| | -13 / +194 | 5 | | 6 | | 7 | | 94 |
| | +194 / +212 | 6.8 | | 7.5 | | 8.5 | | |
| | | 5 million | | 7.5 million | | 12.5 million | | |
| CF9 | -31 / -13 | 6.8 | | 7.5 | | 8.5 | | |
| | -13 / +194 | 5 | | 6 | | 7 | | 98 |
| | +194 / +212 | 6.8 | | 7.5 | | 8.5 | | |
| CF10 | -31 / -13 | 6.8 | | 7.5 | | 8.5 | | |
| | -13 / +194 | 5 | | 6 | | 7 | | 102 |
| | +194 / +212 | 6.8 | | 7.5 | | 8.5 | | |
| | | 5 million | | 40 million | | 100 million | | |
| CF98.PLUS | -31 / -13 | 4 | | 6 | | 7 | | |
| | -13 / +176 | 3 | | 5 | | 6 | | 106 |
| | +176 / +194 | 4 | | 6 | | 7 | | |
| CF99.PLUS | -31 / -13 | 4 | | 6 | | 7 | | |
| | -13 / +176 | 3 | | 5 | | 6 | | 110 |
| | +176 / +194 | 4 | | 6 | | 7 | | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife
Figures in brackets refer to series CF880, CF881, CF890 and CF891

Control cable | PVC outer jacket

# chainflex® CF880

**5,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Flame resistance




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 12.5 x d |
| | **flexible** | min. 10 x d |
| | **fixed** | min. 7 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow. |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.1.1

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF880 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 15 | 16 | 17 |
| +59/+140 | 12.5 | 13.5 | 14.5 |
| +140/+158 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF880




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF880.05.02** | 20 | 2 x 0.5 | 0.20 (5.0) | 7.4 (11) | 21.5 (32) |
| **CF880.05.03** | 20 | 3 G 0.5 | 0.22 (5.5) | 10.8 (16) | 24.9 (37) |
| **CF880.05.04** | 20 | 4 G 0.5 | 0.24 (6.0) | 14.1 (21) | 30.9 (46) |
| **CF880.05.05** | 20 | 5 G 0.5 | 0.26 (6.5) | 17.5 (26) | 37.0 (55) |
| **CF880.05.07** | 20 | 7 G 0.5 | 0.30 (7.5) | 24.9 (37) | 49.1 (73) |
| **CF880.05.12** | 20 | 12 G 0.5 | 0.33 (8.5) | 42.3 (63) | 72.6 (108) |
| **CF880.05.18** | 20 | 18 G 0.5 | 0.39 (10.0) | 63.2 (94) | 106.2 (158) |
| **CF880.05.25** | 20 | 25 G 0.5 | 0.47 (12.0) | 86.0 (128) | 152.5 (227) |
| **CF880.07.02** | 18 | 2 x 0.75 | 0.22 (5.5) | 10.8 (16) | 26.9 (40) |
| **CF880.07.03** | 18 | 3 G 0.75 | 0.24 (6.0) | 16.1 (24) | 32.9 (49) |
| **CF880.07.04** | 18 | 4 G 0.75 | 0.26 (6.5) | 21.5 (32) | 41.0 (61) |
| **CF880.07.05** | 18 | 5 G 0.75 | 0.28 (7.0) | 26.9 (40) | 49.1 (73) |
| **CF880.07.07** | 18 | 7 G 0.75 | 0.31 (8.0) | 37.6 (56) | 66.5 (99) |
| **CF880.07.12** | 18 | 12 G 0.75 | 0.39 (10.0) | 63.2 (94) | 102.1 (152) |
| **CF880.07.18** | 18 | 18 G 0.75 | 0.45 (11.5) | 94.1 (140) | 112.2 (167) |
| **CF880.07.25** | 18 | 25 G 0.75 | 0.53 (13.5) | 130.4 (194) | 190.8 (284) |
| **CF880.10.02** | 17 | 2 x 1.0 | 0.24 (6.0) | 14.1 (21) | 32.3 (48) |
| **CF880.10.03** | 17 | 3 G 1.0 | 0.26 (6.5) | 21.5 (32) | 39.0 (58) |
| **CF880.10.04** | 17 | 4 G 1.0 | 0.28 (7.0) | 28.2 (42) | 41.7 (62) |
| **CF880.10.05** | 17 | 5 G 1.0 | 0.30 (7.5) | 34.9 (52) | 57.8 (86) |
| **CF880.10.07** | 17 | 7 G 1.0 | 0.33 (8.5) | 49.1 (73) | 77.9 (116) |
| **CF880.10.12** | 17 | 12 G 1.0 | 0.41 (10.5) | 83.3 (124) | 122.3 (182) |
| **CF880.10.18** | 17 | 18 G 1.0 | 0.49 (12.5) | 125.0 (186) | 186.8 (278) |
| **CF880.10.25** | 17 | 25 G 1.0 | 0.59 (15.0) | 173.4 (258) | 264.1 (393) |
| **CF880.15.02** | 16 | 2 x 1.5 | 0.26 (6.5) | 21.5 (32) | 43.0 (64) |
| **CF880.15.03** | 16 | 3 G 1.5 | 0.28 (7.0) | 31.6 (47) | 55.1 (82) |
| **CF880.15.04** | 16 | 4 G 1.5 | 0.30 (7.5) | 42.3 (63) | 69.9 (104) |
| **CF880.15.05** | 16 | 5 G 1.5 | 0.33 (8.5) | 52.4 (78) | 80.6 (120) |
| **CF880.15.07** | 16 | 7 G 1.5 | 0.39 (10.0) | 73.2 (109) | 112.2 (167) |
| **CF880.15.12** | 16 | 12 G 1.5 | 0.47 (12.0) | 125.0 (186) | 174.7 (260) |
| **CF880.15.18** | 16 | 18 G 1.5 | 0.57 (14.5) | 187.5 (279) | 248.6 (370) |
| **CF880.15.25** | 16 | 25 G 1.5 | 0.69 (17.5) | 260.1 (387) | 345.4 (514) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 3.1.1.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF880.25.03** | 14 | 3 G 2.5 | 0.33 (8.5) | 52.4 (78.0) | 80.6 (120.0) |
| **CF880.25.04** | 14 | 4 G 2.5 | 0.35 (9.0) | 69.2 (103.0) | 100.8 (150.0) |
| **CF880.25.05** | 14 | 5 G 2.5 | 0.39 (10.0) | 86.7 (129.0) | 123.6 (184.0) |
| **CF880.25.07** | 14 | 7 G 2.5 | 0.47 (12.0) | 121.6 (181.0) | 172.0 (256.0) |
| **CF880.25.12** | 14 | 12 G 2.5 | 0.59 (15.0) | 219.7 (327.0) | 278.2 (414.0) |

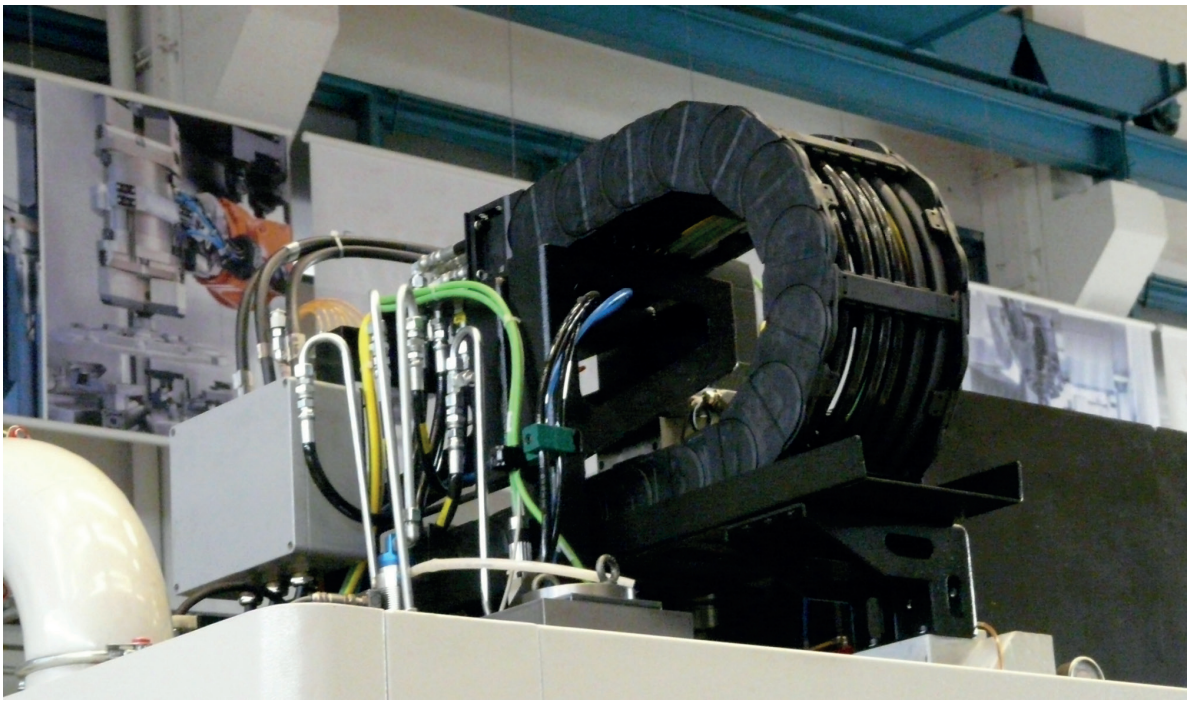
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case



chainflex® CF880 in a short travel application in woodworking

Control cable | PVC outer jacket

# chainflex® CF881




Example image

**5,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame resistance

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 12.5 x d |
| | **flexible** | min. 10 x d |
| | **fixed** | min. 7 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow. |
| Overall shield | Aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.1.1

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF881 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 15 | 16 | 17 |
| +59/+140 | 12.5 | 13.5 | 14.5 |
| +140/+158 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF881




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF881.05.03** | 20 | 3 G 0.5 | 0.24 (6.0) | 18.8 (28) | 31.6 (47) |
| **CF881.05.04** | 20 | 4 G 0.5 | 0.26 (6.5) | 23.5 (35) | 36.3 (54) |
| **CF881.05.05** | 20 | 5 G 0.5 | 0.28 (7.0) | 27.6 (41) | 43.7 (65) |
| **CF881.05.07** | 20 | 7 G 0.5 | 0.31 (8.0) | 39.6 (59) | 50.4 (75) |
| **CF881.05.12** | 20 | 12 G 0.5 | 0.35 (9.0) | 61.1 (91) | 84.0 (125) |
| **CF881.05.18** | 20 | 18 G 0.5 | 0.43 (11.0) | 91.4 (136) | 118.9 (177) |
| **CF881.05.25** | 20 | 25 G 0.5 | 0.51 (13.0) | 141.1 (210) | 163.3 (243) |
| **CF881.07.02** | 18 | 2 x 0.75 | 0.26 (6.5) | 20.2 (30) | 33.6 (50) |
| **CF881.07.03** | 18 | 3 G 0.75 | 0.28 (7.0) | 24.9 (37) | 44.3 (66) |
| **CF881.07.04** | 18 | 4 G 0.75 | 0.30 (7.5) | 30.9 (46) | 48.4 (72) |
| **CF881.07.05** | 18 | 5 G 0.75 | 0.31 (8.0) | 41.0 (61) | 58.5 (87) |
| **CF881.07.07** | 18 | 7 G 0.75 | 0.35 (9.0) | 55.8 (83) | 75.3 (112) |
| **CF881.07.12** | 18 | 12 G 0.75 | 0.41 (10.5) | 83.3 (124) | 114.2 (170) |
| **CF881.07.18** | 18 | 18 G 0.75 | 0.47 (12.0) | 123.0 (183) | 159.9 (238) |
| **CF881.07.25** [11)] | 18 | 25 G 0.75 | 0.57 (14.5) | 149.2 (222) | 207.6 (309) |
| **CF881.10.02** | 17 | 2 x 1.0 | 0.26 (6.5) | 20.2 (30) | 34.9 (52) |
| **CF881.10.03** | 17 | 3 G 1.0 | 0.28 (7.0) | 30.9 (46) | 49.1 (73) |
| **CF881.10.04** | 17 | 4 G 1.0 | 0.30 (7.5) | 42.3 (63) | 68.5 (102) |
| **CF881.10.05** | 17 | 5 G 1.0 | 0.31 (8.0) | 51.1 (76) | 73.9 (110) |
| **CF881.10.07** | 17 | 7 G 1.0 | 0.37 (9.5) | 67.2 (100) | 87.4 (130) |
| **CF881.10.12** | 17 | 12 G 1.0 | 0.45 (11.5) | 112.2 (167) | 153.9 (229) |
| **CF881.10.18** | 17 | 18 G 1.0 | 0.51 (13.0) | 143.1 (213) | 188.8 (281) |
| **CF881.10.25** | 17 | 25 G 1.0 | 0.63 (16.0) | 195.5 (291) | 262.1 (390) |
| **CF881.15.02** | 16 | 2 x 1.5 | 0.30 (7.5) | 40.3 (60) | 47.7 (71) |
| **CF881.15.03** | 16 | 3 G 1.5 | 0.30 (7.5) | 42.3 (63) | 58.5 (87) |
| **CF881.15.04** | 16 | 4 G 1.5 | 0.33 (8.5) | 60.5 (90) | 74.6 (111) |
| **CF881.15.05** | 16 | 5 G 1.5 | 0.35 (9.0) | 63.2 (94) | 88.0 (131) |
| **CF881.15.07** | 16 | 7 G 1.5 | 0.43 (11.0) | 102.8 (153) | 123.0 (183) |
| **CF881.15.12** | 16 | 12 G 1.5 | 0.51 (13.0) | 142.5 (212) | 189.5 (282) |
| **CF881.15.18** | 16 | 18 G 1.5 | 0.59 (15.0) | 268.1 (399) | 307.8 (458) |
| **CF881.15.25** | 16 | 25 G 1.5 | 0.73 (18.5) | 285.6 (425) | 385.0 (573) |
| **CF881.25.04** | 14 | 4 G 2.5 | 0.39 (10.0) | 94.7 (141) | 109.5 (163) |
| **CF881.25.05** | 14 | 5 G 2.5 | 0.43 (11.0) | 100.1 (149) | 131.0 (195) |
| **CF881.25.07** | 14 | 7 G 2.5 | 0.51 (13.0) | 137.1 (204) | 176.1 (262) |
| **CF881.25.12** [11)] | 14 | 12 G 2.5 | 0.63 (16.0) | 229.8 (342) | 287.6 (428) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 3.1.1.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



**Order example: CF881.25.25 - To your required length**

**CF881 chainflex® series .25 Code nominal cross section .25 Number of conductors**

Order online ▶ www.igus.com/CF881

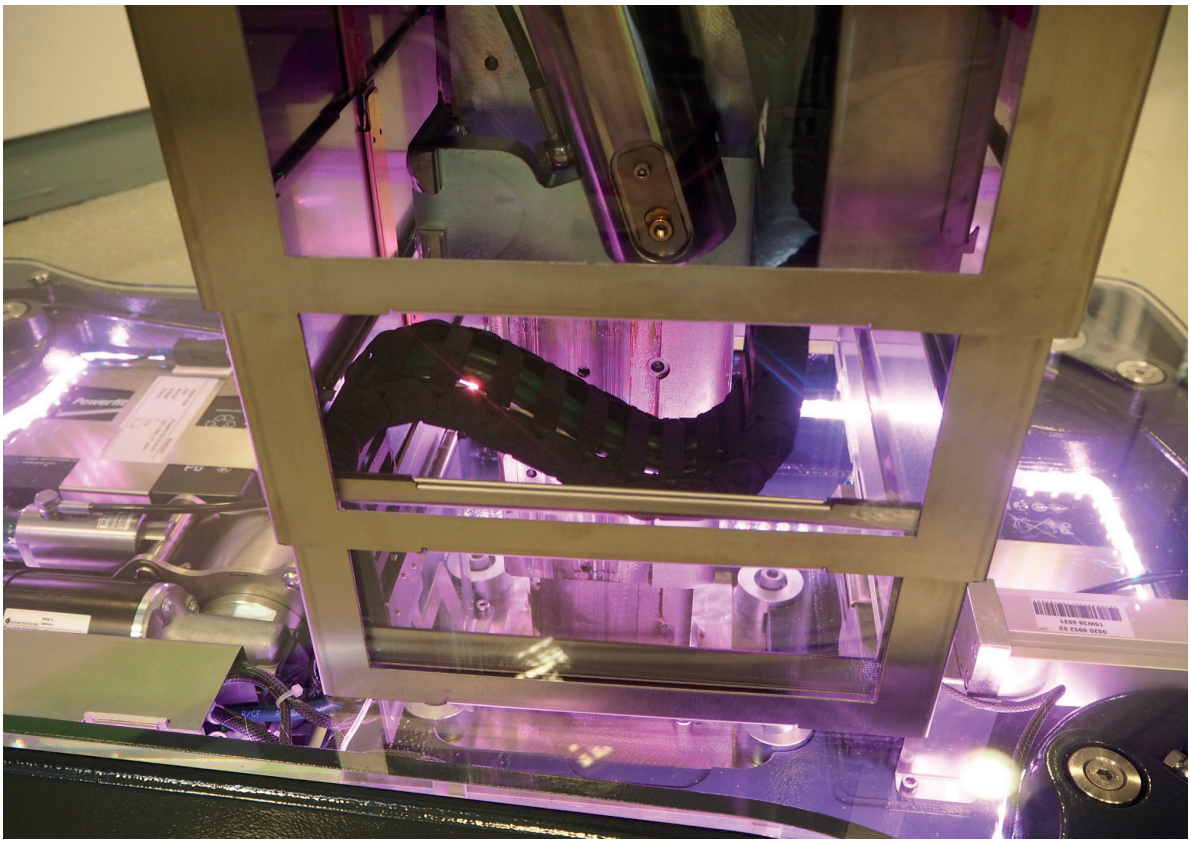
Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online: www.igus.com/cf-case**



chainflex® CF881 in a mobile surgical table

Control cable | PVC outer jacket

# chainflex® CF130US




Example image

**5,000,000** Cycles guaranteed

**8 x d** Bend radius e-chain®

**30 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Oil-resistant
- Flame retardant
- UL Tray cable for exposed run (TC-ER)

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 8 x d |
| | flexible | min. 7.5 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | +41 °F to +176 °F (+5 °C to +80 °C) |
| | flexible | +23 °F to +176 °F (-5 °C to +80 °C) |
| | fixed | -4 °F to +194 °F (-20 °C to +90 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported distances and low duty gliding applications up to 30ft (9m) |
| Torsion | | ±90° with 3.281 ft (1m) cable length |

## Cable structure

| | |
|---|---|
| Conductors | Finely stranded bundled bare copper wires. Designed in accordance with ASTM B174-95. |
| Conductor insulation | Mechanically high-quality, PVC/Nylon. |
| Conductor construction | Conductors concentrically layered with short pitch. |
| Color code | Black with white numbers, one green-yellow. |
| Outer jacket | Oil-resistant UV-resistant PVC, low-adhesion blend, adapted to the requirements of the energy chain®.<br>Color: Gray (similar to RAL 7001) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600 V |
| Test voltage | 3300 V |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium. |
| Oil resistance | Oil resistant (according to DIN EN 60811-2-1, DIN EN 50363-4-1,Class 4 |
| Flame resistance | MTW: UL VW-1 and CSA FT4<br>TC-ER: UL 1685 and CSA FT4 |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |

# Class 3.1.4.2

**Silicone-free** — Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

**PTFE-free** — This cable does not contain PTFE

**NFPA** — Following NFPA 79-2018, chapter 12.9

**UL/CSA** — For installation in accordance with all applicable sections of the National Electric Code.
Type **TC-ER-HL Tray** cable
**ER** = Exposed Run
**HL** = Hazardous Locations Per NEC Articles 501, 502, 503 & 505 permitted for use in **Class I and II**
**Divisions 1 and 2**, Zones 1 and 2 locations
**Direct Burial**
**Oil Resistant I**
**Type WTTC**: Wind Turbine Tray Cable
**Type MTW**: For installation in Accordance with all applicable sections of the National Electric Code.
**UL AWM** 2587 90°C 600V
**cUL**: Canadian Tray Cable CIC-TC FT4
**CSA AWM** I/II A/B 90°C 600V FT4
**CE**: In accordance with European Council Directive 73/23/EEC

**Lead-free** — 2002/95/EC; Please reference the Design Section for more Information.

**CE** — Following 2014/35/EU

**Info** — In general these cables will offer continuous-flex performance in specific “Tray Cable” and “Machine Tool Wire” NEC compliant installations. The CF130US line is designed for use in 600V control and power applications. The oil-resistant jacket also passes the stringent 70,000 BTU UL and CSA Vertical Flame Tests. Not recommended for long travel / gliding applications.

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +23/+59 | 10 | 12 | 13 |
| +59/+140 | 8 | 10 | 12 |
| +140/+176 | 10 | 12 | 13 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

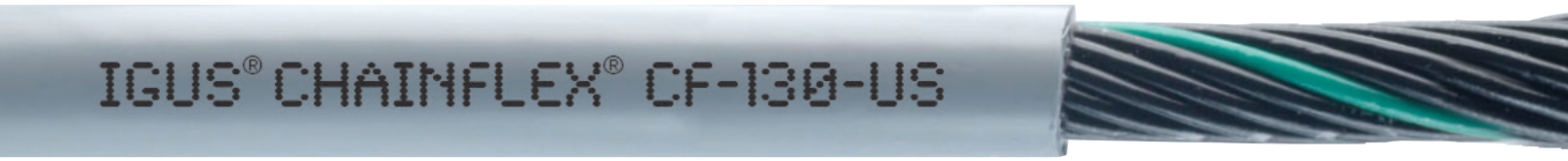
## Typical application areas

- For low duty flexing applications
- Suitable for indoor/outdoor applications
- Especially for unsupported travel distances and low-duty gliding applications up to 30 ft (9m)
- UL Tray cable for exposed run (TC-ER)
- Wood/stone processing, packaging industry, supply systems, handling, adjusting equipment, machine tools

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF130US




Example image

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. | | Copper index | | Weight | |
|---|---|---|---|---|---|---|---|---|
| | | [mm²] | [in.] | [mm] | [lbs/mft] | [kg/km] | [lbs/mft] | [kg/km] |
| **CF130US.05.02** | 20 | 2 x 0.5 | 0.26 | 6.7 | 6.7 | 10 | 22.2 | 33 |
| **CF130US.05.03** | 20 | 3 G 0.5 | 0.28 | 7.1 | 10.1 | 15 | 34.9 | 52 |
| **CF130US.05.04** | 20 | 4 G 0.5 | 0.31 | 7.9 | 12.8 | 19 | 49.1 | 73 |
| **CF130US.05.05** | 20 | 5 G 0.5 | 0.33 | 8.4 | 16.1 | 24 | 56.4 | 84 |
| **CF130US.05.07** | 20 | 7 G 0.5 | 0.38 | 9.7 | 22.2 | 33 | 72.6 | 108 |
| **CF130US.05.12** | 20 | 12 G 0.5 | 0.47 | 11.9 | 38.3 | 57 | 115.6 | 172 |
| **CF130US.05.18** | 20 | 18 G 0.5 | 0.55 | 14.0 | 57.8 | 86 | 161.9 | 241 |
| **CF130US.05.25** | 20 | 25 G 0.5 | 0.65 | 16.6 | 80.0 | 119 | 215.7 | 321 |
| **CF130US.07.04** | 18 | 4 G 0.75 | 0.33 | 8.3 | 20.2 | 30 | 59.1 | 88 |
| **CF130US.07.05** | 18 | 5 G 0.75 | 0.35 | 8.9 | 25.5 | 38 | 68.5 | 102 |
| **CF130US.07.07** | 18 | 7 G 0.75 | 0.40 | 10.2 | 35.6 | 53 | 88.7 | 132 |
| **CF130US.07.12** | 18 | 12 G 0.75 | 0.50 | 12.7 | 60.5 | 90 | 143.1 | 213 |
| **CF130US.07.18** | 18 | 18 G 0.75 | 0.58 | 14.7 | 91.4 | 136 | 202.9 | 302 |
| **CF130US.07.25** | 18 | 25 G 0.75 | 0.69 | 17.5 | 126.3 | 188 | 270.8 | 403 |
| **CF130US.15.03** | 16 | 3 G 1.5 | 0.33 | 8.4 | 24.2 | 36 | 59.8 | 89 |
| **CF130US.15.04** | 16 | 4 G 1.5 | 0.35 | 9.0 | 32.3 | 48 | 76.6 | 114 |
| **CF130US.15.05** | 16 | 5 G 1.5 | 0.39 | 9.8 | 40.3 | 60 | 88.7 | 132 |
| **CF130US.15.07** | 16 | 7 G 1.5 | 0.44 | 11.3 | 56.4 | 84 | 129.0 | 192 |
| **CF130US.15.10** | 16 | 10 G 1.5 | 0.56 | 14.2 | 80.6 | 120 | 184.1 | 274 |
| **CF130US.15.12** | 16 | 12 G 1.5 | 0.56 | 14.2 | 96.1 | 143 | 196.2 | 292 |
| **CF130US.15.18** | 16 | 18 G 1.5 | 0.65 | 16.4 | 144.5 | 215 | 282.9 | 421 |
| **CF130US.15.22** | 16 | 22 G 1.5 | 0.71 | 18.0 | 176.7 | 263 | 339.3 | 505 |
| **CF130US.15.25** | 16 | 25 G 1.5 | 0.76 | 19.4 | 200.2 | 298 | 389.7 | 580 |
| **CF130US.15.33** | 16 | 33 G 1.5 | 0.85 | 21.6 | 264.8 | 394 | 556.4 | 828 |
| **CF130US.25.04** | 14 | 4 G 2.5 | 0.39 | 9.8 | 51.7 | 77 | 101.5 | 151 |
| **CF130US.25.07** | 14 | 7 G 2.5 | 0.51 | 13.0 | 90.7 | 135 | 170.7 | 254 |
| **CF130US.25.10** | 14 | 10 G 2.5 | 0.63 | 16.0 | 127.7 | 190 | 223.8 | 333 |
| **CF130US.25.12** | 14 | 12 G 2.5 | 0.61 | 15.6 | 155.9 | 232 | 269.5 | 401 |
| **CF130US.40.04** | 12 | 4 G 4.0 | 0.49 | 12.4 | 79.3 | 118 | 149.2 | 222 |
| **CF130US.60.04** | 10 | 4 G 6.0 | 0.56 | 14.2 | 129.7 | 193 | 219.7 | 327 |
| **CF130US.60.05** | 10 | 5 G 6.0 | 0.61 | 15.5 | 162.6 | 242 | 261.4 | 389 |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



**Order example: CF130US.05.02 – To your desired length**

**CF130US chainflex® series .05 Code nominal cross section .02 Code Number of conductors**

Online order ▶ www.igus.com/CF130US

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF140US




Example image

**5,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**30 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame retardant
- UL Tray cable for exposed run (TC-ER)

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 7.5 x d |
| Temperature | e-chain® linear | +41 °F to +176 °F (+5 °C to +80 °C) |
| | flexible | +23 °F to +176 °F (-5 °C to +80 °C) |
| | fixed | -4 °F to +194 °F (-20 °C to +90 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported distances and low duty gliding applications up to 30ft (9m) |

## Cable structure

| | |
|---|---|
| Conductors | Finely stranded bundled bare copper wires. Designed in accordance with ASTM B174-95. |
| Conductor insulation | Mechanically high-quality, PVC/Nylon. |
| Conductor construction | Conductors concentrically layered with short pitch. |
| Color code | Black with white numbers, one green-yellow. ** |
| Inner jacket | Low-adhesion PVC. |
| Overall shield | Tinned copper braid.<br>65 % optical coverage |
| Outer jacket | Oil-resistant UV-resistant PVC, low-adhesion blend, adapted to the requirements of the energy chain®.<br>Color: Gray (similar to RAL 7001) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600 V |
| Test voltage | 3300 V |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium. |
| Oil resistance | Oil resistant (according to DIN EN 60811-2-1, DIN EN 50363-4-1, Class 4 |
| Flame resistance | CSA AWM: FT4 |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |

# Class 3.1.4.2

**Silicone-free**
Free from silicone which can affect paint adhesion (following PV3.10.7 – status 1992)

**PTFE-free**
This cable does not contain PTFE

**NFPA**
Following NFPA 79-2018, chapter 12.9

**UL/CSA**
For installation in accordance with all applicable sections of the National Electric Code.
Type **TC-ER-HL Tray** cable
**ER** = Exposed Run
**HL** = Hazardous Locations Per NEC Articles 501, 502, 503 & 505 permitted for use in **Class I and II**
**Divisions 1 and 2**, Zones 1 and 2 locations
**Direct Burial**
**Oil Resistant I**
**Type WTTC**: Wind Turbine Tray Cable
**Type MTW**: For installation in Accordance with all applicable sections of the National Electric Code.
**UL AWM** 2587 90°C 600V
**cUL**: Canadian Tray Cable CIC-TC FT4
**CSA AWM** I/II A/B 90°C 600V FT4
**CE**: In accordance with European Council Directive 73/23/EEC

**Lead-free**
2002/95/EC; Please reference the Design Section for more Information.

**CE**
Following 2014/35/EU

**Info**
In general these cables will offer continuous-flex performance in specific “Tray Cable” and “Machine Tool Wire” NEC compliant installations. The CF140US line is designed for use in 600V control and power applications. The oil-resistant jacket also passes the stringent 70,000 BTU UL and CSA Vertical Flame Tests. Not recommended for long travel / gliding applications.

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +23/+59 | 12 | 13 | 15 |
| +59/+140 | 10 | 12 | 13 |
| +140/+176 | 12 | 13 | 15 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

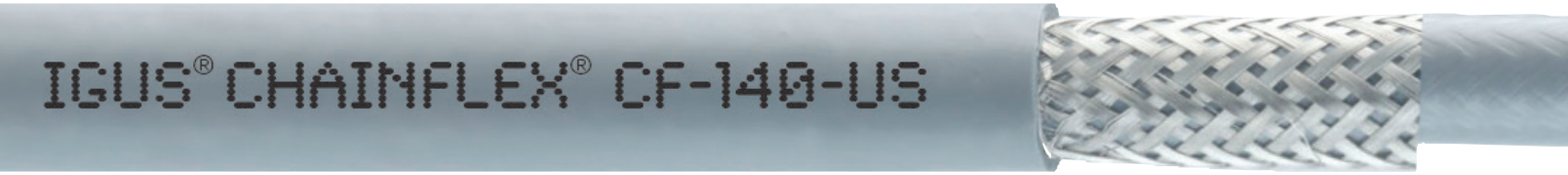
## Typical application areas

- For low duty flexing applications
- Suitable for indoor/outdoor applications
- Especially for unsupported travel distances and low-duty gliding applications up to 30 ft (9m)
- UL Tray cable for exposed run (TC-ER)
- Wood/stone processing, packaging industry, supply systems, handling, adjusting equipment, machine tools

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF140US




Example image

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. | | Copper index | | Weight | |
|---|---|---|---|---|---|---|---|---|
| | | [mm²] | [in.] | [mm] | [lbs/mft] | [kg/km] | [lbs/mft] | [kg/km] |
| **CF140US.05.02** | 20 | 2 x 0.5 | 0.35 | 8.8 | 14.8 | 22 | 55.1 | 82 |
| **CF140US.05.03** | 20 | 3 G 0.5 | 0.36 | 9.1 | 20.8 | 31 | 66.5 | 99 |
| **CF140US.05.04** | 20 | 4 G 0.5 | 0.39 | 9.9 | 24.9 | 37 | 74.6 | 111 |
| **CF140US.05.05** | 20 | 5 G 0.5 | 0.41 | 10.4 | 28.2 | 42 | 87.4 | 130 |
| **CF140US.05.07** | 20 | 7 G 0.5 | 0.46 | 11.7 | 37.6 | 56 | 108.2 | 161 |
| **CF140US.05.12** | 20 | 12 G 0.5 | 0.55 | 14.0 | 61.1 | 91 | 165.3 | 246 |
| **CF140US.05.18** | 20 | 18 G 0.5 | 0.63 | 16.1 | 84.0 | 125 | 219.1 | 326 |
| **CF140US.05.25** | 20 | 25 G 0.5 | 0.78 | 19.7 | 115.6 | 172 | 291.0 | 433 |
| **CF140US.07.04** | 18 | 4 G 0.75 | 0.40 | 10.2 | 32.3 | 48 | 88.7 | 132 |
| **CF140US.07.05** | 18 | 5 G 0.75 | 0.43 | 10.8 | 28.9 | 43 | 101.5 | 151 |
| **CF140US.07.07** | 18 | 7 G 0.75 | 0.48 | 12.2 | 51.1 | 76 | 127.0 | 189 |
| **CF140US.07.12** | 18 | 12 G 0.75 | 0.57 | 14.6 | 86.0 | 128 | 196.9 | 293 |
| **CF140US.07.18** | 18 | 18 G 0.75 | 0.66 | 16.8 | 123.0 | 183 | 267.4 | 398 |
| **CF140US.07.25** | 18 | 25 G 0.75 | 0.78 | 19.7 | 161.3 | 240 | 283.6 | 422 |
| **CF140US.15.03** | 16 | 3 G 1.5 | 0.41 | 10.3 | 37.0 | 55 | 92.7 | 138 |
| **CF140US.15.04** | 16 | 4 G 1.5 | 0.43 | 10.9 | 46.4 | 69 | 108.9 | 162 |
| **CF140US.15.05** | 16 | 5 G 1.5 | 0.46 | 11.7 | 63.2 | 94 | 125.0 | 186 |
| **CF140US.15.07** | 16 | 7 G 1.5 | 0.52 | 13.3 | 79.3 | 118 | 154.6 | 230 |
| **CF140US.15.12** | 16 | 12 G 1.5 | 0.64 | 16.3 | 118.9 | 177 | 250.0 | 372 |
| **CF140US.15.18** | 16 | 18 G 1.5 | 0.72 | 18.4 | 169.3 | 252 | 334.6 | 498 |
| **CF140US.15.22** | 16 | 22 G 1.5 | 0.76 | 19.2 | 203.6 | 303 | 385.7 | 574 |
| **CF140US.15.25** | 16 | 25 G 1.5 | 0.85 | 21.6 | 241.2 | 359 | 454.9 | 677 |
| **CF140US.15.33** | 16 | 33 G 1.5 | 0.93 | 23.5 | 307.1 | 457 | 578.6 | 861 |
| **CF140US.25.04** | 14 | 4 G 2.5 | 0.46 | 11.8 | 67.2 | 100 | 137.1 | 204 |
| **CF140US.25.07** | 14 | 7 G 2.5 | 0.59 | 14.9 | 110.9 | 165 | 217.7 | 324 |
| **CF140US.25.12** | 14 | 12 G 2.5 | 0.69 | 17.5 | 180.1 | 268 | 326.6 | 486 |
| **CF140US.25.18** | 14 | 18 G 2.5 | 0.79 | 20.0 | 200.2 | 298 | 350.4 | 522 |
| **CF140US.40.04** | 12 | 4 G 4.0 | 0.57 | 14.5 | 99.5 | 148 | 195.5 | 291 |
| **CF140US.60.04** | 10 | 4 G 6.0 | 0.64 | 16.3 | 155.2 | 231 | 270.1 | 402 |
| **CF140US.60.05** | 10 | 5 G 6.0 | 0.69 | 17.5 | 186.8 | 278 | 318.5 | 474 |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



**Order example: CF140US.05.02 – To your desired length**

**CF140US chainflex® series .05 Code nominal cross section .02 Code Number of conductors**

Online order ▶ www.igus.com/CF140US

Delivery time 24hrs or today.

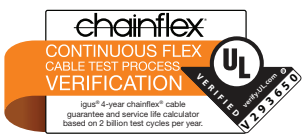
Delivery time means time until goods are shipped.










UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF130.UL




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**164.1 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 9.84 ft/s (3 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 |
| Torsion | | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | **24-22 AWG** Color code in accordance with DIN 47100. **20-4 AWG** Black with white numbers, one conductor green-yellow. |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Color: Gray (similar to RAL 7001) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the outer jacket Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3) 300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | ≥ 1312 ft | |
| Oil resistance | none | **1** | 2 | 3 | 4 | highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | | |

# Class 4.4.1.2

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF130UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1 |
| **CE** | Following 2014/35/EU |

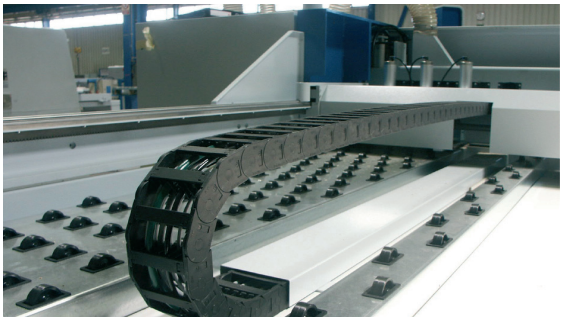
## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +59/+140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |
| +140/+158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 164 ft (50 m), Class 4
- Without influence of oil, Class 1
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment



chainflex® CF130.UL for woodworking. e-chain®: E4/light

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF130.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF130.02.03.UL** | 24 | 3 x 0.25 | 0.20 (5.0) | 6.0 (9) | 17.5 (26) |
| **CF130.02.04.UL** | 24 | 4 x 0.25 | 0.22 (5.5) | 7.4 (11) | 23.5 (35) |
| **CF130.02.06.UL** | 24 | 6 x 0.25 | 0.24 (6.0) | 10.8 (16) | 32.3 (48) |
| **CF130.02.07.UL** | 24 | 7 x 0.25 | 0.26 (6.5) | 12.8 (19) | 37.6 (56) |
| **CF130.02.12.UL** | 24 | 12 x 0.25 | 0.33 (8.5) | 22.2 (33) | 64.5 (96) |
| **CF130.02.18.UL** | 24 | 18 G 0.25 | 0.39 (10.0) | 30.9 (46) | 82.7 (123) |
| **CF130.02.20.UL** | 24 | 20 x 0.25 | 0.41 (10.5) | 34.3 (51) | 97.4 (145) |
| **CF130.02.25.UL** | 24 | 25 x 0.25 | 0.45 (11.5) | 44.3 (66) | 110.2 (164) |
| **CF130.02.30.UL** | 24 | 30 x 0.25 | 0.49 (12.5) | 50.4 (75) | 126.3 (188) |
| **CF130.03.02.UL** | 22 | 2 x 0.34 | 0.20 (5.0) | 5.4 (8) | 18.1 (27) |
| **CF130.03.05.UL** | 22 | 5 x 0.34 | 0.24 (6.0) | 12.1 (18) | 28.2 (42) |
| **CF130.05.02.UL** | 20 | 2 x 0.5 | 0.22 (5.5) | 7.4 (11) | 25.5 (38) |
| **CF130.05.03.UL** | 20 | 3 G 0.5 | 0.22 (5.5) | 10.8 (16) | 26.9 (40) |
| **CF130.05.04.UL** | 20 | 4 G 0.5 | 0.24 (6.0) | 14.1 (21) | 31.6 (47) |
| **CF130.05.05.UL** | 20 | 5 G 0.5 | 0.26 (6.5) | 17.5 (26) | 37.6 (56) |
| **CF130.05.07.UL** | 20 | 7 G 0.5 | 0.30 (7.5) | 24.9 (37) | 51.1 (76) |
| **CF130.05.12.UL** | 20 | 12 G 0.5 | 0.39 (10.0) | 42.3 (63) | 94.1 (140) |
| **CF130.05.18.UL** | 20 | 18 G 0.5 | 0.47 (12.0) | 63.2 (94) | 129.0 (192) |
| **CF130.05.25.UL** | 20 | 25 G 0.5 | 0.53 (13.5) | 86.7 (129) | 174.0 (259) |
| **CF130.07.02.UL** | 18 | 2 x 0.75 | 0.24 (6.0) | 10.8 (16) | 32.3 (48) |
| **CF130.07.03.UL** | 18 | 3 G 0.75 | 0.24 (6.0) | 15.5 (23) | 33.6 (50) |
| **CF130.07.04.UL** | 18 | 4 G 0.75 | 0.26 (6.5) | 20.8 (31) | 40.3 (60) |
| **CF130.07.05.UL** | 18 | 5 G 0.75 | 0.28 (7.0) | 25.5 (38) | 47.0 (70) |
| **CF130.07.07.UL** | 18 | 7 G 0.75 | 0.31 (8.0) | 36.3 (54) | 64.5 (96) |
| **CF130.07.12.UL** | 18 | 12 G 0.75 | 0.43 (11.0) | 61.1 (91) | 117.6 (175) |
| **CF130.07.18.UL** | 18 | 18 G 0.75 | 0.53 (13.5) | 90.0 (134) | 166.6 (248) |
| **CF130.07.25.UL** | 18 | 25 G 0.75 | 0.63 (16.0) | 125.0 (186) | 232.5 (346) |
| **CF130.07.36.UL** | 18 | 36 G 0.75 | 0.75 (19.0) | 196.9 (293) | 356.8 (531) |
| **CF130.07.42.UL** | 18 | 42 G 0.75 | 0.83 (21.0) | 229.1 (341) | 408.6 (608) |
| **CF130.10.02.UL** | 17 | 2 x 1.0 | 0.24 (6.0) | 14.1 (21) | 37.0 (55) |
| **CF130.10.03.UL** | 17 | 3 G 1.0 | 0.26 (6.5) | 20.8 (31) | 41.0 (61) |
| **CF130.10.04.UL** | 17 | 4 G 1.0 | 0.28 (7.0) | 27.6 (41) | 49.7 (74) |
| **CF130.10.05.UL** | 17 | 5 G 1.0 | 0.30 (7.5) | 33.6 (50) | 58.5 (87) |
| **CF130.10.07.UL** | 17 | 7 G 1.0 | 0.35 (9.0) | 47.7 (71) | 79.3 (118) |
| **CF130.10.12.UL** | 17 | 12 G 1.0 | 0.49 (12.5) | 80.6 (120) | 153.2 (228) |
| **CF130.10.18.UL** | 17 | 18 G 1.0 | 0.59 (15.0) | 120.3 (179) | 207.0 (308) |
| **CF130.10.25.UL** | 17 | 25 G 1.0 | 0.69 (17.5) | 166.6 (248) | 275.5 (410) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.1.2

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | ±360° |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF130.15.02.UL | 16 | 2 x 1.5 | 0.26 (6.5) | 20.8 (31.0) | 47.7 (71.0) |
| CF130.15.03.UL | 16 | 3 G 1.5 | 0.28 (7.0) | 30.9 (46.0) | 51.1 (76.0) |
| CF130.15.04.UL | 16 | 4 G 1.5 | 0.31 (8.0) | 41.0 (61.0) | 62.5 (93.0) |
| CF130.15.05.UL | 16 | 5 G 1.5 | 0.33 (8.5) | 50.4 (75.0) | 74.6 (111.0) |
| CF130.15.07.UL [17)] | 16 | 7 G 1.5 | 0.41 (10.5) | 70.6 (105.0) | 111.5 (166.0) |
| CF130.15.12.UL | 16 | 12 G 1.5 | 0.51 (13.0) | 120.3 (179.0) | 193.5 (288.0) |
| CF130.15.18.UL | 16 | 18 G 1.5 | 0.67 (17.0) | 180.1 (268.0) | 294.3 (438.0) |
| CF130.15.25.UL | 16 | 25 G 1.5 | 0.77 (19.5) | 249.3 (371.0) | 378.3 (563.0) |
| CF130.15.36.UL | 16 | 36 G 1.5 | 0.91 (23.0) | 389.1 (579.0) | 596.0 (887.0) |
| CF130.25.03.UL | 14 | 3 G 2.5 | 0.33 (8.5) | 50.4 (75.0) | 79.3 (118.0) |
| CF130.25.04.UL | 14 | 4 G 2.5 | 0.37 (9.5) | 67.2 (100.0) | 100.1 (149.0) |
| CF130.25.07.UL [17)] | 14 | 7 G 2.5 | 0.47 (12.0) | 116.9 (174.0) | 168.0 (250.0) |
| CF130.25.12.UL | 14 | 12 G 2.5 | 0.65 (16.5) | 199.6 (297.0) | 299.0 (445.0) |
| CF130.40.03.UL | 12 | 3 G 4.0 | 0.39 (10.0) | 80.0 (119.0) | 140.4 (209.0) |
| New CF130.40.04.UL | 12 | 4 G 4.0 | 0.43 (11.0) | 106.8 (159.0) | 164.6 (245.0) |
| CF130.40.05.UL | 12 | 5 G 4.0 | 0.47 (12.0) | 133.0 (198.0) | 197.6 (294.0) |
| CF130.60.04.UL | 10 | 4 G 6.0 | 0.51 (13.0) | 159.3 (237.0) | 263.4 (392.0) |
| CF130.60.05.UL | 10 | 5 G 6.0 | 0.55 (14.0) | 200.9 (299.0) | 316.5 (471.0) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF140.UL




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**164.1 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 9.84 ft/s (3 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| a max. | 65.6 ft/s² (20 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | **24-22 AWG** Color code in accordance with DIN 47100. **20-4 AWG** Black with white numbers, one conductor green-yellow. |
| Inner jacket | PVC mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Bending-resistant tinned copper braid. 80 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Color: Gray (similar to RAL 7001) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3) 300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | ≥ 1312 ft | |
| Oil resistance | none | **1** | 2 | 3 | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 4.4.1.1

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF140UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF130.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +59/+140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |
| +140/+158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 164 ft (50 m), Class 4
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF140.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | CF140.02.12.UL | 24 | 12xG 0.25 | 0.41 (10.5) | 48.4 (72) | 89.4 (133) |
| | CF140.03.05.UL | 22 | 5 x 0.34 | 0.30 (7.5) | 24.2 (36) | 48.4 (72) |
| | CF140.05.03.UL | 20 | 3 G 0.5 | 0.28 (7.0) | 22.2 (33) | 48.4 (72) |
| New | CF140.05.04.UL | 20 | 4 G 0.5 | 0.30 (7.5) | 25.5 (38) | 54.4 (81) |
| | CF140.05.05.UL | 20 | 5 G 0.5 | 0.31 (8.0) | 30.2 (45) | 61.1 (91) |
| | CF140.05.18.UL | 20 | 18 G 0.5 | 0.57 (14.5) | 98.8 (147) | 173.4 (258) |
| | CF140.05.36.UL | 20 | 36 G 0.5 | 0.73 (18.5) | 173.4 (258) | 314.5 (468) |
| | CF140.07.03.UL | 18 | 3 G 0.75 | 0.31 (8.0) | 28.2 (42) | 57.1 (85) |
| | CF140.07.04.UL | 18 | 4 G 0.75 | 0.33 (8.5) | 34.3 (51) | 68.5 (102) |
| | CF140.07.05.UL | 18 | 5 G 0.75 | 0.35 (9.0) | 41.0 (61) | 77.3 (115) |
| | CF140.07.07.UL | 18 | 7 G 0.75 | 0.39 (10.0) | 55.8 (83) | 102.1 (152) |
| | CF140.07.12.UL | 18 | 12 G 0.75 | 0.51 (13.0) | 91.4 (136) | 176.7 (263) |
| | CF140.07.18.UL | 18 | 18 G 0.75 | 0.61 (15.5) | 130.4 (194) | 241.2 (359) |
| | CF140.07.25.UL | 18 | 25 G 0.75 | 0.71 (18.0) | 175.4 (261) | 321.9 (479) |
| | CF140.10.02.UL | 17 | 2 x 1.0 | 0.31 (8.0) | 23.5 (35) | 57.8 (86) |
| | CF140.10.03.UL | 17 | 3 G 1.0 | 0.33 (8.5) | 34.3 (51) | 70.6 (105) |
| | CF140.10.04.UL | 17 | 4 G 1.0 | 0.35 (9.0) | 41.7 (62) | 79.3 (118) |
| | CF140.10.05.UL | 17 | 5 G 1.0 | 0.37 (9.5) | 49.7 (74) | 91.4 (136) |
| | CF140.10.07.UL | 17 | 7 G 1.0 | 0.41 (10.5) | 69.9 (104) | 118.3 (176) |
| | CF140.10.12.UL | 17 | 12 G 1.0 | 0.55 (14.0) | 111.5 (166) | 201.6 (300) |
| | CF140.10.18.UL | 17 | 18 G 1.0 | 0.65 (16.5) | 161.3 (240) | 277.5 (413) |
| | CF140.10.25.UL | 17 | 25 G 1.0 | 0.77 (19.5) | 218.4 (325) | 377.6 (562) |
| | CF140.15.03.UL | 16 | 3 G 1.5 | 0.35 (9.0) | 45.7 (68) | 84.7 (126) |
| | CF140.15.04.UL | 16 | 4 G 1.5 | 0.37 (9.5) | 57.8 (86) | 98.1 (146) |
| | CF140.15.05.UL | 16 | 5 G 1.5 | 0.37 (9.5) | 72.6 (108) | 112.9 (168) |
| | CF140.15.07.UL [17)] | 16 | 7 G 1.5 | 0.45 (11.5) | 96.8 (144) | 151.9 (226) |
| | CF140.15.12.UL | 16 | 12 G 1.5 | 0.63 (16.0) | 156.6 (233) | 260.1 (387) |
| | CF140.15.18.UL | 16 | 18 G 1.5 | 0.75 (19.0) | 232.5 (346) | 311.1 (463) |
| | CF140.15.25.UL | 16 | 25 G 1.5 | 0.89 (22.5) | 311.8 (464) | 495.2 (737) |
| | CF140.15.36.UL | 16 | 36 G 1.5 | 1.04 (26.5) | 445.5 (663) | 772.8 (1150) |
| | CF140.25.03.UL | 14 | 3 G 2.5 | 0.41 (10.5) | 71.2 (106) | 135.7 (202) |
| | CF140.25.04.UL | 14 | 4 G 2.5 | 0.45 (11.5) | 94.1 (140) | 141.1 (210) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

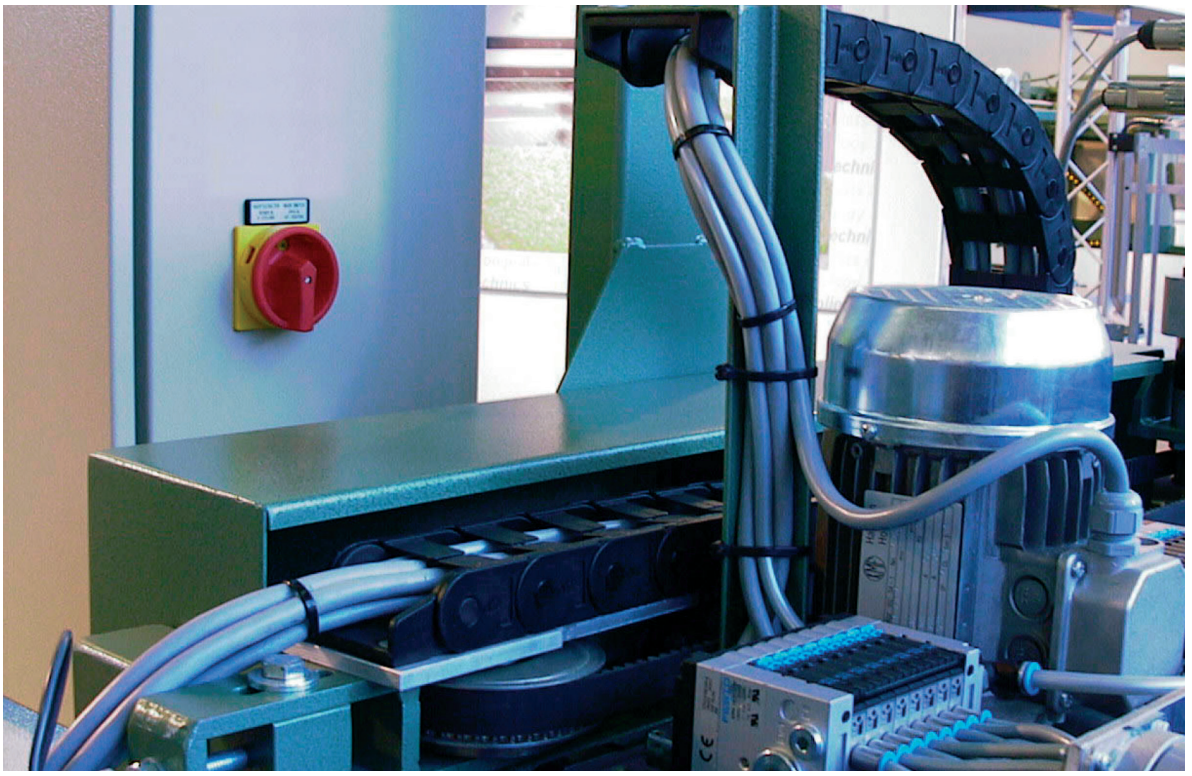
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.1.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |





chainflex® CF140.UL in a feeder application. e-chain®: easychain®




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED E233650 igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF150.UL




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**164.1 ft** Travel distance

- For medium duty applications
- PVC outer jacket
- Oil-resistant
- Flame-retardant
- TC-ER (Power and Control Tray Cable)
- UL-listed

| UL | CSA: |
|---|---|
| TC-ER UL 1277 | C(UL) CIC/TC |
| MTW UL 1063 | |
| WTTC UL 2277 | **Specifications:** |
| DP-1 UL 1690 | OIL RES I / SUN RES |
| AWM 2587 | 75°C wet ≥2.5mm² |
| | 90°C dry |
| | DIR BUR ≥2.5mm² |

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| **v max.** | **unsupported** | 9.84 ft/s (3 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| **a max.** | 65.6 ft/s² (20 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 | |
| **Torsion** | Torsion ±90°, with 1m cable length, Class 2 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Finely stranded conductor consisting of bare copper wires (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality PVC/PA mixture. |
| **Conductor construction** | **Number of conductors < 12:** Cores wound in a layer with short pitch length. **Number of conductors ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength center element, all with optimized short pitch lengths and directions. Especially low-torsion structure. |
| **Color code** | Black conductors with white numbers, one green-yellow core. |
| **Outer jacket** | Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1)<br>Color: jet black (similar to RAL 9005) |
| **CFRIP®** | Strip cables faster: a tear strip is molded into the outer jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3)<br>600V TC-ER, 1000V WTTC, 600V MTW, 600V AWM |
| **Testing voltage** | 2,000V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.2.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil resistant (according to DIN EN 50363-4-1), UL Oil Res I, Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame, FT4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL-listed** | TC-ER UL 1277, WTTC UL 2277, MTW UL W63 |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF150UL |
| **NEC** | In accordance with Article 501 Part II 501.10(B) Class I Division 2 and Article 502 Part II 502.10(B), TC-ER cables may be used in Class I and Class II, Division 2 hazardous areas. |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +59/+140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |
| +140/+158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 164 ft for gliding applications, Class 4
- Light oil influence, Class 2
- Torsion ±90°, with 1m cable length, Class 2
- Preferably indoor applications, but also outdoor ones at temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, laying of cables on cable trays

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF150.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | CF150.UL.10.03 | 17 | 3 G 1.0 | 0.31 (8.0) | 20.2 (30) | 52.4 (78) |
| | CF150.UL.10.04 | 17 | 4 G 1.0 | 0.33 (8.5) | 26.9 (40) | 63.2 (94) |
| | CF150.UL.10.05 | 17 | 5 G 1.0 | 0.35 (9.0) | 33.6 (50) | 75.3 (112) |
| | CF150.UL.10.07 | 17 | 7 G 1.0 | 0.41 (10.5) | 47.0 (70) | 104.2 (155) |
| | CF150.UL.10.12 | 17 | 12 G 1.0 | 0.59 (15.0) | 80.0 (119) | 188.8 (281) |
| | CF150.UL.10.18 | 17 | 18 G 1.0 | 0.75 (19.0) | 119.6 (178) | 285.6 (425) |
| | CF150.UL.15.03 | 16 | 3 G 1.5 | 0.33 (8.5) | 30.2 (45) | 65.9 (98) |
| | CF150.UL.15.04 | 16 | 4 G 1.5 | 0.35 (9.0) | 40.3 (60) | 82.0 (122) |
| | CF150.UL.15.05 | 16 | 5 G 1.5 | 0.39 (10.0) | 50.4 (75) | 99.5 (148) |
| | CF150.UL.15.07 [17)] | 16 | 7 G 1.5 | 0.47 (12.0) | 69.9 (104) | 137.8 (205) |
| | CF150.UL.15.12 | 16 | 12 G 1.5 | 0.65 (16.5) | 119.6 (178) | 245.3 (365) |
| | CF150.UL.15.18 | 16 | 18 G 1.5 | 0.83 (21.0) | 179.4 (267) | 355.5 (529) |
| New | CF150.UL.15.25 | 16 | 25 G 1.5 | 0.96 (24.5) | 249.3 (371) | 501.3 (746) |
| | CF150.UL.25.03 | 14 | 3 G 2.5 | 0.37 (9.5) | 50.4 (75) | 89.4 (133) |
| | CF150.UL.25.04 | 14 | 4 G 2.5 | 0.39 (10.0) | 67.2 (100) | 110.2 (164) |
| | CF150.UL.25.05 | 14 | 5 G 2.5 | 0.43 (11.0) | 83.3 (124) | 134.4 (200) |
| | CF150.UL.25.07 [17)] | 14 | 7 G 2.5 | 0.53 (13.5) | 116.3 (173) | 195.5 (291) |
| | CF150.UL.25.12 | 14 | 12 G 2.5 | 0.73 (18.5) | 199.6 (297) | 337.3 (502) |
| | CF150.UL.25.18 | 14 | 18 G 2.5 | 0.96 (24.5) | 299.0 (445) | 543.0 (808) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

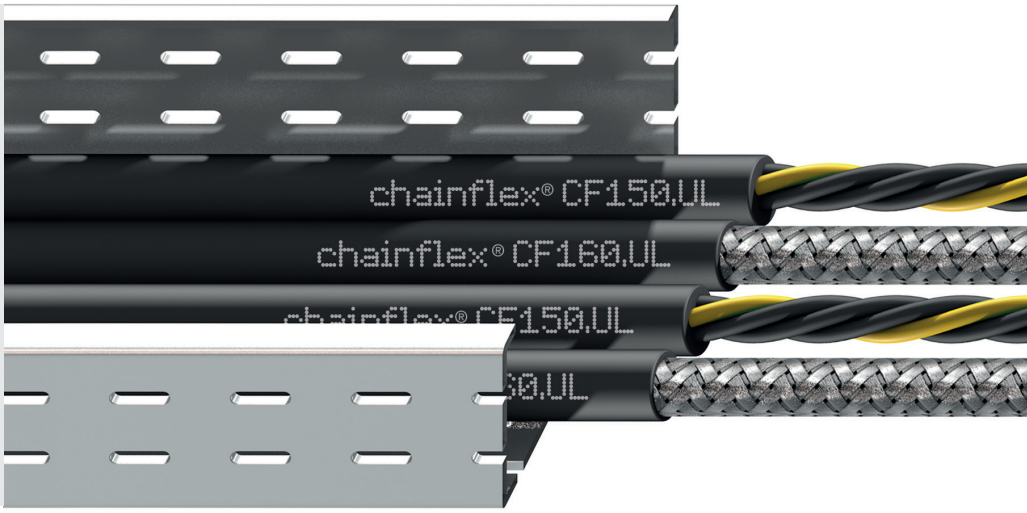
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

## The only* UL-listed MTW/TC-ER cable for e-chain® AND cable tray

**UL**
TC-ER UL 1277
MTW UL 1063
WTTC UL 2277
DP-1 UL 1690
AWM 2587

**CSA:**
C(UL) CIC/TC

**Specifications:**
OIL RES I / SUN RES
75°C wet ≥2.5mm²
90°C dry
DIR BUR ≥2.5mm²




* with guaranteed service life for use in e-chains® according to the guarantee conditions

# Class 4.4.2.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



**Order example: CF150.UL.10.03 - To your required length**

CF150.UL chainflex® series .10 Code nominal cross section .03 Code Number of conductors

Order online ▶ www.igus.com/CF150UL

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case



Control cable | PVC outer jacket

# chainflex® CF160.UL




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**164.1 ft** Travel distance

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- TC-ER (Power and Control Tray Cable)
- UL-listed

| UL | CSA: |
|---|---|
| TC-ER UL 1277 | C(UL) CIC/TC |
| MTW UL 1063 | |
| WTTC UL 2277 | **Specifications:** |
| DP-1 UL 1690 | OIL RES I / SUN RES |
| AWM 2587 | 75°C wet ≥ 2.5mm² |
| | 90°C dry |
| | DIR BUR ≥2.5mm² |

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| **v max.** | **unsupported** | 9.84 ft/s (3 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| **a max.** | 65.6 ft/s² (20 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Finely stranded conductor consisting of bare copper wires (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality PVC/PA mixture. |
| **Conductor construction** | **Number of conductors < 12:** Cores wound in a layer with short pitch length. **Number of conductors ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength center element, all with optimized short pitch lengths and directions. Especially low-torsion structure. |
| **Color code** | Black cores with white numbers, one green-yellow core. |
| **Inner jacket** | PVC mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80% |
| **Outer jacket** | Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1) Color: jet black (similar to RAL 9005) |
| **CFRIP®** | Strip cables faster: a tear strip is molded into the inner jacket Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3) 600V TC-ER, 1000V WTTC, 600V MTW, 600V AWM |
| **Testing voltage** | 2,000V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | **2** | 3 | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 4.4.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil resistant (according to DIN EN 50363-4-1), UL Oil Res I, Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame, FT4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL-listed** | TC-ER UL 1277, WTTC UL 2277, MTW UL W63 |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF160UL |
| **NEC** | In accordance with Article 501 Part II 501.10(B) Class I Division 2 and Article 502 Part II 502.10(B), TC-ER cables may be used in Class I and Class II, Division 2 hazardous areas. |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +59/+140 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |
| +140/+158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 164.1 ft (50m) for gliding applications, Class 4
- Light oil influence, Class 2
- Preferably indoor applications, but also outdoor ones at temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, laying of cables on cable trays

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF160.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF160.UL.10.03** | 17 | 3 G 1.0 | 0.37 (9.5) | 35.6 (53) | 81.3 (121) |
| **CF160.UL.10.04** | 17 | 4 G 1.0 | 0.39 (10.0) | 44.3 (66) | 96.1 (143) |
| **CF160.UL.10.05** | 17 | 5 G 1.0 | 0.43 (11.0) | 51.7 (77) | 110.2 (164) |
| **CF160.UL.10.07** | 17 | 7 G 1.0 | 0.49 (12.5) | 71.9 (107) | 147.8 (220) |
| **CF160.UL.10.12** | 17 | 12 G 1.0 | 0.73 (18.5) | 118.9 (177) | 261.4 (389) |
| **CF160.UL.10.18** | 17 | 18 G 1.0 | 0.93 (23.5) | 188.2 (280) | 435.4 (648) |
| **CF160.UL.15.03** | 16 | 3 G 1.5 | 0.39 (10.0) | 48.4 (72) | 100.1 (149) |
| **CF160.UL.15.04** | 16 | 4 G 1.5 | 0.43 (11.0) | 59.8 (89) | 117.6 (175) |
| **CF160.UL.15.05** | 16 | 5 G 1.5 | 0.47 (12.0) | 70.6 (105) | 137.1 (204) |
| **CF160.UL.15.07** [17)] | 16 | 7 G 1.5 | 0.53 (13.5) | 94.1 (140) | 182.1 (271) |
| **CF160.UL.15.12** | 16 | 12 G1.5 | 0.79 (20.0) | 163.3 (243) | 321.2 (478) |
| **CF160.UL.15.18** | 16 | 18 G 1.5 | 1.00 (25.5) | 250.6 (373) | 512.0 (762) |
| **CF160.UL.25.03** | 14 | 3 G 2.5 | 0.43 (11.0) | 69.2 (103) | 124.3 (185) |
| **CF160.UL.25.04** | 14 | 4 G 2.5 | 0.47 (12.0) | 86.7 (129) | 147.2 (219) |
| **CF160.UL.25.05** | 14 | 5 G 2.5 | 0.51 (13.0) | 106.8 (159) | 177.4 (264) |
| **CF160.UL.25.07** [17)] | 14 | 7 G 2.5 | 0.57 (14.5) | 149.8 (223) | 242.6 (361) |
| **CF160.UL.25.12** | 14 | 12 G 2.5 | 0.93 (23.5) | 261.4 (389) | 462.3 (688) |
| **CF160.UL.25.18** | 14 | 18 G 2.5 | 1.16 (29.5) | 385.0 (573) | 733.8 (1092) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

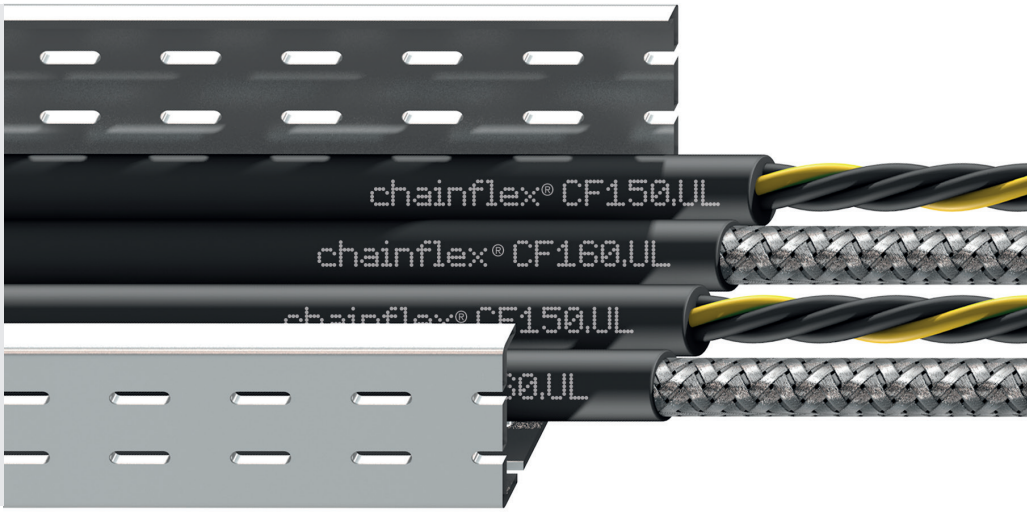
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

## The only* UL-listed MTW/TC-ER cable for e-chain® AND cable tray

**UL**
TC-ER UL 1277
MTW UL 1063
WTTC UL 2277
DP-1 UL 1690
AWM 2587

**CSA:**
C(UL) CIC/TC

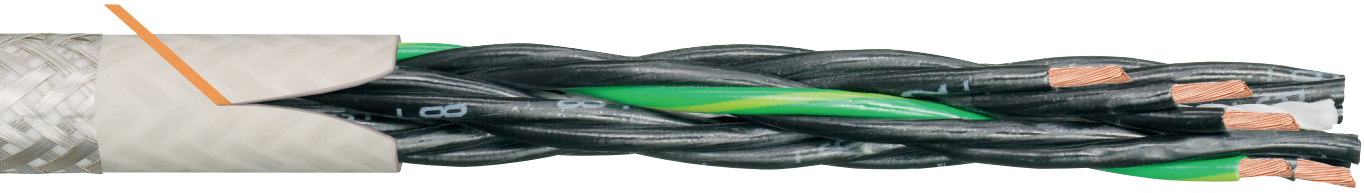
**Specifications:**
OIL RES I / SUN RES
75°C wet ≥2.5mm²
90°C dry
DIR BUR ≥2.5mm²




* with guaranteed service life for use in e-chains® according to the guarantee conditions

# Class 4.4.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



**Order example: CF160.UL.10.03 - To your required length**

CF160.UL chainflex® series .10 Code nominal cross section .03 Code Number of conductors

Order online ▶ www.igus.com/CF160UL

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

chainflex CASE

## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case



Control cable | PVC outer jacket

# chainflex® CF5




Example image

**10,000,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PVC outer jacket
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 6.8 x d |
| | **flexible** | min. 5 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |
| Torsion | | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | **Cores ≥ 20 AWG:** Mechanically high-quality TPE mixture.<br>**Cores ≤ 18 AWG:** Mechanically high-quality PVC mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length.<br>**Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | **24-22 AWG** Color code in accordance with DIN 47100.<br>**20-4 AWG** Black with white numbers, one conductor green-yellow. |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Green (similar to RAL 6005) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the outer jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>600V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | | |

# Class 5.5.2.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF5 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |
| +59/+140 | 6.8 | 7.5 | 7.8 | 8.5 | 8.8 | 9.5 |
| +140/+158 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Light oil influence, Class 2
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF5

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF5.02.36** | 24 | 36 x 0.25 | 0.59 (15.0) | 66.5 (99) | 140.4 (209) |
| **CF5.03.15** | 22 | 15 x 0.34 | 0.43 (11.0) | 37.0 (55) | 75.9 (113) |
| **CF5.03.18** | 22 | 18 x 0.34 | 0.47 (12.0) | 45.0 (67) | 96.1 (143) |
| **CF5.03.25** | 22 | 25 x 0.34 | 0.55 (14.0) | 61.8 (92) | 130.4 (194) |
| **CF5.05.02** | 20 | 2 x 0.5 | 0.24 (6.0) | 7.4 (11) | 25.5 (38) |
| **CF5.05.03** | 20 | 3 G 0.5 | 0.24 (6.0) | 10.8 (16) | 27.6 (41) |
| **CF5.05.04** | 20 | 4 G 0.5 | 0.26 (6.5) | 14.1 (21) | 31.6 (47) |
| **CF5.05.05** | 20 | 5 G 0.5 | 0.28 (7.0) | 16.8 (25) | 39.6 (59) |
| **CF5.05.07** | 20 | 7 G 0.5 | 0.31 (8.0) | 24.2 (36) | 52.4 (78) |
| **CF5.05.12** | 20 | 12 G 0.5 | 0.43 (11.0) | 41.0 (61) | 88.0 (131) |
| **CF5.05.18** | 20 | 18 G 0.5 | 0.51 (13.0) | 61.1 (91) | 127.7 (190) |
| **CF5.05.25** | 20 | 25 G 0.5 | 0.63 (16.0) | 83.3 (124) | 188.8 (281) |
| **CF5.05.30** | 20 | 30 G 0.5 | 0.71 (18.0) | 100.1 (149) | 218.4 (325) |
| **CF5.07.03** | 18 | 3 G 0.75 | 0.26 (6.5) | 15.5 (23) | 36.3 (54) |
| **CF5.07.04** | 18 | 4 G 0.75 | 0.28 (7.0) | 21.5 (32) | 45.0 (67) |
| **CF5.07.05** | 18 | 5 G 0.75 | 0.30 (7.5) | 26.2 (39) | 55.1 (82) |
| **CF5.07.07** | 18 | 7 G 0.75 | 0.35 (9.0) | 37.6 (56) | 77.3 (115) |
| **CF5.07.12** | 18 | 12 G 0.75 | 0.49 (12.5) | 61.1 (91) | 127.0 (189) |
| **CF5.07.18** | 18 | 18 G 0.75 | 0.59 (15.0) | 90.0 (134) | 180.8 (269) |
| **CF5.07.25** | 18 | 25 G 0.75 | 0.69 (17.5) | 127.7 (190) | 258.0 (384) |
| **CF5.07.36** | 18 | 36 G 0.75 | 0.87 (22.0) | 179.4 (267) | 394.4 (587) |
| **CF5.07.42** | 18 | 42 G 0.75 | 0.93 (23.5) | 210.3 (313) | 500.6 (745) |
| **CF5.10.03** | 17 | 3 G 1.0 | 0.26 (6.5) | 20.8 (31) | 37.6 (56) |
| **CF5.10.04** | 17 | 4 G 1.0 | 0.28 (7.0) | 27.6 (41) | 52.4 (78) |
| **CF5.10.05** | 17 | 5 G 1.0 | 0.31 (8.0) | 33.6 (50) | 63.2 (94) |
| **CF5.10.07** | 17 | 7 G 1.0 | 0.37 (9.5) | 49.7 (74) | 87.4 (130) |
| **CF5.10.12** | 17 | 12 G 1.0 | 0.51 (13.0) | 80.0 (119) | 152.5 (227) |
| **CF5.10.18** | 17 | 18 G 1.0 | 0.65 (16.5) | 120.3 (179) | 205.6 (306) |
| **CF5.10.25** | 17 | 25 G 1.0 | 0.77 (19.5) | 166.6 (248) | 327.2 (487) |
| **CF5.15.03** | 16 | 3 G 1.5 | 0.30 (7.5) | 30.9 (46) | 49.7 (74) |
| **CF5.15.04** | 16 | 4 G 1.5 | 0.31 (8.0) | 41.0 (61) | 70.6 (105) |
| **CF5.15.05** | 16 | 5 G 1.5 | 0.35 (9.0) | 50.4 (75) | 85.3 (127) |
| **CF5.15.07** [17)] | 16 | 7 G 1.5 | 0.41 (10.5) | 70.6 (105) | 121.0 (180) |
| **CF5.15.12** | 16 | 12 G 1.5 | 0.59 (15.0) | 120.3 (179) | 177.4 (264) |
| **CF5.15.18** | 16 | 18 G 1.5 | 0.77 (19.5) | 179.4 (267) | 321.2 (478) |
| **CF5.15.25** | 16 | 25 G 1.5 | 0.85 (21.5) | 249.3 (371) | 433.4 (645) |
| **CF5.15.36** | 16 | 36 G 1.5 | 1.04 (26.5) | 355.5 (529) | 645.1 (960) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF5.25.04** | 14 | 4G2.5 | 0.39 (10.0) | 64.5 (96.0) | 114.2 (170) |
| **CF5.25.05** | 14 | 5 G 2.5 | 0.43 (11.0) | 80.6 (120.0) | 134.4 (200.0) |
| **CF5.25.07** [17)] | 14 | 7 G 2.5 | 0.51 (13.0) | 113.6 (169.0) | 187.5 (279.0) |
| **CF5.25.12** | 14 | 12 G 2.5 | 0.73 (18.5) | 190.8 (284.0) | 322.5 (480.0) |
| **CF5.25.18** | 14 | 18 G 2.5 | 0.93 (23.5) | 286.9 (427.0) | 514.1 (765.0) |
| **CF5.25.25** | 14 | 25 G 2.5 | 1.08 (27.5) | 397.1 (591.0) | 708.3 (1054.0) |

17) When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case



chainflex® CF5/CF6 for storage retrieval unit: Long travel in longitudinal axis.
e-chain®: Series E4/00 with igus® guide trough made of steel

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF6



Example image

**10,000,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- Flame-retardant
- PVC outer jacket
- Shielded
- Oil-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 6.8 x d |
| | **flexible** | min. 5 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| a max. | 262.5 ft/s² (80 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | **24-20 AWG:** Mechanically high-quality TPE mixture.<br>**18-14 AWG:** Mechanically high-quality PVC mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length.<br>**Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | **24-22 AWG** Color code in accordance with DIN 47100.<br>**20-4 AWG** Black with white numbers, one conductor green-yellow. |
| Inner jacket | PVC mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Green (similar to RAL 6005) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>600V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | **2** | 3 | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 5.5.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |
| +59/+140 | 6.8 | 7.5 | 7.8 | 8.5 | 8.8 | 9.5 |
| +140/+158 | 7.5 | 10 | 8.5 | 11 | 9.5 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PVC outer jacket

# chainflex® CF6

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF6.02.04** | 24 | 4 x 0.25 | 0.28 (7.0) | 19.5 (29) | 41.0 (61) |
| **CF6.02.25** | 24 | 25 x 0.25 | 0.57 (14.5) | 74.6 (111) | 174.7 (260) |
| **CF6.03.05** | 22 | 5 x 0.34 | 0.30 (7.5) | 24.9 (37) | 60.5 (90) |
| **CF6.05.02** | 20 | 2 x 0.5 | 0.28 (7.0) | 20.2 (30) | 51.7 (77) |
| **CF6.05.05** | 20 | 5 G 0.5 | 0.33 (8.5) | 32.9 (49) | 71.2 (106) |
| **CF6.05.07** | 20 | 7 G 0.5 | 0.39 (10.0) | 43.0 (64) | 85.3 (127) |
| **CF6.05.09** | 20 | 9 G 0.5 | 0.47 (12.0) | 53.8 (80) | 103.5 (154) |
| **CF6.05.12** | 20 | 12 G 0.5 | 0.51 (13.0) | 65.9 (98) | 155.9 (232) |
| **CF6.05.18** | 20 | 18 G 0.5 | 0.59 (15.0) | 97.4 (145) | 192.2 (286) |
| **CF6.05.25** | 20 | 25 G 0.5 | 0.69 (17.5) | 129.0 (192) | 268.1 (399) |
| **CF6.07.03** | 18 | 3 G 0.75 | 0.31 (8.0) | 30.9 (46) | 65.9 (98) |
| **CF6.07.04** | 18 | 4 G 0.75 | 0.33 (8.5) | 37.6 (56) | 75.9 (113) |
| **CF6.07.05** | 18 | 5 G 0.75 | 0.35 (9.0) | 45.0 (67) | 86.0 (128) |
| **CF6.07.07** | 18 | 7 G 0.75 | 0.41 (10.5) | 58.5 (87) | 102.1 (152) |
| **CF6.07.12** | 18 | 12 G 0.75 | 0.55 (14.0) | 86.0 (128) | 178.7 (266) |
| **CF6.07.18** | 18 | 18 G 0.75 | 0.69 (17.5) | 131.7 (196) | 268.8 (400) |
| **CF6.07.25** | 18 | 25 G 0.75 | 0.77 (19.5) | 178.1 (265) | 360.2 (536) |
| **CF6.10.03** | 17 | 3 G 1.0 | 0.31 (8.0) | 36.3 (54) | 71.9 (107) |
| **CF6.10.04** | 17 | 4 G 1.0 | 0.35 (9.0) | 43.7 (65) | 77.9 (116) |
| **CF6.10.05** | 17 | 5 G 1.0 | 0.37 (9.5) | 51.7 (77) | 91.4 (136) |
| **CF6.10.07** | 17 | 7 G 1.0 | 0.47 (12.0) | 69.2 (103) | 137.8 (205) |
| **CF6.10.12** | 17 | 12 G 1.0 | 0.59 (15.0) | 108.2 (161) | 214.4 (319) |
| **CF6.10.18** | 17 | 18 G 1.0 | 0.75 (19.0) | 164.6 (245) | 323.9 (482) |
| **CF6.10.25** | 17 | 25 G 1.0 | 0.83 (21.0) | 216.4 (322) | 399.8 (595) |
| **CF6.15.03** | 16 | 3 G 1.5 | 0.35 (9.0) | 48.4 (72) | 82.0 (122) |
| **CF6.15.04** | 16 | 4 G 1.5 | 0.37 (9.5) | 59.1 (88) | 104.2 (155) |
| **CF6.15.05** | 16 | 5 G 1.5 | 0.41 (10.5) | 70.6 (105) | 118.9 (177) |
| **CF6.15.07** [17)] | 16 | 7 G 1.5 | 0.49 (12.5) | 98.1 (146) | 173.4 (258) |
| **CF6.15.12** | 16 | 12 G 1.5 | 0.67 (17.0) | 151.2 (225) | 252.0 (375) |
| **CF6.15.18** | 16 | 18 G 1.5 | 0.83 (21.0) | 231.8 (345) | 390.4 (581) |
| **CF6.15.25** | 16 | 25 G 1.5 | 0.94 (24.0) | 310.4 (462) | 581.3 (865) |
| **CF6.25.03** | 14 | 3 G 2.5 | 0.41 (10.5) | 71.9 (107) | 121.0 (180) |
| **CF6.25.04** | 14 | 4 G 2.5 | 0.45 (11.5) | 88.0 (131) | 149.2 (222) |

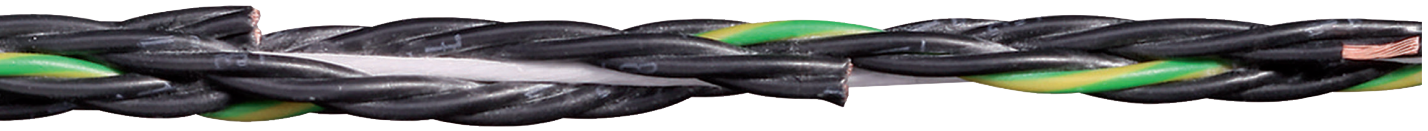
17) When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



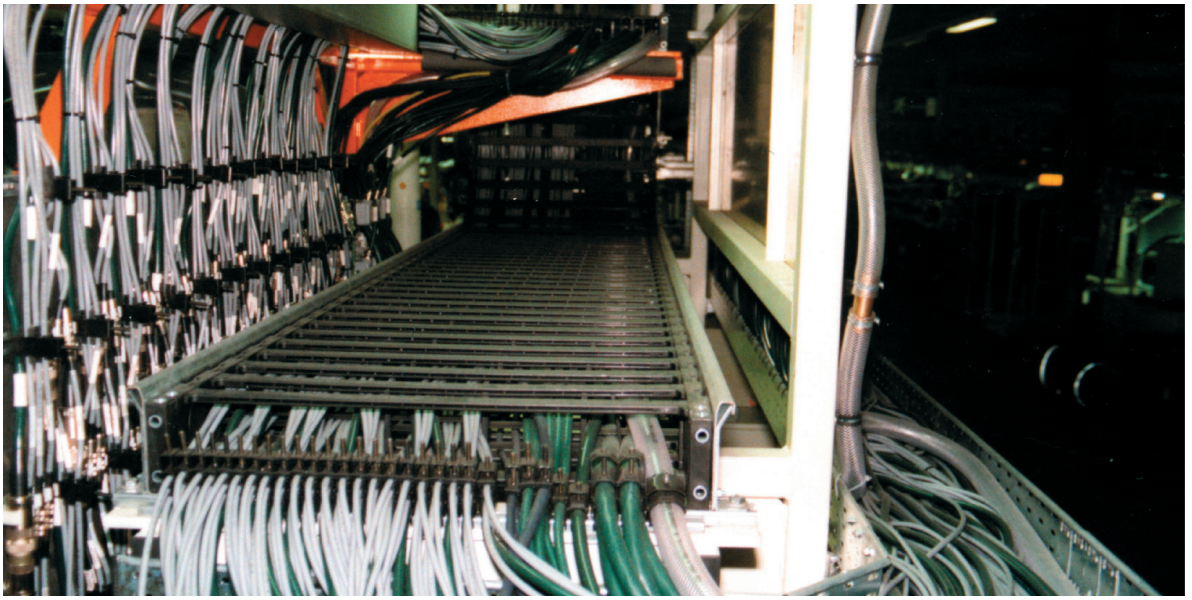
## Order example: CF6.02.04 - To your required length

**CF6 chainflex® series .02 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF6

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.



**chainflex® CF5 and CF6 Control cables (green) as well as CF211 measuring system cables (gray) in a screwing station of a car factory. e-chain®: System E4/00 with chainfix clip strain relief devices.**




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online: www.igus.com/cf-case**

**UL-verified chainflex® guarantee ... www.igus.com/ul-verified**

Control cable | PVC outer jacket

# chainflex® CFSOFT1




Example image

**20,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**16.4 ft** Travel distance e-chain®

- For heaviest duty applications and especially small radii down to 5 x d
- Highly flexible, soft design
- PVC outer jacket
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 5 x d |
| | flexible | min. 4 x d |
| | fixed | min. 3 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space, Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors cabled in one layer with especially short pitch length. |
| Color code | Color code in accordance with DIN 47100. |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium |
| Oil resistance | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 7.1.2.1

| | |
|---|---|
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSOFT1 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 10 million | 15 million | 20 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 6.8 | 7.5 | 8.5 |
| +59/+140 | 5 | 6 | 7 |
| +140/+158 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For heaviest duty applications and especially small radii down to 5 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 1
- Light oil influence, Class 2
- Especially soft cable design, for reduced forces
- Pick and place machines, Automatic doors, Cleanroom, very quick handling

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFSOFT1.02.03** | 24 | 3 x 0.25 | 0.22 (5.5) | 6.0 (9) | 18.8 (28) |
| **CFSOFT1.02.08** | 24 | 8 x 0.25 | 0.28 (7.0) | 14.1 (21) | 41.7 (62) |
| **CFSOFT1.03.04** | 22 | 4 x 0.34 | 0.24 (6.0) | 10.1 (15) | 26.2 (39) |
| **CFSOFT1.05.04** | 20 | 4 x 0.5 | 0.28 (7.0) | 14.1 (21) | 34.9 (52) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

Control cable | PVC outer jacket

# chainflex® CFSOFT2




Example image

**20,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**16.4 ft** Travel distance e-chain®

- For heaviest duty applications and especially small radii down to 5 x d
- Highly flexible, soft design
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 5 x d |
| | **flexible** | min. 4 x d |
| | **fixed** | min. 3 x d |
| **Temperature** | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | 262.5 ft/s² (80 m/s²) | |
| **Travel distance** | Short, very fast applications with small radii and restricted installation space, Class 1 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | Conductors cabled in one layer with especially short pitch length. |
| **Color code** | **24-22 AWG:** Color code in accordance with DIN 47100.<br>**20-18 AWG:** Black with white numbers, one conductor green-yellow. |
| **Intermediate layer** | polyester tape over external layer |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3)<br>300V (following UL) |
| **Test voltage** | 2000 V (following DIN EN 50395) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | **2** | 3 | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 7.1.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSOFT2 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 10 million | 15 million | 20 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 6.8 | 7.5 | 8.5 |
| +59/+140 | 5 | 6 | 7 |
| +140/+158 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For heaviest duty applications and especially small radii down to 5 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 1
- Light oil influence, Class 2
- Especially soft cable design, for reduced forces
- Pick and place machines, Automatic doors, Cleanroom, very quick handling

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFSOFT2.02.03** | 24 | 3 x 0.25 | 0.24 (6.0) | 11.4 (17) | 27.6 (41) |
| **CFSOFT2.02.08** | 24 | 8 x 0.25 | 0.30 (7.5) | 25.5 (38) | 57.8 (86) |
| **CFSOFT2.03.04** | 22 | 4 x 0.34 | 0.26 (6.5) | 16.1 (24) | 33.6 (50) |
| **CFSOFT2.05.04** | 20 | 4 x 0.5 | 0.30 (7.5) | 24.2 (36) | 53.8 (80) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Control cable | iguPUR outer jacket

# chainflex® CF890




Example image

**5,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 12.5 x d |
| | flexible | min. 10 x d |
| | fixed | min. 7 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow. |
| Outer jacket | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V<br>600V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF890 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 15 | 16 | 17 |
| +14/+158 | 12.5 | 13.5 | 14.5 |
| +158/+176 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | iguPUR outer jacket

# chainflex® CF890




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF890.05.02** | 20 | 2 x 0.5 | 0.20 (5.0) | 7.4 (11) | 20.2 (30) |
| **CF890.05.03** | 20 | 3 G 0.5 | 0.22 (5.5) | 10.8 (16) | 22.8 (34) |
| **CF890.05.04** | 20 | 4 G 0.5 | 0.24 (6.0) | 14.1 (21) | 29.6 (44) |
| **CF890.05.05** | 20 | 5 G 0.5 | 0.26 (6.5) | 17.5 (26) | 35.6 (53) |
| **CF890.05.07** | 20 | 7 G 0.5 | 0.30 (7.5) | 24.9 (37) | 47.0 (70) |
| **CF890.05.12** | 20 | 12 G 0.5 | 0.33 (8.5) | 42.3 (63) | 70.6 (105) |
| **CF890.05.18** | 20 | 18 G 0.5 | 0.39 (10.0) | 63.2 (94) | 104.2 (155) |
| **CF890.05.25** | 20 | 25 G 0.5 | 0.47 (12.0) | 86.0 (128) | 149.2 (222) |
| **CF890.07.02** | 18 | 2 x 0.75 | 0.22 (5.5) | 10.8 (16) | 25.5 (38) |
| **CF890.07.03** | 18 | 3 G 0.75 | 0.24 (6.0) | 16.1 (24) | 30.9 (46) |
| **CF890.07.04** | 18 | 4 G 0.75 | 0.26 (6.5) | 21.5 (32) | 39.0 (58) |
| **CF890.07.05** | 18 | 5 G 0.75 | 0.28 (7.0) | 26.9 (40) | 47.7 (71) |
| **CF890.07.07** | 18 | 7 G 0.75 | 0.31 (8.0) | 37.6 (56) | 64.5 (96) |
| **CF890.07.12** | 18 | 12 G 0.75 | 0.39 (10.0) | 63.2 (94) | 98.1 (146) |
| **CF890.07.18** | 18 | 18 G 0.75 | 0.45 (11.5) | 94.1 (140) | 108.9 (162) |
| **CF890.07.25** | 18 | 25 G 0.75 | 0.53 (13.5) | 130.4 (194) | 186.8 (278) |
| **CF890.10.02** | 17 | 2 x 1.0 | 0.24 (6.0) | 14.1 (21) | 30.9 (46) |
| **CF890.10.03** | 17 | 3 G 1.0 | 0.26 (6.5) | 21.5 (32) | 37.6 (56) |
| **CF890.10.04** | 17 | 4 G 1.0 | 0.28 (7.0) | 28.2 (42) | 39.0 (58) |
| **CF890.10.05** | 17 | 5 G 1.0 | 0.30 (7.5) | 34.9 (52) | 59.8 (89) |
| **CF890.10.07** | 17 | 7 G 1.0 | 0.33 (8.5) | 49.1 (73) | 78.6 (117) |
| **CF890.10.12** | 17 | 12 G 1.0 | 0.41 (10.5) | 83.3 (124) | 119.6 (178) |
| **CF890.10.18** | 17 | 18 G 1.0 | 0.49 (12.5) | 125.0 (186) | 183.4 (273) |
| **CF890.10.25** | 17 | 25 G 1.0 | 0.59 (15.0) | 173.4 (258) | 252.0 (375) |
| **CF890.15.02** | 16 | 2 x 1.5 | 0.26 (6.5) | 21.5 (32) | 41.7 (62) |
| **CF890.15.03** | 16 | 3 G 1.5 | 0.28 (7.0) | 31.6 (47) | 51.1 (76) |
| **CF890.15.04** | 16 | 4 G 1.5 | 0.30 (7.5) | 42.3 (63) | 65.2 (97) |
| **CF890.15.05** | 16 | 5 G 1.5 | 0.33 (8.5) | 52.4 (78) | 78.6 (117) |
| **CF890.15.07** | 16 | 7 G 1.5 | 0.39 (10.0) | 73.2 (109) | 109.5 (163) |
| **CF890.15.12** | 16 | 12 G 1.5 | 0.47 (12.0) | 125.0 (186) | 172.0 (256) |
| **CF890.15.18** | 16 | 18 G 1.5 | 0.57 (14.5) | 187.5 (279) | 243.3 (362) |
| **CF890.15.25** | 16 | 25 G 1.5 | 0.69 (17.5) | 260.1 (387) | 337.3 (502) |
| **CF890.25.03** | 14 | 3 G 2.5 | 0.33 (8.5) | 52.4 (78) | 91.4 (136) |
| **CF890.25.04** | 14 | 4 G 2.5 | 0.35 (9.0) | 69.2 (103) | 97.4 (145) |
| **CF890.25.05** | 14 | 5 G 2.5 | 0.39 (10.0) | 86.7 (129) | 117.6 (175) |
| **CF890.25.07** | 14 | 7 G 2.5 | 0.47 (12.0) | 121.6 (181) | 165.3 (246) |
| **CF890.25.12** | 14 | 12 G 2.5 | 0.59 (15.0) | 219.7 (327) | 274.2 (408) |
| **CF890.25.25** | 14 | 25 G 2.5 | 0.85 (21.5) | 428.7 (638) | 528.2 (786) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



## Order example: CF890.05.02 - To your required length

**CF890 chainflex® series .05 Code nominal cross section .02 Number of conductors**

Order online ▶ www.igus.com/CF890

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | iguPUR outer jacket

# chainflex® CF891




Example image

**5,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 12.5 x d |
| | flexible | min. 10 x d |
| | fixed | min. 7 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow. |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V<br>600V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF891 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 15 | 16 | 17 |
| +14/+158 | 12.5 | 13.5 | 14.5 |
| +158/+176 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | iguPUR outer jacket

# chainflex® CF891




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF891.05.02** | 20 | 2 x 0.5 | 0.24 (6.0) | 12.1 (18) | 24.9 (37) |
| **CF891.05.03** | 20 | 3 G 0.5 | 0.24 (6.0) | 18.8 (28) | 30.2 (45) |
| **CF891.05.05** | 20 | 5 G 0.5 | 0.28 (7.0) | 27.6 (41) | 41.7 (62) |
| **CF891.05.12** | 20 | 12 G 0.5 | 0.35 (9.0) | 61.1 (91) | 82.0 (122) |
| **CF891.05.18** | 20 | 18 G 0.5 | 0.43 (11.0) | 91.4 (136) | 116.9 (174) |
| **CF891.05.25** | 20 | 25 G 0.5 | 0.51 (13.0) | 141.1 (210) | 157.2 (234) |
| **CF891.07.02** | 18 | 2 x 0.75 | 0.26 (6.5) | 20.2 (30) | 32.3 (48) |
| **CF891.07.03** | 18 | 3 G 0.75 | 0.28 (7.0) | 24.9 (37) | 42.3 (63) |
| **CF891.07.04** | 18 | 4 G 0.75 | 0.30 (7.5) | 30.9 (46) | 45.7 (68) |
| **CF891.07.05** | 18 | 5 G 0.75 | 0.31 (8.0) | 41.0 (61) | 57.1 (85) |
| **CF891.07.07** | 18 | 7 G 0.75 | 0.35 (9.0) | 55.8 (83) | 73.2 (109) |
| **CF891.07.12** | 18 | 12 G 0.75 | 0.41 (10.5) | 83.3 (124) | 111.5 (166) |
| **CF891.07.18** | 18 | 18 G 0.75 | 0.47 (12.0) | 123.0 (183) | 155.9 (232) |
| **CF891.07.25** | 18 | 25 G 0.75 | 0.57 (14.5) | 149.2 (222) | 200.9 (299) |
| **CF891.10.02** | 17 | 2 x 1.0 | 0.26 (6.5) | 20.2 (30) | 33.6 (50) |
| **CF891.10.03** | 17 | 3 G 1.0 | 0.28 (7.0) | 30.9 (46) | 47.7 (71) |
| **CF891.10.04** | 17 | 4 G 1.0 | 0.30 (7.5) | 42.3 (63) | 65.9 (98) |
| **CF891.10.05** | 17 | 5 G 1.0 | 0.31 (8.0) | 51.1 (76) | 70.6 (105) |
| **CF891.10.07** | 17 | 7 G 1.0 | 0.37 (9.5) | 67.2 (100) | 84.7 (126) |
| **CF891.10.12** | 17 | 12 G 1.0 | 0.45 (11.5) | 112.2 (167) | 150.5 (224) |
| **CF891.10.18** [11)] | 17 | 18 G 1.0 | 0.51 (13.0) | 143.1 (213) | 185.5 (276) |
| **CF891.10.25** | 17 | 25 G 1.0 | 0.63 (16.0) | 195.5 (291) | 256.7 (382) |
| **CF891.15.02** | 16 | 2 x 1.5 | 0.30 (7.5) | 40.3 (60) | 46.4 (69) |
| **CF891.15.03** | 16 | 3 G 1.5 | 0.30 (7.5) | 42.3 (63) | 57.1 (85) |
| **CF891.15.04** | 16 | 4 G 1.5 | 0.33 (8.5) | 60.5 (90) | 72.6 (108) |
| **CF891.15.05** | 16 | 5 G 1.5 | 0.35 (9.0) | 63.2 (94) | 86.7 (129) |
| **CF891.15.07** | 16 | 7 G 1.5 | 0.43 (11.0) | 102.8 (153) | 118.9 (177) |
| **CF891.15.12** | 16 | 12 G 1.5 | 0.51 (13.0) | 142.5 (212) | 185.5 (276) |
| **CF891.15.25** [11)] | 16 | 25 G 1.5 | 0.73 (18.5) | 285.6 (425) | 376.3 (560) |
| **CF891.25.04** | 14 | 4 G 2.5 | 0.39 (10.0) | 94.7 (141) | 105.5 (157) |
| **CF891.25.05** | 14 | 5 G 2.5 | 0.43 (11.0) | 100.1 (149) | 129.0 (192) |
| **CF891.25.07** | 14 | 7 G 2.5 | 0.51 (13.0) | 137.1 (204) | 171.4 (255) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 3.1.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



## Order example: CF891.05.02 - To your required length

**CF891 chainflex® series .05 Code nominal cross section .02 Number of conductors**

Order online ▶ www.igus.com/CF891

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case



chainflex® CF891 in an adjustment device for a process crane

Control cable | PUR outer jacket

# chainflex® CF77.UL.D



Example image

**10,000,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 6.8 x d |
| | **flexible** | min. 5 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | 262.5 ft/s² (80 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 | |
| **Torsion** | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 (except for 5-conductor types ≥ 4.0 mm² ▶ Product range table) | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| **Color code** | **24-22 AWG:** Color code in accordance with DIN 47100. **20-10 AWG:** Black with white numbers, one conductor green-yellow. **CF77-UL-03-04-INI:** brown, blue, black, white |
| **Outer jacket** | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Color: Gray (similar to RAL 7040) Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3) **Number of conductors < 12:** **24-22 AWG:** 300 V (following UL) **20-10 AWG:** 1000 V (following UL) **Number of conductors ≥ 12:** 1000 V (following UL) |
| **Test voltage** | 2000 V (following DIN EN 50395) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | 1 | 2 | **3** | 4 | ±360° | | | |

# Class 5.5.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF77ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X1 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF77ULD |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1 |
| **DESINA** | According to VDW, DESINA standardisation |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |
| +5/+158 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 |
| +158/+176 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |

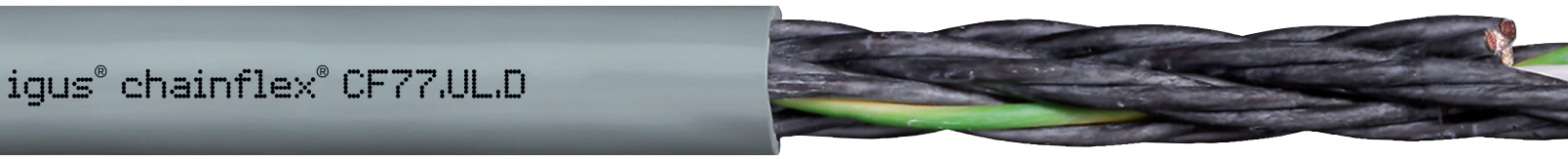
* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

Control cable | PUR outer jacket

# chainflex® CF77.UL.D




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF77.UL.02.03.INI** [12)] | 24 | 3 x 0.25 | 0.20 (5.0) | 6.0 (9) | 19.5 (29) |
| **CF77.UL.02.04.D** | 24 | 4 x 0.25 | 0.22 (5.5) | 7.4 (11) | 23.5 (35) |
| **CF77.UL.02.05.D** | 24 | 5 x 0.25 | 0.24 (6.0) | 8.7 (13) | 26.2 (39) |
| **CF77.UL.02.07.D** | 24 | 7 x 0.25 | 0.26 (6.5) | 12.1 (18) | 34.3 (51) |
| **CF77.UL.02.12.D** | 24 | 12 x 0.25 | 0.35 (9.0) | 21.5 (32) | 52.4 (78) |
| **CF77.UL.02.18.D** | 24 | 18 x 0.25 | 0.41 (10.5) | 31.6 (47) | 85.3 (127) |
| **CF77.UL.02.25.D** | 24 | 25 x 0.25 | 0.45 (11.5) | 42.3 (63) | 104.2 (155) |
| **CF77.UL.03.04.INI** [12)] | 22 | 4 x 0.34 | 0.24 (6.0) | 10.1 (15) | 24.2 (36) |
| **CF77.UL.03.05.INI** [12)] | 22 | 5 x 0.34 | 0.24 (6.0) | 12.8 (19) | 29.6 (44) |
| **CF77.UL.03.05.INI.D** | 22 | 5 x 0.34 | 0.24 (6.0) | 12.8 (19) | 29.6 (44) |
| **CF77.UL.05.04.D** | 20 | 4 G 0.5 | 0.24 (6.0) | 14.1 (21) | 30.9 (46) |
| **CF77.UL.05.05.D** | 20 | 5 G 0.5 | 0.26 (6.5) | 17.5 (26) | 35.6 (53) |
| **CF77.UL.05.07.D** | 20 | 7 G 0.5 | 0.30 (7.5) | 26.2 (39) | 52.4 (78) |
| **CF77.UL.05.12.D** | 20 | 12 G 0.5 | 0.39 (10.0) | 42.3 (63) | 87.4 (130) |
| **CF77.UL.05.18.D** | 20 | 18 G 0.5 | 0.47 (12.0) | 63.2 (94) | 123.6 (184) |
| **CF77.UL.05.25.D** | 20 | 25 G 0.5 | 0.55 (14.0) | 86.7 (129) | 163.3 (243) |
| **CF77.UL.05.30.D** | 20 | 30 G 0.5 | 0.59 (15.0) | 104.2 (155) | 211.7 (315) |
| **CF77.UL.07.03.D** | 18 | 3 G 0.75 | 0.26 (6.5) | 15.5 (23) | 34.9 (52) |
| **CF77.UL.07.04.D** | 18 | 4 G 0.75 | 0.28 (7.0) | 20.8 (31) | 39.6 (59) |
| **CF77.UL.07.05.D** | 18 | 5 G 0.75 | 0.30 (7.5) | 25.5 (38) | 47.7 (71) |
| **CF77.UL.07.07.D** | 18 | 7 G 0.75 | 0.33 (8.5) | 36.3 (54) | 67.2 (100) |
| **CF77.UL.07.12.D** | 18 | 12 G 0.75 | 0.47 (12.0) | 61.1 (91) | 121.0 (180) |
| **CF77.UL.07.18.D** | 18 | 18 G 0.75 | 0.53 (13.5) | 90.0 (134) | 160.6 (239) |
| **CF77.UL.07.20.D** | 18 | 20 G 0.75 | 0.57 (14.5) | 100.1 (149) | 180.8 (269) |
| **CF77.UL.07.25.D** | 18 | 25 G 0.75 | 0.63 (16.0) | 125.0 (186) | 225.8 (336) |
| **CF77.UL.07.36.D** | 18 | 36 G 0.75 | 0.75 (19.0) | 187.5 (279) | 340.0 (506) |
| **CF77.UL.07.42.D** | 18 | 42 G 0.75 | 0.83 (21.0) | 229.1 (341) | 389.7 (580) |
| **CF77.UL.10.02.D** | 17 | 2 x 1.0 | 0.26 (6.5) | 14.1 (21) | 34.3 (51) |
| **CF77.UL.10.03.D** | 17 | 3 G 1.0 | 0.26 (6.5) | 20.8 (31) | 39.0 (58) |
| **CF77.UL.10.04.D** | 17 | 4 G 1.0 | 0.28 (7.0) | 27.6 (41) | 49.1 (73) |
| **CF77.UL.10.05.D** | 17 | 5 G 1.0 | 0.31 (8.0) | 33.6 (50) | 60.5 (90) |
| **CF77.UL.10.07.D** | 17 | 7 G 1.0 | 0.35 (9.0) | 47.7 (71) | 80.6 (120) |
| **CF77.UL.10.12.D** | 17 | 12 G 1.0 | 0.49 (12.5) | 80.6 (120) | 147.8 (220) |
| **CF77.UL.10.18.D** | 17 | 18 G 1.0 | 0.59 (15.0) | 120.3 (179) | 211.0 (314) |
| **CF77.UL.10.25.D** | 17 | 25 G 1.0 | 0.69 (17.5) | 166.6 (248) | 289.6 (431) |
| **CF77.UL.10.42.D** | 17 | 42 G 1.0 | 0.89 (22.5) | 291.0 (433) | 469.7 (699) |

[12)] Color outer jacket: Yellow (similar to RAL 1021)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | 1 | 2 | **3** | 4 | | | | ±360° |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF77.UL.15.03.D | 16 | 3 G 1.5 | 0.28 (7.0) | 30.9 (46.0) | 47.7 (71.0) |
| CF77.UL.15.04.D | 16 | 4 G 1.5 | 0.30 (7.5) | 41.0 (61.0) | 59.1 (88.0) |
| CF77.UL.15.05.D | 16 | 5 G 1.5 | 0.31 (8.0) | 50.4 (75.0) | 70.6 (105.0) |
| CF77.UL.15.07.D [17] | 16 | 7 G 1.5 | 0.37 (9.5) | 70.6 (105.0) | 102.1 (152.0) |
| CF77.UL.15.12.D | 16 | 12 G 1.5 | 0.51 (13.0) | 120.3 (179.0) | 199.6 (297.0) |
| CF77.UL.15.18.D | 16 | 18 G 1.5 | 0.67 (17.0) | 180.1 (268.0) | 272.1 (405.0) |
| CF77.UL.15.25.D | 16 | 25 G 1.5 | 0.77 (19.5) | 199.6 (297.0) | 379.0 (564.0) |
| CF77.UL.15.36.D | 16 | 36 G 1.5 | 0.93 (23.5) | 370.3 (551.0) | 569.8 (848.0) |
| CF77.UL.25.03.D | 14 | 3 G 2.5 | 0.33 (8.5) | 50.4 (75.0) | 88.7 (132.0) |
| CF77.UL.25.04.D | 14 | 4 G 2.5 | 0.37 (9.5) | 63.8 (95.0) | 112.2 (167.0) |
| CF77.UL.25.05.D | 14 | 5 G 2.5 | 0.39 (10.0) | 83.3 (124.0) | 131.7 (196.0) |
| CF77.UL.25.07.D [17] | 14 | 7 G 2.5 | 0.47 (12.0) | 116.9 (174.0) | 181.4 (270.0) |
| CF77.UL.25.12.D | 14 | 12 G 2.5 | 0.67 (17.0) | 199.6 (297.0) | 321.9 (479.0) |
| CF77.UL.40.04.D [90] | 12 | 4 G 4.0 | 0.45 (11.5) | 110.9 (165.0) | 164.6 (245.0) |
| CF77.UL.40.05.D [90] | 12 | 5 G 4.0 | 0.47 (12.0) | 133.0 (198.0) | 190.8 (284.0) |
| CF77.UL.60.05.D [90] | 10 | 5 G 6.0 | 0.53 (13.5) | 199.6 (297.0) | 276.9 (412.0) |

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.
[90] Torsion ± 90°

**Note:** The given outer diameters are maximum values.
**G** = with green-yellow earth core **x** = without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case




UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PUR outer jacket

# chainflex® CF78.UL

**10,000,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant



Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 6.8 x d |
| | flexible | min. 5 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | Black with white numbers, one conductor green-yellow. |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Gray (similar to RAL 7040) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>**Number of conductors < 12:**<br>**24-22 AWG:** 300 V (following UL)<br>**20-10 AWG:** 1000 V (following UL)<br>**Number of conductors ≥ 12:** 1000 V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 5.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF78UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X1 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF78UL |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |
| +5/+158 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 |
| +158/+176 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PUR outer jacket

# chainflex® CF78.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF78.UL.05.04 | 20 | 4 G 0.5 | 0.31 (8.0) | 25.5 (38) | 51.7 (77) |
| CF78.UL.05.05 | 20 | 5 G 0.5 | 0.31 (8.0) | 30.2 (45) | 61.1 (91) |
| CF78.UL.05.07 | 20 | 7 G 0.5 | 0.37 (9.5) | 39.6 (59) | 77.3 (115) |
| CF78.UL.05.09 | 20 | 9 G 0.5 | 0.43 (11.0) | 51.7 (77) | 96.1 (143) |
| CF78.UL.05.12 | 20 | 12 G 0.5 | 0.49 (12.5) | 61.8 (92) | 135.7 (202) |
| CF78.UL.05.18 | 20 | 18 G 0.5 | 0.57 (14.5) | 98.1 (146) | 166.6 (248) |
| CF78.UL.05.25 | 20 | 25 G 0.5 | 0.63 (16.0) | 112.9 (168) | 237.9 (354) |
| CF78.UL.07.03 | 18 | 3 G 0.75 | 0.31 (8.0) | 28.2 (42) | 53.1 (79) |
| CF78.UL.07.04 | 18 | 4 G 0.75 | 0.33 (8.5) | 32.9 (49) | 64.5 (96) |
| CF78.UL.07.05 | 18 | 5 G 0.75 | 0.37 (9.5) | 41.0 (61) | 75.3 (112) |
| CF78.UL.07.07 | 18 | 7 G 0.75 | 0.41 (10.5) | 55.8 (83) | 101.5 (151) |
| CF78.UL.07.12 | 18 | 12 G 0.75 | 0.53 (13.5) | 91.4 (136) | 167.3 (249) |
| CF78.UL.07.18 | 18 | 18 G 0.75 | 0.61 (15.5) | 130.4 (194) | 237.9 (354) |
| CF78.UL.07.36 | 18 | 36 G 0.75 | 0.87 (22.0) | 262.1 (390) | 471.7 (702) |
| CF78.UL.10.03 | 17 | 3 G 1.0 | 0.33 (8.5) | 33.6 (50) | 64.5 (96) |
| CF78.UL.10.04 | 17 | 4 G 1.0 | 0.35 (9.0) | 41.7 (62) | 75.3 (112) |
| CF78.UL.10.05 | 17 | 5 G 1.0 | 0.37 (9.5) | 49.7 (74) | 86.7 (129) |
| CF78.UL.10.07 | 17 | 7 G 1.0 | 0.43 (11.0) | 69.9 (104) | 118.3 (176) |
| CF78.UL.10.12 | 17 | 12 G 1.0 | 0.57 (14.5) | 111.5 (166) | 201.6 (300) |
| CF78.UL.10.18 | 17 | 18 G 1.0 | 0.67 (17.0) | 161.3 (240) | 273.5 (407) |
| CF78.UL.10.25 | 17 | 25 G 1.0 | 0.79 (20.0) | 218.4 (325) | 366.2 (545) |
| CF78.UL.15.03 | 16 | 3 G 1.5 | 0.37 (9.5) | 45.7 (68) | 82.0 (122) |
| CF78.UL.15.04 | 16 | 4 G 1.5 | 0.39 (10.0) | 57.8 (86) | 97.4 (145) |
| CF78.UL.15.05 | 16 | 5 G 1.5 | 0.37 (9.5) | 72.6 (108) | 106.8 (159) |
| CF78.UL.15.07 [17)] | 16 | 7 G 1.5 | 0.45 (11.5) | 96.8 (144) | 145.8 (217) |
| CF78.UL.15.12 | 16 | 12 G 1.5 | 0.63 (16.0) | 156.6 (233) | 260.1 (387) |
| CF78.UL.15.18 | 16 | 18 G 1.5 | 0.75 (19.0) | 232.5 (346) | 363.5 (541) |
| CF78.UL.15.25 | 16 | 25 G 1.5 | 0.89 (22.5) | 311.8 (464) | 486.5 (724) |
| CF78.UL.15.36 | 16 | 36 G 1.5 | 1.04 (26.5) | 445.5 (663) | 735.8 (1095) |
| CF78.UL.15.42 | 16 | 42 G 1.5 | 1.16 (29.5) | 551.0 (820) | 870.9 (1296) |
| CF78.UL.25.03 | 14 | 3 G 2.5 | 0.39 (10.0) | 71.2 (106) | 116.9 (174) |
| CF78.UL.25.04 | 14 | 4 G 2.5 | 0.45 (11.5) | 94.1 (140) | 136.4 (203) |
| CF78.UL.25.05 | 14 | 5 G 2.5 | 0.47 (12.0) | 111.5 (166) | 157.9 (235) |
| CF78.UL.25.07 [17)] | 14 | 7 G 2.5 | 0.57 (14.5) | 154.6 (230) | 224.4 (334) |
| CF78.UL.25.12 | 14 | 12 G 2.5 | 0.75 (19.0) | 256.7 (382) | 393.1 (585) |
| CF78.UL.40.04 | 12 | 4 G 4.0 | 0.51 (13.0) | 136.4 (203) | 220.4 (328) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |



**Order example: CF78.UL.05.04 - To your required length**

**CF78.UL chainflex® series .05 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF78UL

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

cost down...



...life up

## Reduce cost, improve technology, now!

Do the chainflex® price check ...

www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF6 ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PUR outer jacket

# chainflex® CF2

Phase-out model




Example image

**10,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For very high mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 5 x d |
| | **flexible** | min. 4 x d |
| | **fixed** | min. 3 x d |
| Temperature | **e-chain® linear** | -4 °F to +176 °F (-20 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | Color code in accordance with DIN 47100. |
| Inner jacket | PVC mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Gray (similar to RAL 7016) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 6.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF2 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 6.8 | 7.5 | 8.5 |
| +14/+158 | 5 | 6.8 | 7.5 |
| +158/+176 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

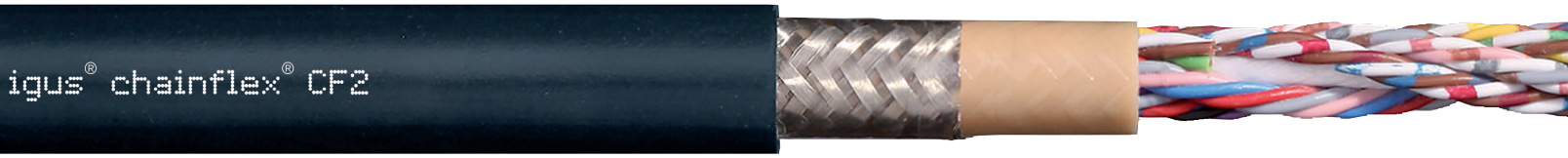
- For maximum mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PUR outer jacket

# chainflex® CF2

Phase-out model




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF2.01.04** [11] | 26 | 4 x 0.14 | 0.26 (6.5) | 12.1 (18) | 32.9 (49) |
| **CF2.01.08** [11] | 26 | 8 x 0.14 | 0.30 (7.5) | 20.8 (31) | 44.3 (66) |
| **CF2.01.12** [11] | 26 | 12 x 0.14 | 0.37 (9.5) | 34.3 (51) | 68.5 (102) |
| **CF2.01.18** [11] | 26 | 18 x 0.14 | 0.41 (10.5) | 37.6 (56) | 90.7 (135) |
| **CF2.01.24** [3] [11] | 26 | 24 x 0.14 | 0.45 (11.5) | 45.7 (68) | 108.9 (162) |
| **CF2.01.36** [11] | 26 | 36 x 0.14 | 0.57 (14.5) | 61.8 (92) | 161.3 (240) |
| **CF2.02.04** [11] | 24 | 4 x 0.25 | 0.28 (7.0) | 16.8 (25) | 39.6 (59) |
| **CF2.02.08** [11] | 24 | 8 x 0.25 | 0.31 (8.0) | 28.9 (43) | 56.4 (84) |
| **CF2.02.18** [11] | 24 | 18 x 0.25 | 0.47 (12.0) | 67.2 (100) | 116.3 (173) |
| **CF2.02.48** [11] | 24 | 48 x 0.25 | 0.69 (17.5) | 128.3 (191) | 260.1 (387) |

The chainflex® types marked with a [3] refer to cables that are based on a bundling of 4 cores each. Due to their excellent electrical properties (starquad with especially minimum crosstalk), these cables can virtually be used in all cases in which otherwise twisted-pair cables are required.
[11] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

## Order example: CF2.01.04 - To your required length

**CF6 chainflex® series .01 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF2

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |





chainflex® CF2 cables are resistant to oil and coolants. e-chain®: E4/00 system.

cost down...




...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

... just one idea for you: Reduce cost with CF240.PUR ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF9.UL




Example image

**10,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- PVC-free
- Low-temperature-flexibility
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 5 x d |
| | **flexible** | min. 4 x d |
| | **fixed** | min. 3 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -49 °F to +212 °F (-45 °C to +100 °C) |
| | **fixed** | -58 °F to +212 °F (-50 °C to +100 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 328.1 ft/s² (100 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |
| **Torsion** | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| **Color code** | **24-20 AWG** Color code in accordance with DIN 47100.<br>**18-10 AWG** Black with white numbers, one conductor green-yellow.<br>**CF9-UL-02-03-INI:** brown, blue, black<br>**CF9-UL-03-04-INI:** brown, blue, black, white<br>**CF9-UL-03-05-INI:** brown, blue, black, white, green-yellow |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Gray (similar to RAL 7015) |
| **CFRIP®** | Strip 50% faster: a tear strip is molded into the outer jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3)<br>**24-22 AWG:** 300 V (following UL)<br>**20-10 AWG:** 1000 V (following UL) |
| **Test voltage** | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |

# Class 6.6.4.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF9UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X2 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF9UL |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 6.8 | 7.5 | 8.5 |
| -13/+194 | 5 | 6 | 7 |
| +194/+212 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, Ship to shore, outdoor cranes, low temperature applications







UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF9.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF9.UL.02.02 | 24 | 2 x 0.25 | 0.20 (5.0) | 3.4 (5) | 16.1 (24) |
| CF9.UL.02.03.INI | 24 | 3 x 0.25 | 0.20 (5.0) | 5.4 (8) | 18.8 (28) |
| CF9.UL.02.04 | 24 | 4 x 0.25 | 0.22 (5.5) | 6.7 (10) | 21.5 (32) |
| CF9.UL.02.06 | 24 | 6 x 0.25 | 0.24 (6.0) | 10.1 (15) | 28.2 (42) |
| CF9.UL.02.08 | 24 | 8 x 0.25 | 0.28 (7.0) | 13.4 (20) | 38.3 (57) |
| CF9.UL.02.12 | 24 | 12 x 0.25 | 0.30 (7.5) | 20.2 (30) | 54.4 (81) |
| CF9.UL.03.04.INI | 22 | 4 x 0.34 | 0.22 (5.5) | 9.4 (14) | 25.5 (38) |
| CF9.UL.03.05.INI | 22 | 5 x 0.34 | 0.24 (6.0) | 11.4 (17) | 30.9 (46) |
| CF9.UL.03.06 | 22 | 6 x 0.34 | 0.26 (6.5) | 14.1 (21) | 34.3 (51) |
| CF9.UL.03.08 | 22 | 8 x 0.34 | 0.30 (7.5) | 18.8 (28) | 45.0 (67) |
| CF9.UL.05.02 | 20 | 2 x 0.5 | 0.22 (5.5) | 6.7 (10) | 23.5 (35) |
| CF9.UL.05.03 | 20 | 3 x 0.5 | 0.24 (6.0) | 10.1 (15) | 28.2 (42) |
| CF9.UL.05.04 | 20 | 4 x 0.5 | 0.24 (6.0) | 13.4 (20) | 33.6 (50) |
| CF9.UL.05.05 | 20 | 5 x 0.5 | 0.26 (6.5) | 16.8 (25) | 37.6 (56) |
| CF9.UL.05.07 | 20 | 7 x 0.5 | 0.30 (7.5) | 23.5 (35) | 53.1 (79) |
| CF9.UL.05.12 | 20 | 12 x 0.5 | 0.37 (9.5) | 40.3 (60) | 92.1 (137) |
| CF9.UL.05.18 | 20 | 18 x 0.5 | 0.47 (12.0) | 60.5 (90) | 135.1 (201) |
| CF9.UL.07.05 | 18 | 5 G 0.75 | 0.28 (7.0) | 25.5 (38) | 51.7 (77) |
| CF9.UL.07.07 | 18 | 7 G 0.75 | 0.33 (8.5) | 35.6 (53) | 70.6 (105) |
| CF9.UL.07.12 | 18 | 12 G 0.75 | 0.43 (11.0) | 60.5 (90) | 128.3 (191) |
| CF9.UL.07.25 | 18 | 25 G 0.75 | 0.59 (15.0) | 125.0 (186) | 245.9 (366) |
| CF9.UL.10.03 | 17 | 3 G 1.0 | 0.26 (6.5) | 20.2 (30) | 41.7 (62) |
| CF9.UL.10.04 | 17 | 4 G 1.0 | 0.28 (7.0) | 26.9 (40) | 52.4 (78) |
| CF9.UL.10.12 | 17 | 12 G 1.0 | 0.45 (11.5) | 80.0 (119) | 153.2 (228) |
| CF9.UL.10.18 | 17 | 18 G 1.0 | 0.57 (14.5) | 119.6 (178) | 223.1 (332) |
| CF9.UL.10.25 | 17 | 25 G 1.0 | 0.63 (16.0) | 166.6 (248) | 300.4 (447) |
| CF9.UL.15.04 | 16 | 4 G 1.5 | 0.31 (8.0) | 40.3 (60) | 68.5 (102) |
| CF9.UL.15.05 | 16 | 5 G 1.5 | 0.33 (8.5) | 50.4 (75) | 83.3 (124) |
| CF9.UL.15.07 [17)] | 16 | 7 G 1.5 | 0.39 (10.0) | 69.9 (104) | 114.9 (171) |
| CF9.UL.15.12 | 16 | 12 G 1.5 | 0.53 (13.5) | 119.6 (178) | 207.6 (309) |
| CF9.UL.15.18 | 16 | 18 G 1.5 | 0.63 (16.0) | 179.4 (267) | 301.7 (449) |
| CF9.UL.15.25 | 16 | 25 G 1.5 | 0.75 (19.0) | 249.3 (371) | 436.8 (650) |

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF9.UL.25.04 | 14 | 4 G 2.5 | 0.35 (9.0) | 67.2 (100.0) | 106.8 (159.0) |
| CF9.UL.25.05 | 14 | 5 G 2.5 | 0.39 (10.0) | 83.3 (124.0) | 130.4 (194.0) |
| CF9.UL.25.07 [17] | 14 | 7 G 2.5 | 0.47 (12.0) | 116.9 (174.0) | 181.4 (270.0) |
| CF9.UL.25.12 | 14 | 12 G 2.5 | 0.63 (16.0) | 199.6 (297.0) | 337.3 (502.0) |
| CF9.UL.25.18 | 14 | 18 G 2.5 | 0.79 (20.0) | 299.0 (445.0) | 495.2 (737.0) |
| CF9.UL.25.25 | 14 | 25 G 2.5 | 0.93 (23.5) | 411.2 (612.0) | 679.4 (1011.0) |
| CF9.UL.40.04 | 12 | 4 G 4.0 | 0.41 (10.5) | 106.8 (159.0) | 155.2 (231.0) |

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

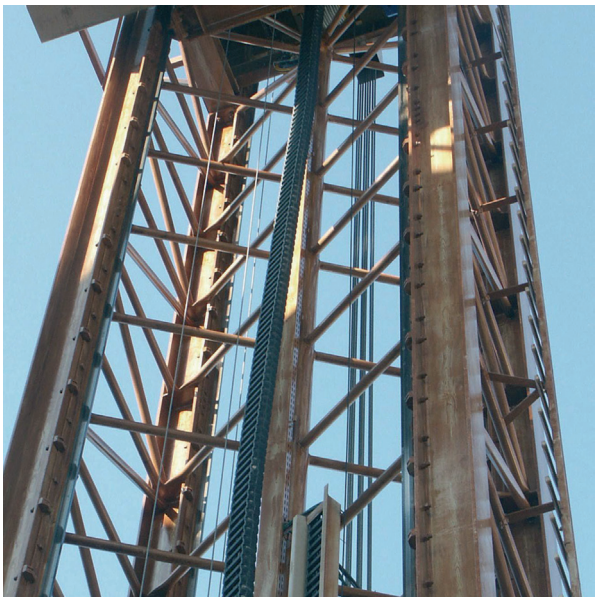
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case



igus® chainflex® cables in a drilling application.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF10.UL




Example image

**10,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- PVC-free
- Low-temperature-flexibility
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 5 x d |
| | **flexible** | min. 4 x d |
| | **fixed** | min. 3 x d |
| Temperature | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -49 °F to +212 °F (-45 °C to +100 °C) |
| | **fixed** | -58 °F to +212 °F (-50 °C to +100 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| Color code | **24-20 AWG:** Color code in accordance with DIN 47100. **18-12 AWG:** Black with white numbers, one conductor green-yellow. |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid. 90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®. Color: Gray (similar to RAL 7015) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3) **24-22 AWG:** 300 V (following UL) **20-10 AWG:** 1000 V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF10UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X2 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF10UL |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 6.8 | 7.5 | 8.5 |
| -13/+194 | 5 | 6 | 7 |
| +194/+212 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, Ship to shore, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF10.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF10.UL.02.04** | 24 | 4 x 0.25 | 0.26 (6.5) | 16.1 (24) | 40.3 (60) |
| **CF10.UL.02.08** | 24 | 8 x 0.25 | 0.33 (8.5) | 26.9 (40) | 63.2 (94) |
| **CF10.UL.02.12** | 24 | 12 x 0.25 | 0.37 (9.5) | 43.0 (64) | 92.1 (137) |
| **CF10.UL.02.25** [11)] | 24 | 25 G 0.25 | 0.49 (12.5) | 73.9 (110) | 161.9 (241) |
| **CF10.UL.05.04** | 20 | 4 x 0.5 | 0.30 (7.5) | 24.9 (37) | 55.8 (83) |
| **CF10.UL.05.05** | 20 | 5 x 0.5 | 0.31 (8.0) | 29.6 (44) | 65.9 (98) |
| **CF10.UL.05.12** | 20 | 12 x 0.5 | 0.45 (11.5) | 69.2 (103) | 141.8 (211) |
| **CF10.UL.05.25** [11)] | 20 | 25 x 0.5 | 0.61 (15.5) | 125.0 (186) | 257.4 (383) |
| **CF10.UL.07.04** | 18 | 4 G 0.75 | 0.31 (8.0) | 32.9 (49) | 67.9 (101) |
| **CF10.UL.07.05** [11)] | 18 | 5 G 0.75 | 0.33 (8.5) | 39.6 (59) | 80.0 (119) |
| **CF10.UL.07.07** | 18 | 7 G 0.75 | 0.39 (10.0) | 59.8 (89) | 114.9 (171) |
| **CF10.UL.07.12** | 18 | 12 G 0.75 | 0.49 (12.5) | 90.7 (135) | 180.1 (268) |
| **CF10.UL.10.02** | 17 | 2 x 1.0 | 0.30 (7.5) | 25.5 (38) | 59.1 (88) |
| **CF10.UL.10.03** [11)] | 17 | 3 G 1.0 | 0.31 (8.0) | 32.3 (48) | 66.5 (99) |
| **CF10.UL.10.04** | 17 | 4 G 1.0 | 0.33 (8.5) | 41.0 (61) | 78.6 (117) |
| **CF10.UL.10.05** [11)] | 17 | 5 G 1.0 | 0.35 (9.0) | 48.4 (72) | 92.1 (137) |
| **CF10.UL.10.07** | 17 | 7 G 1.0 | 0.43 (11.0) | 73.9 (110) | 137.1 (204) |
| **CF10.UL.15.04** | 16 | 4 G 1.5 | 0.35 (9.0) | 55.8 (83) | 96.8 (144) |
| **CF10.UL.15.05** | 16 | 5 G 1.5 | 0.39 (10.0) | 74.6 (111) | 123.6 (184) |
| **CF10.UL.15.07** [17)] | 16 | 7 G 1.5 | 0.45 (11.5) | 99.5 (148) | 168.0 (250) |
| **CF10.UL.15.12** | 16 | 12 G 1.5 | 0.59 (15.0) | 161.3 (240) | 282.2 (420) |
| **CF10.UL.15.18** | 16 | 18 G 1.5 | 0.73 (18.5) | 245.3 (365) | 411.9 (613) |
| **CF10.UL.25.04** | 14 | 4 G 2.5 | 0.43 (11.0) | 94.1 (140) | 155.9 (232) |
| **CF10.UL.25.07** [17)] | 14 | 7 G 2.5 | 0.55 (14.0) | 151.9 (226) | 248.0 (369) |
| **CF10.UL.25.12** [11)] | 14 | 12 G 2.5 | 0.73 (18.5) | 265.4 (395) | 447.5 (666) |
| **CF10.UL.40.04** [11)] | 12 | 4 G 4.0 | 0.49 (12.5) | 137.8 (205) | 211.7 (315) |

[11)] Phase-out model
[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case




**The special cable structure of chainflex® CF10.UL guarantees quality – offered by igus® fully harnessed.**

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF9



Example image

**12,500,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexibility
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 5 x d |
| | **flexible** | min. 4 x d |
| | **fixed** | min. 3 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -58 °F to +212 °F (-50 °C to +100 °C) |
| | **fixed** | -67 °F to +212 °F (-55 °C to +100 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 328.1 ft/s² (100 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |
| **Torsion** | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 | |

## Cable structure

**Conductor** — Conductor consisting of bare copper wires (according to DIN EN 60228).

**Conductor insulation** — Mechanically high-quality TPE mixture.

**Conductor construction** — **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure.

**Color code** — **24-20 AWG:** Color code in accordance with DIN 47100.:
**18-6 AWG:** Black with white numbers, one conductor green-yellow.
**CF9-02-03-INI:** brown, blue, black.
**CF9-03-04-INI:** brown, blue, black, white
**CF9-03-05-INI:** brown, blue, black, white, green-yellow
**CF9-03-16-07-03-INI:**
**22 AWG:** violet/red/gray/red-blue, green/gray-pink/white-green/white-yellow, white-gray/black/yellow-brown/brown-green, white/yellow/pink/gray-brown
**18 AWG:** blue/green-yellow/brown

**Outer jacket** — Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.
Color: Dark blue (similar to RAL 5011)

**CFRIP®** — Strip 50% faster: a tear strip is molded into the outer jacket
Video ▶ www.igus.com/CFRIP

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | | |

# Class 7.6.4.2

## Electrical Information

**Nominal voltage**
300 V

**Test voltage**
2000 V (following DIN EN 50395)

## Properties and approvals

**UV resistance**
High

**Oil resistance**
Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4

**Silicone-free**
Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

**Halogen-free**
Following DIN EN 60754

**PTFE-free**
This cable does not contain PTFE

**UL-verified**
Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“

**UL AWM**
See data sheet for details ▶ www.igus.com/CF9
(from production date 01/2022)

**REACH**
In accordance with regulation (EC) No. 1907/2006 (REACH)

**Lead-free**
Following 2011/65/EC (RoHS-II/RoHS-III)

**Cleanroom**
According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1

**Dry cleanroom**
Tested in "dry cleanroom" according to DIN EN ISO 14644-1

**CE**
Following 2014/35/EU

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 6.8 | 7.5 | 8.5 |
| -13/+194 | 5 | 6 | 7 |
| +194/+212 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF9

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF9.02.02** | 24 | 2 x 0.25 | 0.18 (4.5) | 3.4 (5) | 12.1 (18) |
| **CF9.02.03.INI** | 24 | 3 x 0.25 | 0.20 (5.0) | 5.4 (8) | 14.8 (22) |
| **CF9.02.06** | 24 | 6 x 0.25 | 0.22 (5.5) | 10.1 (15) | 24.2 (36) |
| **CF9.02.07** | 24 | 7 x 0.25 | 0.26 (6.5) | 12.1 (18) | 28.9 (43) |
| **CF9.02.08** | 24 | 8 x 0.25 | 0.26 (6.5) | 13.4 (20) | 32.9 (49) |
| **CF9.02.12** | 24 | 12 x 0.25 | 0.31 (8.0) | 20.2 (30) | 47.7 (71) |
| **CF9.02.18** | 24 | 18 x 0.25 | 0.35 (9.0) | 30.2 (45) | 67.2 (100) |
| **CF9.02.20** | 24 | 20 x 0.25 | 0.37 (9.5) | 33.6 (50) | 75.9 (113) |
| **CF9.02.25** | 24 | 25 G 0.25 | 0.41 (10.5) | 42.3 (63) | 92.7 (138) |
| **CF9.03.04.INI** | 22 | 4 x 0.34 | 0.20 (5.0) | 9.4 (14) | 20.8 (31) |
| **CF9.03.05.INI** | 22 | 5 x 0.34 | 0.22 (5.5) | 11.4 (17) | 24.2 (36) |
| **CF9.03.06** | 22 | 6 x 0.34 | 0.24 (6.0) | 14.1 (21) | 28.9 (43) |
| **CF9.03.08** | 22 | 8 x 0.34 | 0.28 (7.0) | 18.8 (28) | 38.3 (57) |
| **CF9.03.16.07.03.INI** | 22 | 4 x 4 x 0.34 | 0.43 (11.0) | 51.7 (77) | 102.1 (152) |
| **CF9.05.02** | 20 | 2 x 0.5 | 0.20 (5.0) | 6.7 (10) | 18.8 (28) |
| **CF9.05.03** | 20 | 3 x 0.5 | 0.22 (5.5) | 10.1 (15) | 22.8 (34) |
| **CF9.05.04** | 20 | 4 x 0.5 | 0.24 (6.0) | 13.4 (20) | 27.6 (41) |
| **CF9.05.05** | 20 | 5 x 0.5 | 0.26 (6.5) | 16.8 (25) | 33.6 (50) |
| **CF9.05.07** | 20 | 7 x 0.5 | 0.30 (7.5) | 23.5 (35) | 46.4 (69) |
| **CF9.05.12** | 20 | 12 x 0.5 | 0.39 (10.0) | 40.3 (60) | 82.7 (123) |
| **CF9.05.18** | 20 | 18 x 0.5 | 0.45 (11.5) | 60.5 (90) | 120.3 (179) |
| **CF9.05.25** | 20 | 25 x 0.5 | 0.53 (13.5) | 83.3 (124) | 161.3 (240) |
| **CF9.05.36** | 20 | 36 x 0.5 | 0.65 (16.5) | 119.6 (178) | 231.8 (345) |
| **CF9.07.04** | 18 | 4 G 0.75 | 0.26 (6.5) | 20.2 (30) | 37.6 (56) |
| **CF9.07.05** | 18 | 5 G 0.75 | 0.28 (7.0) | 25.5 (38) | 46.4 (69) |
| **CF9.07.07** | 18 | 7 G 0.75 | 0.31 (8.0) | 35.6 (53) | 63.2 (94) |
| **CF9.07.12** | 18 | 12 G 0.75 | 0.43 (11.0) | 60.5 (90) | 118.3 (176) |
| **CF9.07.20** | 18 | 20 G 0.75 | 0.53 (13.5) | 100.1 (149) | 181.4 (270) |
| **CF9.07.25** | 18 | 25 G 0.75 | 0.59 (15.0) | 125.0 (186) | 221.7 (330) |
| **CF9.10.03** | 17 | 3 G 1.0 | 0.24 (6.0) | 20.2 (30) | 36.3 (54) |
| **CF9.10.04** | 17 | 4 G 1.0 | 0.26 (6.5) | 26.9 (40) | 45.7 (68) |
| **CF9.10.05** | 17 | 5 G 1.0 | 0.30 (7.5) | 33.6 (50) | 56.4 (84) |
| **CF9.10.12** | 17 | 12 G 1.0 | 0.47 (12.0) | 80.6 (120) | 142.5 (212) |
| **CF9.10.18** | 17 | 18 G 1.0 | 0.55 (14.0) | 120.3 (179) | 203.6 (303) |
| **CF9.10.25** | 17 | 25 G 1.0 | 0.65 (16.5) | 166.6 (248) | 280.2 (417) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 7.6.4.2

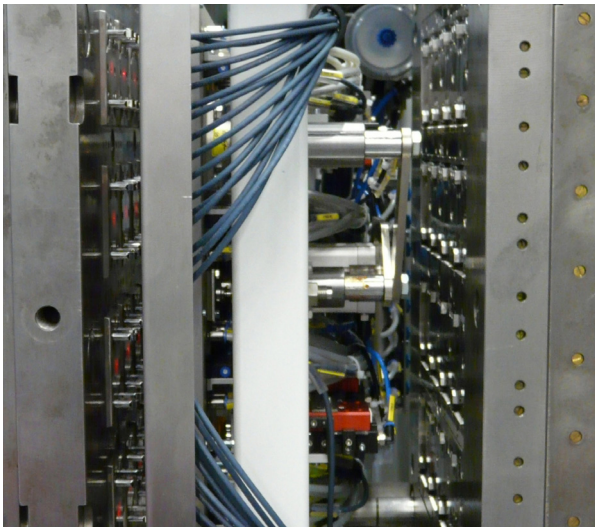
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | | |

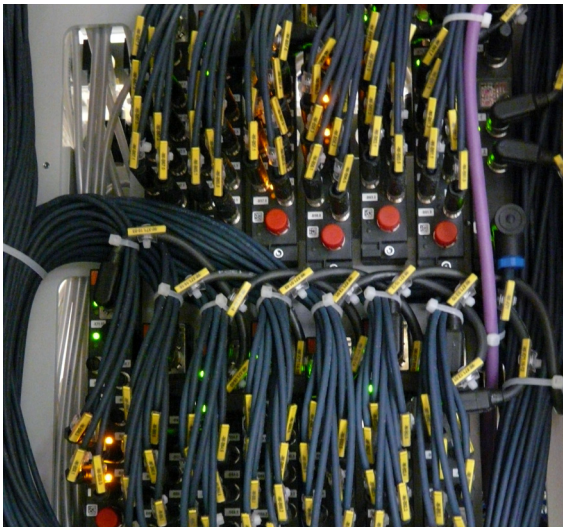


| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF9.15.02** | 16 | 2 x 1.5 | 0.26 (6.5) | 20.2 (30.0) | 37.0 (55.0) |
| **CF9.15.04** | 16 | 4 G 1.5 | 0.30 (7.5) | 40.3 (60.0) | 60.5 (90.0) |
| **CF9.15.05** | 16 | 5 G 1.5 | 0.31 (8.0) | 50.4 (75.0) | 74.6 (111.0) |
| **CF9.15.07** [17)] | 16 | 7 G 1.5 | 0.37 (9.5) | 69.9 (104.0) | 106.8 (159.0) |
| **CF9.15.12** | 16 | 12 G 1.5 | 0.51 (13.0) | 119.6 (178.0) | 188.2 (280.0) |
| **CF9.15.18** | 16 | 18 G 1.5 | 0.63 (16.0) | 179.4 (267.0) | 276.9 (412.0) |
| **CF9.15.25** | 16 | 25 G 1.5 | 0.75 (19.0) | 249.3 (371.0) | 393.1 (585.0) |
| **CF9.15.36** | 16 | 36 G 1.5 | 0.89 (22.5) | 358.8 (534.0) | 548.3 (816.0) |
| **CF9.25.04** | 14 | 4 G 2.5 | 0.35 (9.0) | 67.2 (100.0) | 96.8 (144.0) |
| **CF9.25.05** | 14 | 5 G 2.5 | 0.37 (9.5) | 83.3 (124.0) | 118.3 (176.0) |
| **CF9.25.07** [17)] | 14 | 7 G 2.5 | 0.47 (12.0) | 116.9 (174.0) | 170.0 (253.0) |
| **CF9.25.12** | 14 | 12 G 2.5 | 0.67 (17.0) | 199.6 (297.0) | 312.5 (465.0) |
| **CF9.25.16** | 14 | 16 G 2.5 | 0.75 (19.0) | 266.1 (396.0) | 413.9 (616.0) |
| **CF9.25.18** [7)] | 14 | 18 G 2.5 | 0.89 (22.5) | 299.0 (445.0) | 534.2 (795.0) |
| **CF9.25.25** | 14 | 25 G 2.5 | 0.91 (23.0) | 411.2 (612.0) | 622.2 (926.0) |
| **CF9.40.04** | 12 | 4 G 4.0 | 0.41 (10.5) | 106.8 (159.0) | 142.5 (212.0) |
| **CF9.60.04** | 10 | 4 G 6.0 | 0.47 (12.0) | 159.9 (238.0) | 207.0 (308.0) |
| **CF9.60.05** | 10 | 5 G 6.0 | 0.51 (13.0) | 199.6 (297.0) | 254.0 (378.0) |
| **CF9.100.04** | 8 | 4 G 10.0 | 0.65 (16.5) | 266.1 (396.0) | 369.6 (550.0) |
| **CF9.160.04** | 6 | 4 G 16.0 | 0.81 (20.5) | 425.4 (633.0) | 566.5 (843.0) |

[7)] Nominal voltage 600/1000 V
[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core





chainflex® CF9 INI cables in a high-performance system for plastics processing with cycle times in seconds. e-chain® E6 series. (Source: Hekuma)

Control cable | TPE outer jacket

# chainflex® CF10



Example image

**12,500,000**
Cycles guaranteed

**5 x d**
Bend radius e-chain®

**1312.4 ft**
Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexibility
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 5 x d |
| | **flexible** | min. 4 x d |
| | **fixed** | min. 3 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -58 °F to +212 °F (-50 °C to +100 °C) |
| | **fixed** | -67 °F to +212 °F (-55 °C to +100 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 328.1 ft/s² (100 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| **Color code** | 24-20 AWG: Color code in accordance with DIN 47100.<br>18-12 AWG: Black with white numbers, one conductor green-yellow.<br>CF10-03-05-INI: brown, blue, black, white, green-yellow |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Dark blue (similar to RAL 5011) |
| **CFRIP®** | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 7.6.4.1

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3)<br>**Conductors < 0.5mm²:** 300V (following UL)<br>**Conductors ≥ 0.5mm²:** 1000V (following UL) |
| **Test voltage** | 2000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF10<br>(from production date 01/2022) |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 6.8 | 7.5 | 8.5 |
| -13/+194 | 5 | 6 | 7 |
| +194/+212 | 6.8 | 7.5 | 8.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, Ship to shore, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF10

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF10.01.12** | 26 | 12 x 0.14 | 0.30 (7.5) | 24.9 (37) | 52.4 (78) |
| **CF10.01.18** | 26 | 18 x 0.14 | 0.37 (9.5) | 42.3 (63) | 80.0 (119) |
| **CF10.02.04** | 24 | 4 x 0.25 | 0.26 (6.5) | 16.1 (24) | 32.9 (49) |
| **CF10.02.08** | 24 | 8 x 0.25 | 0.31 (8.0) | 26.9 (40) | 53.1 (79) |
| **CF10.02.12** | 24 | 12 x 0.25 | 0.37 (9.5) | 43.7 (65) | 82.0 (122) |
| **CF10.02.25** | 24 | 25 x 0.25 | 0.47 (12.0) | 73.9 (110) | 141.8 (211) |
| **CF10.03.05.INI** | 22 | 5 x 0.34 | 0.28 (7.0) | 22.2 (33) | 42.3 (63) |
| **CF10.05.04** | 20 | 4 x 0.5 | 0.28 (7.0) | 24.9 (37) | 47.0 (70) |
| **CF10.05.05** | 20 | 5 x 0.5 | 0.30 (7.5) | 29.6 (44) | 54.4 (81) |
| **CF10.05.07** | 20 | 7 x 0.5 | 0.33 (8.5) | 39.0 (58) | 69.9 (104) |
| **CF10.05.12** | 20 | 12 x 0.5 | 0.47 (12.0) | 71.9 (107) | 133.0 (198) |
| **CF10.05.18** | 20 | 18 x 0.5 | 0.53 (13.5) | 96.8 (144) | 175.4 (261) |
| **CF10.05.25** | 20 | 25 x 0.5 | 0.59 (15.0) | 125.0 (186) | 223.1 (332) |
| **CF10.07.04** | 18 | 4 G 0.75 | 0.30 (7.5) | 32.9 (49) | 57.8 (86) |
| **CF10.07.05** | 18 | 5 G 0.75 | 0.31 (8.0) | 39.0 (58) | 68.5 (102) |
| **CF10.07.07** | 18 | 7 G 0.75 | 0.37 (9.5) | 60.5 (90) | 98.8 (147) |
| **CF10.07.12** | 18 | 12 G 0.75 | 0.49 (12.5) | 93.4 (139) | 164.0 (244) |
| **CF10.07.20** | 18 | 20 G 0.75 | 0.61 (15.5) | 141.1 (210) | 235.2 (350) |
| **CF10.07.25** | 18 | 25 G 0.75 | 0.67 (17.0) | 171.4 (255) | 297.7 (443) |
| **CF10.10.02** | 17 | 2 x 1.0 | 0.30 (7.5) | 25.5 (38) | 48.4 (72) |
| **CF10.10.03** | 17 | 3 G 1.0 | 0.30 (7.5) | 32.3 (48) | 56.4 (84) |
| **CF10.10.04** | 17 | 4 G 1.0 | 0.31 (8.0) | 40.3 (60) | 67.2 (100) |
| **CF10.10.05** | 17 | 5 G 1.0 | 0.33 (8.5) | 48.4 (72) | 79.3 (118) |
| **CF10.10.07** | 17 | 7 G 1.0 | 0.39 (10.0) | 73.9 (110) | 115.6 (172) |
| **CF10.10.12** | 17 | 12 G 1.0 | 0.53 (13.5) | 117.6 (175) | 197.6 (294) |
| **CF10.10.18** | 17 | 18 G 1.0 | 0.63 (16.0) | 164.0 (244) | 271.5 (404) |
| **CF10.10.25** | 17 | 25 G 1.0 | 0.75 (19.0) | 217.0 (323) | 369.6 (550) |
| **CF10.15.04** | 16 | 4 G 1.5 | 0.35 (9.0) | 63.2 (94) | 94.7 (141) |
| **CF10.15.05** | 16 | 5 G 1.5 | 0.37 (9.5) | 74.6 (111) | 109.5 (163) |
| **CF10.15.07** [17] | 16 | 7 G 1.5 | 0.45 (11.5) | 99.5 (148) | 150.5 (224) |
| **CF10.15.12** | 16 | 12 G 1.5 | 0.59 (15.0) | 161.3 (240) | 250.6 (373) |
| **CF10.15.18** | 16 | 18 G 1.5 | 0.73 (18.5) | 245.3 (365) | 381.7 (568) |
| **CF10.25.04** | 14 | 4 G 2.5 | 0.43 (11.0) | 94.1 (140) | 140.4 (209) |
| **CF10.25.07** [17] | 14 | 7 G 2.5 | 0.53 (13.5) | 152.5 (227) | 225.1 (335) |
| **CF10.25.12** | 14 | 12 G 2.5 | 0.77 (19.5) | 270.1 (402) | 427.4 (636) |
| **CF10.40.04** | 12 | 4 G 4.0 | 0.49 (12.5) | 137.8 (205) | 192.9 (287) |
| **CF10.40.05** [11] | 12 | 5 G 4.0 | 0.53 (13.5) | 170.7 (254) | 235.9 (351) |

[11] Phase-out model
[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 7.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |



## Order example: CF10.01.12 - To your required length

**CF10 chainflex® series .01 Code nominal cross section .12 Number of conductors**

Order online ▶ www.igus.com/CF10

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.



**Control cable chainflex® CF10 in storage and retrieval units for high-bay warehouses. e-chain®: System E2**




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online: www.igus.com/cf-case**

**UL-verified chainflex® guarantee ... www.igus.com/ul-verified**

Control cable | TPE outer jacket

# chainflex® CF98.PLUS

**100,000,000** Cycles guaranteed

**3 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For heaviest duty applications and very small radii down to 3 x d
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

**100 million cycles in e-chains® guaranteed!**




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 3 x d |
| | flexible | min. 3 x d |
| | fixed | min. 3 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -58 °F to +194 °F (-50 °C to +90 °C) |
| | fixed | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space, Class 5 |
| Torsion | | Torsion ±90°, with 1m cable length, Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of a highly flexible special alloy. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Cores wound in a layer with especially short pitch length. |
| Color code | Colour code in accordance with DIN 47100.<br>**CF98-PLUS-02-03-INI:** brown, blue, black<br>**CF98-PLUS-03-04-INI:** brown, blue, black, white |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.<br>Colour: Steel blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V |
| Test voltage | 1,500V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | | |

# Class 7.5.4.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 40 million | 100 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 4 | 6 | 7 |
| -13/+176 | 3 | 5 | 6 |
| +176/+194 | 4 | 6 | 7 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For heaviest duty applications and very small radii down to 3 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Pick and place machines, automatic doors, cleanroom, very quick handling

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF98.PLUS




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF98.PLUS.01.02 | 26 | 2 x 0.14 | 0.18 (4.5) | 2.7 (4) | 12.1 (18) |
| CF98.PLUS.01.03 | 26 | 3 x 0.14 | 0.18 (4.5) | 4.0 (6) | 13.4 (20) |
| CF98.PLUS.01.04 | 26 | 4 x 0.14 | 0.20 (5.0) | 4.7 (7) | 16.8 (25) |
| CF98.PLUS.01.08 | 26 | 8 x 0.14 | 0.26 (6.5) | 10.1 (15) | 30.2 (45) |
| CF98.PLUS.02.03.INI | 24 | 3 x 0.25 | 0.20 (5.0) | 6.7 (10) | 19.5 (29) |
| CF98.PLUS.02.04 | 24 | 4 x 0.25 | 0.22 (5.5) | 9.4 (14) | 24.2 (36) |
| CF98.PLUS.02.08 | 24 | 8 x 0.25 | 0.30 (7.5) | 19.5 (29) | 45.7 (68) |
| CF98.PLUS.03.04.INI | 22 | 4 x 0.34 | 0.24 (6.0) | 10.1 (15) | 25.5 (38) |
| CF98.PLUS.05.04 | 20 | 4 x 0.5 | 0.24 (6.0) | 21.5 (32) | 35.6 (53) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

**Order example: CF98.PLUS.01.02 - To your required length**

CF98.PLUS chainflex® series .01 Code nominal cross section .02 Number of conductors

Order online ▶ www.igus.com/CF98PLUS

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

# Class 7.5.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | | |






Smaller and smaller installation spaces, shorter and shorter cycle times, 99% availability. These are the requirements that innovative automation specialists must meet.

To do this, igus® has been working on an unprecedented innovation for more than ten years.
The new generation of chainflex® **CF98.PLUS** (unshielded) and chainflex® **CF99.PLUS** (shielded) Control cables are a consistent development of the well-known, highly successful CF98/CF99 and CF298 and CF299 Control cable series.

Systematic research on process technology and insulation and conductor materials supported by a wide variety of test series in the igus® laboratory enabled igus® to develop this new generation of Control cables.
The result is cable series that can be used reliably with a minimum **bend radius of just 3 x d** (3 x cable diameter).

The cross-sectional areas range from 0.14mm² to 0.5mm² in both the shielded and unshielded versions.
This makes igus® the first and only manufacturer to offer catalogue goods for use in an e-chain® with a **guaranteed service life of 100 million cycles!**
This is with acceleration values of up to 100m/s².

Control cable | TPE outer jacket

# chainflex® CF99.PLUS



Example image

**100,000,000** Cycles guaranteed

**3 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For heaviest duty applications and very small radii down to 3 x d
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

**100 million cycles in e-chains® guaranteed!**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 3 x d |
| | flexible | min. 3 x d |
| | fixed | min. 2 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -58 °F to +194 °F (-50 °C to +90 °C) |
| | fixed | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space, Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of a highly flexible special alloy. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Cores wound in a layer with especially short pitch length. |
| Color code | Colour code in accordance with DIN 47100. |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending resistant braiding made of alloy wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.<br>Colour: Steel blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V |
| Test voltage | 1,500V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 7.5.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 40 million | 100 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 4 | 6 | 7 |
| -13/+176 | 3 | 5 | 6 |
| +176/+194 | 4 | 6 | 7 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

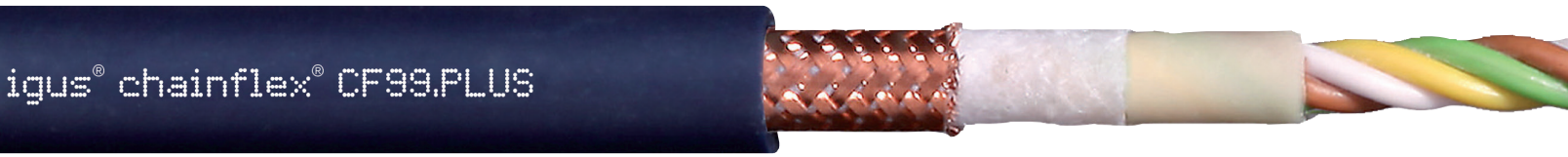
## Typical application areas

- For heaviest duty applications and very small radii down to 3 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Pick and place machines, automatic doors, cleanroom, very quick handling

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | TPE outer jacket

# chainflex® CF99.PLUS




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF99.PLUS.01.02 | 26 | 2 x 0.14 | 0.24 (6.0) | 8.1 (12) | 26.2 (39) |
| CF99.PLUS.01.04 | 26 | 4 x 0.14 | 0.26 (6.5) | 10.8 (16) | 32.3 (48) |
| CF99.PLUS.01.08 | 26 | 8 x 0.14 | 0.31 (8.0) | 18.8 (28) | 51.1 (76) |
| CF99.PLUS.02.04 | 24 | 4 x 0.25 | 0.28 (7.0) | 15.5 (23) | 40.3 (60) |
| CF99.PLUS.03.08 | 22 | 8 x 0.34 | 0.37 (9.5) | 30.2 (45) | 74.6 (111) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

**Order example: CF99.PLUS.01.02 - To your required length**
CF99.PLUS chainflex® series .01 Code nominal cross section .02 Number of conductors

Order online ▶ www.igus.com/CF99PLUS

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

# Class 7.5.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |






Smaller and smaller installation spaces, shorter and shorter cycle times, 99% availability. These are the requirements that innovative automation specialists must meet.

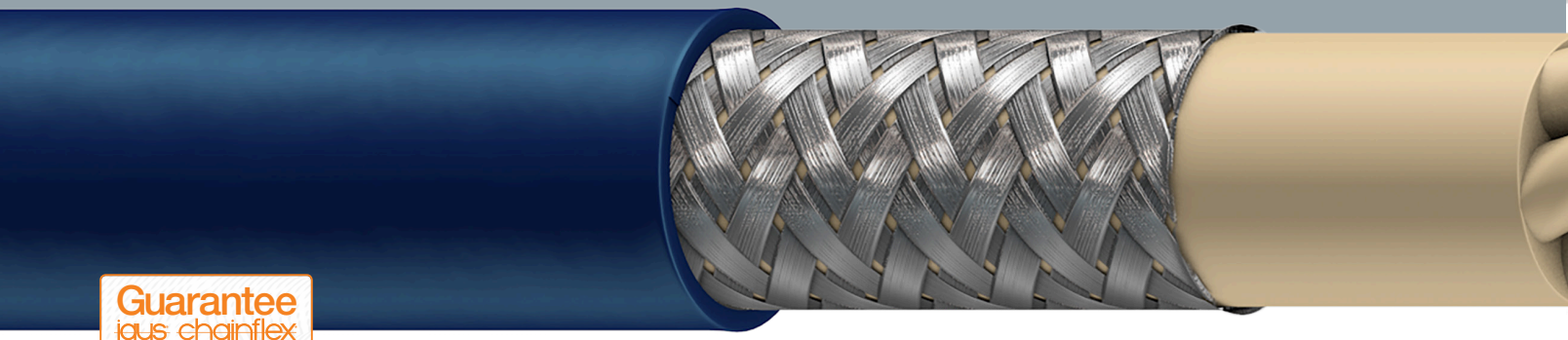
To do this, igus® has been working on an unprecedented innovation for more than ten years.
The new generation of chainflex® **CF98.PLUS** (unshielded) and chainflex® **CF99.PLUS** (shielded) Control cables are a consistent development of the well-known, highly successful CF98/CF99 and CF298 and CF299 Control cable series.

Systematic research on process technology and insulation and conductor materials supported by a wide variety of test series in the igus® laboratory enabled igus® to develop this new generation of Control cables.
The result is cable series that can be used reliably with a minimum **bend radius of just 3 x d** (3 x cable diameter).

The cross-sectional areas range from 0.14mm² to 0.5mm² in both the shielded and unshielded versions.
This makes igus® the first and only manufacturer to offer catalogue goods for use in an e-chain® with a **guaranteed service life of 100 million cycles!**
This is with acceleration values of up to 100m/s².

chainflex®

# Data cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29365

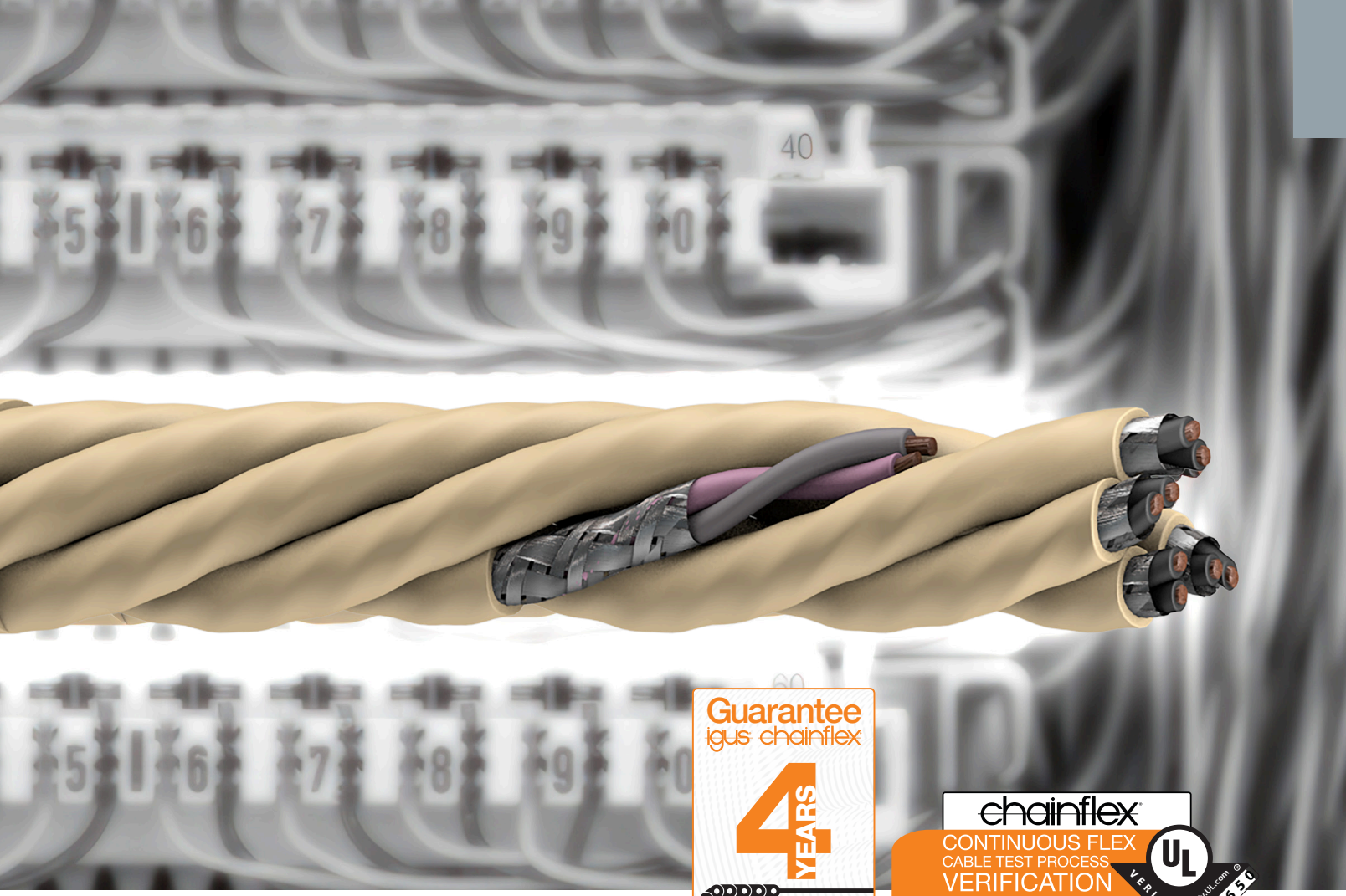
igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · cULus · UL · NFPA · DNV · REACH · RoHS · clean-room · dry cleanroom tested · CE

## Data cables for energy chains®

Specially designed for use in e-chains®, for small bend radii (up to 6.8 x d). Cores wound in layers, twisted pairs and twisted pairs with pair shields. In addition, various mechanical qualities are available. Tested with a chainflex® guarantee of up to 4 years.

- Three different structures: cores wound in layers, twisted pairs and pair shields
- With three different outer jacket materials, always find the most cost-effective Data cable that is guaranteed to work in your application
- Best EMC properties thanks to high shield coverage, tested in the largest test laboratory for moving cables
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment
- Calculate the exact service life online: igus.com/chainflexlife




Background

# Flexible Data cable as information carrier

Data cables are usually shielded and are used for signal transmission in automation technology e.g.

The electrical nominal cross-sections range from 0.14 $mm^2$ to 0.5 $mm^2$. Depending on requirements, there may also be exceptions with larger cross-sections.

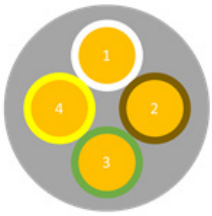
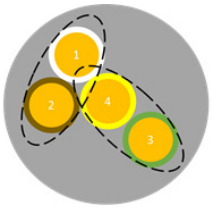
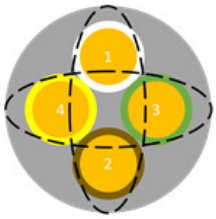
Due to their small cross-sections, Data cables are usually color-marked for better differentiation. Different color markings are used, with the DIN 47100 system being the most common. This system defines the color sequence of the wires (see the table on page 488).

Data cables have three different cores structures, which are based on the electrical requirements of automation technology.

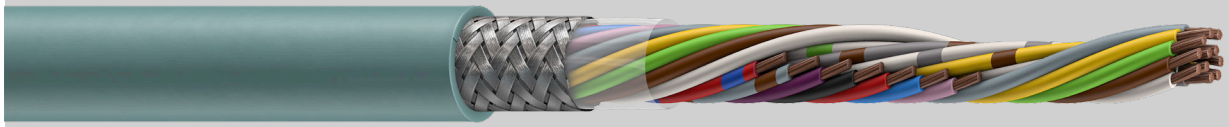
The difference between bus and Data cables is that bus cables are assigned to a specific bus system in their electrical design. Certain electrical properties, such as characteristic wave impedance, are also defined here. Data cables, on the other hand, do not usually have specific data technology limits.

igus® offers nine electrically identical Data cable series with different mechanical properties and jacket materials to provide the best solution for every e-chain® application.

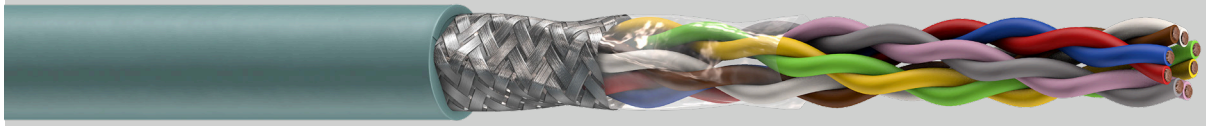
# Core structures overview

| Core structures | Benefit | Disadvantage |
|---|---|---|
| Cores wound in layers  | Low costs, diameter-optimized design | Low security during data transmission |
| Twisted pair  | High data transfer security | Higher costs |
| Star-quad stranding (typically used for 4-core cables)  | Cost-effective, small diameter, high data transmission security | Connection type must be observed |

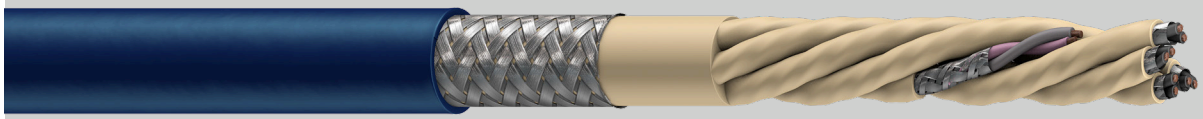
## Cores wound in layers



## Twisted pair



## Twisted pairs with pair shields



# chainflex® Data cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CF240 | PVC | ● | 10 | +41/+158 | 9.84 | 6.56 | 65.6 | ≤ 164.1 | 118 |
| CF240.PUR | PUR | ● | 10 | -13/+176 | 9.84 | 6.56 | 65.6 | ≤ 164.1 | 122 |
| CF211 | PVC | ● | 7.5 | +41/+158 | 16.41 | 9.84 | 164.1 | ≤ 328.1 | 126 |
| CF211.PUR New | PUR | ● | 7.5 | -13/+176 | 16.41 | 9.84 | 164.1 | ≤ 328.1 | 130 |
| CF11 | TPE | ● | 6.8 | -31/+212 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 134 |
| CF112 | PUR | ● | 10 | -13/+176 | 32.81 | 16.41 | 262.5 | ≤ 328.1 | 138 |
| CF12 | TPE | ● | 10 | -31/+212 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 142 |
| CFKoax1/3 | TPE | ● | 10 | -31/+212 | 32.81 | 16.41 | 328.1 | ≤ 1,312 | 144 |
| CFKoax2 | TPE | ● | 10 | -31/+158 | 32.81 | 16.41 | 328.1 | ≤ 1,312 | 144 |

## Approvals/Resistance

| chainflex® cables | Approvals and standards | | | | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | oil | | PTFE FREE | c UL us LISTED | c UL us LISTED | UL LISTED | | | | | | | | | | | | | CE | |
| CF240 | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | | 118 |
| CF240.PUR | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | | 122 |
| CF211 | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | | 126 |
| CF211.PUR New | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | | 130 |
| CF11 | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | | ● | | 134 |
| CF112 | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | | 138 |
| CF12 | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | | ● | | 142 |
| CFKoax1/3 | ● | | | | | | | | | | | | ● | ● | ● | | | ● | | 144 |
| CFKoax2 | ● | | ● | | | | | | | | | | ● | ● | ● | | | ● | | 144 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Page |
|---|---|---|---|---|---|---|---|---|
| | | 5 million cycles * | | 7.5 million cycles * | | 10 million cycles * | | |
| CF240 | +41 / +59 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 | 118 |
| | +59 / +140 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| | +140 / +158 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 | |
| CF240.PUR | -13 / +5 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 | 122 |
| | +5 / +158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 | |
| | +158 / +176 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 | |
| CF211 | +41 / +59 | 10 | | 11 | | 12 | | 126 |
| | +59 / +140 | 7.5 | | 8.5 | | 9.5 | | |
| | +140 / +158 | 10 | | 11 | | 12 | | |
| CF211.PUR New | -13 / +5 | 10 | | 11 | | 12 | | 130 |
| | +5 / +158 | 7.5 | | 8.5 | | 9.5 | | |
| | +158 / +176 | 10 | | 11 | | 12 | | |
| | | 5 million | | 7.5 million | | 12.5 million | | |
| CF11 | -31 / -13 | 7.5 | | 8.5 | | 9.5 | | 134 |
| | -13 / +194 | 6.8 | | 7.5 | | 8.5 | | |
| | +194 / +212 | 7.5 | | 8.5 | | 9.5 | | |
| | | 5 million | | 7.5 million | | 10 million | | |
| CF112 | -13 / +5 | 12.5 | | 13.5 | | 14.5 | | 138 |
| | +5 / +158 | 10 | | 11 | | 12 | | |
| | +158 / +176 | 12.5 | | 13.5 | | 14.5 | | |
| | | 5 million | | 7.5 million | | 12.5 million | | |
| CF12 | -31 / -13 | 12.5 | | 13.5 | | 14.5 | | 142 |
| | -13 / +194 | 10 | | 11 | | 12 | | |
| | +194 / +212 | 12.5 | | 13.5 | | 14.5 | | |
| | | 5 million | | 7.5 million | | 10 million | | |
| CFKoax1/3 | -31 / -13 | 12.5 | | 13.5 | | 14.5 | | 144 |
| | -13 / +194 | 10 | | 11 | | 12 | | |
| | +194 / +212 | 12.5 | | 13.5 | | 14.5 | | |
| CFKoax2 | -31 / -13 | 12.5 | | 13.5 | | 14.5 | | 144 |
| | -13 / +140 | 10 | | 11 | | 12 | | |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

Data cable | PVC outer jacket

# chainflex® CF240

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**164.1 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors are cabled in layers with short pitch lengths. |
| Color code | Color code in accordance with DIN 47100. |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Gray (similar to RAL 7001) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 1500 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.2.1

## Properties and approvals

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF240 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 |
| +59/+140 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +140/+158 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

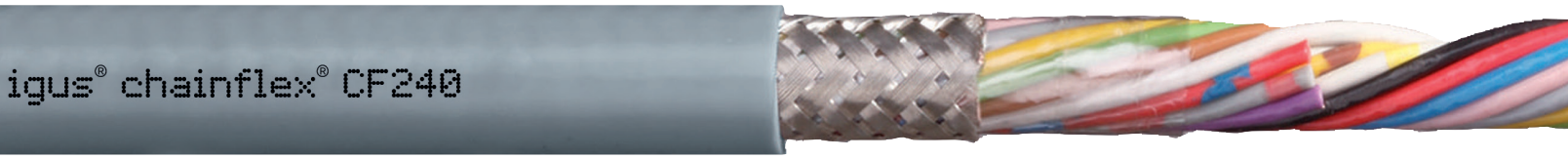
## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 164 ft (50 m), Class 4
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, Handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PVC outer jacket

# chainflex® CF240




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF240.01.03** | 26 | 3 x 0.14 | 0.18 (4.5) | 8.1 (12) | 18.8 (28) |
| **CF240.01.04** | 26 | 4 x 0.14 | 0.20 (5.0) | 11.4 (17) | 21.5 (32) |
| **CF240.01.05** | 26 | 5 x 0.14 | 0.22 (5.5) | 12.8 (19) | 24.9 (37) |
| **CF240.01.07** | 26 | 7 x 0.14 | 0.24 (6.0) | 16.8 (25) | 31.6 (47) |
| **CF240.01.14** | 26 | 14 x 0.14 | 0.28 (7.0) | 27.6 (41) | 50.4 (75) |
| **CF240.01.18** | 26 | 18 x 0.14 | 0.30 (7.5) | 34.3 (51) | 60.5 (90) |
| **CF240.01.24** | 26 | 24 x 0.14 | 0.33 (8.5) | 43.0 (64) | 84.0 (125) |
| **CF240.02.03** | 24 | 3 x 0.25 | 0.20 (5.0) | 12.8 (19) | 23.5 (35) |
| **CF240.02.04** | 24 | 4 x 0.25 | 0.22 (5.5) | 15.5 (23) | 30.2 (45) |
| **CF240.02.05** | 24 | 5 x 0.25 | 0.24 (6.0) | 18.8 (28) | 32.9 (49) |
| **CF240.02.07** | 24 | 7 x 0.25 | 0.26 (6.5) | 23.5 (35) | 41.0 (61) |
| **CF240.02.08** | 24 | 8 x 0.25 | 0.28 (7.0) | 26.2 (39) | 45.7 (68) |
| **CF240.02.14** | 24 | 14 x 0.25 | 0.30 (7.5) | 40.3 (60) | 61.8 (92) |
| **CF240.02.18** | 24 | 18 x 0.25 | 0.33 (8.5) | 47.7 (71) | 82.0 (122) |
| **CF240.02.24** | 24 | 24 x 0.25 | 0.39 (10.0) | 63.8 (95) | 108.2 (161) |
| **CF240.03.02** | 22 | 2 x 0.34 | 0.22 (5.5) | 14.1 (21) | 24.9 (37) |
| **CF240.03.03** | 22 | 3 x 0.34 | 0.22 (5.5) | 19.5 (29) | 28.2 (42) |
| **CF240.03.04** | 22 | 4 x 0.34 | 0.24 (6.0) | 22.2 (33) | 34.3 (51) |
| **CF240.03.05** | 22 | 5 x 0.34 | 0.26 (6.5) | 25.5 (38) | 37.6 (56) |
| **CF240.03.07** | 22 | 7 x 0.34 | 0.30 (7.5) | 33.6 (50) | 51.7 (77) |
| **CF240.03.10** | 22 | 10 x 0.34 | 0.31 (8.0) | 39.0 (58) | 65.2 (97) |
| **CF240.03.14** | 22 | 14 x 0.34 | 0.31 (8.0) | 49.7 (74) | 75.3 (112) |
| **CF240.03.18** | 22 | 18 x 0.34 | 0.35 (9.0) | 61.1 (91) | 93.4 (139) |
| **CF240.03.24** | 22 | 24 x 0.34 | 0.39 (10.0) | 80.0 (119) | 118.9 (177) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



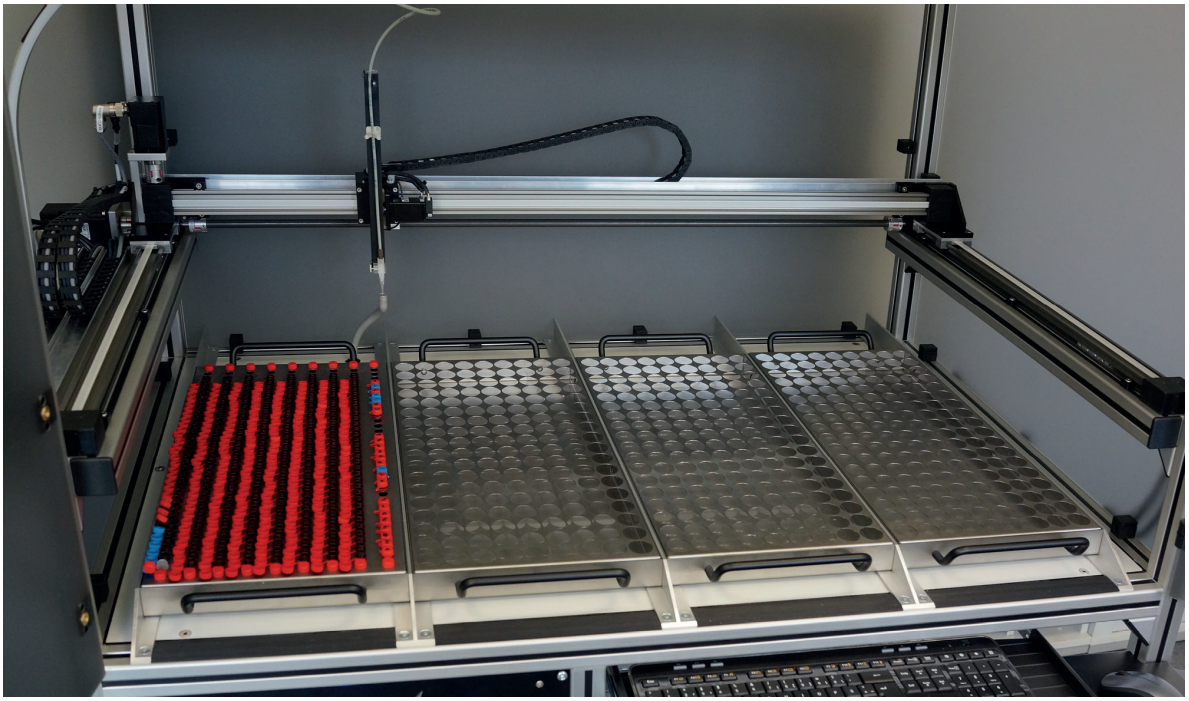
## Order example: CF240.01.03 - To your required length

CF240 chainflex® series .01 Code nominal cross section .03 Number of conductors

Order online ▶ www.igus.com/CF240

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.



chainflex® CF240 Data cables in small handling machines

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PUR outer jacket

# chainflex® CF240.PUR




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**164.1 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | 65.6 ft/s² (20 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors are cabled in layers with short pitch lengths. |
| Color code | Color code in accordance with DIN 47100. |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Gray (similar to RAL 7040) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 1500 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF240PUR |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X3 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF240PUR |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 |
| +5/+158 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +158/+176 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

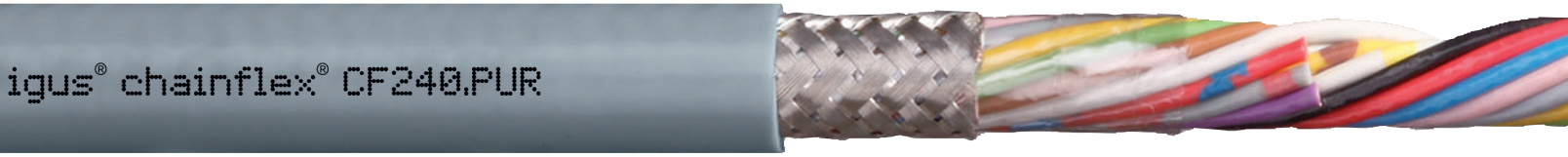
## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 164 ft (50 m), Class 4
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PUR outer jacket

# chainflex® CF240.PUR




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF240.PUR.01.04** | 26 | 4 x 0.14 | 0.22 (5.5) | 10.1 (15) | 26.2 (39) |
| **CF240.PUR.01.07** | 26 | 7 x 0.14 | 0.26 (6.5) | 16.1 (24) | 36.3 (54) |
| **CF240.PUR.01.08** [11)] | 26 | 8 x 0.14 | 0.28 (7.0) | 17.5 (26) | 43.0 (64) |
| **CF240.PUR.01.14** | 26 | 14 x 0.14 | 0.30 (7.5) | 27.6 (41) | 53.1 (79) |
| **CF240.PUR.01.18** | 26 | 18 x 0.14 | 0.31 (8.0) | 34.3 (51) | 65.2 (97) |
| **CF240.PUR.01.25** | 26 | 25 x 0.14 | 0.33 (8.5) | 44.3 (66) | 67.9 (101) |
| **CF240.PUR.02.03** | 24 | 3 x 0.25 | 0.22 (5.5) | 12.1 (18) | 27.6 (41) |
| **CF240.PUR.02.04** | 24 | 4 x 0.25 | 0.24 (6.0) | 14.8 (22) | 30.2 (45) |
| **CF240.PUR.02.05** | 24 | 5 x 0.25 | 0.24 (6.0) | 16.8 (25) | 33.6 (50) |
| **CF240.PUR.02.07** | 24 | 7 x 0.25 | 0.28 (7.0) | 22.2 (33) | 43.7 (65) |
| **CF240.PUR.02.08** | 24 | 8 x 0.25 | 0.28 (7.0) | 26.2 (39) | 48.4 (72) |
| **CF240.PUR.02.14** | 24 | 14 x 0.25 | 0.31 (8.0) | 40.3 (60) | 69.2 (103) |
| **CF240.PUR.02.18** | 24 | 18 x 0.25 | 0.35 (9.0) | 47.7 (71) | 82.0 (122) |
| **CF240.PUR.02.25** | 24 | 25 x 0.25 | 0.41 (10.5) | 65.2 (97) | 102.1 (152) |
| **CF240.PUR.03.03** | 22 | 3 x 0.34 | 0.20 (5.0) | 16.8 (25) | 31.6 (47) |
| **CF240.PUR.03.04** | 22 | 4 x 0.34 | 0.22 (5.5) | 20.2 (30) | 36.3 (54) |
| **CF240.PUR.03.05** | 22 | 5 x 0.34 | 0.24 (6.0) | 22.8 (34) | 40.3 (60) |
| **CF240.PUR.03.07** | 22 | 7 x 0.34 | 0.26 (6.5) | 30.2 (45) | 56.4 (84) |
| **CF240.PUR.03.14** | 22 | 14 x 0.34 | 0.31 (8.0) | 49.7 (74) | 84.7 (126) |
| **CF240.PUR.03.18** | 22 | 18 x 0.34 | 0.33 (8.5) | 61.1 (91) | 104.8 (156) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.4.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



**Order example: CF240.PUR.01.04 - To your required length**
CF240.PUR chainflex® series .01 Code nominal cross section .04 Number of conductors

Order online ▶ www.igus.com/CF240PUR

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you:: Reduce cost with CF240 ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PVC outer jacket

# chainflex® CF211




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PVC outer jacket
- Shielded
- Twisted pair
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 16.41 ft/s (5 m/s) |
| | gliding | 9.84 ft/s (3 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Twisted Pairs cabled together with short pitch lengths. |
| Color code | Color code in accordance with DIN 47100. |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Gray (similar to RAL 7001) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 1500 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.1

## Properties and approvals

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF211DATA |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF240.02.24 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 11 | 12 |
| +59/+140 | 7.5 | 8.5 | 9.5 |
| +140/+158 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, Handling, indoor cranes

Guarantee igus chainflex 4 YEARS up to 4 years guarantee
igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year
chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION VERIFIED E223650

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PVC outer jacket

# chainflex® CF211




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF211.02.01.02** | 24 | 1 PR x 0.25 | 0.20 (5.0) | 12.1 (18) | 22.2 (33) |
| **CF211.02.02.02** [2)] | 24 | 2 PR x 0.25 | 0.24 (6.0) | 16.8 (25) | 34.3 (51) |
| **CF211.02.03.02** | 24 | 3 PR x 0.25 | 0.28 (7.0) | 24.2 (36) | 42.3 (63) |
| **CF211.02.04.02** | 24 | 4 PR x 0.25 | 0.30 (7.5) | 29.6 (44) | 51.1 (76) |
| **CF211.02.05.02** | 24 | 5 PR x 0.25 | 0.33 (8.5) | 34.9 (52) | 61.8 (92) |
| **CF211.02.06.02** | 24 | 6 PR x 0.25 | 0.35 (9.0) | 41.7 (62) | 70.6 (105) |
| **CF211.02.08.02** | 24 | 8 PR x 0.25 | 0.41 (10.5) | 52.4 (78) | 92.1 (137) |
| **CF211.02.10.02** | 24 | 10 PR x 0.25 | 0.47 (12.0) | 60.5 (90) | 114.2 (170) |
| **CF211.02.14.02** | 24 | 14 PR x 0.25 | 0.47 (12.0) | 80.0 (119) | 137.1 (204) |
| **CF211.03.03.02** | 22 | 3 PR x 0.34 | 0.31 (8.0) | 29.6 (44) | 57.8 (86) |
| **CF211.03.08.02** | 22 | 8 PR x 0.34 | 0.47 (12.0) | 68.5 (102) | 138.4 (206) |
| **CF211.05.01.02** | 20 | 1 PR x 0.5 | 0.24 (6.0) | 17.5 (26) | 34.3 (51) |
| **CF211.05.02.02** [2)] | 20 | 2 PR x 0.5 | 0.28 (7.0) | 30.9 (46) | 60.5 (90) |
| **CF211.05.03.02** | 20 | 3 PR x 0.5 | 0.35 (9.0) | 41.0 (61) | 73.2 (109) |
| **CF211.05.04.02** | 20 | 4 PR x 0.5 | 0.37 (9.5) | 49.7 (74) | 84.0 (125) |
| **CF211.05.05.02** | 20 | 5 PR x 0.5 | 0.43 (11.0) | 61.1 (91) | 102.8 (153) |
| **CF211.05.06.02** | 20 | 6 PR x 0.5 | 0.45 (11.5) | 69.2 (103) | 127.0 (189) |
| **CF211.05.08.02** | 20 | 8 PR x 0.5 | 0.51 (13.0) | 92.1 (137) | 157.2 (234) |
| **CF211.05.10.02** | 20 | 10 PR x 0.5 | 0.61 (15.5) | 121.6 (181) | 219.1 (326) |
| **CF211.05.14.02** | 20 | 14 PR x 0.5 | 0.63 (16.0) | 129.7 (193) | 229.1 (341) |

The chainflex® types marked with [2)] are cables designed as a star-quad.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |



**Order example: CF211.02.01.02 - To your required length**

CF211 chainflex® series .02 Code nominal cross section .01 Number of pairs .02 Identification pairs

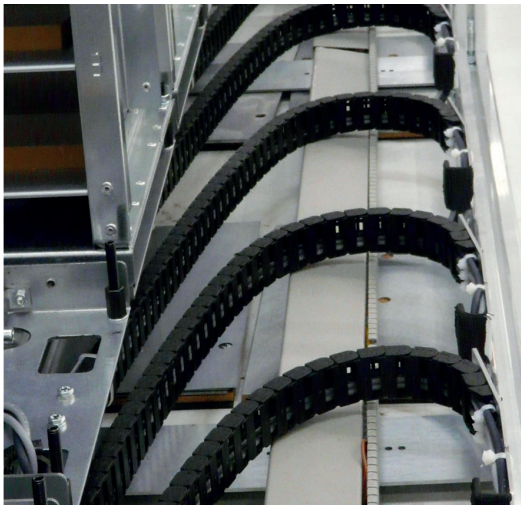
Order online ▶ www.igus.com/CF211DATA

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.



chainflex® cables (e.g. CF211) and igus® e-chains® (E065 series) in a pharmacy picking systems



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year. VERIFIED E233650

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PUR outer jacket

# chainflex® CF211.PUR




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PUR outer jacket
- Shielded
- Twisted pair
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 16.41 ft/s (5 m/s) |
| | gliding | 9.84 ft/s (3 m/s) |
| a max. | 164.1 ft/s² (50 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Twisted Pairs cabled together with short pitch lengths. |
| Color code | Color code in accordance with DIN 47100. |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Gray (similar to RAL 7040) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 1500 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 5.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF211PUR |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X3 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF211PUR |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 10 | 11 | 12 |
| +5/+158 | 7.5 | 8.5 | 9.5 |
| +158/+176 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

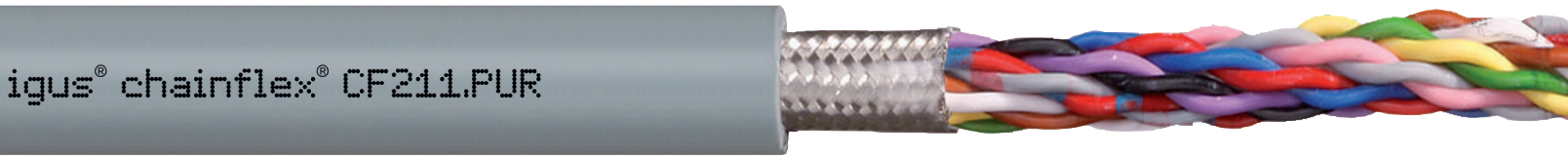
## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PUR outer jacket

# chainflex® CF211.PUR




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF211.PUR.02.01.02** | 24 | 1 PR x 0.25 | 0.20 (5.0) | 12.1 (18) | 21.5 (32) |
| **CF211.PUR.02.02.02** 2) | 24 | 2 PR x 0.25 | 0.24 (6.0) | 16.8 (25) | 32.9 (49) |
| **CF211.PUR.02.03.02** | 24 | 3 PR x 0.25 | 0.28 (7.0) | 24.2 (36) | 43.7 (65) |
| **CF211.PUR.02.04.02** | 24 | 4 PR x 0.25 | 0.30 (7.5) | 29.6 (44) | 51.1 (76) |
| **CF211.PUR.02.05.02** | 24 | 5 PR x 0.25 | 0.33 (8.5) | 34.9 (52) | 59.8 (89) |
| **CF211.PUR.02.06.02** | 24 | 6 PR x 0.25 | 0.35 (9.0) | 41.7 (62) | 68.5 (102) |
| **CF211.PUR.02.08.02** | 24 | 8 PR x 0.25 | 0.41 (10.5) | 52.4 (78) | 87.4 (130) |
| **CF211.PUR.02.10.02** | 24 | 10 PR x 0.25 | 0.47 (12.0) | 60.5 (90) | 112.9 (168) |
| **CF211.PUR.02.14.02** | 24 | 14 PR x 0.25 | 0.47 (12.0) | 80.0 (119) | 137.1 (204) |
| **CF211.PUR.03.03.02** | 22 | 3 PR x 0.34 | 0.31 (8.0) | 29.6 (44) | 55.8 (83) |
| New **CF211.PUR.03.06.02** | 22 | 6 PR x 0.34 | 0.39 (10.0) | 42.3 (63) | 80.0 (119) |
| **CF211.PUR.03.08.02** | 22 | 8 PR x 0.34 | 0.47 (12.0) | 63.8 (95) | 109.5 (163) |
| **CF211.PUR.05.01.02** | 20 | 1 PR x 0.5 | 0.24 (6.0) | 17.5 (26) | 34.3 (51) |
| **CF211.PUR.05.02.02** 2) | 20 | 2 PR x 0.5 | 0.28 (7.0) | 27.6 (41) | 57.8 (86) |
| **CF211.PUR.05.03.02** | 20 | 3 PR x 0.5 | 0.35 (9.0) | 41.0 (61) | 70.6 (105) |
| **CF211.PUR.05.04.02** | 20 | 4 PR x 0.5 | 0.37 (9.5) | 49.7 (74) | 82.7 (123) |
| **CF211.PUR.05.05.02** | 20 | 5 PR x 0.5 | 0.43 (11.0) | 61.1 (91) | 102.1 (152) |
| **CF211.PUR.05.06.02** | 20 | 6 PR x 0.5 | 0.45 (11.5) | 69.2 (103) | 127.0 (189) |
| **CF211.PUR.05.08.02** | 20 | 8 PR x 0.5 | 0.51 (13.0) | 92.1 (137) | 148.5 (221) |
| **CF211.PUR.05.10.02** | 20 | 10 PR x 0.5 | 0.61 (15.5) | 114.2 (170) | 199.6 (297) |
| **CF211.PUR.05.14.02** | 20 | 14 PR x 0.5 | 0.61 (15.5) | 124.3 (185) | 209.0 (311) |

The chainflex® types marked with 2) are cables designed as a star-quad.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |



**Order example: CF211.PUR.02.01.02 - To your required length**

CF211-PUR **chainflex® series** .02 **Code nominal cross section** .01 **Number of pairs** .02 **Identification pairs**

Order online ▶ www.igus.com/CF211PUR

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**

Do the chainflex® price check ...

www.igus.com/info/cable-price-check

… just one idea for you:: Reduce cost with CF211 ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | TPE outer jacket

# chainflex® CF11




Example image

**12,500,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Shielded
- Twisted pair
- Oil and bio-oil-resistant
- PVC and halogen-free
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 6.8 x d |
| | **flexible** | min. 5 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -58 °F to +212 °F (-50 °C to +100 °C) |
| | **fixed** | -67 °F to +212 °F (-55 °C to +100 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 328.1 ft/s² (100 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | Twisted Pairs cabled together with short pitch lengths. |
| **Color code** | **26-18 AWG:** Color code in accordance with DIN 47100.<br>**17-14 AWG:** Black with white numbers. |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| **Test voltage** | 1500 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF11 (from production date 01/2022) |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 7.5 | 8.5 | 9.5 |
| -13/+194 | 6.8 | 7.5 | 8.5 |
| +194/+212 | 7.5 | 8.5 | 9.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | TPE outer jacket

# chainflex® CF11




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF11.01.04.02** | 26 | 4 PR x 0.14 | 0.30 (7.5) | 20.2 (30) | 42.3 (63) |
| **CF11.01.18.02** | 26 | 18 PR x 0.14 | 0.49 (12.5) | 67.9 (101) | 135.7 (202) |
| **CF11.02.01.02** | 24 | 1 PR x 0.25 | 0.24 (6.0) | 11.4 (17) | 26.2 (39) |
| **CF11.02.02.02** [2)] | 24 | 2 PR x 0.25 | 0.26 (6.5) | 17.5 (26) | 31.6 (47) |
| **CF11.02.03.02** | 24 | 3 PR x 0.25 | 0.31 (8.0) | 23.5 (35) | 52.4 (78) |
| **CF11.02.04.02** | 24 | 4 PR x 0.25 | 0.33 (8.5) | 28.2 (42) | 60.5 (90) |
| **CF11.02.05.02** | 24 | 5 PR x 0.25 | 0.35 (9.0) | 32.9 (49) | 67.2 (100) |
| **CF11.02.06.02** | 24 | 6 PR x 0.25 | 0.39 (10.0) | 46.4 (69) | 84.0 (125) |
| **CF11.02.10.02** | 24 | 10 PR x 0.25 | 0.53 (13.5) | 69.2 (103) | 139.1 (207) |
| **CF11.02.14.02** | 24 | 14 PR x 0.25 | 0.55 (14.0) | 83.3 (124) | 153.2 (228) |
| **CF11.03.08.02** | 22 | 8 PR x 0.34 | 0.51 (13.0) | 71.2 (106) | 140.4 (209) |
| **CF11.05.04.02** | 20 | 4 PR x 0.5 | 0.37 (9.5) | 51.7 (77) | 94.1 (140) |
| **CF11.05.06.02** | 20 | 6 PR x 0.5 | 0.47 (12.0) | 69.2 (103) | 133.0 (198) |
| **CF11.05.08.02** | 20 | 8 PR x 0.5 | 0.57 (14.5) | 90.7 (135) | 168.7 (251) |
| **CF11.07.03.02** | 18 | 3 PR x 0.75 | 0.41 (10.5) | 55.8 (83) | 104.2 (155) |
| **CF11.10.04.02** | 17 | 4 PR x 1.0 | 0.49 (12.5) | 84.0 (125) | 155.9 (232) |
| **CF11.15.06.02** | 16 | 6 PR x 1.5 | 0.65 (16.5) | 166.0 (247) | 282.2 (420) |

The chainflex® types marked with [2)] are cables designed as a star-quad.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



**Order example: CF11.01.04.02 - To your required length**

CF11 chainflex® series .01 Code nominal cross section .04 Number of pairs .02 Identification pairs

Order online ▶ www.igus.com/CF11

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**

Do the chainflex® price check ...

www.igus.com/info/cable-price-check

… just one idea for you:: Reduce cost with CF211.PUR ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PUR outer jacket

# chainflex® CF112




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For very high mechanical load requirements
- PUR outer jacket
- Shielded twisted Pairs with an overall shield
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Twisted Pairs cabled together with short pitch lengths. |
| Color code | Color code in accordance with DIN 47100. |
| Element shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Gray (similar to RAL 7016) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 1500 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF112 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X3 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF112 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

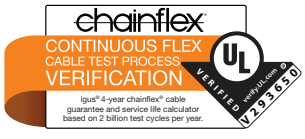
| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 13.5 | 14.5 |
| +5/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

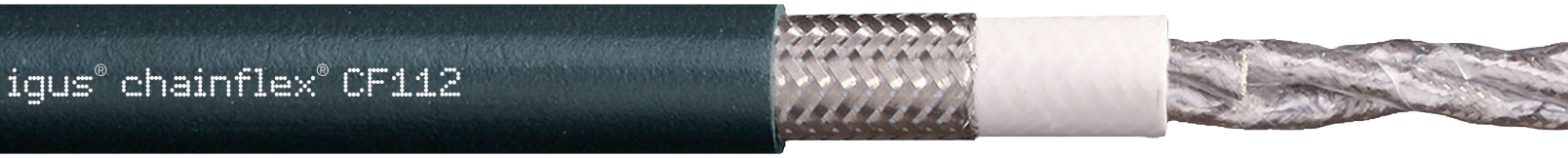



UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Data cable | PUR outer jacket

# chainflex® CF112




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF112.02.02.02** | 24 | 2 PR x 0.25 | 0.37 (9.5) | 38.3 (57) | 79.3 (118) |
| **CF112.02.03.02** | 24 | 3 PR x 0.25 | 0.39 (10.0) | 47.7 (71) | 89.4 (133) |
| **CF112.02.04.02** | 24 | 4 PR x 0.25 | 0.43 (11.0) | 52.4 (78) | 102.8 (153) |
| **CF112.02.05.02** | 24 | 5 PR x 0.25 | 0.45 (11.5) | 66.5 (99) | 119.6 (178) |
| **CF112.05.02.02** | 20 | 2 PR x 0.5 | 0.45 (11.5) | 50.4 (75) | 109.5 (163) |
| **CF112.05.04.02** | 20 | 4 PR x 0.5 | 0.51 (13.0) | 78.6 (117) | 145.8 (217) |
| **CF112.05.06.02** | 20 | 6 PR x 0.5 | 0.57 (14.5) | 107.5 (160) | 191.5 (285) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

**Order example:** CF112.02.02.02 **- To your required length**

CF112 **chainflex® series** .02 **Code nominal cross section** .02 **Number of pairs** .02 **Identification pairs**

Order online ▶ www.igus.com/CF112

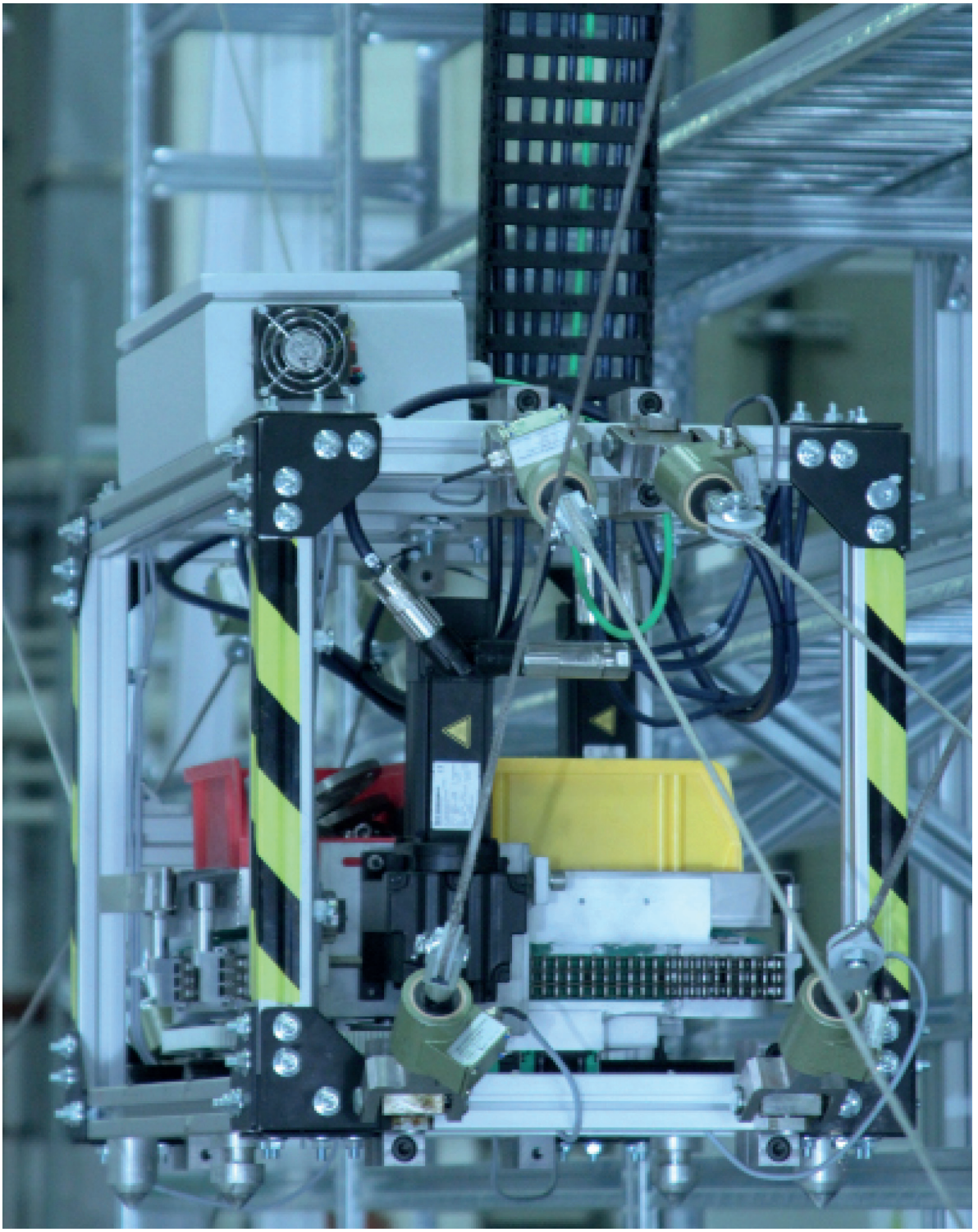
Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |





Hanging application with chainflex® CF112 Data cables

Data cable | TPE outer jacket

# chainflex® CF12




Example image

**12,500,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Double-shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -58 °F to +212 °F (-50 °C to +100 °C) |
| | **fixed** | -67 °F to +212 °F (-55 °C to +100 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 328.1 ft/s² (100 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | Twisted Pairs cabled together with short pitch lengths. |
| **Color code** | **24AWG:** Color code in accordance with DIN 47100.<br>**20-17AWG:** Black with white numbers. |
| **Element shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Element jacket** | TPE mixture on pair shielding adapted to suit the requirements in e-chains®. |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Highly flexible shield consisting of galvanized steel wire braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/300V (following DIN VDE 0298-3)<br>300V (following UL) |
| **Test voltage** | 1500 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |

# Class 6.6.4.1

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF12 (from production date 01/2022) |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 12.5 | 13.5 | 14.5 |
| -13/+194 | 10 | 11 | 12 |
| +194/+212 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- For maximum EMC protection
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF12.02.04.02** | 24 | 4 PR x 0.25 | 0.45 (11.5) | 34.9 (52) | 115.6 (172) |
| **CF12.05.03.02** | 20 | 3 PR x 0.5 | 0.53 (13.5) | 43.7 (65) | 150.5 (224) |
| **CF12.05.04.02** | 20 | 4 PR x 0.5 | 0.57 (14.5) | 55.8 (83) | 179.4 (267) |
| **CF12.05.06.02** | 20 | 6 PR x 0.5 | 0.67 (17.0) | 86.0 (128) | 252.7 (376) |
| **CF12.05.08.02** | 20 | 8 PR x 0.5 | 0.81 (20.5) | 109.5 (163) | 338.0 (503) |
| **CF12.05.10.02** [11)] | 20 | 10 PR x 0.5 | 0.89 (22.5) | 136.4 (203) | 406.5 (605) |
| **CF12.05.14.02** | 20 | 14 PR x 0.5 | 0.89 (22.5) | 199.6 (297) | 456.3 (679) |
| **CF12.10.06.02** | 17 | 6 PR x 1.0 | 0.79 (20.0) | 133.0 (198) | 355.5 (529) |

[11)] Phase-out model
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Coax cable | TPE outer jacket

# chainflex® CFKoax




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- UV-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) (CFKoax1/3) |
| | | -31 °F to +158 °F (-35 °C to +70 °C) (CFKoax2) |
| | **flexible** | -58 °F to +212 °F (-50 °C to +100 °C) (CFKoax1/3) |
| | | -58 °F to +158 °F (-50 °C to +70 °C) (CFKoax2) |
| | **fixed** | -67 °F to +212 °F (-55 °C to +100 °C) (CFKoax1/3) |
| | | -67 °F to +158 °F (-55 °C to +70 °C) (CFKoax2) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | | 328.1 ft/s² (100 m/s²) |
| **Travel distance** | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| **Conductor** | **CFKoax1:** Silvered copper wires.<br>**CFKoax2**: Tinned copper wires.<br>**CFKoax3:** Silvered copper wires. |
| **Conductor insulation** | Special FEP mixture (CFKoax1/3)<br>Special PE-isolating mixture (CFKoax2) |
| **Conductor construction** | Conductors cabled in one layer with especially short pitch length. |
| **Color code** | Coaxial elements ▶ **Product range table** |
| **Element shield** | Extremely bending-resistant tinned copper braid.<br>Coverage approx. 70% linear, approx. 90 % optical |
| **Element jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: ▶ **Product range table** |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 500/500V (following DIN VDE 0298-3) |
| **Test voltage** | 1500 V (following DIN EN 50395) |

**4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE (CFKoax2) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |
| **Info** | The coaxial elements used in cables of the CFKoax1 series are comparable with a HF75-0.3/1.6 according to MIL-C-17/94-RG179 and thus fit into an RG179 plug! The coaxial elements used in cables of the CFKoax2 series are comparable with a HF50-0.9/2.95 according to MIL-C-17/28-RG58 and thus fit into an RG58 plug! The coaxial elements used in cables of the CFKoax3 series are comparable with a HF50-0.3/0.85 according to MIL-C-17/93-RG178 and thus fit into an RG178 plug! |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 12.5 | 13.5 | 14.5 |
| -13/+140 (CFKoax2) | 10 | 11 | 12 |
| -13/+194 (CFKoax1/3) | 10 | 11 | 12 |
| +140/+158 (CFKoax2) | 12.5 | 13.5 | 14.5 |
| +194/+212 (CFKoax1/3) | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

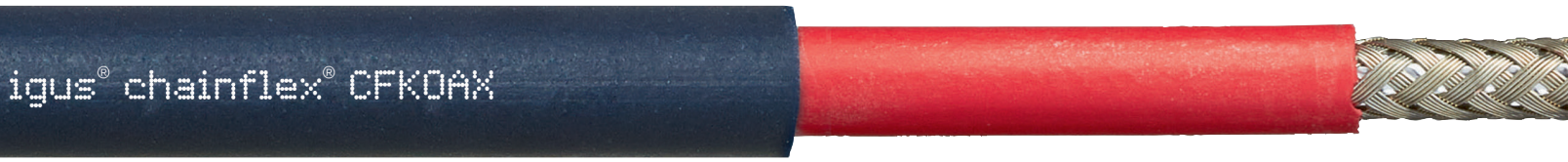
## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications with average sun radiation
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Coax cable | TPE outer jacket

# chainflex® CFKoax




Example image

| Part No. | AWG | Compatible with plug type | Coaxial elements | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| **CFKoax1.01** [5] | 30 | RG 179 | 1 | 0.18 (4.5) | 5.4 (8) | 15.5 (23) |
| **CFKoax1.05** [5] | 20 | RG 179 | 5 | 0.39 (10.0) | 22.8 (34) | 73.9 (110) |
| **CFKoax2.01** | 20 | RG 58 | 1 | 0.22 (5.5) | 12.8 (19) | 24.2 (36) |
| **CFKoax3.01** [5] | 30 | RG 178 | 1 | 0.14 (3.5) | 4.0 (6) | 8.1 (12) |

[5] Not PTFE-free

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

| Part No. | Characteristic wave impedance approx. [Ω] | Conductor/Core diameter nominal [mm] | Color code | Color outer jacket (similar to RAL) |
|---|---|---|---|---|
| **CFKoax1.01** | 75 | 0.3/1.6 | red | Dark blue (similar to RAL 5011) |
| **CFKoax1.05** | 75 | 0.3/1.6 | red, green, blue, white, black | Dark blue (similar to RAL 5011) |
| **CFKoax2.01** | 50 | 0.9/2.95 | | Jet black (similar to RAL 9005) |
| **CFKoax3.01** | 50 | 0.3/0.85 | | Gray (similar to RAL 7040) |




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |



**Order example: CFKoax1.01 - To your required length**

CFKoax **chainflex® series** .01 **Number of coaxial elements**

Order online ▶ www.igus.com/CFKoax

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.



**Coax cable and other chainflex® cables in stage technology. e-chain®: System E4/4**

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

REACH

RoHS

clean-room

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

chainflex®

# Bus cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29350

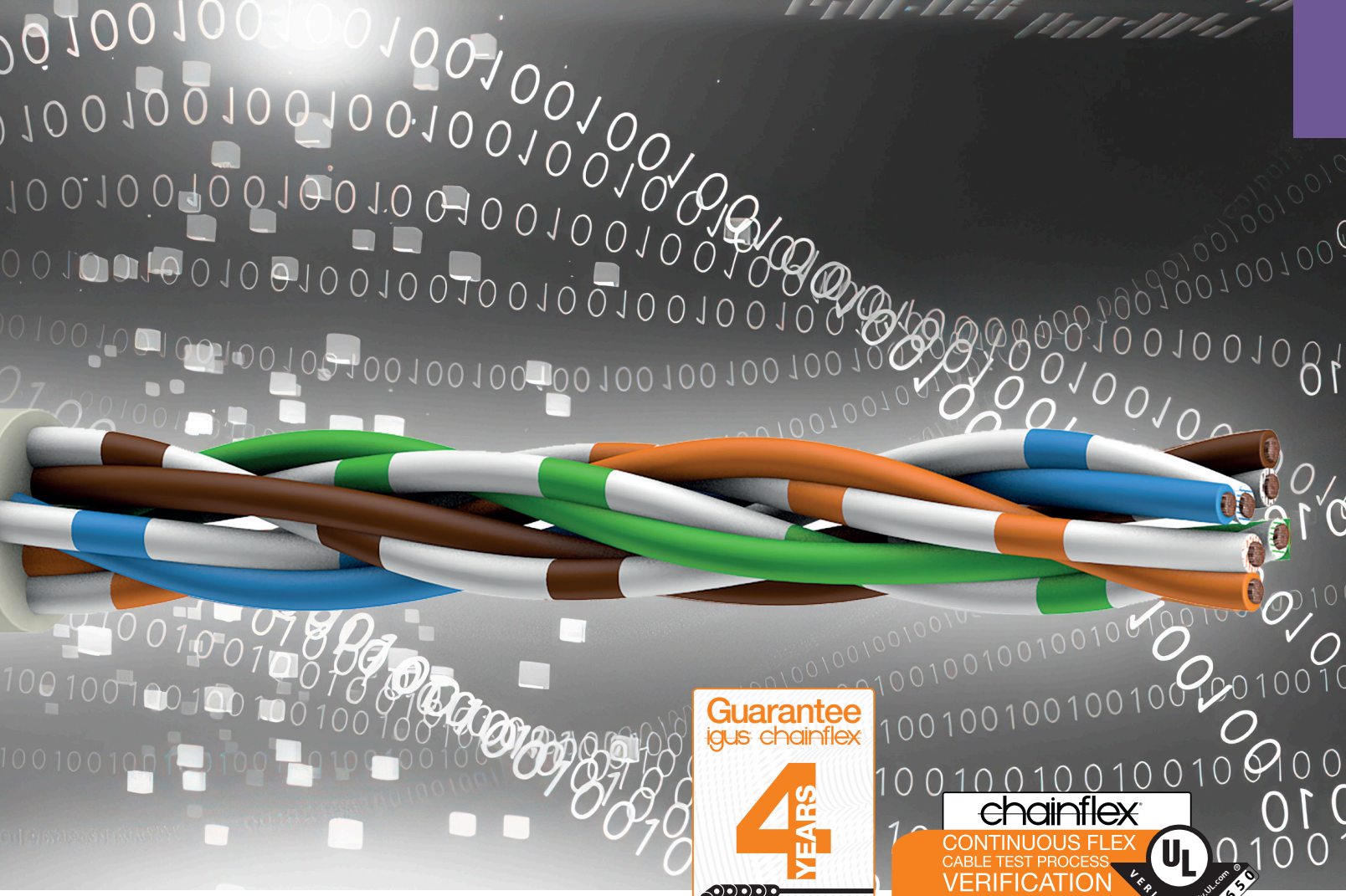
igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · c UL us LISTED · NFPA · CLPA · DNV · REACH · RoHS · clean-room · dry cleanroom tested · DESINA · CE

## Bus cables for energy chains®

Specially designed for use in e-chains®. All common bus systems with mechanical features for reliable data transmission in moving applications. Six different outer jacket materials. Tested with a chainflex® guarantee of up to 4 years.

- All common bus systems for a wide range of (mechanical) application requirements
- With six different outer jacket materials, always find the most cost-effective Bus cable that is guaranteed to work in your application
- Reliable data transmission tested in the igus® laboratory
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment
- Calculate the exact service life online:
  igus.com/chainflexlife




Background

# For the transfer of high data volumes

Today, these cables are the basis for familiar bus systems such as Profibus, Profinet and CAN bus, but also USB and CC-Link. We will show you the features that allow continuously functioning data transmission here.

**Ethernet**

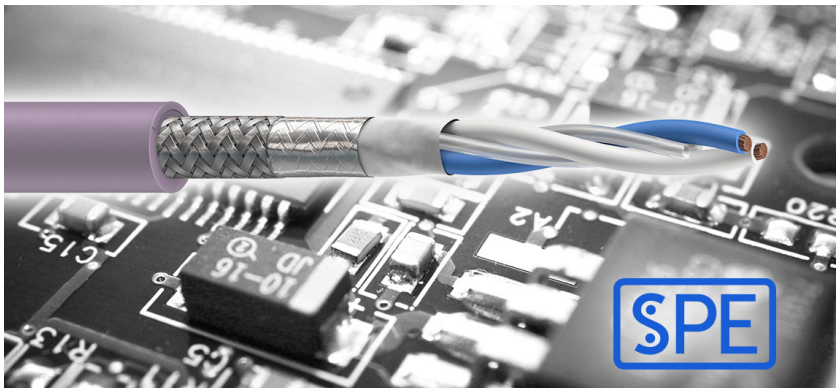
Many bus systems are based on Ethernet. Well-known brands include Profinet, CC-Link IE, EtherCat and Sercos. They are all based on a structure that has been used for many years in mainframes and PCs. Ethernet is described as categories that cover frequencies and data volume capacities from 100MBit/s cover up to 10 GBit/s. The terms CAT5, CAT5e, CAT6A and CAT7 are frequently used. These cables contain two or four pairs in a shield pair or overall shield design, depending on requirements. We have prepared an overview matrix that considers the mechanical parameters in addition to the electrical parameters just mentioned.

**Profinet**

Profinet is one of the most popular Bus cables for use in industry. The real-time capability option and modular concept makes it eminently well-suited to a large majority of applications. igus® has nine different mechanical qualities of Profinet cable, from PVC cables to PUR cables to cables for extraordinary applications such as those involving torsional movement or requiring great strength. Profinet fits into the Industrial Ethernet standard, alongside bus systems such as Sercos, EtherCat and CC-Link IE. igus® is a member of the Profinet user organization and conforms to all required market standards.

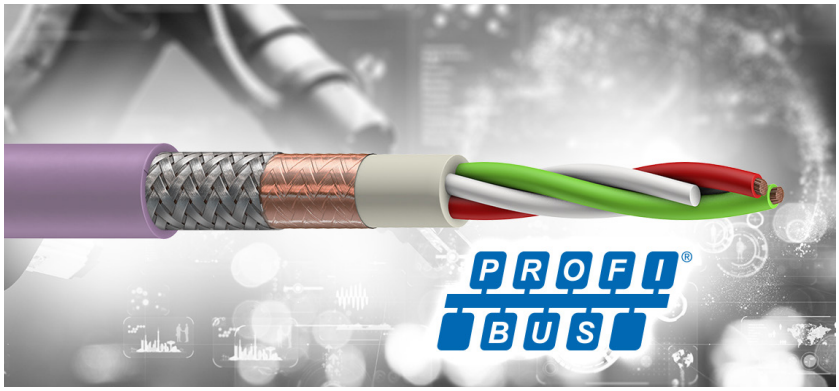
### SPE

Single Pair Ethernet (SPE), the newest addition to the group of bus systems. The new bus technology was introduced in 2019 and has since progressively conquered the market. This innovation offers new capabilities for the fast-growing IIoT market. What is special here is the cable's new design: a single pair, but still with the capability of transmitting a CAT5e signal. We are working steadily with the SPE organization on refining and standardizing this technology. This technology has notable capabilities, particularly in applications involving tight installation space.



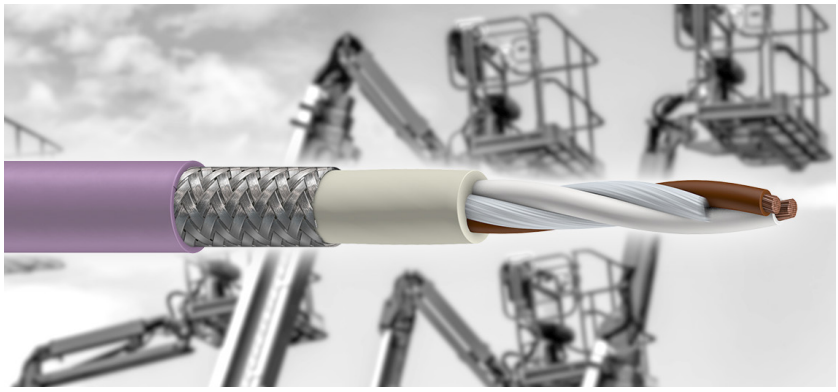

### Profibus

Today, Profibus is one of the most important industrial Bus cables. It was developed in the 1990s and quickly became the standard for reliability and high data quantities. The Profinet Nutzer Organization (PNO), Germany's Regional PI Association, is concerned with technical refinement and coordination of various member companies such as igus®. The cable, with its red and green foam cores, is very distinctive. igus® provides chainflex® Profinet cables in PVC, PUR and TPE designs for any moving e-chain® application.




### CAN-Bus

The CAN bus is extremely tough and remarkable for its robust network protocol. Its origins are in the automotive industry, and it is commonly found in industrial systems today. What is special about the CAN bus is that it is available in a variety of cross sections, which can be chosen according to requirement and can have one or two pairs, depending on application.
As with other bus systems, chainflex® offers cables for e-chains for linear multi-axis applications.



### Other Bus cables

Bus cables are used in a variety of applications, and bus systems for computers or consumer electronics are also commonly used in industrial applications. One example is USB 2.0 and USB 3.0, which have distinctive connectors and can often be found in industrial cameras. The same is true for DVI, a typical monitor interface. There are also chainflex® solutions for these Bus cables. Some applications require prominent bus systems such as INTERBUS or DeviceNet, which are part of the CFBUS Bus cable family. There is also the prominent ASi Bus cable, which is easily identifiable in any system because of its yellow Color and square corners.

# chainflex® Bus cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CF888 | PVC | ● | 15 | +41/+158 | 9.84 | - | 65.62 | ≤ 32.81 | 156 |
| CFBUS.PVC | PVC | ● | 12.5 | +41/+158 | 9.84 | 6.56 | 98.43 | ≤ 65.62 | 160 |
| CF898 | iguPUR | ● | 15 | -4/+158 | 9.84 | - | 65.62 | ≤ 32.81 | 164 |
| CFBUS.PUR | PUR | ● | 12.5 | -4/+158 | 9.84 | 6.56 | 98.43 | ≤ 65.62 | 168 |
| CF14US | PUR | ● | 12.5 | -4/+176 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 172 |
| CFBUS | TPE | ● | 10 | -31/+158 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 174 |
| CFBUS.LB | TPE | ● | 7.5 | -31/+158 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 180 |

## Approvals/Resistance

| chainflex® cables | Approvals and standards | | | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF888 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 156 |
| CFBUS.PVC | ● | | ● | ● | | | ● | | | ● | ● | | ● | ● | ● | | | ● | 160 |
| CF898 | ● | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 164 |
| CFBUS.PUR | ● | | ● | ● | | | ● | | | ● | ● | ● | ● | ● | ● | | ● | ● | 168 |
| CF14US | ● | | ● | | | | ● | | | ● | | | | ● | | | | ● | 172 |
| CFBUS | ● | | ● | | | | ● | | | ● | ● | ● | ● | ● | ● | | ● | ● | 174 |
| CFBUS.LB | ● | | ● | | | | | ● | | | ● | | ● | ● | ● | ● | ● | ● | 180 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Page |
|---|---|---|---|---|---|---|---|---|
| | | 5 million (1 million) cycles * | | 7.5 million (3 million) cycles * | | 10 million (5 million) cycles * | | |
| CF888 | +41 / +59 | 17.5 | | 18.5 | | 19.5 | | |
| | +59 / +140 | 15 | | 16 | | 17 | | 156 |
| | +140 / +158 | 17.5 | | 18.5 | | 19.5 | | |
| CFBUS.PVC | +41 / +59 | 15 | | 16 | | 17 | | |
| | +59 / +140 | 12.5 | | 13.5 | | 14.5 | | 160 |
| | +140 / +158 | 15 | | 16 | | 17 | | |
| CF898 | -4 / +14 | 17.5 | | 18.5 | | 19.5 | | |
| | +14 / +140 | 15 | | 16 | | 17 | | 164 |
| | +140 / +158 | 17.5 | | 18.5 | | 19.5 | | |
| CFBUS.PUR | -4 / +14 | 15 | | 16 | | 17 | | |
| | +14 / +140 | 12.5 | | 13.5 | | 14.5 | | 168 |
| | +140 / +158 | 15 | | 16 | | 17 | | |
| CF14US | -4 / +14 | 12.5 | | 13.5 | | 14.5 | | |
| | +14 / +140 | 10 | | 11 | | 12 | | 172 |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |
| CFBUS.001-.049 | -31 / -13 | 12.5 | | 13.5 | | 14.5 | | |
| CFBUS.060 | -13 / +140 | 10 | | 11 | | 12 | | 174 |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |
| CFBUS.050-.055 | -31 / -13 | 15 | | 16 | | 17 | | |
| CFBUS.065-.070 | -25 / +60 | 12.5 | | 13.5 | | 14.5 | | 174 |
| | +140 / +158 | 15 | | 16 | | 17 | | |
| | | 5 million | | 7.5 million | | 12.5 million | | |
| CFBUS.LB | -31 / -13 | 12.5 | | 13.5 | | 14.5 | | |
| .001-.022 | -25 / +60 | 10 | | 11 | | 12 | | 180 |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |
| CFBUS.LB | -31 / -13 | 10 | | 11 | | 12 | | |
| .040-.060 | -25 / +60 | 7.5 | | 8.5 | | 9.5 | | 180 |
| | +140 / +158 | 10 | | 11 | | 12 | | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife
Figures in brackets refer to series CF888 and CF898

# The chainflex® Bus cables product range at a glance

| chainflex® cables | CF888 | CFBUS.PVC | CF898 | CFBUS.PUR | CFBUS | CFBUS.LB | CFROBOT8. PLUS | CFSPECIAL. 182 | CFCLEAN8 |
|---|---|---|---|---|---|---|---|---|---|
| Page | 156 | 160 | 164 | 168 | 174 | 180 | 390 | 406 | 436 |
| | Mechanical performance | | | | | | | | |
| Bus types | PVC 15 x d | PVC oil-resistant 12.5 x d | iguPUR 15 x d | PUR 12.5 x d | TPE UL 10-12.5 x d | TPE 7.5 x d | Torsion 10 x d | Special applications* | Special applications |
| DVI | | | | | ● | | | | |
| CC-Link | | ● | | ● | ● | | | | |
| SPE | | | | ● | | | | | |
| Ethercat** | ● | ● | ● | ● | ● | ● | | | |
| Ethernet** | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Profinet** | ● | ● | ● | ● | ● | ● | ● | ● | |
| USB | | ● | | ● | ● | | | | |
| FireWire | | ● | | ● | ● | | | | |
| CAN-Bus | ● | ● | ● | ● | ● | | ● | | |
| ASI | | | ● | | | | | | |
| Device Net | | | | | ● | | | | |
| Interbus | | | | | ● | | | | |
| Profibus | ● | ● | ● | ● | ● | | ● | | |

* high tensile strain (.182)

** Details of the chainflex® Ethernet cables can be found on page 155!

| Bus system/ chainflex® type | Jacket | Number of cores and conductor nominal cross section[mm²] | Page |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | **150Ohm** | |
| CF888.001 | PVC | (2x0.25)C | 158 |
| CFBUS.PVC.001 | PVC | (2x0.25)C | 162 |
| CF898.001 | iguPUR | (2x0.25)C | 166 |
| CFBUS.PUR.001 | PUR | (2x0.25)C | 170 |
| CFBUS.001 | TPE | (2x0.25)C | 176 |
| CFBUS.002 | TPE | (2x0.25)C+4x1.5 | 176 |
| CFBUS.003 | TPE | (2x0.25)C+3G0.75 | 176 |
| CFBUS.LB.001 | TPE | (2x0.25)C | 182 |
| CFROBOT8.PLUS.001 | PUR | (2x0.25)C | 392 |
| **Interbus** | | **100Ohm** | |
| CFBUS.010 | TPE | (3x(2x0.25))C | 176 |
| CFBUS.011 | TPE | (3x(2x0.25)+(3G1.0))C | 176 |
| **CAN-Bus** | | **120Ohm** | |
| CF888.021 | PVC | (2x0.5)C | 158 |
| CFBUS.PVC.020 | PVC | (4x0.25)C | 162 |
| CFBUS.PVC.021 | PVC | (2x0.5)C | 162 |
| CFBUS.PVC.022 | PVC | (4x0.5)C | 162 |
| CF898.021 | iguPUR | (2x0.5)C | 166 |
| CFBUS.PUR.020 | PUR | (4x0.25)C | 170 |
| CFBUS.PUR.021 | PUR | (2x0.5)C | 170 |
| CFBUS.PUR.022 | PUR | (4x0.5)C | 170 |
| CFBUS.020 | TPE | (4x0.25)C | 176 |
| CFBUS.021 | TPE | (2x0.5)C | 176 |
| CFBUS.022 | TPE | (4x0.5)C | 176 |
| CFBUS.LB.020 | TPE | (4x0.25)C | 182 |
| CFBUS.LB.021 | TPE | (2x0.5)C | 182 |
| CFBUS.LB.022 | TPE | (4x0.5)C | 182 |
| CFROBOT8.PLUS.022 | PUR | (4x0.5)C | 392 |
| **Device Net** | | **120Ohm** | |
| CFBUS.030 | TPE | ((2xAWG24)C+2xAWG22)C | 176 |
| CFBUS.031 | TPE | ((2xAWG18)C+2xAWG15)C | 176 |
| **CC-Link** | | **110Ohm** | |
| CFBUS.PVC.035 | PVC | (3x0.5)C | 162 |
| CFBUS.PUR.035 | PUR | (3x0.5)C | 170 |
| CFBUS.035 | TPE | (3xAWG20)C | 176 |
| **Ethernet/CAT5l** | | **100Ohm** | |
| CFBUS.PVC.040 | PVC | (4x0.25)C | 162 |
| CFBUS.PUR.040 | PUR | (4x0.25)C | 170 |
| CFBUS.040 | TPE | (4x0.25)C | 178 |
| CFBUS.LB.040 | TPE | (4x(0.25)C | 182 |
| **Single Pair Ethernet** | | **100Ohm** | |
| CFBUS.PUR.042 | PUR | (2x0.15)C | 170 |
| **Ethernet/CAT5e** | | **100Ohm** | |
| CF888.045 | PVC | (4x(2x0.14))C | 158 |
| CFBUS.PVC.045 | PVC | (4x(2x0.15))C | 162 |
| CF898.045 | iguPUR | (4x(2x0.14))C | 166 |
| CFBUS.PUR.045 | PUR | (4x(2x0.15))C | 170 |

| Bus system/ chainflex® type | Jacket | Number of cores and conductor nominal cross section[mm²] | Page |
|---|---|---|---|
| **Ethernet/CAT5e** | | **100Ohm** | |
| CFBUS.045 | TPE | (4x(2x0.15))C | 178 |
| CFBUS.LB.045 | TPE | (4x(2x0.15))C | 182 |
| CFROBOT8.PLUS.045 | PUR | (4x(2x0.15))C | 192 |
| CFSPECIAL.182.045 | PUR | (4x(2x0.15))C | 406 |
| **Ethernet/CAT6** | | **100Ohm** | |
| CFBUS.PVC.049 | PVC | (4x(2x0.15))C | 162 |
| CFBUS.PUR.049 | PUR | (4x(2x0.15))C | 170 |
| CFBUS.PUR.H01.049 | PUR | (4x(2x0.15))C+4x1.5 | 170 |
| CFBUS.049 | TPE | (4x(2x0.15))C | 178 |
| CFBUS.LB.049 | TPE | (4x(2x0.15))C | 182 |
| CFROBOT8.PLUS.049 | PUR | (4x(2x0.15))C | 392 |
| **Ethernet/CAT6A** | | **100Ohm** | |
| CFBUS.PVC.050 | PVC | 4x(2x0.20)C | 162 |
| CFBUS.PUR.050 | PUR | 4x(2x0.20)C | 170 |
| CFBUS.050 | TPE | (4x(2x0.15)C)C | 178 |
| CFROBOT8.PLUS.050 | PUR | (4x(2x0.15)C)C | 392 |
| **Ethernet/CAT7** | | **100Ohm** | |
| CFBUS.PVC.052 | PVC | (4x(2x0.15)C)C | 162 |
| CFBUS.PUR.052 | PUR | (4x(2x0.15)C)C | 170 |
| CFBUS.052 | TPE | (4x(2x0.15)C)C | 178 |
| CFROBOT8.PLUS.052 New | PUR | (4x(2x0.15)C)C | 392 |
| **FireWire IEEE 1394a/b** | | **100Ohm** | |
| CFBUS.PUR.056 | PUR | (2x(2x0.15)C+2x0.38)C | 170 |
| CFBUS.055 | TPE | 2x(2x0.15)C+2x(0.34)C | 178 |
| **Profinet** | | **100Ohm** | |
| CF888.060 | PVC | (4x0.38)C | 158 |
| CFBUS.PVC.060 | PVC | (4x0.38)C | 162 |
| CF898.060 | iguPUR | (4x0.34)C | 166 |
| CF898.061.FC | iguPUR | (4x0.34)C | 166 |
| CFBUS.PUR.060 | PUR | (4x0.38)C | 170 |
| CFBUS.PUR.H01.060 | PUR | (4x0.38)C+4x1.5 | 170 |
| CFBUS.060 | TPE | (4x0.38)C | 178 |
| CFBUS.LB.060 | TPE | (4x0.38)C | 182 |
| CFROBOT8.PLUS.060 | PUR | (4x0.38)C | 392 |
| CFSPECIAL.182.060 | PUR | (4x0.38)C | 406 |
| **USB** | | **90Ohm** | |
| CFBUS.065 | TPE | ((2xAWG28)+2xAWG20)C | 178 |
| CFBUS.066 | TPE | ((2xAWG24)+2xAWG20)C | 178 |
| **USB 3.0** | | **90Ohm** | |
| CFBUS.PVC.068 | PVC | (2x(2xAWG28)+2x(2xAWG28)C)C | 162 |
| CFBUS.PUR.068 | PUR | (2x(2xAWG28)+2x(2xAWG28)C)C | 170 |
| **DVI** | | **100Ohm** | |
| CFBUS.070 | TPE | (4x(2xAWG28)C +(2xAWG28)+3xAWG28)C | 178 |
| **ASI BUS (flat cables)** | | | |
| CF898.082 (yellow) | iguPUR | 2x2.5 | 166 |
| CF898.083 (black) | iguPUR | 2x2.5 | 166 |

For all data volumes and types of movement ...

# Networking your machine with chainflex® Ethernet cables

In our catalogue range you will find the right Ethernet solution for every type of motion. We have prepared a wide range of products both sold by the meter and also a wide variety of ready-to-connect cables with connectors. All chainflex® cables come with a **4-year guarantee** and up to 12.5 million cycles as standard, giving you peace-of-mind and confidence.

We support you in three aspects of machine networking with Ethernet cables for moving applications that have been developed, manufactured and tested for high quality:

For your system, we offer Ethernet cables from **CAT5 to CAT7** so that you have the right solution for all data volumes. With that you can safely use Bus systems such as Ethernet/IP, Profinet, EtherCAT, Sercos and many other derivatives. The different quality levels of cable mean that there are opportunities for very large savings or future-proofing.

With the new **Single Pair Ethernet (SPE)** bus technology, it is now possible to create Ethernet connections all the way from the control cabinet to each machine element and thus connect the entire machine with one single bus system. Due to the construction using only one pair of wires, the cable can be manufactured with a considerable weight decrease and a 25% smaller outer diameter. For this pioneering development, we are a member in the Industrial Partner Network for SPE.

By taking into account the individual mechanical requirements in your application, we can offer more customized solutions. There are cables for large and small bend radii for linear movements in energy chains or torsional movements on robots. We can offer you a reasonably priced PVC solution, an oil-resistant PUR cable or a solution with highly abrasion-resistant TPE. Also, **special solutions** for long travels or high tensile strength versions for hanging applications or rolling solutions are standard products for us.

Our **online tools** also enable you to reduce process costs and help you to find the right cable with just a few clicks.

Also visit our Ethernet website:

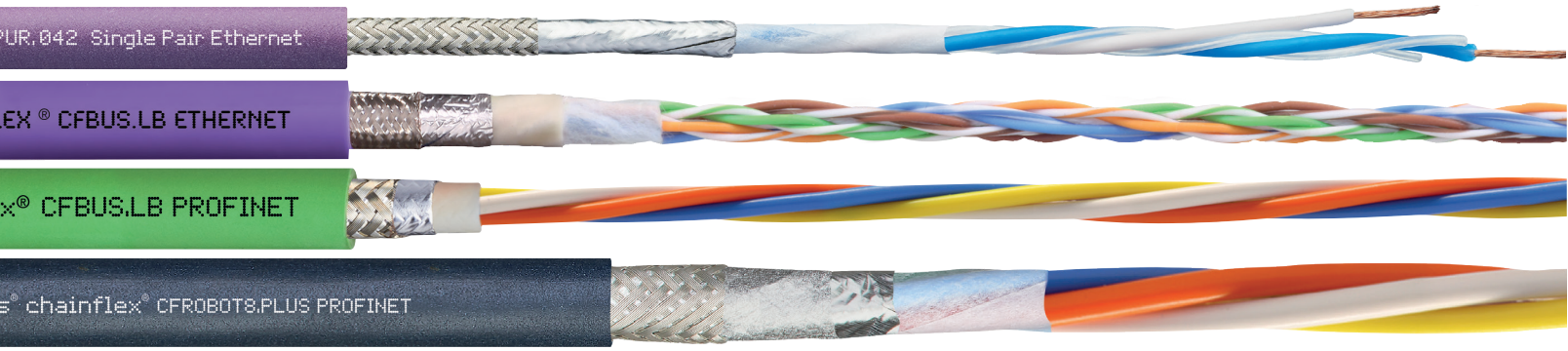
**www.igus.com/ethernet**

All common bus types in different cable quality levels for your diverse applications. From stock. Tested. With a guarantee.

EtherCAT®

CC-Link IE Field

PROFINET®



Selection table for the largest range of flexible Ethernet cables

# The most cost-effective Ethernet cable that is guaranteed to work

| chainflex® cables | CF888 | CFBUS.PVC | CF898 | CFBUS.PUR | CFBUS | CFBUS.LB | CFROBOT8. PLUS | CFSPECIAL.182/ CFCLEAN8 |
|---|---|---|---|---|---|---|---|---|
| Page | 158 | 162 | 166 | 170 | 180 | 184 | 392 | 406/436 |
| | Mechanical performance | | | | | | | |
| **Electrical performance** | PVC 15 x d | PVC oil-resistant12.5 x d | iguPUR 15 x d | PUR 12.5 x d | TPE UL 10-12.5 x d | TPE Hal 7.5 x d | PUR ± 360°/m | Special cables |
| **CAT7** 10GBit 600MHz | | .052 | | .052 | .052 | | .052 **New** | |
| **CAT6A** 10GBit 500MHz | | .050 | | .050 | .050 | | .050 | |
| **CAT6** 1GBit 250MHz | | .049 | | .049 | .049 | .049 | .049 | |
| **CAT5e** 1GBit 100MHz | .045 | .045 | .045 | .045 | .045 | .045 | .045 | .045 |
| **SPE** 1GBit 600MHz | | | | .042 | | | | |
| **Profinet** 100MBit 100MHz | .060 | .060 | .060 / .061.FC | .060 | .060 | .060 | .060 | |
| **CAT5** 100MBit 100MHz | | .040 | | .040 | .040 | .040 | | |

The key to smart industrial automation

# Single Pair Ethernet (SPE)

In the area of mechanical engineering, a strong trend in recent years has been a continuous increase in the need for more and faster data. Fieldbuses such as Profibus and CC-Link in Ethernet derivates such as Profinet and CC-Link IE have been developed further in order to enable improved performance in machines.

The situation is similar in the case of the Ethernet types. Whereas CAT5 used to be the standard and a quantum leap was achieved with CAT5e, everyone is now talking about CAT6A and CAT7 for the future. This is not only true with regard to building infrastructure but is also in the case of machine and robot cabling.

However, all products end at the last "intelligent" component of the machine. Due to the sheer size of the cable and the connector solutions, connections extending as far as the smallest sensor had not yet been possible. This is where we and our partners of the Industrial Partner Network e.V. are now breaking new ground with the Single Pair Ethernet (SPE). The idea is to reduce to one data pair in order to keep connector and cable small.

This is most evident in the case of the connector. It is now the size of an M8 round connector and is therefore considerably smaller than the normal RJ45. As regards the cable, we have reduced the diameter by 25% and have now also arrived in the range of a proximity switch cable. This allows smaller installation spaces and energy chains, which will be welcome in the field of machine design.

As a clear service life together with a guarantee is always given for all cables in the igus® catalogue; thorough testing is what allows us to do it. This also applies to the new member of the family, of course: CFBUS.PUR.042 is guaranteed to last for 10 million cycles or 4 years.

Bus cable | PVC outer jacket

# chainflex® CF888




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Violet (similar to RAL 4001)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL), except **CF888-001:** 30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.1.1

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF888 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

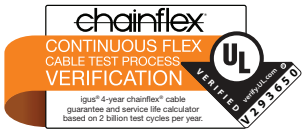
| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment




UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | PVC outer jacket

# chainflex® CF888




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | | | |
| **CF888.001** | 24 | 1 PR x 0.25 | 0.31 (8.0) | 12.1 (18) | 39.6 (59) |
| **CAN-Bus** | | | | | |
| **CF888.021** | 20 | 1 PR x 0.5 | 0.33 (8.5) | 16.1 (24) | 49.1 (73) |
| **Ethernet/CAT5e** | | | | | |
| **CF888.045** | 26 | 4 PR x 0.14 | 0.28 (7.0) | 16.8 (25) | 41.7 (62) |
| **Profinet** | | | | | |
| **CF888.060** [2) 13)] | 22 | 2 PR x 0.34 | 0.28 (7.0) | 16.8 (25) | 39.6 (59) |

The chainflex® types marked with [2)] are cables designed as a star-quad.
[13)] Color outer jacket: Yellow-green (similar to RAL 6018)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

**Technical note on Bus cables**
chainflex® Bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the Bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.1.1



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CF888.001** | 150 | 2x0.25 | red, green |
| **CAN-Bus** | | | |
| **CF888.021** | 120 | 2x0.5 | white, brown |
| **Ethernet/CAT5e** | | | |
| **CF888.045** | 100 | 4x(2x0.14) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Profinet** | | | |
| **CF888.060** [2) 13)] | 100 | 4x0.34 | white, orange, blue, yellow (star-quad) |




chainflex® CF888 Bus cables in a handling application

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | PVC outer jacket

# chainflex® CFBUS.PVC




Example image

**10,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**65.6 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 12.5 x d |
| | **flexible** | min. 10 x d |
| | **fixed** | min. 7 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 9.84 ft/s (3 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| a max. | | 98.4 ft/s² (30 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 65.6 ft (20 m), Class 3 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Violet (similar to RAL 4001)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL), except **CFBUS-PVC-020:** 30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | **3** | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 4.3.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL-listed** | CMX, 75°C (except CFBUS.PVC.068) |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFBUSPVC |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **CLPA** | **CFBUS.PVC.045:** CC-Link IE Field, Reference no. 153<br>**CFBUS.PVC.049:** CC-Link IE Field, Reference no. 154 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF240.02.24 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 15 | 16 | 17 |
| +59/+140 | 12.5 | 13.5 | 14.5 |
| +140/+158 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 66 ft (20 m), Class 3
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- machining units/packaging machines, Handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | PVC outer jacket

# chainflex® CFBUS.PVC




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | | | |
| **CFBUS.PVC.001** | 24 | 1 PR x 0.25 | 0.33 (8.5) | 16.8 (25) | 51.7 (77) |
| **CAN-Bus** | | | | | |
| **CFBUS.PVC.020** [2] | 24 | 2 PR x 0.25 | 0.28 (7.0) | 15.5 (23) | 38.3 (57) |
| **CFBUS.PVC.021** | 20 | 1 PR x 0.5 | 0.33 (8.5) | 21.5 (32) | 57.8 (86) |
| **CFBUS.PVC.022** [2] | 20 | 2 PR x 0.5 | 0.33 (8.5) | 28.9 (43) | 63.2 (94) |
| **CC-Link** | | | | | |
| **CFBUS.PVC.035** | 20 | 3 x 0.5 | 0.31 (8.0) | 26.9 (40) | 55.1 (82) |
| **Ethernet/CAT5I** | | | | | |
| **CFBUS.PVC.040** [2] | 24 | 2 PR x 0.25 | 0.26 (6.5) | 19.5 (29) | 47.0 (70) |
| **Ethernet/CAT5e** | | | | | |
| **CFBUS.PVC.045** | 26 | 4 PR x 0.15 | 0.30 (7.5) | 22.2 (33) | 45.0 (67) |
| **Ethernet/CAT6** | | | | | |
| **CFBUS.PVC.049** | 26 | 4 PR x 0.15 | 0.30 (7.5) | 22.2 (33) | 45.0 (67) |
| **Ethernet/CAT6A** | | | | | |
| **CFBUS.PVC.050** | 26 | 4 STP x 0.15 | 0.39 (10.0) | 43.7 (65) | 82.7 (123) |
| **Ethernet/CAT7** | | | | | |
| **CFBUS.PVC.052** | 26 | 4 STP x 0.15 | 0.37 (9.5) | 59.8 (89) | 91.4 (136) |
| **Profinet** | | | | | |
| **CFBUS.PVC.060** [2] [13] | 22 | 2 PR x 0.38 | 0.28 (7.0) | 22.2 (33) | 45.0 (67) |
| **USB 3.0** | | | | | |
| **CFBUS.PVC.068** | 28 | 2 PR x AWG28 | 0.28 (7.0) | 26.2 (39) | 45.7 (68) |
| | 28 | 2 STP x AWG28 | | | |

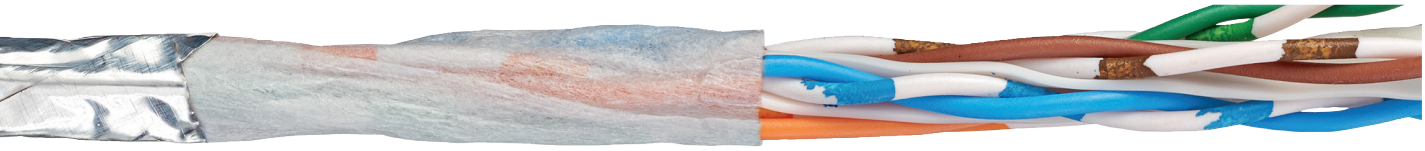
The chainflex® types marked with [2] are cables designed as a star-quad.
[13] Color outer jacket: Yellow-green (similar to RAL 6018)

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 4.3.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | **3** | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CFBUS.PVC.001** | 150 | 2x0.25 | red, green |
| **CAN-Bus** | | | |
| **CFBUS.PVC.020** [2] | 120 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **CFBUS.PVC.021** | 120 | 2x0.5 | white, brown |
| **CFBUS.PVC.022** [2] | 120 | 4x0.5 | white, green, brown, yellow (star-quad) |
| **CC-Link** | | | |
| **CFBUS.PVC.035** | 110 | 3x0.5 | white, blue, yellow |
| **Ethernet/CAT5I** | | | |
| **CFBUS.PVC.040** [2] | 100 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **Ethernet/CAT5e** | | | |
| **CFBUS.PVC.045** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6** | | | |
| **CFBUS.PVC.049** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6A** | | | |
| **CFBUS.PVC.050** | 100 | 4x(2x0.20)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT7** | | | |
| **CFBUS.PVC.052** | 100 | 4x(2x0.15)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Profinet** | | | |
| **CFBUS.PVC.060** [2] [13] | 100 | 4x0.38 | white, orange, blue, yellow (star-quad) |
| **USB 3.0** | | | |
| **CFBUS.PVC.068** | 90 | 2x(2xAWG28) | red/black, green/white-green |
| | | 2x(2xAWG28)C | blue/yellow, orange/violet |

**Technical note on Bus cables**
chainflex® Bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the Bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

Bus cable | iguPUR outer jacket

# chainflex® CF898




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | -4 °F to +158 °F (-20 °C to +70 °C) |
| | flexible | -40 °F to +158 °F (-40 °C to +70 °C) |
| | fixed | -58 °F to +158 °F (-50 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Violet (similar to RAL 4001)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL), except **CF898-001:** 30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame<br>**CF898.082-CF898.083:** According to IEC 60332-1-2, FT2 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF898 |
| **NFPA** | **CF898.001-CF898.060:** Following NFPA 79-2018, Kapitel 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 17.5 | 18.5 | 19.5 |
| +14/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | iguPUR outer jacket

# chainflex® CF898




Example image

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. | Copper index | Weight |
|---|---|---|---|---|---|
| | | [mm²] | [In. (mm)] | [lbs/mft (kg/km)] | [lbs/mft (kg/km)] |
| **Profibus (1x2x0.64mm)** | | | | | |
| **CF898.001** | 24 | 1 PR x 0.25 | 0.31 (8.0) | 12.1 (18) | 37.6 (56) |
| **CAN-Bus** | | | | | |
| **CF898.021** | 20 | 1 PR x 0.5 | 0.33 (8.5) | 16.1 (24) | 53.8 (80) |
| **Ethernet/CAT5e** | | | | | |
| **CF898.045** | 26 | 4 PR x 0.14 | 0.28 (7.0) | 16.8 (25) | 36.3 (54) |
| **Profinet** | | | | | |
| **CF898.060** [13] | 22 | 2 PR x 0.34 | 0.28 (7.0) | 16.8 (25) | 39.0 (58) |
| **CF898.061.FC** | 22 | 2 PR x 0.34 | 0.28 (7.0) | 16.8 (25) | 48.4 (72) |
| **ASI BUS (flat cables)** | | | | | |
| **CF898.082** [14] | 14 | 1 PR x 2.5 | 0.16 (4.0) | 33.6 (50) | 55.1 (82) |
| **CF898.083** [15] | 14 | 1 PR x 2.5 | 0.16 (4.0) | 33.6 (50) | 53.1 (79) |

[13] Color outer jacket: Yellow-green (similar to RAL 6018)
[14] Color outer jacket: Yellow (similar to RAL 1021)
[15] Color outer jacket: Black (similar to RAL 9005)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

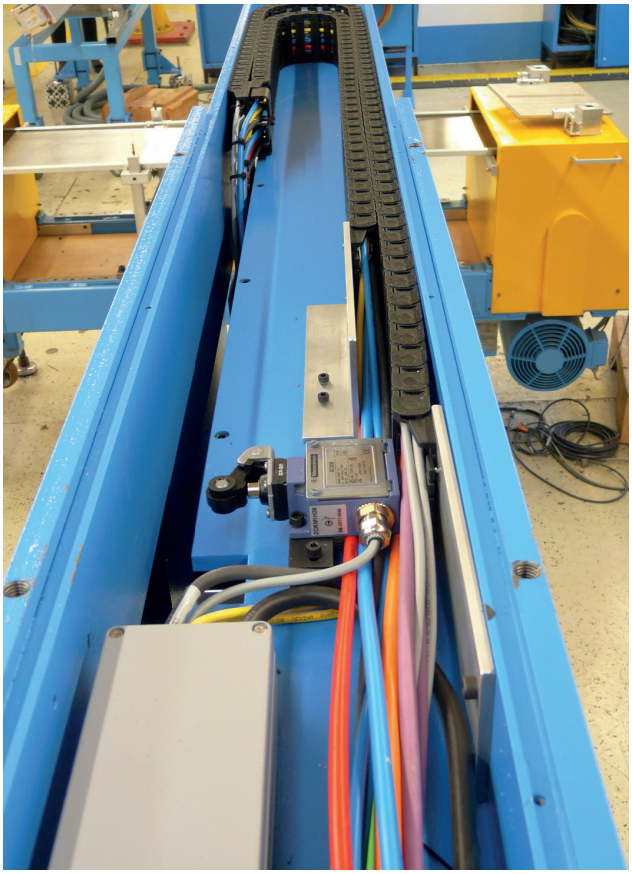
**Technical note on Bus cables**
chainflex® Bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the Bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.3.1



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CF898.001** | 150 | 2x0.25 | red, green |
| **CAN-Bus** | | | |
| **CF898.021** | 120 | 2x0.5 | white, brown |
| **Ethernet/CAT5e** | | | |
| **CF898.045** | 100 | 4x(2x0.14) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Profinet** | | | |
| **CF898.060** [13)] | 100 | 4x0.34 | white, orange, blue, yellow (star-quad) |
| **CF898.061.FC** | 100 | 4x0.34 | white, orange, blue, yellow (star-quad) |
| **ASI BUS (flat cables)** | | | |
| **CF898.082** [14)] | According to ASI | 2x2.5 | blue, brown |
| **CF898.083** [15)] | According to ASI | 2x2.5 | blue, brown |



**Adjustment device with chainflex® CF898 Bus cables**

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | PUR outer jacket

# chainflex® CFBUS.PUR




Example image

**10,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**65.6 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 12.5 x d |
| | flexible | min. 10 x d |
| | fixed | min. 7 x d |
| Temperature | e-chain® linear | -4 °F to +158 °F (-20 °C to +70 °C) |
| | flexible | -40 °F to +158 °F (-40 °C to +70 °C) |
| | fixed | -58 °F to +158 °F (-50 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 98.4 ft/s² (30 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 65.6 ft (20 m), Class 3 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Violet (similar to RAL 4001)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL), except **CFBUS-PUR-020:** 30V (following UL) |
| Test voltage | 500 V |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |

# Class 4.3.3.1

| | |
|---|---|
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL-listed** | CMX, 75°C (except CFBUS.PUR.068) |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFBUSPUR |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **CLPA** | **CFBUS.PUR.045:** CC-Link IE Field, Reference no. 151<br>**CFBUS.PUR.049:** CC-Link IE Field, Reference no. 152 |
| **DNV** | Type Approval Certificate TAE00003X6 (Issue: 04/2025)<br>**CFBUS.PUR.040-.052:** Type Approval Certificate TAE00003X8 (Issue: 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CFBUSPUR |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardisation |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 15 | 16 | 17 |
| +14/+140 | 12.5 | 13.5 | 14.5 |
| +140/+158 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 66 ft (20 m), Class 3
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Bus cable | PUR outer jacket

# chainflex® CFBUS.PUR




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | | | |
| **CFBUS.PUR.001** | 24 | 1 PR x 0.25 | 0.33 (8.5) | 16.8 (25) | 50.4 (75) |
| **CAN-Bus** | | | | | |
| **CFBUS.PUR.020** [2] | 24 | 2 PR x 0.25 | 0.30 (7.5) | 15.5 (23) | 43.0 (64) |
| **CFBUS.PUR.021** | 20 | 1 PR x 0.5 | 0.33 (8.5) | 21.5 (32) | 55.1 (82) |
| **CFBUS.PUR.022** [2] | 20 | 2 PR x 0.5 | 0.33 (8.5) | 28.9 (43) | 61.1 (91) |
| **CC-Link** | | | | | |
| **CFBUS.PUR.035** | 20 | 3 x 0.5 | 0.31 (8.0) | 26.9 (40) | 51.1 (76) |
| **Ethernet/CAT5I** | | | | | |
| **CFBUS.PUR.040** [2] | 24 | 2 PR x 0.25 | 0.26 (6.5) | 19.5 (29) | 46.4 (69) |
| **Single Pair Ethernet/CAT5e** | | | | | |
| **CFBUS.PUR.042** | 26 | 1 PR x 0.15 | 0.22 (5.5) | 8.1 (12) | 22.2 (33) |
| **Ethernet/CAT5e** | | | | | |
| **CFBUS.PUR.045** | 26 | 4 PR x 0.15 | 0.30 (7.5) | 22.2 (33) | 44.3 (66) |
| **Ethernet/CAT6** | | | | | |
| **CFBUS.PUR.049** | 26 | 4 PR x 0.15 | 0.30 (7.5) | 22.2 (33) | 44.3 (66) |
| **CFBUS.PUR.H01.049** | 26 | 4 PR x 0.5 | 0.49 (12.5) | 84.0 (125) | 135.7 (202) |
| | 16 | 4 x 1.5 | | | |
| **Ethernet/CAT6A** | | | | | |
| **CFBUS.PUR.050** | 26 | 4 STP x 0.15 | 0.39 (10.0) | 43.7 (65) | 80.6 (120) |
| **Ethernet/CAT7** | | | | | |
| **CFBUS.PUR.052** | 26 | 4 STP x 0.15 | 0.37 (9.5) | 59.8 (89) | 86.7 (129) |
| **FireWire IEEE 1394b** | | | | | |
| **CFBUS.PUR.056** | 26 | 2 STP x 0.15 | 0.35 (9.0) | 39.6 (59) | 61.1 (91) |
| | 22 | 2 x 0.38 | | | |
| **Profinet** | | | | | |
| **CFBUS.PUR.060** [2] [13] | 22 | 2 PR x 0.38 | 0.28 (7.0) | 22.2 (33) | 43.0 (64) |
| **CFBUS.PUR.H01.060** | 22 | 2 PR x 0.38 | 0.45 (11.5) | 80.6 (120) | 131.7 (196) |
| | 16 | 4 x 1.5 | | | |
| **USB 3.0** | | | | | |
| **CFBUS.PUR.068** | 28 | 2 PR x AWG28 | 0.28 (7.0) | 26.2 (39) | 43.0 (64) |
| | 28 | 2 STP x AWG28 | | | |

The chainflex® types marked with [2] are cables designed as a star-quad.
[13] Color outer jacket: Yellow-green (similar to RAL 6018)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

# Class 4.3.3.1

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 highest |
| Travel distance | unsupported | 1 | 2 | **3** | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | |



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CFBUS.PUR.001** | 150 | 2x0.25 | red, green |
| **CAN-Bus** | | | |
| **CFBUS.PUR.020** [2] | 120 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **CFBUS.PUR.021** | 120 | 2x0.5 | white, brown |
| **CFBUS.PUR.022** [2] | 120 | 4x0.5 | white, green, brown, yellow (star-quad) |
| **CC-Link** | | | |
| **CFBUS.PUR.035** | 110 | 3x0.5 | white, blue, yellow |
| **Ethernet/CAT5I** | | | |
| **CFBUS.PUR.040** [2] | 100 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **Single Pair Ethernet/CAT5e** | | | |
| **CFBUS.PUR.042** | | 2x0.15 | white/blue |
| **Ethernet/CAT5e** | | | |
| **CFBUS.PUR.045** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6** | | | |
| **CFBUS.PUR.049** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **CFBUS.PUR.H01.049** | 100 | (4x(2x0.15))C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| | | 4x1.5 | black, brown, gray, blue |
| **Ethernet/CAT6A** | | | |
| **CFBUS.PUR.050** | 100 | 4x(2x0.20)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT7** | | | |
| **CFBUS.PUR.052** | 110 | (4x(2x0.15))C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **FireWire IEEE 1394b** | | | |
| **CFBUS.PUR.056** | 110 | 2x(2x0.15)C | orange/blue, blue/red |
| | | 2x0.38 | black, white |
| **Profinet** | | | |
| **CFBUS.PUR.060** [2] [13] | 100 | 4x0.38 | white, orange, blue, yellow (star-quad) |
| **CFBUS.PUR.H01.060** | 100 | (4x0.38)C | white, orange, blue, yellow (star-quad) |
| | | 4x1.5 | black, brown, gray, blue |
| **USB 3.0** | | | |
| **CFBUS.PUR.068** | 90 | 2x(2xAWG28) | red/black, green/white-green |
| | | 2x(2xAWG28)C | blue/yellow, orange/violet |

Ethernet Bus cable | PUR outer jacket

# chainflex® CF14US




Example image

**10,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**164 ft** Travel distance e-chain®

- For high mechanical load applications
- PUR outer jacket
- Shielded
- Oil-resistant
- UV-resistant
- Flame-retardant
- Abrasion and tear resistant
- Hydrolosis/microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 12.5 x d |
| | **flexible** | min. 10 x d |
| | **fixed** | min. 7.5 x d |
| Temperature | **e-chain® linear** | -4 °F to +158 °F (-20 °C to +70 °C) |
| | **flexible** | -40 °F to +158 °F (-40 °C to +70 °C) |
| | **fixed** | -50 °F to +158 °F (-45 °C to +70 °C ) |
| a max. | 328.1 ft/s² (100 m/s²) | |
| Travel distance | Especially for unsupported and gliding travel up to 164 ft (50m) | |

## Cable structure

| | |
|---|---|
| Conductors | Conductor consisting of bare copper wires (according to EN 60228). |
| Conductor insulation | Foam polyethylene |
| Conductor construction | 4 pairs twisted together |
| Color code | See Table |
| Inner jacket | TPE |
| Overall shield | Tinned copper braid<br>90 % optical coverage |
| Outer jacket | Low adhesion PUR blend adapted to the requirements of the energy chain®<br>Color: ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300 V |
| Test voltage | 2500 V |

## Properties and approvals

| | |
|---|---|
| UV resistance | **CF14US-02-04-02:** Medium<br>**CF14US-02-04-02-UV:** High |
| Oil resistance | High |
| Flame resistance | According to IEC 60332-1-2, CEI 20-35, FT1 |
| PTFE-free | This cable does not contain PTFE |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | **3** | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 4.3.3.1

| | |
|---|---|
| **UL/CSA AWM** | **UL AWM:** Style 20233, 80 °C, 300V<br>**CSA AWM:** I/II A/B 80 °C, 300V, FT1 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/-13 | 12.5 | 13.5 | 14.5 |
| -14/+140 | 10 | 11 | 12 |
| +140/+158 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- CF14US-02-04-02-UV is good for direct sunlight
- For extremely heavy duty applications
- Suitable for indoor/outdoor applications without direct sunlight
- Especially for unsupported and gliding travel up to 164 ft (50m)
- For application lengths > 164 ft (50m) use igus® P/N CFBUS-045
- Storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. | | Copper index | | Weight | | Jacket color |
|---|---|---|---|---|---|---|---|---|---|
| | | [mm²] | [in.] | [mm] | [lbs/mft] | [kg/km] | [lbs/mft] | [kg/km] | |
| **CF14US.02.04.02** | 26 | 4 PR x 0.14 | 0.30 | 7.6 | 7.4 | 11 | 59.8 | 89 | Violet |
| **CF14US.02.04.02.UV** | 26 | 4 PR x 0.14 | 0.30 | 7.6 | 7.4 | 11 | 59.8 | 89 | Black |

**Note:** The given outer diameters are maximum values.
**PR =** Twisted Pair

| Part No. | Characteristic Impedance [Ω] | Core group | Color code |
|---|---|---|---|
| **CF14US.02.04.02** | 100 | 4 PR x 0.14 | Blue & White/Blue, Orange & White/Orange, Green & White/Green, Brown & White/Brown |
| **CF14US.02.04.02.UV** | 100 | 4 PR x 0.14 | |

**Order example: CF14US.02.04.02 – To your desired length**
**CF14US chainflex® series .02 Code nominal cross section .04 Number of pairs .02 Identification pairs**

Online order ▶ www.igus.com/CF14US

Delivery time 24hr or today.
Delivery time means time until shipping of goods.

Bus cable | TPE outer jacket

# chainflex® CFBUS




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | minimum 10 x d (CFBUS.001-.049 and CFBUS.060)<br>minimum 12.5 x d (CFBUS.050-.055 and CFBUS.070) |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +158 °F (-35 °C to +70 °C) |
| | **flexible** | -49 °F to +158 °F (-45 °C to +70 °C) |
| | **fixed** | -58 °F to +158 °F (-50 °C to +70 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 328.1 ft/s² (100 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | According to bus specification. |
| **Conductor construction** | According to bus specification. |
| **Color code** | According to bus specification.<br>▶ Product range table |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Violet (similar to RAL 4001)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 50V<br>600V (following UL), except **CFBUS-065/-066:** 30V (following UL) |
| **Test voltage** | 500 V (following DIN EN 50289-1-3) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame<br>**CFBUS.030/CFBUS.065/CFBUS.066:** According to IEC 60332-1-2, FT2 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶www.igus.com/CFBUS |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **CLPA** | **CFBUS.045:** CC-Link IE Field, Reference no. 130<br>**CFBUS.049:** CC-Link IE Field, Reference no. 137 |
| **DNV** | Type Approval Certificate TAE00003X5 (Issue: 04/2025)<br>**CFBUS.040-.052:** Type Approval Certificate TAE00003X7 (Issue: 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CFBUS |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardisation |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 10 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | CFBUS .001-.049 | CFBUS .050-.070 | CFBUS .001-.049 | CFBUS .050-.070 | CFBUS .001-.049 | CFBUS .050-.070 |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 |
| -13/+140 | 10 | 12.5 | 11 | 13.5 | 12 | 14.5 |
| +140/+158 | 12.5 | 15 | 13.5 | 16 | 14.5 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

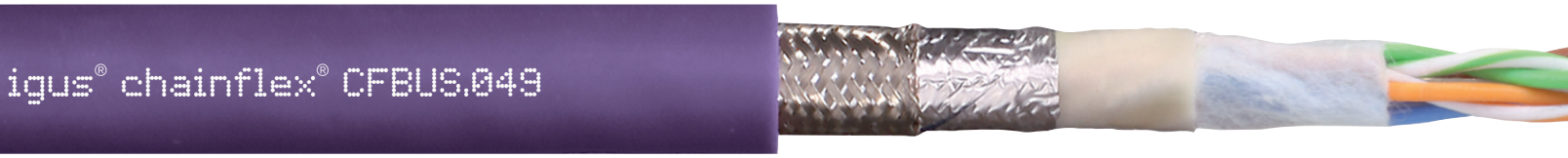
## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | TPE outer jacket

# chainflex® CFBUS




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | | | |
| **CFBUS.001** | 24 | 1 PR x 0.25 | 0.35 (9.0) | 22.2 (33) | 61.8 (92) |
| **CFBUS.002** | 24 | 1 PR x 0.25 | 0.49 (12.5) | 63.2 (94) | 128.3 (191) |
| | 16 | 4 x 1.5 | | | |
| **CFBUS.003** | 24 | 1 PR x 0.25 | 0.45 (11.5) | 37.0 (55) | 97.4 (145) |
| | 18 | 3G 0.75 | | | |
| **Interbus** | | | | | |
| **CFBUS.010** | 24 | 3 PR x 0.25 | 0.35 (9.0) | 31.6 (47) | 61.1 (91) |
| **CFBUS.011** | 24 | 3 PR x 0.25 | 0.41 (10.5) | 58.5 (87) | 102.1 (152) |
| | 17 | 3G 1.0 | | | |
| **CAN-Bus** | | | | | |
| **CFBUS.020** [2] | 24 | 2 PR x 0.25 | 0.26 (6.5) | 18.8 (28) | 39.0 (58) |
| **CFBUS.021** | 20 | 1 PR x 0.5 | 0.31 (8.0) | 26.2 (39) | 54.4 (81) |
| **CFBUS.022** [2] | 20 | 2 PR x 0.5 | 0.31 (8.0) | 28.9 (43) | 58.5 (87) |
| **DeviceNet** | | | | | |
| **CFBUS.030** [4] | 24 | 1 PR 24 AWG | 0.28 (7.0) | 24.2 (36) | 38.3 (57) |
| | 22 | 1 PR 22 AWG | | | |
| **CFBUS.031** [4] | 18 | 1 PR 18 AWG | 0.45 (11.5) | 69.2 (103) | 116.9 (174) |
| | 15 | 1 PR 15 AWG | | | |
| **CC-Link** | | | | | |
| **CFBUS.035** | 20 | 3 x 20 AWG | 0.33 (8.5) | 28.9 (43) | 64.5 (96) |

The chainflex® types marked with [2] are cables designed as a star-quad.
[4] Manufactured without inner jacket

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

# Class 6.6.4.1



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CFBUS.001** | 150 | 2x0.25 | red, green |
| **CFBUS.002** | 150 | (2x0.25)C | red/green |
| | | 4x1.5 | black with white numbers 1-4 |
| **CFBUS.003** | 150 | (2x0.25)C | red/green |
| | | 3G0.75 | black, blue, green-yellow |
| **Interbus** | | | |
| **CFBUS.010** | 100 | 3x(3x0.25) | white/brown, green/yellow, gray/pink |
| **CFBUS.011** | 100 | 3x(2x0.25) | white/brown, green/yellow, gray/pink |
| | | (3G1.0) | red, blue, green-yellow |
| **CAN-Bus** | | | |
| **CFBUS.020** [2] | 120 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **CFBUS.021** | 120 | 2x0.5 | white, brown |
| **CFBUS.022** [2] | 120 | 4x0.5 | white, green, brown, yellow (star-quad) |
| **DeviceNet** | | | |
| **CFBUS.030** [4] | 120 | (2xAWG24)C | white/blue |
| | | 2xAWG22 | red, black |
| **CFBUS.031** [4] | 120 | (2xAWG18)C | white/blue |
| | | 2xAWG15 | red, black |
| **CC-Link** | | | |
| **CFBUS.035** | 110 | 3xAWG20 | white, blue, yellow |

**Technical note on Bus cables**

chainflex® Bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the Bus cables are designed for different mechanical requirements and resistance to diverse media.

The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.

It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.

The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.

igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

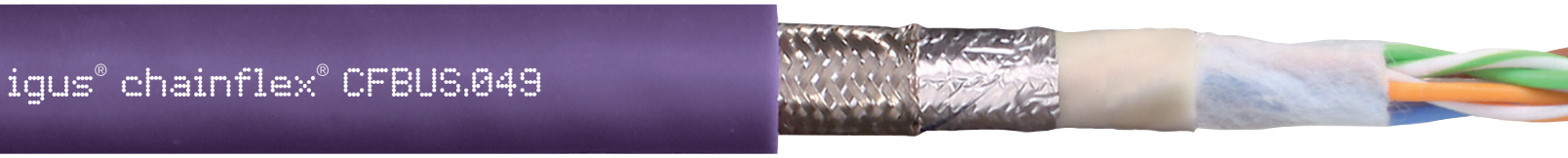
Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year. VERIFIED E223650

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | TPE outer jacket

# chainflex® CFBUS




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Ethernet/CAT5I** | | | | | |
| **CFBUS.040** [2] | 24 | 2 PR x 0.25 | 0.28 (7.0) | 22.2 (33) | 39.6 (59) |
| **Ethernet/CAT5e** | | | | | |
| **CFBUS.045** | 26 | 4 PR x 0.15 | 0.33 (8.5) | 28.2 (42) | 56.4 (84) |
| **Ethernet/CAT6** | | | | | |
| **CFBUS.049** | 26 | 4 PR x 0.15 | 0.33 (8.5) | 28.2 (42) | 56.4 (84) |
| **Ethernet/CAT6A** | | | | | |
| **CFBUS.050** [4] [5] | 26 | 4 STP x 0.14 | 0.41 (10.5) | 55.8 (83) | 90.0 (134) |
| **Ethernet/CAT7** | | | | | |
| **CFBUS.052** [4] | 26 | 4 STP x 0.15 | 0.41 (10.5) | 59.8 (89) | 89.4 (133) |
| **FireWire 1394a** | | | | | |
| **CFBUS.055** [5] | 26 | 2 STP x 0.15 | 0.31 (8.0) | 26.2 (39) | 51.1 (76) |
| | 22 | 2 x 0.34 | | | |
| **Profinet** | | | | | |
| **CFBUS.060** [2] [13] | 22 | 2 PR x 0.38 | 0.30 (7.5) | 26.2 (39) | 49.7 (74) |
| **USB** | | | | | |
| **CFBUS.065** [5] | 28 | 1 PR x 0.08 | 0.22 (5.5) | 18.8 (28) | 30.2 (45) |
| | 20 | 2 x 0.5 | | | |
| **CFBUS.066** | 24 | 1 PR x 0.24 | 0.26 (6.5) | 21.5 (32) | 34.3 (51) |
| | 20 | 2 x 0.5 | | | |
| **DVI** | | | | | |
| **CFBUS.070** [4] [5] [6] | 28 | 4 PR x 0.08 | 0.35 (9.0) | 23.5 (35) | 63.8 (95) |
| | 28 | 2 x 0.08 | | | |
| | 28 | 3 x 0.08 | | | |

The chainflex® types marked with [2] are cables designed as a star-quad.
[4] Manufactured without inner jacket
[5] Not PTFE-free
[6] without cULus
[13] Color outer jacket: Yellow-green (similar to RAL 6018)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

# Class 6.6.4.1

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 6 7 highest
unsupported 1 2 3 4 5 6 ≥ 1312 ft
none 1 2 3 4 highest
none 1 2 3 4 ±360°



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Ethernet/CAT5I** | | | |
| **CFBUS.040** [2] | 100 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **Ethernet/CAT5e** | | | |
| **CFBUS.045** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6** | | | |
| **CFBUS.049** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6A** | | | |
| **CFBUS.050** [4] [5] | 100 | 4x(2x0.15)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT7** | | | |
| **CFBUS.052** [4] | 100 | 4x(2x0.15)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **FireWire 1394a** | | | |
| **CFBUS.055** [5] | 100 | 2x(2x0.15)C | orange/blue, green/red |
| | | 2x(0.34)C | white, black |
| **Profinet** | | | |
| **CFBUS.060** [2] [13] | 100 | 4x0.38 | white, orange, blue, yellow (star-quad) |
| **USB** | | | |
| **CFBUS.065** [5] | 90 | (2xAWG28) | white/green |
| | | 2xAWG20 | red, black |
| **CFBUS.066** | 90 | (2xAWG24) | white/green |
| | | 2xAWG20 | red, black |
| **DVI** | | | |
| **CFBUS.070** [4] [5] [6] | 100 | 4x(2xAWG28)C | 4 x white/yellow with element-shield in blue, black, red, white |
| | | (2xAWG28) | white/brown |
| | | 3xAWG28)C | green, yellow, gray |

**Technical note on Bus cables**
chainflex® Bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the Bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

Bus cable | TPE outer jacket

# chainflex® CFBUS.LB




Example image

**12,500,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Low-temperature-flexibility
- PVC and halogen-free
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | minimum 7.5 x d (CFBUS-LB.040-.060)<br>minimum 10 x d (CFBUS-LB.001-.022) |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -31 °F to +158 °F (-35 °C to +70 °C) |
| | flexible | -58 °F to +158 °F (-50 °C to +70 °C) |
| | fixed | -67 °F to +158 °F (-55 °C to +70 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Violet (similar to RAL 4001)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>600V (following UL) |
| Test voltage | 500 V (following DIN EN 50289-1-3) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 7.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CFBUSLB (from production date 01/2022) |
| **CLPA** | **CFBUS.LB.045:** CC-Link IE Field, Reference no. 131<br>**CFBUS.LB.049:** CC-Link IE Field, Reference no. 138 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardisation |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 12.5 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | CFBUS.LB .001-.022 | CFBUS.LB .040-.060 | CFBUS.LB .001-.022 | CFBUS.LB .040-.060 | CFBUS.LB .001-.022 | CFBUS.LB .040-.060 |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 12.5 | 10 | 13.5 | 11 | 14.5 | 12 |
| -13/+140 | 10 | 7.5 | 11 | 8.5 | 12 | 9.5 |
| +140/+158 | 12.5 | 10 | 13.5 | 11 | 14.5 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | TPE outer jacket

# chainflex® CFBUS.LB




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | | | |
| **CFBUS.LB.001** | 24 | 1 PR x 0.25 | 0.35 (9.0) | 22.2 (33) | 52.4 (78) |
| **CAN-Bus/Feldbus** | | | | | |
| **CFBUS.LB.020** [2] | 24 | 2 PR x 0.25 | 0.26 (6.5) | 18.8 (28) | 32.9 (49) |
| **CFBUS.LB.021** | 20 | 1 PR x 0.5 | 0.31 (8.0) | 26.2 (39) | 45.0 (67) |
| **CFBUS.LB.022** [2] | 20 | 2 PR x 0.5 | 0.31 (8.0) | 28.9 (43) | 52.4 (78) |
| **Ethernet/CAT5I** | | | | | |
| **CFBUS.LB.040** [2] | 24 | 2 PR x 0.25 | 0.28 (7.0) | 22.2 (33) | 33.6 (50) |
| **Ethernet/CAT5e** | | | | | |
| **CFBUS.LB.045** | 26 | 4 PR x 0.15 | 0.33 (8.5) | 28.2 (42) | 47.7 (71) |
| **Ethernet/CAT6** | | | | | |
| **CFBUS.LB.049** | 26 | 4 PR x 0.15 | 0.33 (8.5) | 28.2 (42) | 47.7 (71) |
| **Profinet** | | | | | |
| **CFBUS.LB.060** [2] [13] | 22 | 2 PR x 0.38 | 0.30 (7.5) | 26.2 (39) | 45.0 (67) |

The chainflex® types marked with [2] are cables designed as a star-quad.
[13] Color outer jacket: Yellow-green (similar to RAL 6018)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

**Technical note on Bus cables**
chainflex® Bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the Bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 7.6.4.1



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CFBUS.LB.001** | 150 | 2x0.25 | red, green |
| **CAN-Bus/Feldbus** | | | |
| **CFBUS.LB.020** [2)] | 120 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **CFBUS.LB.021** | 120 | 2x0.5 | white, brown |
| **CFBUS.LB.022** [2)] | 120 | 4x0.5 | white, green, brown, yellow (star-quad) |
| **Ethernet/CAT5I** | | | |
| **CFBUS.LB.040** [2)] | 100 | 4x0.25 | white, green, brown, yellow (star-quad) |
| **Ethernet/CAT5e** | | | |
| **CFBUS.LB.045** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6** | | | |
| **CFBUS.LB.049** | 100 | 4x(2x0.15) | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Profinet** | | | |
| **CFBUS.LB.060** [2) 13)] | 100 | 4x0.38 | white, orange, blue, yellow (star-quad) |

cost down...


...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

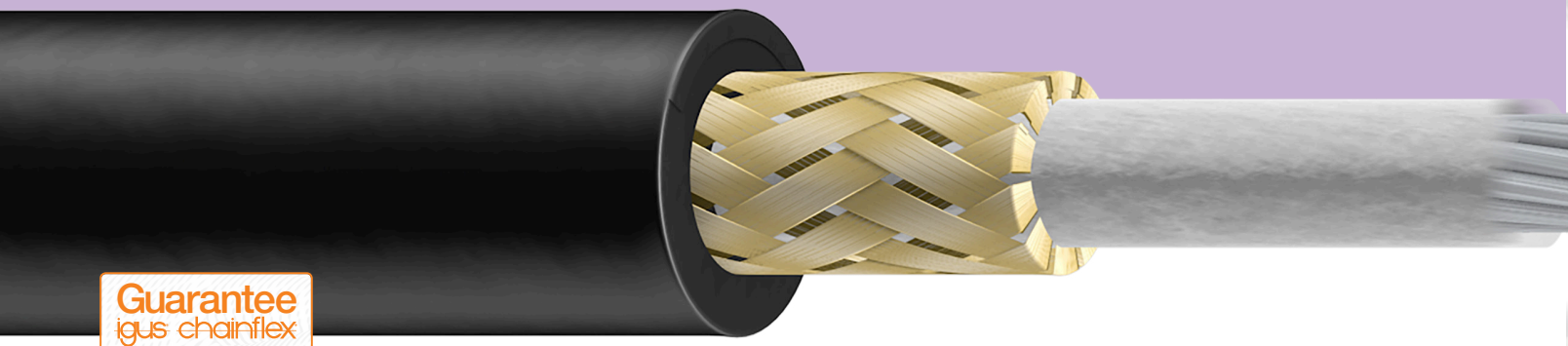
… just one idea for you:: Reduce cost with CFBUS.PUR ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# Fiber optic cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29365O

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · DNV · REACH · RoHS · cleanroom · dry cleanroom tested · CE

## Fiber optic cables for energy chains®

Specially designed for use in e-chains®. Available with various fiber types and outer jacket materials.
For long distances and reliable transmission of large data volumes. Tested with a chainflex® guarantee of up to 4 years.

- For long distances, small radii and large data volumes
- With different fiber types and outer jacket materials, always find the most cost-effective Fiber optic cable that is guaranteed to work in your application
- Tested in the industry's largest test laboratory (55,201 ft²)
- Use without braided shielding that is susceptible to mechanical damage as EMC protection
- Calculate the exact service life online:
  igus.com/chainflexlife




Background

# Flexible and durable

Communication between systems in machines and plant is becoming more and more complex all the time, yet fault-free performance is becoming ever more important. However, many plant manufacturers or operators have major EMC problems that occur sporadically or even after years of operation.

These problems are often based on conventional bus cables that either have insufficient or unreliable shielding.

Alongside igus® chainflex® bus cables that already prevent these problems to a large extent, chainflex® Fiber optic cables provide further advantages for even greater data safety.

Fiber optic cables (FOC) do not require a braided shielding that is susceptible to mechanical damage as EMC protection, and are insensitive to EMC on account of their very nature, since industrial conventional interference fields do not have any effect on light signals. In addition, Fiber optic cables can be used independently of the system, since a special bus cable is not required for every bus system type, rather one FOC type can usually be used to operate any bus system providing the bus system manufacturer provides respective FOC converters.

The large number of Fiber optic cables in industrial data transmission is also much more manageable than the large number of different field or high-speed buses which require a separate cable for each bus.

Thus the following fiber types can be used for industrial data communication, completely independently of the type of field bus used. The fiber type and number depends only on which converters are used and which fiber type the respective manufacturer prescribes.

The fibers are defined on the basis of diameter and result in a clear and limited choice.

**Important fiber types:**

- **Multimode Fibers**
  **50/125 µm**
  **62.5/125 µm**

The ideal fiber for large data volumes and longer transmission lengths in the field of automation. Transmission lengths of several hundred meters can be realized quite easily, due to the very low output attenuation (0.8-3db/km per fiber and light wave length) of these fiber types.

- **POF (Plastic Fibers)**
  **980/1000 µm**

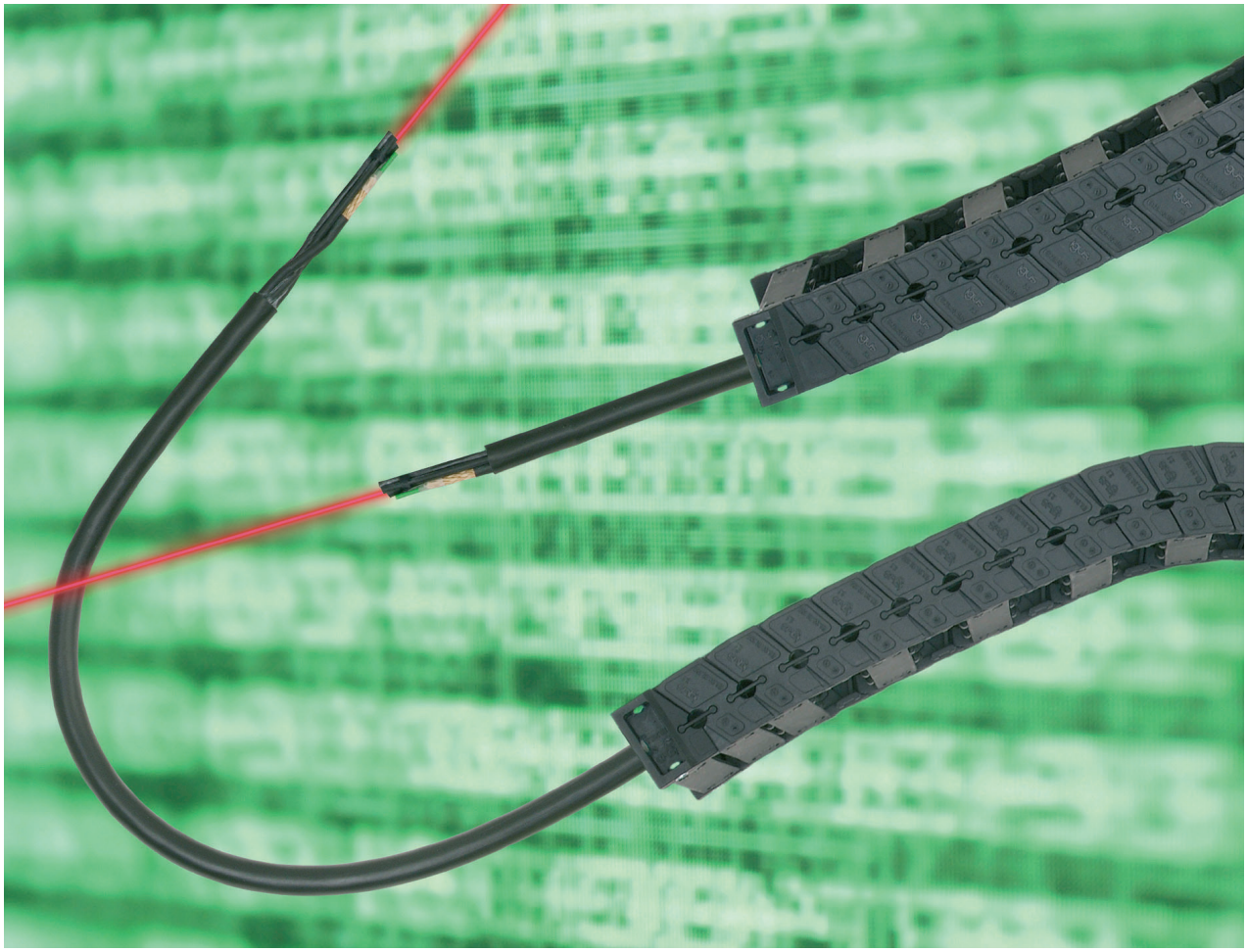
The ideal and low-cost fiber for short transmission paths. On account of the high output attenuation of the fiber type of 160-230dB/km, lengths over 15m must be avoided in constantly moving energy chains.

- **PCF (Polymer Cladded Fiber)**
  **200/230 µm**

The ideal compromise for POF fiber. This plastic coated quartz glass fiber is a viable alternative for many terminal devices that have been designed for POF. This means greater transmission lengths (100m and more) are possible without the original POF terminal devices having to be replaced.

- **Singlemode Fibers**
  **9/125 µm**

Singlemode fiber optics are also colloquially referred to as "Telecom cables", as this type of fiber is typically used for very long distances (several kilometers) and very high data rates in telecommunications networks. However, these fibers are increasingly being used in automation as the corresponding modules are becoming more cost-effective, while also enabling higher data rates.



# chainflex® Fiber optic cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CFLK | PUR | | 12.5 | -4/+140 | 32.81 | 16.41 | 65.62 | ≤ 65.62 | 188 |
| CFLG88 | PVC | | 7.5 | +41/+158 | 9.84 | - | 65.62 | ≤ 32.81 | 190 |
| CFLG.LB.PUR | PUR | | 5 | -13/+176 | 32.81 | 19.69 | 65.62 | ≤ 328.1 | 192 |
| CFLG.LB New | TPE | | 5 | -31/+176 | 32.81 | 19.69 | 65.62 | ≤ 328.1 | 196 |
| CFLG.G | TPE | | 10 | -40/+176 | 32.81 | 19.69 | 65.62 | ≤ 164.1 | 200 |

## Approvals/Resistance

| chainflex® cables | oil | 2x | PTFE free | Approvals and standards | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CFLK | ● | | ● | | | | | | | | | | ● | ● | | | | | ● | 188 |
| CFLG88 | | | ● | | | | | | | | | | ● | ● | ● | | | | ● | 190 |
| CFLG.LB.PUR | ● | | ● | | | | | | | | | ● | ● | ● | ● | | | | ● | 192 |
| CFLG.LB New | ● | | ● | | | | | | | | | | ● | ● | ● | ● | | | ● | 196 |
| CFLG.G | ● | | ● | | | | | | | | | | ● | ● | ● | ● | | | ● | 200 |

## Overview to find the right Fiber optic cable

| chainflex® cables | POF plastic FOC 980/1,000 µm | GOF Multimode glass fiber FOC 50/125µm 62.5/125 µm | GOF Singlemode glass fiber FOC 9/125 µm | Page |
|---|---|---|---|---|
| CFLK | ● | | | 188 |
| CFLG88 | | ● | | 190 |
| CFLG.LB.PUR | | ● | ● | 192 |
| CFLG.LB New | | ● | ● | 196 |
| CFLG.G | | ● | ● | 200 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Page |
|---|---|---|---|---|---|---|---|---|
| | | 5 million (1 million) cycles * | | 7.5 million (3 million) cycles * | | 10 million (5 million) cycles * | | |
| CFLK | -4 / +14 | 15 | | 16 | | 17 | | |
| | +14 / +122 | 12.5 | | 13.5 | | 14.5 | | 188 |
| | +122 / +140 | 15 | | 16 | | 17 | | |
| CFLG88 | +41 / +59 | 10 | | 11 | | 12 | | |
| | +59 / +140 | 7.5 | | 8.5 | | 9.5 | | 190 |
| | +140 / +158 | 10 | | 11 | | 12 | | |
| CFLG.LB.PUR | -13 / +5 | 7.5 | | 8.5 | | 9.5 | | |
| | +5 / +158 | 5 | | 6 | | 7 | | 192 |
| | +158 / +176 | 7.5 | | 8.5 | | 9.5 | | |
| CFLG.LB New | -31 / -13 | 7.5 | | 8.5 | | 9.5 | | |
| | -13 / +158 | 5 | | 6 | | 7 | | 196 |
| | +158 / +176 | 7.5 | | 8.5 | | 9.5 | | |
| CFLG.G | -40 / -22 | 12.5 | | 13.5 | | 14.5 | | |
| | -22 / +158 | 10 | | 11 | | 12 | | 200 |
| | +158 / +176 | 12.5 | | 13.5 | | 14.5 | | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife
Figures in brackets refer to series CFLG88

Fiber optic cable, POF | PUR outer jacket

# chainflex® CFLK

**10,000,000** Cycles guaranteed

**12.5 x d** Bend radius e-chain®

**65.6 ft** Travel distance e-chain®

- Plastic Optical Fibers (POF) for high mechanical load requirements and interference-free transmission
- PUR outer jacket
- Oil-resistant and coolant-resistant



Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 12.5 x d |
| | flexible | min. 10 x d |
| | fixed | min. 7 x d |
| Temperature | e-chain® linear | -4 °F to +140 °F (-20 °C to +60 °C) |
| | flexible | -40 °F to +140 °F (-40 °C to +60 °C) |
| | fixed | -58 °F to +140 °F (-50 °C to +60 °C) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 65.6 ft (20 m), Class 3 |

## Cable structure

| | |
|---|---|
| Fibre Optic Cable | 980/1000 µm fiber with PE Insulation. |
| Conductor construction | Polymer Optical Fiber cabled with high-tensile plastic reinforcement. |
| Color code | ▶ Product range table |
| Outer jacket | Low-adhesion PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Violet (similar to RAL 4001) |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |
| PTFE-free | This cable does not contain PTFE |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| REACH | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| Lead-free | Following 2011/65/EC (RoHS-II/RoHS-III) |
| CE | Following 2014/35/EU |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |

# Class 5.3.3.1

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 15 | 16 | 17 |
| +14/+122 | 12.5 | 13.5 | 14.5 |
| +122/+140 | 15 | 16 | 17 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

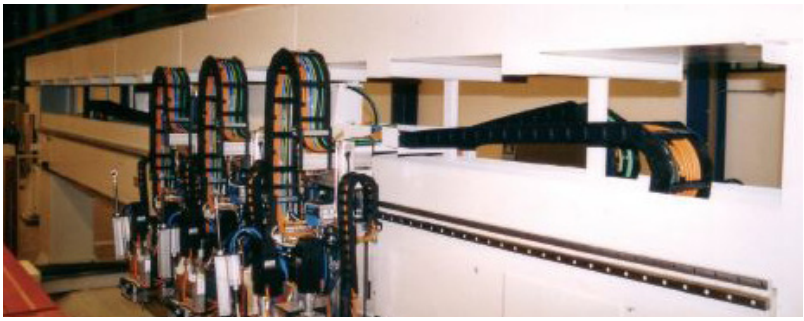
## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 66 ft (20 m), Class 3
- Almost unlimited resistance to oil, Class 3
- Highest EMC safety
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | Fiber Count | Fiber Diameter approx. | Outer diameter max. [In. (mm)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|
| **CFLK.L1.01** | 1 | 980/1,000 | 0.24 (6.0) | 18.1 (27) |
| **CFLK.L1.02** | 2 | 980/1,000 | 0.28 (7.0) | 20.8 (31) |

**Note:** The given outer diameters are maximum values.

| Part No. | Bandwidth [MHz x km] @ 650nm | Attenuation [dB/km] @ 650nm | Fiber identification |
|---|---|---|---|
| **CFLK.L1.01** | 2 | 200 | black |
| **CFLK.L1.02** | 2 | 200 | black, blue |



Woodworking machines with e-chains® and chainflex® cables

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Fiber optic cable, glass | PVC outer jacket

# chainflex® CFLG88

**5,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- Graded index glass-fiber cable for flexing applications
- PVC outer jacket
- Flame resistance



Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Fibre Optic Cable | 50/125 µm, 62.5/125 µm special fixed fiber elements with aramid strain relief |
| Conductor construction | Optical Fibers cabled with high-tensile aramid dampers and especially short pitch length. |
| Color code | Optical Fibers: Orange or blue with black numbers. |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Properties and approvals

| | |
|---|---|
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| PTFE-free | This cable does not contain PTFE |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| REACH | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| Lead-free | Following 2011/65/EC (RoHS-II/RoHS-III) |
| Cleanroom | According to ISO Class 1. The outer jacket material of this series complies with CF240.02.24 - tested by IPA according to standard DIN EN ISO 14644-1 |
| CE | Following 2014/35/EU |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.1.1

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 11 | 12 |
| +59/+140 | 7.5 | 8.5 | 9.5 |
| +140/+158 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Highest EMC safety
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | Fiber Count | Fiber Diameter approx. | Outer diameter max. [In. (mm)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|
| **CFLG88.2.62.5/125** | 2 | 62.5/125 | 0.28 (7.0) | 29.6 (44) |
| **CFLG88.2.50/125** | 2 | 50/125 | 0.28 (7.0) | 29.6 (44) |

**Note:** The given outer diameters are maximum values.

| Part No. | Bandwidth [MHz x km] @ 850 nm | Attenuation [dB/km] @ 850 nm | Bandwidth [MHz x km] @ 1,300 nm | Attenuation [dB/km] @ 1,300 nm | Fiber identification |
|---|---|---|---|---|---|
| **CFLG88.2.62.5/125** | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| **CFLG88.2.50/125** | ≥ 200 | ≤ 3.0 | ≥ 500 | ≤ 1.0 | blue with black numbers |

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Fiber optic cable, glass | PUR outer jacket

# chainflex® CFLG.LB.PUR




Example image

**10,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- Glass-fiber cable for heaviest duty applications
- PUR outer jacket
- Metal-free
- Oil-resistant
- Low-temperature-flexible
- PVC and halogen-free
- UV-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 5 x d |
| | flexible | min. 4 x d |
| | fixed | min. 3 x d |
| Temperature | e-chain® linear | -31 °F to +176 °F (-35 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Fibre Optic Cable | 50/125 µm, 62.5/125 µm, 9/125 µm. |
| Conductor construction | Optical Fibers cabled with high-tensile aramid dampers and especially short pitch length. |
| Color code | Orange, blue or yellow with black numbers. |
| Overall shield | Extremely bending-resistant aramid braid for torsion-protection. |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Color: Jet black (similar to RAL 9005) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Load | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |

# Class 6.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **DNV** | Type Approval Certificate TAE000048J |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

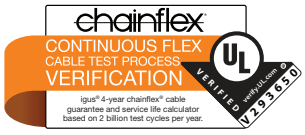
| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 7.5 | 8.5 | 9.5 |
| +5/+158 | 5 | 6 | 7 |
| +158/+176 | 7.5 | 8.5 | 9.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with 5 x d, Class 6
- Unsupported travel distances and for gliding applications (horizontal + vertical) up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Maximum EMC protection, with high transmission qualities
- Indoor and outdoor applications
- Offshore, ship, Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, quick handling, semiconductor insertion, refrigerating sector




UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Fiber optic cable, glass | PUR outer jacket

# chainflex® CFLG.LB.PUR




Example image

| Part No. | Fiber Count | Fiber Diameter approx. | Outer diameter max. [In. (mm)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|
| CFLG.2LB.PUR.62.5/125 | 2 | 62.5/125 | 0.33 (8.5) | 41.7 (62) |
| CFLG.4LB.PUR.62.5/125 | 4 | 62.5/125 | 0.35 (9.0) | 45.7 (68) |
| CFLG.6LB.PUR.62.5/125 | 6 | 62.5/125 | 0.43 (11.0) | 64.5 (96) |
| CFLG.12LB.PUR.62.5/125 | 12 | 62.5/125 | 0.55 (14.0) | 100.8 (150) |
| CFLG.6LB.PUR.50/125 | 6 | 50/125 | 0.43 (11.0) | 63.8 (95) |
| CFLG.12LB.PUR.50/125 | 12 | 50/125 | 0.55 (14.0) | 107.5 (160) |
| CFLG.6LB.PUR.9/125 | 6 | 9/125 | 0.43 (11.0) | 63.8 (95) |

**Note:** The given outer diameters are maximum values.

| Part No. | Bandwidth [MHz x km] @ 850 nm | Attenuation [dB/km] @ 850 nm | Bandwidth [MHz x km] @ 1,300 nm | Attenuation [dB/km] @ 1,300 nm | Fiber identification |
|---|---|---|---|---|---|
| CFLG.2LB.PUR.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.4LB.PUR.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.6LB.PUR.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.12LB.PUR.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.6LB.PUR.50/125 | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | blue with black numbers |
| CFLG.12LB.PUR.50/125 | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | blue with black numbers |

| Part No. | Attenuation [dB/km] @ 1,310 nm | Chromatic dispersion [ps/nm/km] @ 1,310 nm | Attenuation [dB/km] @ 1,550 nm | Chromatic dispersion [ps/nm/km] @ 1,550 nm | Fiber identification |
|---|---|---|---|---|---|
| CFLG.6LB.PUR.9/125 | ≤ 0.5 | ≤ 3.5 | ≤ 0.5 | ≤ 18 | yellow with black numbers |

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |



**Order example: CFLG.4LB.PUR.62.5/125 - To your required length**
CFLG.LB.PUR **chainflex® series** .4 **Number of fibers** .62.5/125 **Fiber diameter**

Order online ▶ www.igus.com/CFLGLBPUR

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

Fiber optic cable, glass | TPE outer jacket

# chainflex® CFLG.LB




Example image

**10,000,000** Cycles guaranteed

**5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- Glass-fiber cable for heaviest duty applications
- TPE outer jacket
- Metal-free
- Oil and bio-oil-resistant
- Low-temperature-flexible
- PVC and halogen-free
- UV-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 5 x d |
| | flexible | min. 4 x d |
| | fixed | min. 3 x d |
| Temperature | e-chain® linear | -31 °F to +176 °F (-35 °C to +80 °C) |
| | flexible | -58 °F to +176 °F (-50 °C to +80 °C) |
| | fixed | -67 °F to +176 °F (-55 °C to +80 °C) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Fibre Optic Cable | 50/125 µm, 62.5/125 µm, 200/230 µm special fixed fiber elements with aramid strain relief |
| Conductor construction | Optical Fibers cabled with high-tensile aramid dampers and especially short pitch length. |
| Color code | Orange or blue with black numbers or black with white numbers. |
| Overall shield | Extremely bending-resistant aramid braid for torsion-protection.<br>optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Load | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |

# Class 7.5.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 7.5 | 8.5 | 9.5 |
| -13/+158 | 5 | 6 | 7 |
| +158/+176 | 7.5 | 8.5 | 9.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with 5 x d, Class 7
- Unsupported travel distances and for gliding applications (horizontal + vertical) up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Maximum EMC protection, with high transmission qualities
- Indoor and outdoor applications
- crane applications, Material handling, Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, semiconductor insertion, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

## Fiber optic cable, glass | TPE outer jacket

# chainflex® CFLG.LB




Example image

| | Part No. | Fiber Count | Fiber Diameter approx. | Outer diameter max. [In. (mm)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| | CFLG.2LB.62.5/125 | 2 | 62.5/125 | 0.33 (8.5) | 38.3 (57) |
| | CFLG.4LB.62.5/125 | 4 | 62.5/125 | 0.35 (9.0) | 45.7 (68) |
| | CFLG.6LB.62.5/125 | 6 | 62.5/125 | 0.43 (11.0) | 61.1 (91) |
| | CFLG.12LB.62.5/125 | 12 | 62.5/125 | 0.55 (14.0) | 100.8 (150) |
| | CFLG.2LB.50/125 | 2 | 50/125 | 0.33 (8.5) | 36.3 (54) |
| | CFLG.4LB.50/125 | 4 | 50/125 | 0.35 (9.0) | 43.0 (64) |
| | CFLG.6LB.50/125 | 6 | 50/125 | 0.43 (11.0) | 57.8 (86) |
| | CFLG.12LB.50/125 | 12 | 50/125 | 0.55 (14.0) | 100.8 (150) |
| New | CFLG.2LB.9/125 | 2 | 9/125 | 0.33 (8.5) | 38.3 (57) |
| New | CFLG.4LB.9/125 | 4 | 9/125 | 0.35 (9.0) | 45.7 (68) |
| New | CFLG.12LB.9/125 | 12 | 9/125 | 0.59 (15.0) | 84.0 (125) |

**Note:** The given outer diameters are maximum values.

| Part No. | Bandwidth [MHz x km] @ 850nm | Attenuation [dB/km] @ 850nm | Bandwidth [MHz x km] @ 1,300nm | Attenuation [dB/km] @ 1,300nm | Fiber identification |
|---|---|---|---|---|---|
| CFLG.2LB.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.4LB.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.6LB.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.12LB.62.5/125 | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | orange with black numbers |
| CFLG.2LB.50/125 | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | blue with black numbers |
| CFLG.4LB.50/125 | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | blue with black numbers |
| CFLG.6LB.50/125 | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | blue with black numbers |
| CFLG.12LB.50/125 | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.5 | blue with black numbers |

| | Part No. | Attenuation [dB/km] @ 1,310nm | Chromatic dispersion [ps/nm/km] @ 1,310nm | Attenuation [dB/km] @ 1,550nm | Chromatic dispersion [ps/nm/km] @ 1,550nm | Fiber identification |
|---|---|---|---|---|---|---|
| New | CFLG.2LB.9/125 | ≤ 0.5 | 3.5 | ≤ 0.5 | 18 | yellow with black numbers |
| New | CFLG.4LB.9/125 | ≤ 0.5 | 3.5 | ≤ 0.5 | 18 | yellow with black numbers |
| New | CFLG.12LB.9/125 | ≤ 0.5 | 3.5 | ≤ 0.5 | 18 | yellow with black numbers |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 7.5.4.1

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | highest | | |
| Torsion | none | 1 | 2 | 3 | 4 | ±360° | | |



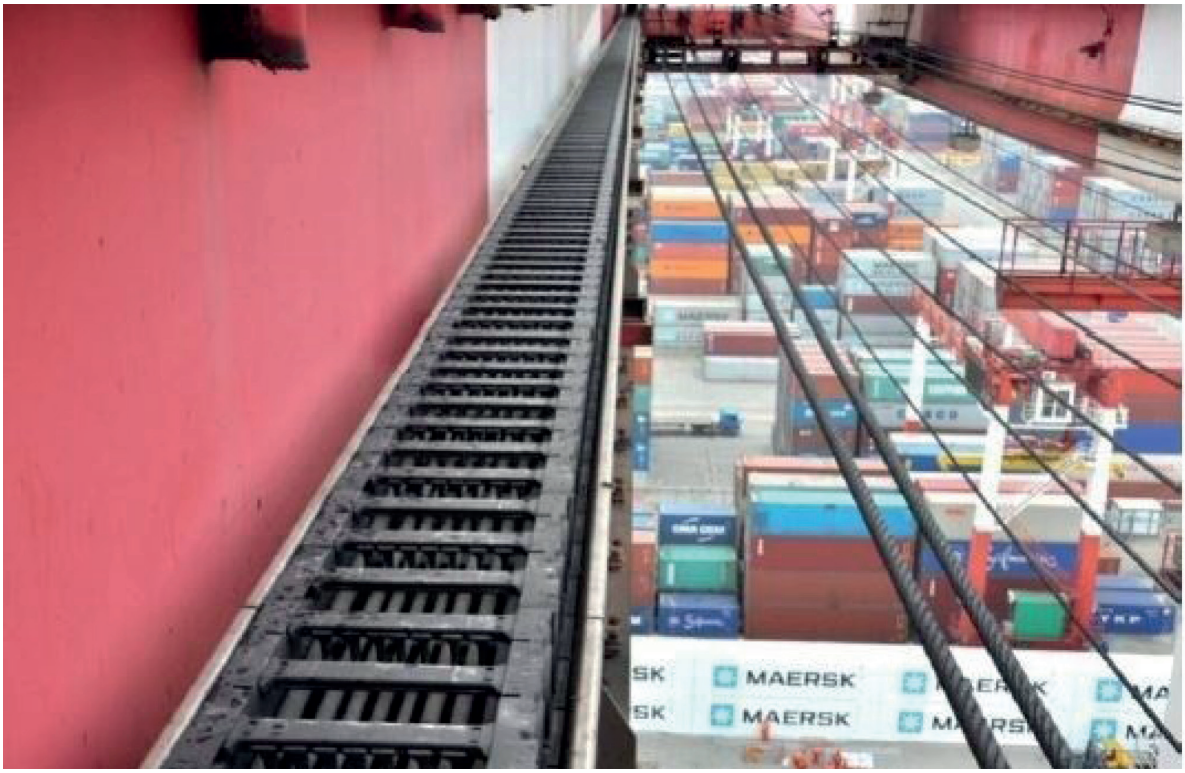
**Order example: CFLG.4LB.62.5/125 - To your required length**

CFLG.LB chainflex® series .4 Number of fibers .62.5/125 Fiber diameter

Order online ▶ www.igus.com/CFLGLB

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




chainflex® Fiber optic Cables on STS crane

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Fiber optic cable, glass | TPE outer jacket

# chainflex® CFLG.G




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**164.1 ft** Travel distance e-chain®

- Glass-fiber cable for maximum mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexibility
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -40 °F to +176 °F (-40 °C to +80 °C) |
| | flexible | -58 °F to +176 °F (-50 °C to +80 °C) |
| | fixed | -67 °F to +176 °F (-55 °C to +80 °C) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 |

## Cable structure

| | |
|---|---|
| Fibre Optic Cable | 9/125 µm, 50/125 µm, 62.5/125 µm fibers in gel-filled hollow cores. |
| Conductor construction | Strengthening rods with integrated torsion-protection braid in the outer jacket over a central gel-filled fiber tube. |
| Core identification | Fibers<br>▶ Product range table |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |

# Class 7.4.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |
| **Info** | For hanging applications, please use cables of the series CFLG.LB - see page 196! |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -40/-22 | 12.5 | 13.5 | 14.5 |
| -22/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

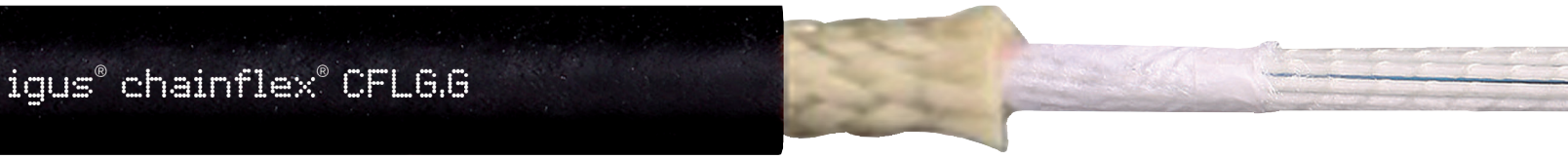
## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travels and up to 50m for gliding applications (horizontal), Class 4
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Maximum EMC protection, with high transmission qualities
- Indoor and outdoor applications
- crane applications, Material handling, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Fiber optic cable | TPE outer jacket

# chainflex® CFLG.G




Example image

| Part No. | Fiber Count | Fiber Diameter approx. | Outer diameter max. [In. (mm)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|
| CFLG.6G.62.5/125.TC | 6 | 62.5/125 | 10.0 (0.39) | 80 (53.8) |
| CFLG.12G.62.5/125.TC | 12 | 62.5/125 | 10.0 (0.39) | 80 (53.8) |
| CFLG.6G.50/125.TC | 6 | 50/125 | 10.0 (0.39) | 60 (40.3) |
| CFLG.12G.50/125.TC | 12 | 50/125 | 10.0 (0.39) | 75 (50.4) |
| CFLG.12E.9/125.TC | 12 | 9/125 | 10.0 (0.39) | 75 (50.4) |

**Note:** The given outer diameters are maximum values.

| Part No. | Bandwidth [MHz x km] @ 850nm | Attenuation [dB/km] @ 850nm | Bandwidth [MHz x km] @ 1,300nm | Attenuation [dB/km] @ 1,300nm |
|---|---|---|---|---|
| CFLG.6G.62.5/125.TC | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.0 |
| CFLG.12G.62.5/125.TC | ≥ 200 | ≤ 3.5 | ≥ 500 | ≤ 1.0 |
| CFLG.6G.50/125.TC | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.0 |
| CFLG.12G.50/125.TC | ≥ 1,500 | ≤ 3.5 | ≥ 500 | ≤ 1.0 |

| Part No. | Attenuation [dB/km] @ 1,310nm | Chromatic dispersion [ps/nm/km] @ 1,310nm | Attenuation [dB/km] @ 1,550nm | Chromatic dispersion [ps/nm/km] @ 1,550nm |
|---|---|---|---|---|
| CFLG.12E.9/125.TC | ≤ 0.5 | ≤ 3.5 | ≤ 0.5 | ≤ 18 |

| Part No. | Fiber identification | Hollow core identification |
|---|---|---|
| CFLG.6G.62.5/125.TC | ecru, yellow, green, red, violet, blue | orange |
| CFLG.12G.62.5/125.TC | ecru, yellow, green, red, violet, blue, turquoise, grey, brown, black, orange, pink | orange |
| CFLG.6G.50/125.TC | ecru, yellow, green, red, violet, blue | blue |
| CFLG.12G.50/125.TC | ecru, yellow, green, red, violet, blue, turquoise, grey, brown, black, orange, pink | blue |
| CFLG.12E.9/125.TC | ecru, yellow, green, red, violet, blue, turquoise, grey, brown, black, orange, pink | yellow |

# Class 7.4.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | 4 | | | | ±360° |



**Order example: CFLG.6G.62.5/125.TC - To your required length**

CFLG.G chainflex® series .6G Number of fibers .62.5/125 Fiber diameter .TC Special identification

Order online ▶ www.igus.com/CFLGG

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

cost down...

...life up

**Reduce cost, improve technology, now!**

Do the chainflex® price check ...

www.igus.com/info/cable-price-check

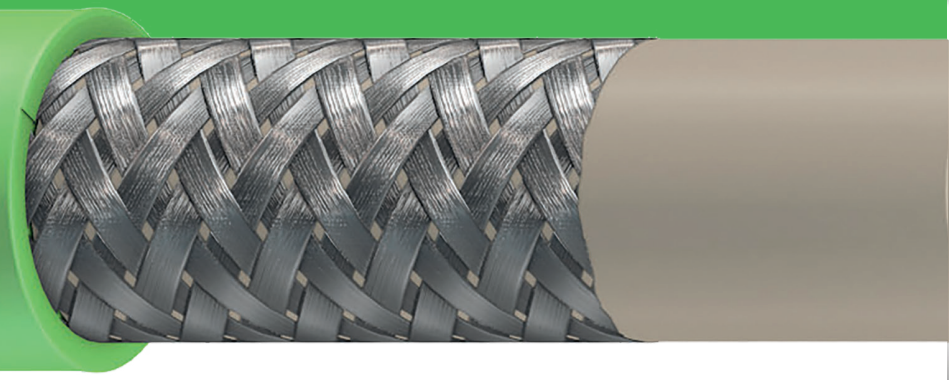
... just one idea for you: Reduce bend radius with CFLG.LB ...



chainflex® Fiber Optic Cable in sea lock

chainflex®

# Measuring system cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29350

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · cULus · UL · NFPA · DNV · REACH · RoHS · cleanroom · dry cleanroom tested · DESINA · CE

## Measuring system cables for energy chains®

Specially designed for use in e-chains®. Electric design suitable for 24 manufacturer standards. Bend radii up to 10 x d, available in four jacket materials. Tested with a chainflex® guarantee of up to 4 years.

- Electric design according to manufacturer standards for bend radius up to 10 x d
- Always find the most cost-effective Measuring system cable made from various jacket materials that is guaranteed to work.
- Developed, tested and optimized for longest life in e-chains®
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online: igus.com/chainflexlife




Background

# Suitable for drive systems from numerous manufacturers

**Structural differences by manufacturer**
There are various measuring system manufacturers on the market. The electrically identical design elements also highlight the differences among the manufacturers. Core cross-section combinations, conductor identifications and element shields vary widely from manufacturer to manufacturer. At igus®, we match the important elements such as the outer jacket, shield, inner jacket and much more to the movement in the energy chain. This allows us to optimize durability.

**DriveCliq - the Siemens standard**
DriveCliq is a digital encoder interface from Siemens. The standard has become publicly available and can be used by other manufacturers. Unlike rotary encoders commonly used in earlier generations, this encoder system is equipped with a CAT5 Ethernet element and two thick supply cores. Connection is usually with a connector solution by Yamaichi that, much like an RJ 45 connector, carries data, but has power contacts to the right and left of the notch. This pin arrangement is also in an IP20 housing for the control cabinet or an IP65 housing for the field. An M12 solution has established itself among the connectors because it is more robust and compact and eliminates the need for an expensive connection coupling.

**Benefits**
- For high dynamics
- Suitable for 24 drive manufacturers
- Jacket materials: PVC, PUR, TPE
- Tested with a 4-year guarantee

**Typical application areas**
- Storage and retrieval units, machining units/packaging machines
- Handling, indoor cranes, wood/stone processing
- Machine tools




**Design**

1. Stranded elements with optimized pitch length and pitch direction
2. Gusset-filling extruded inner jacket supports bundles
3. Tensile stress-resistant center element
4. Pair braided shield
5. Overall shield with optimized braiding angle
6. Pressure extruded outer jacket

**DriveCliq - the machine tool standard**

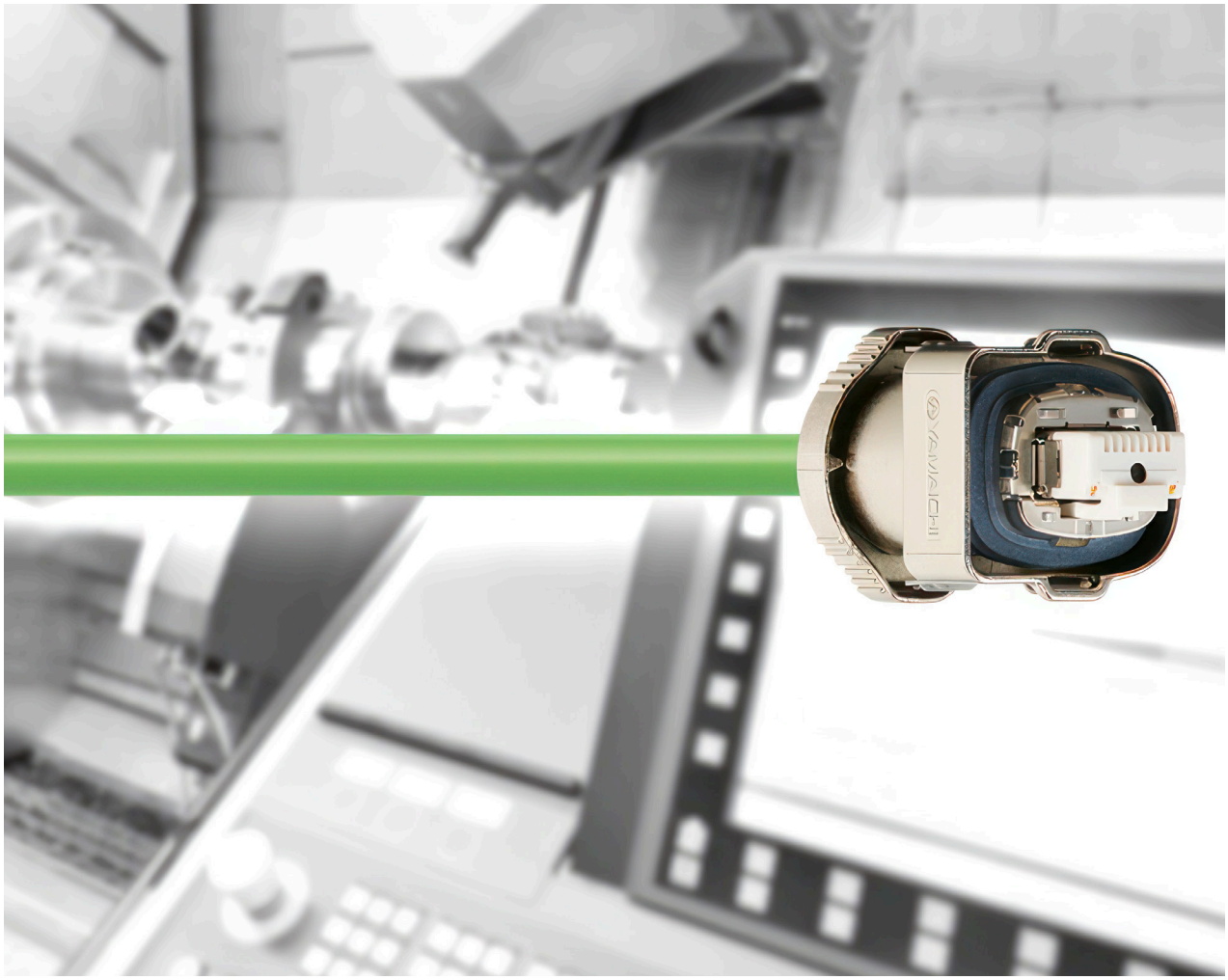
Several years ago, there was a widespread move away from conventional analogue encoder systems to DriveCliq technology, which was new at the time. We were able to support major customers such as WALDRICH (based in Coburg) in this move.

Challenges arose for the new connector technology in conjunction with long cable lengths. We developed an extremely robust M23 circular signal connector together, which significantly improved processability and data transmission compared to the original solution.

So if you are also looking for a solution that is not available in the catalogue today, come to us and we promise to take a close look at your application.

**Inner jacket - why it is important for long travels and small radii**

Our inner jacket, located between the core structure and the shielding, gives us a unique design detail for our high-end cables. It protects and guides sensitive cores and supports the shield. Both of these functions are extremely important both in long travels and small bend radii, which is just where the cable is subjected to the most extreme forces.



# chainflex® Measuring system cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CF884 | PVC | ● | 15 | +41/+158 | 9.84 | - | 65.62 | ≤ 32.81 | 210 |
| CF211 New | PVC | ● | 10 | +41/+158 | 16.41 | 9.84 | 98.43 | ≤ 32.81 | 214 |
| CF894 | iguPUR | ● | 15 | -4/+176 | 9.84 | - | 65.62 | ≤ 32.81 | 220 |
| CF111.D New | PUR | ● | 10 | -13/+176 | 16.41 | 9.84 | 98.43 | ≤ 32.81 | 224 |
| CF113.D | PUR | ● | 7.5 | -13/+176 | 32.81 | 16.41 | 164.05 | ≤ 328.1 | 230 |
| CF11.D | TPE | ● | 6.8 | -31/+90 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 236 |

## Approvals/Resistance

| chainflex® cables | oil | | PTFE free | Approvals and standards | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF884 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 210 |
| CF211 New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 214 |
| CF894 | ● | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 220 |
| CF111.D New | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | 224 |
| CF113.D | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | 230 |
| CF11.D | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | 236 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Bending radius min. [factor x d] for travel distance < 32.81 ft | Bending radius min. [factor x d] for travel distance ≥ 32.81 ft | Page |
|---|---|---|---|---|---|---|---|---|
| | | 5 million (1 million) cycles * | | 7.5 million (3 million) cycles * | | 10 million (5 million) cycles * | | |
| CF884 | +41 / +59 | 17.5 | | 18.5 | | 19.5 | | |
| | +59 / +140 | 15 | | 16 | | 17 | | 210 |
| | +140 / +158 | 17.5 | | 18.5 | | 19.5 | | |
| CF211 New | +41 / +59 | 12.5 | | 13.5 | | 14.5 | | |
| | +59 / +140 | 10 | | 11 | | 12 | | 214 |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |
| CF894 | -4 / +14 | 17.5 | | 18.5 | | 19.5 | | |
| | +14 / +158 | 15 | | 16 | | 17 | | 220 |
| | +158 / +176 | 17.5 | | 18.5 | | 19.5 | | |
| CF111.D New | -13 / +5 | 12.5 | | 13.5 | | 14.5 | | |
| | +5 / +158 | 10 | | 11 | | 12 | | 224 |
| | +158 / +176 | 12.5 | | 13.5 | | 14.5 | | |
| CF113.D | -13 / +5 | 10 | | 11 | | 12 | | |
| | +5 / +158 | 7.5 | | 8.5 | | 9.5 | | 230 |
| | +158 / +176 | 10 | | 11 | | 12 | | |
| | | 5 million | | 7.5 million | | 12.5 million | | |
| CF11.D | -13 / +5 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| | +5 / +158 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 | 236 |
| | +158 / +176 | 7.5 | 10 | 9.5 | 11 | 10.5 | 12 | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife
Figures in brackets refer to series CF884 and CF894

# chainflex® Measuring system cables

| Drive technology system | | chainflex® series<br>Class<br>Jacket<br>Page<br>Number of cores and conductor nominal cross section [mm²] | CF884.yyy<br>3.1.1.1<br>PVC<br>210 | CF211.yyy<br>4.2.2.1<br>PVC<br>214 | CF894.yyy<br>3.1.3.1<br>PUR<br>220 | CF111.yyy.D<br>4.2.3.1<br>PUR<br>224 | CF113.yyy.D<br>6.5.3.1<br>PUR<br>230 | CF11.yyy.D<br>6.6.4.1<br>TPE<br>236 |
|---|---|---|---|---|---|---|---|---|
| Allen Bradley | CFxxx.040.D | (3x(4x0.14)+(2x0.14+2x0.34)+2x1.5)C | | | | ● | ● | |
| B&R | CFxxx.024.D | ((4x0.14)+2x(2x0.34))C | | ● | | ● | | |
| | CFxxx.027.D | (5x(2x0.14)+2x0.5)C | | ● | | ● | ● | ● |
| Baumüller | CFxxx.027.D | (5x(2x0.14)+2x0.5)C | | ● | | ● | ● | ● |
| Beckhoff | CFxxx.007.D | (4x0.34)C | | ● | | | ● | ● |
| Berger Lahr | CFxxx.011.D | (4x(2x0.34)+4x0.5)C | ● | ● | ● | ● | ● | ● |
| Control | CFxxx.001.D | (3x(2x0.14)C+(4x0.14)+(2x0.5))C | ● | ● | ● | ● | ● | ● |
| Techniques | CFxxx.011.D | (4x(2x0.34)+4x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.026.D | (6x(2x0.25)+(2x0.34)C+2x0.5)C | | | | ● | | |
| ELAU | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| Fagor | CFxxx.002.D | (3x(2x0.14)C+2x(0.5)C)C | | ● | | ● | ● | ● |
| | CFxxx.004.D | (2x(2x2x0.14)+(4x0.14)C+(4x0.5))C | | ● | | ● | ● | ● |
| | CFxxx.015.D | (4x(2x0.14)+4x0.5)C | ● | ● | ● | ● | ● | ● |
| FANUC | CFxxx.021.D | ((4x0.25)+3x(2x0.25+2x0.5))C | | | | ● | | ● |
| | CFxxx.022.D | ((2x0.25)+5x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.041.D | (2x(2x0.18)+5x0.5)C | | ● | | ● | | |
| | CFxxx.042.D | (3x(2x0.18)+6x0.5)C | | ● | | ● | | |
| Festo | CFxxx.002.D | (3x(2x0.14)C+2x(0.5)C)C | | ● | | ● | ● | ● |
| Harmonic Drive | CFxxx.014.D | (4x(2x0.25)C+(2x0.5))C | | ● | | ● | ● | ● |
| Heidenhain | CFxxx.002.D | (3x(2x0.14)C+2x(0.5)C)C | | ● | | ● | ● | ● |
| | CFxxx.004.D | (2x(2x2x0.14)+(4x0.14)C+(4x0.5))C | | ● | | ● | ● | ● |
| | CFxxx.005.D | (4x(2x0.14)+4x0.5)C | | | | | ● | ● |
| | CFxxx.015.D | (4x(2x0.14)+4x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.017.D | (4x(2x0.14)+(4x0.14)C+4x1.0)C | | ● | | | ● | ● |
| | CFxxx.025.D | (3x(2x0.14)C+(2x0.5)C)C | | | | | ● | ● |
| Hengstler | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| Jetter | CFxxx.025.D | (3x(2x0.14)C+(2x0.5)C)C | | | | | ● | ● |
| Lenze | CFxxx.002.D | (3x(2x0.14)C+2x(0.5)C)C | | ● | | ● | ● | ● |
| | CFxxx.010.D | (4x(2x0.25)+2x1.0)C | | ● | | ● | ● | ● |
| | CFxxx.025.D | (3x(2x0.14)C+(2x0.5)C)C | | | | | ● | ● |
| | CFxxx.032.D | 3x(2x0.14)C+(3x0.14)C | | ● | | ● | ● | ● |
| | CFxxx.033.D | 4x(2x0.14)C+2x(1.0)C | | ● | | | ● | ● |
| LTi DRiVES | CFxxx.004.D | (2x(2x2x0.14)+(4x0.14)C+(4x0.5))C | | ● | | ● | ● | ● |
| | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.010.D | (4x(2x0.25)+2x1.0)C | | ● | ● | | ● | ● |
| NUM | CFxxx.001.D | (3x(2x0.14)C+(4x0.14)+(2x0.5))C | ● | ● | ● | ● | ● | ● |
| Omron | CFxxx.008.D | (3x(2x0.25))C | | | | | ● | ● |
| | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.010.D | (4x(2x0.25)+2x1.0)C | | ● | | ● | ● | ● |
| | CFxxx.018.D | (2x(2x0.25)+2x0.5)C | | ● | | | ● | ● |

| Drive technology system | | chainflex® series<br>Class<br>Jacket<br>Page<br>Number of cores and conductor nominal cross section [mm²] | CF884.yyy<br>3.1.1.1<br>PVC<br>210 | CF211.yyy<br>4.2.2.1<br>PVC<br>214 | CF894.yyy<br>3.1.3.1<br>PUR<br>220 | CF111.yyy.D<br>4.2.3.1<br>PUR<br>224 | CF113.yyy.D<br>6.5.3.1<br>PUR<br>230 | CF11.yyy.D<br>6.6.4.1<br>TPE<br>236 |
|---|---|---|---|---|---|---|---|---|
| Rexroth | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.010.D | (4x(2x0.25)+2x1.0)C | | ● | | ● | ● | ● |
| | CFxxx.017.D | (4x(2x0.14)+(4x0.14)C+4x1.0)C | | ● | | | ● | ● |
| | CFxxx.018.D | (2x(2x0.25)+2x0.5)C | | ● | | | ● | ● |
| | CFxxx.019.D | (3x(2x0.25)C+(3x0.25)+2x1.0)C | | ● | | | ● | ● |
| Schneider Electric | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| SEW | CFxxx.008.D | (3x(2x0.25))C | | | | | ● | ● |
| | CFxxx.036.D | (5x(2x0.25))C | | ● | | | ● | |
| | CFxxx.037.D | (6x(2x0.25))C | | ● | | | ● | |
| Siemens | CFxxx.001.D | (3x(2x0.14)C+(4x0.14)+(2x0.5))C | ● | ● | ● | ● | ● | ● |
| | CFxxx.002.D | (3x(2x0.14)C+2x(0.5)C)C | | ● | | ● | ● | ● |
| | CFxxx.006.D | (3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.011.D | (4x(2x0.34)+4x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.028.D | (2x(2x0.15)+(2x0.38))C | ● | ● | ● | ● | ● | ● |
| Stöber | CFxxx.008.D | (3x(2x0.25))C | | | | | ● | ● |
| | CFxxx.009.D | (4x(2x0.25)+2x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.011.D | (4x(2x0.34)+4x0.5)C | ● | ● | ● | ● | ● | ● |
| | CFxxx.016.D | (3x(2x0.25)C)C | | ● | | | ● | |
| | CFxxx.021.D | (3x(2x0.5+2x0.25)+(4x0.25))C | | | | ● | | ● |

Measuring system cable | PVC outer jacket

# chainflex® CF884




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | According to measuring system specification. |
| Color code | According to measuring system specification.<br>▶ Product range table |
| Element shield | Foil taping of optimized, bending-resistant foil shield.<br>100 % optical coverage |
| Overall shield | Aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Green (similar to RAL 6018) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.1.1

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶www.igus.com/CF884 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | PVC outer jacket

# chainflex® CF884




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF884.001** | 26 | 3 STP x 0.14 | 0.33 (8.5) | 27.6 (41) | 61.1 (91) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF884.006** | 26 | 3 STP x 0.14 | 0.35 (9.0) | 33.6 (50) | 67.9 (101) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.22 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF884.009** | 24 | 4 PR x 0.25 | 0.31 (8.0) | 29.6 (44) | 61.1 (91) |
| | 20 | 2 x 0.5 | | | |
| **CF884.011** | 22 | 4 PR x 0.34 | 0.37 (9.5) | 43.0 (64) | 78.6 (117) |
| | 20 | 4 x 0.5 | | | |
| **CF884.015** | 26 | 4 PR x 0.14 | 0.33 (8.5) | 29.6 (44) | 61.8 (92) |
| | 20 | 4 x 0.5 | | | |
| **CF884.022** | 24 | 1 PR x 0.25 | 0.31 (8.0) | 29.6 (44) | 53.1 (79) |
| | 20 | 5 x 0.5 | | | |
| **CF884.028** | 26 | 2 PR x 0.15 | 0.30 (7.5) | 27.6 (41) | 39.0 (58) |
| | 22 | 2 x 0.38 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

## Order example: CF884.015 - To your required length

**CF884 chainflex® series .015 Code measuring system type**

Order online ▶ www.igus.com/CF884

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.1.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF884.001** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray, blue, white-yellow, white-black |
| | (2x0.5) | brown-red, brown-blue |
| **CF884.006** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray, blue, white-yellow, white-black |
| | (4x0.22) | brown-yellow/brown-gray/green-black/green-red |
| | (2x0.5) | brown-red, brown-blue |
| **CF884.009** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white, brown |
| **CF884.011** | 4x(2x0.34) | black/brown, red/orange, yellow/green, blue/violet |
| | 4x0.5 | blue-white, black-white, red-white, yellow-white |
| **CF884.015** | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |
| **CF884.022** | (2x0.25) | white, brown |
| | 5x0.5 | green, yellow, gray, pink, blue |
| **CF884.028** | 2x(2x0.15) | green/yellow, pink/blue |
| | (2x0.38) | red/black |




**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

... just one idea for you: Reduce bend radius with CF113.D ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

Measuring system cable | PVC outer jacket

# chainflex® CF211




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 16.41 ft/s (5 m/s) |
| | gliding | 9.84 ft/s (3 m/s) |
| a max. | 98.4 ft/s² (30 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | According to measuring system specification. |
| Color code | According to measuring system specification.<br>▶ Product range table |
| Element shield | Extremely bending-resistant, tinned copper.<br>85 % optical coverage |
| Element jacket | TPE mixture on pair shielding adapted to suit the requirements in e-chains®. |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Green (similar to RAL 6018) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 4.2.2.1

## Properties and approvals

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF211 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 12.5 | 13.5 | 14.5 |
| +59/+140 | 10 | 11 | 12 |
| +140/+158 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, Handling, indoor cranes, Wood/stone processing

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

## Measuring system cable | PVC outer jacket

# chainflex® CF211




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF211.001** | 26 | 3 STP x 0.14 | 0.35 (9.0) | 43.0 (64) | 67.2 (100) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF211.002** | 26 | 3 STP x 0.14 | 0.37 (9.5) | 44.3 (66) | 71.2 (106) |
| | 20 | 2 SC x 0.5 | | | |
| **CF211.004** | 26 | 4 PR x 0.14 | 0.39 (10.0) | 47.0 (70) | 77.3 (115) |
| | 26 | 4 C x 0.14 SHLD | | | |
| | 20 | 4 x 0.5 | | | |
| **CF211.006** | 26 | 3 STP x 0.14 | 0.39 (10.0) | 51.1 (76) | 82.0 (122) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.25 | | | |
| | 20 | 2 x 0.5 | | | |
| New **CF211.007** | 22 | 4 SC 0.34 | 0.22 (5.5) | 16.8 (25) | 30.2 (45) |
| **CF211.009** | 24 | 4 PR x 0.25 | 0.31 (8.0) | 32.9 (49) | 53.1 (79) |
| | 20 | 2 x 0.5 | | | |
| **CF211.010** | 24 | 4 PR x 0.25 | 0.33 (8.5) | 41.0 (61) | 61.8 (92) |
| | 17 | 2 x 1.0 | | | |
| **CF211.011** | 22 | 4 PR x 0.34 | 0.37 (9.5) | 48.4 (72) | 73.2 (109) |
| | 20 | 4 x 0.5 | | | |
| **CF211.014** | 24 | 4 STP x 0.25 | 0.41 (10.5) | 51.7 (77) | 83.3 (124) |
| | 20 | 2 x 0.5 | | | |
| **CF211.015** | 26 | 4 PR x 0.14 | 0.33 (8.5) | 36.3 (54) | 57.8 (86) |
| | 20 | 4 x 0.5 | | | |
| **CF211.016** | 24 | 3 STP x 0.25 | 0.35 (9.0) | 34.3 (51) | 59.8 (89) |
| **CF211.017** | 26 | 4 PR x 0.14 | 0.39 (10.0) | 61.8 (92) | 90.0 (134) |
| | 26 | 4 x 0.14 SHLD | | | |
| | 17 | 4 x 1.0 | | | |
| **CF211.018** | 24 | 2 PR x 0.25 | 0.26 (6.5) | 22.8 (34) | 36.3 (54) |
| | 20 | 2 x 0.5 | | | |
| **CF211.019** | 24 | 3 STP x 0.25 | 0.39 (10.0) | 57.8 (86) | 84.0 (125) |
| | 24 | 3 x 0.25 | | | |
| | 17 | 2 x 1.0 | | | |
| **CF211.022** | 24 | 1 PR x 0.25 | 0.28 (7.0) | 30.9 (46) | 47.7 (71) |
| | 20 | 5 x 0.5 | | | |
| New **CF211.023** | 24 | 2 STP x 0.25 | 0.28 (7.0) | 26.2 (39) | 40.3 (60) |
| | 22 | 2 x 0.34 | | | |
| **CF211.024** | 26 | 4 x 0.14 | 0.28 (7.0) | 24.2 (36) | 41.0 (61) |
| | 22 | 2 PR x 0.34 | | | |
| **CF211.027** | 26 | 5 PR x 0.14 | 0.31 (8.0) | 30.2 (45) | 50.4 (75) |
| | 20 | 1 PR x 0.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

# Class 4.2.2.1



| Part No. | Core group | Color code |
|---|---|---|
| CF211.001 | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (2x0.5) | brown-red, brown-blue |
| CF211.002 | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | 2x(0.5)C | black, red |
| CF211.004 | 2x(2x(2x0.14)) | (brown/green)/(yellow/violet), (gray/pink)/(red/black) |
| | (4x0.14)C | yellow-black/red-black/green-black/blue-black |
| | (4x0.5) | brown-green/white-green/blue/white |
| CF211.006 | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (4x0.25) | brown-yellow/brown-gray/green-black/green-red |
| | (2x0.5) | brown-red, brown-blue |
| CF211.007 | 4x(0.34)C | white, green, brown, yellow (star-quad) |
| CF211.009 | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white, brown |
| CF211.010 | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x1.0 | white, brown |
| CF211.011 | 4x(2x0.34) | black/brown, red/orange, green/yellow, blue/violet |
| | 4x0.5 | black-white, red-white, yellow-white, blue-white |
| CF211.014 | 4x(2x0.25)C | white/brown, green/yellow, gray/pink, blue/red |
| | (2x0.5) | black no. 1/black no. 2 |
| CF211.015 | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |
| CF211.016 | 3x(2x0.25)C | white/brown, green/yellow, gray/pink |
| CF211.017 | 4x(2x0.14) | red/black, brown/green, yellow/violet, gray/pink |
| | (4x0.14)C | blue-black/yellow-black/red-black/green-black |
| | 4x1.0 | white-green, brown-green, blue, white |
| CF211.018 | 2x(2x0.25) | red/black, gray/pink |
| | 2x0.5 | white, brown |
| CF211.019 | 3x(2x0.25)C | brown/green, gray/pink, red/black |
| | (3x0.25) | blue/violet/yellow |
| | 2x1.0 | white, brown |
| CF211.022 | (2x0.25) | white/brown |
| | 5x0.5 | green, yellow, gray, pink, blue |
| CF211.023 | 2x(2x0.25) | white/brown, green/yellow |
| | (2x0.34) | blue/red |
| CF211.024 | (4x0.14) | yellow/gray/violet/pink |
| | 2x(2x0.34) | white-green/white, brown-green/blue |
| CF211.027 | 5x(2x0.14) | brown/green, yellow/gray, white/violet, red/black, pink/blue |
| | 2x0.5 | white-green, white-red |

Other types ▶ Page 218

Measuring system cable | PVC outer jacket

# chainflex® CF211

New




Example image

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | CF211.028 | 26 | 2 PR x 0.15 | 0.30 (7.5) | 26.9 (40) | 51.7 (77) |
| | | 22 | 2 x 0.38 | | | |
| New | CF211.030 | 24 | 3 STP x 0.25 | 0.33 (8.5) | 40.3 (60) | 58.5 (87) |
| | | 24 | 2 PR x 0.25 | | | |
| | CF211.032 [5)] | 26 | 3 STP x 0.14 | 0.31 (8.0) | 23.5 (35) | 53.1 (79) |
| | | 26 | 3 x 0.14 SHLD | | | |
| | CF211.033 [5)] | 26 | 4 STP x 0.14 | 0.37 (9.5) | 43.0 (64) | 75.3 (112) |
| | | 17 | 2 x 1.0 | | | |
| | CF211.036 | 24 | 5 PR x 0.25 | 0.31 (8.0) | 28.2 (42) | 46.4 (69) |
| | CF211.037 | 24 | 6 PR x 0.25 | 0.33 (8.5) | 34.3 (51) | 55.8 (83) |
| | CF211.038 | 26 | 3 PR x 0.14 | 0.30 (7.5) | 22.2 (33) | 41.7 (62) |
| | | 22 | 1 PR x 0.34 | | | |
| | CF211.039 | 26 | 4 STP x 0.14 | 0.39 (10.0) | 51.7 (77) | 84.0 (125) |
| | | 20 | 2 x 0.5 SC | | | |
| | CF211.041 | 26 | 2 PR x 0.18 | 0.30 (7.5) | 32.9 (49) | 53.1 (79) |
| | | 20 | 5 x 0.5 | | | |
| | CF211.042 | 26 | 3 PR x 0.18 | 0.33 (8.5) | 41.7 (62) | 65.9 (98) |
| | | 20 | 6 x 0.5 | | | |

[5)] Manufactured without overall shield

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

Other types ▶ Page 216




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

**Order example: CF211.038 - To your required length**
**CF211 chainflex® series .038 Code measuring system type**

Order online ▶ www.igus.com/CF211

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

# Class 4.2.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF211.028** | 2x(2x0.15) | green/yellow, pink/blue |
| | (2x0.38) | red/black |
| **CF211.030** | 3x(2x0.25)C | white/brown, green/yellow, gray/pink |
| | 2x(2x0.25) | blue/red, black/violet |
| **CF211.032** [5)] | 3x(2x0.14)C | green/black, yellow/black, red/black |
| | (3x0.14)C | gray/pink/black |
| **CF211.033** [5)] | 4x(2x0.14)C | yellow/black, red/black, blue/black, green/black |
| | 2x(1.0)C | white, brown |
| **CF211.036** | 5x(2x0.25) | white/brown green/yellow, gray/pink, blue/red, black/violet |
| **CF211.037** | 6x(2x0.25) | white/brown, green/yellow, gray/pink, blue/red, black/violet, gray-pink/red-blue |
| **CF211.038** | 3x(2x0.14) | white/brown, green/yellow, gray/pink |
| | (2x0.34) | blue/red |
| **CF211.039** | (4x(2x0.14)C | green/yellow, gray/pink, blue/red, black/violet |
| | 2x(0.5)C | white, brown |
| **CF211.041** | 2x(2x0.18) | white/brown, black/violet |
| | 5x0.5 | blue, violet, green, yellow, gray |
| **CF211.042** | 3x(2x0.18) | white/black, red/white, black/red |
| | 6x0.5 | black no. 1, black no. 2, black no. 3, red no. 4, red no. 5, red no. 6 |


cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF884 ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | iguPUR outer jacket

# chainflex® CF894




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | According to measuring system specification. |
| Color code | According to measuring system specification.<br>▶ Product range table |
| Element shield | Foil taping of optimized, bending-resistant foil shield.<br>100 % optical coverage |
| Overall shield | Aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Green (similar to RAL 6018) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF894 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 17.5 | 18.5 | 19.5 |
| +14/+158 | 15 | 16 | 17 |
| +158/+176 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | iguPUR outer jacket

# chainflex® CF894




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF894.001** | 26 | 3 STP x 0.14 | 0.33 (8.5) | 27.6 (41) | 53.8 (80) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF894.006** | 26 | 3 STP x 0.14 | 0.35 (9.0) | 33.6 (50) | 70.6 (105) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.22 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF894.009** | 24 | 4 PR x 0.25 | 0.31 (8.0) | 29.6 (44) | 53.8 (80) |
| | 20 | 2 x 0.5 | | | |
| **CF894.011** | 22 | 4 PR x 0.34 | 0.37 (9.5) | 43.0 (64) | 84.7 (126) |
| | 20 | 4 x 0.5 | | | |
| **CF894.015** | 26 | 4 PR x 0.14 | 0.33 (8.5) | 29.6 (44) | 56.4 (84) |
| | 20 | 4 x 0.5 | | | |
| **CF894.022** | 24 | 1 PR x 0.25 | 0.31 (8.0) | 29.6 (44) | 52.4 (78) |
| | 20 | 5 x 0.5 | | | |
| **CF894.028** | 26 | 2 PR x 0.15 | 0.30 (7.5) | 27.6 (41) | 38.3 (57) |
| | 22 | 2 x 0.38 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

## Order example: CF894.011 - To your required length

**CF894 chainflex® series .011 Code measuring system type**

Order online ▶ www.igus.com/CF894

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 3.1.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF894.001** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray, blue, white-yellow, white-black |
| | (2x0.5) | brown-red, brown-blue |
| **CF894.006** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray, blue, white-yellow, white-black |
| | (4x0.22) | brown-yellow/brown-gray/green-black/green-red |
| | (2x0.5) | brown-red, brown-blue |
| **CF894.009** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white/brown |
| **CF894.011** | 4x(2x0.34) | black/brown, red/orange, yellow/green, blue/violet |
| | 4x0.5 | blue-white, black-white, red-white, yellow-white |
| **CF894.015** | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |
| **CF894.022** | (2x0.25) | white, brown |
| | 5x0.5 | green, yellow, gray, pink, blue |
| **CF894.028** | 2x(2x0.15) | green/yellow, pink/blue |
| | (2x0.38) | red/black |


cost down...




...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

... just one idea for you: Reduce bend radius with CF113.D ...



UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | PUR outer jacket

# chainflex® CF111.D




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 16.41 ft/s (5 m/s) |
| | gliding | 9.84 ft/s (3 m/s) |
| a max. | | 98.4 ft/s² (30 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | According to measuring system specification. |
| Color code | According to measuring system specification.<br>▶ Product range table |
| Element shield | Extremely bending-resistant, tinned copper.<br>95 % optical coverage |
| Element jacket | TPE mixture on pair shielding adapted to suit the requirements in e-chains®. |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Green (similar to RAL 6018) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | | ±360° | | |

# Class 4.2.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF111D |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X4 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF111D |
| **REACH** | In accordance with Regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 13.5 | 14.5 |
| +5/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | PUR outer jacket

# chainflex® CF111.D




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF111.001.D** | 26 | 3 STP x 0.14 | 0.37 (9.5) | 43.0 (64) | 69.9 (104) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF111.002.D** | 26 | 3 STP x 0.14 | 0.37 (9.5) | 44.3 (66) | 73.2 (109) |
| | 20 | 2 SC x 0.5 | | | |
| **CF111.004.D** | 26 | 4 PR x 0.14 | 0.41 (10.5) | 47.0 (70) | 77.9 (116) |
| | 26 | 4 x 0.14 SHLD | | | |
| | 20 | 4 x 0.5 | | | |
| **CF111.006.D** | 26 | 3 STP x 0.14 | 0.39 (10.0) | 51.1 (76) | 82.0 (122) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.25 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF111.009.D** | 24 | 4 PR x 0.25 | 0.31 (8.0) | 32.9 (49) | 53.1 (79) |
| | 20 | 2 x 0.5 | | | |
| **CF111.010.D** | 24 | 4 PR x 0.25 | 0.33 (8.5) | 41.0 (61) | 63.2 (94) |
| | 17 | 2 x 1.0 | | | |
| **CF111.011.D** | 22 | 4 PR x 0.34 | 0.37 (9.5) | 48.4 (72) | 77.3 (115) |
| | 20 | 4 x 0.5 | | | |
| **CF111.014.D** | 24 | 4 STP x 0.25 | 0.41 (10.5) | 51.7 (77) | 83.3 (124) |
| | 20 | 2 x 0.5 | | | |
| **CF111.015.D** | 26 | 4 PR x 0.14 | 0.33 (8.5) | 36.3 (54) | 58.5 (87) |
| | 20 | 4 x 0.5 | | | |
| **CF111.020.D** | 26 | 3 PR x 0.14 | 0.33 (8.5) | 34.9 (52) | 58.5 (87) |
| | 26 | 4 PR x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF111.021.D** | 24 | 6 x 0.50 | 0.37 (9.5) | 53.8 (80) | 78.6 (117) |
| | 24 | 3 PR x 0.25 | | | |
| | 20 | 3 PR x 0.5 | | | |
| **CF111.022.D** | 24 | 1 PR x 0.25 | 0.28 (7.0) | 30.9 (46) | 50.4 (75) |
| | 20 | 5 x 0.5 | | | |
| New **CF111.023.D** | 24 | 4 PR x 0.25 | 0.28 (7.0) | 26.2 (39) | 40.3 (60) |
| | 22 | 2 x 0.34 | | | |
| **CF111.024.D** | 26 | 4 x 0.14 | 0.28 (7.0) | 24.2 (36) | 41.0 (61) |
| | 22 | 2 PR x 0.34 | | | |
| **CF111.026.D** | 24 | 6 PR x 0.25 | 0.41 (10.5) | 49.7 (74) | 80.0 (119) |
| | 22 | 1 STP x 0.34 | | | |
| | 20 | 2 x 0.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

# Class 4.2.3.1



| Part No. | Core group | Color code |
|---|---|---|
| **CF111.001.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (2x0.5) | brown-red/brown-blue |
| **CF111.002.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | 2x(0.5)C | black, red |
| **CF111.004.D** | 2x(2x(2x0.14)) | (brown/green)/(yellow/violet), (gray/pink)/(red/black) |
| | (4x0.14)C | yellow-black/red-black/green-black/blue-black |
| | (4x0.5) | brown-green/white-green/blue/white |
| **CF111.006.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (4x0.25) | brown-yellow/brown-gray/green-black/green-red |
| | (2x0.5) | brown-red/brown-blue |
| **CF111.009.D** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white, brown |
| **CF111.010.D** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x1.0 | white, brown |
| **CF111.011.D** | 4x(2x0.34) | black/brown, red/orange, green/yellow, blue/violet |
| | 4x0.5 | black-white, red-white, yellow-white, blue-white |
| **CF111.014.D** | 4x(2x0.25)C | white/brown, green/yellow, gray/pink, blue/red |
| | (2x0.5) | black no. 1/black no. 2 |
| **CF111.015.D** | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |
| **CF111.020.D** | 3x(2x0.14) | blue/red, black/violet, gray-pink/red-blue |
| | 2x(4x0.14) | green/gray/yellow/pink, white-green/white-yellow/brown-green/yellow-brown |
| | (2x0.5) | white/brown |
| **CF111.021.D** | (4x0.25) | white/brown/gray/black |
| | 3x2x0.25 | white/yellow, white/gray, black/orange |
| | 3x2x0.5 | black no. 1/black no. 2, black no. 3/black no. 4, black no. 5/black no. 6 |
| **CF111.022.D** | (2x0.25) | white/brown |
| | 5x0.5 | green, yellow, gray, pink, blue |
| **CF111.023.D** | 2x(2x0.25) | white/brown, green/yellow |
| | (2x0.34) | blue/red |
| **CF111.024.D** | (4x0.14) | yellow/gray/violet/pink |
| | 2x(2x0.34) | white-green/white, brown-green/blue |
| **CF111.026.D** | 6x(2x0.25) | green/yellow, gray/pink, blue/red, black/violet, gray-pink/red-blue, white-green/brown-green |
| | (2x0.34)C | white/brown |
| | (2x0.5) | blue/red |

Other types ▶ Page 228

# chainflex® CF111.D




Example image

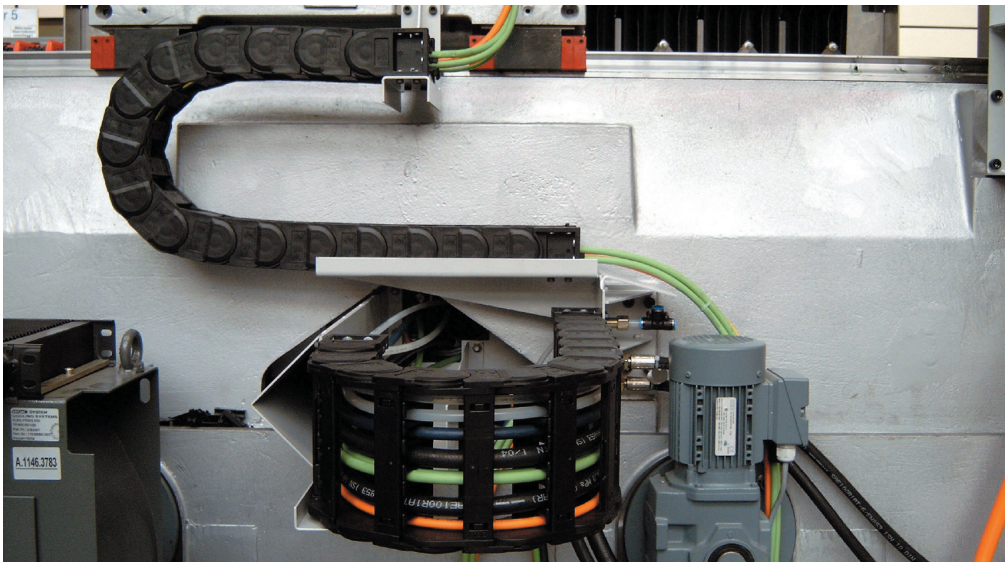
| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF111.027.D** | 26 | 5 PR x 0.14 | 0.31 (8.0) | 30.2 (45) | 51.1 (76) |
| | 20 | 1 PR x 0.5 | | | |
| **CF111.028.D** | 26 | 2 PR x 0.15 | 0.30 (7.5) | 26.9 (40) | 49.1 (73) |
| | 22 | 2 x 0.38 | | | |
| **CF111.032.D** [5] | 26 | 3 STP x 0.14 | 0.33 (8.5) | 23.5 (35) | 55.1 (82) |
| | 26 | 3 x 0.14 SHLD | | | |
| **CF111.040.D** | 26 | 14 x 0.14 | 0.35 (9.0) | 54.4 (81) | 79.3 (118) |
| | 22 | 2 x 0.34 | | | |
| | 16 | 2 x 1.5 | | | |
| **CF111.041.D** | 26 | 2 PR x 0.18 | 0.30 (7.5) | 32.9 (49) | 53.8 (80) |
| | 20 | 5 x 0.5 | | | |
| **CF111.042.D** | 26 | 3 PR x 0.18 | 0.33 (8.5) | 41.7 (62) | 66.5 (99) |
| | 20 | 6 x 0.5 | | | |

[5] Manufactured without overall shield

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

Other types ▶ Page 226



**readychain® systems from igus® are completely pre-harnessed with chainflex® cables, hoses, metal parts etc.**

# Class 4.2.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF111.027.D** | 5x(2x0.14) | brown/green, yellow/gray, white/violet, red/black, pink/blue |
| | 2x0.5 | white-green, white-red |
| **CF111.028.D** | 2x(2x0.15) | green/yellow, pink/blue |
| | (2x0.38) | red/black |
| **CF111.032.D** [5)] | 3x(2x0.14)C | green/black, yellow/black, red/black |
| | (3x0.14)C | gray/pink/black |
| **CF111.040.D** | 3x(4x0.14) | black/red/white-black/white-red, green/blue/white-green/white-blue, yellow/brown/white-yellow/white-brown |
| | (2x0.14+2x0.34) | violet/orange/white-violet/white-orange |
| | 2x1.5 | white-gray, gray |
| **CF111.041.D** | 2x(2x0.18) | white/brown, black/violet |
| | 5x0.5 | blue, violet, green, yellow, gray |
| **CF111.042.D** | 3x(2x0.18) | white/black, red/white, black/red |
| | 6x0.5 | black no. 1, black no. 2, black no. 3, red no. 4, red no. 5, red no. 6 |




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

cost down...




...life up

## Reduce cost, improve technology, now!

Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF211 ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | PUR outer jacket

# chainflex® CF113.D



Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For very high mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

**DriveCliq with 300V UL approval**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | 164.1 ft/s² (50 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Stranded conductor in especially bending-resistant version consisting of tinned copper wires (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | According to measuring system specification. |
| **Color code** | According to measuring system specification.<br>▶ Product range table |
| **Element shield** | Extremely bending-resistant tinned copper braid.<br>95 % optical coverage |
| **Element jacket** | TPE mixture on pair shielding adapted to suit the requirements in e-chains®. |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Green (similar to RAL 6018) |
| **CFRIP®** | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 50V<br>300V (following UL) |
| **Test voltage** | 500 V |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 6.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF113D |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X4 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF113D |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 10 | 11 | 12 |
| +5/+158 | 7.5 | 8.5 | 9.5 |
| +158/+176 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, indoor cranes, low temperature applications

Measuring system cable | PUR outer jacket

# chainflex® CF113.D

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF113.001.D** | 26 | 3 STP x 0.14 | 0.39 (10.0) | 47.7 (71) | 92.1 (137) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF113.002.D** | 26 | 3 STP x 0.14 | 0.39 (10.0) | 49.7 (74) | 96.8 (144) |
| | 20 | 2 SC x 0.5 | | | |
| **CF113.003.D** | 26 | 3 PR x 0.14 | 0.31 (8.0) | 37.6 (56) | 69.2 (103) |
| | 17 | 2 x 1.0 | | | |
| **CF113.004.D** | 26 | 4 PR x 0.14 | 0.43 (11.0) | 52.4 (78) | 102.1 (152) |
| | 26 | 4 x 0.14 SHLD | | | |
| | 20 | 4 x 0.5 | | | |
| **CF113.005.D** | 26 | 4 PR x 0.14 | 0.35 (9.0) | 40.3 (60) | 77.3 (115) |
| | 20 | 4 x 0.5 | | | |
| **CF113.006.D** | 26 | 3 STP x 0.14 | 0.43 (11.0) | 57.1 (85) | 106.2 (158) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.25 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF113.007.D** [2] | 22 | 2 PR x 0.34 | 0.26 (6.5) | 20.8 (31) | 36.3 (54) |
| **CF113.008.D** | 24 | 3 PR x 0.25 | 0.30 (7.5) | 24.2 (36) | 51.1 (76) |
| **CF113.009.D** | 24 | 4 PR x 0.25 | 0.33 (8.5) | 38.3 (57) | 66.5 (99) |
| | 20 | 2 x 0.5 | | | |
| **CF113.010.D** | 24 | 4 PR x 0.25 | 0.35 (9.0) | 45.7 (68) | 82.0 (122) |
| | 17 | 2 x 1.0 | | | |
| **CF113.011.D** | 22 | 4 PR x 0.34 | 0.39 (10.0) | 54.4 (81) | 95.4 (142) |
| | 20 | 4 x 0.5 | | | |
| **CF113.013.D** | 26 | 3 STP x 0.14 | 0.35 (9.0) | 41.7 (62) | 81.3 (121) |
| | 20 | 2 x 0.5 | | | |
| **CF113.014.D** | 24 | 4 STP x 0.25 | 0.43 (11.0) | 57.8 (86) | 109.5 (163) |
| | 20 | 2 x 0.5 | | | |
| **CF113.015.D** | 26 | 4 PR x 0.14 | 0.35 (9.0) | 40.3 (60) | 76.6 (114) |
| | 20 | 4 x 0.5 | | | |
| **CF113.016.D** | 24 | 3 STP x 0.25 | 0.39 (10.0) | 40.3 (60) | 84.7 (126) |
| **CF113.017.D** [4] | 26 | 4 PR x 0.14 | 0.39 (10.0) | 67.2 (100) | 100.8 (150) |
| | 26 | 4 x 0.14 SHLD | | | |
| | 17 | 4 x 1.0 | | | |
| **CF113.018.D** [4] | 24 | 2 PR 0.25 | 0.26 (6.5) | 27.6 (41) | 43.7 (65) |
| | 20 | 2 x 0.5 | | | |

The chainflex® types marked with [2] are cables designed as a star-quad.
[4] Manufactured without inner jacket

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |



| Part No. | Core group | Color code |
|---|---|---|
| **CF113.001.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (2x0.5) | brown-red/brown-blue |
| **CF113.002.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | 2x(0.5)C | black, red |
| **CF113.003.D** | 3x(2x0.14) | white/brown, green/yellow, gray/pink |
| | 2x1.0 | blue, red |
| **CF113.004.D** | 2x(2x(2x0.14)) | (brown/green)/(yellow/violet), (gray/pink)/(red/black) |
| | (4x0.14)C | yellow-black/red-black/green-black/blue-black |
| | (4x0.5) | brown-green/white-green/blue/white |
| **CF113.005.D** | 4x(2x0.14) | white/brown, green/yellow, gray/pink, blue/red |
| | 4x0.5 | black, violet, gray-pink, red-blue |
| **CF113.006.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (4x0.25) | brown-yellow/brown-gray/green-black/green-red |
| | (2x0.5) | brown-red/brown-blue |
| **CF113.007.D** [2)] | 4x0.34 | white, green, brown, yellow (star-quad) |
| **CF113.008.D** | 3x(2x0.25) | white/brown, green/yellow, gray/pink |
| **CF113.009.D** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white, brown |
| **CF113.010.D** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x1.0 | white, brown |
| **CF113.011.D** | 4x(2x0.34) | black/brown, red/orange, green/yellow, blue/violet |
| | 4x0.5 | black-white, red-white, yellow-white, blue-white |
| **CF113.013.D** | 3x(2x0.14)C | white/brown, green/yellow, gray/pink |
| | 2x0.5 | blue, red |
| **CF113.014.D** | 4x(2x0.25)C | white/brown, green/yellow, gray/pink, blue/red |
| | (2x0.5) | black no. 1/black no. 2 |
| **CF113.015.D** | (4x(2x0.15))C | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |
| **CF113.016.D** | 3x(2x0.25)C | white/brown, green/yellow, gray/pink |
| **CF113.017.D** [4)] | 4x(2x0.14) | red/black, brown/green, yellow/violet, gray/pink |
| | (4x0.14)C | blue-black/yellow-black/red-black/green-black |
| | 4x1.0 | white-green, brown-green, blue, white |
| **CF113.018.D** [4)] | 2x(2x0.25) | red/black, gray/pink |
| | 2x0.5 | white, brown |

Other types ▶ Page 234

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CF113.D

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF113.019.D** [4] | 24 | 3 STP x 0.25 | 0.39 (10.0) | 62.5 (93) | 96.1 (143) |
| | 24 | 3 x 0.25 | | | |
| | 17 | 2 x 1.0 | | | |
| **CF113.022.D** | 24 | 1 PR x 0.25 | 0.31 (8.0) | 36.3 (54) | 63.2 (94) |
| | 20 | 5 x 0.5 | | | |
| **CF113.025.D** | 26 | 3 STP x 0.14 | 0.39 (10.0) | 48.4 (72) | 94.7 (141) |
| | 20 | 1 STP x 0.5 | | | |
| **CF113.027.D** | 26 | 5 PR x 0.14 | 0.35 (9.0) | 34.9 (52) | 70.6 (105) |
| | 20 | 1 PR x 0.5 | | | |
| **CF113.028.D** [4] | 24 | 2 PR x 0.20 | 0.30 (7.5) | 29.6 (44) | 46.4 (69) |
| | 22 | 2 x 0.38 | | | |
| **CF113.029.D** | 24 | 5 STP x 0.25 | 0.47 (12.0) | 70.6 (105) | 129.0 (192) |
| | 24 | 2 x 0.25 | | | |
| **CF113.031.D** | 24 | 2 STP x 0.25 | 0.37 (9.5) | 46.4 (69) | 89.4 (133) |
| | 17 | 2 x 1.0 | | | |
| **CF113.032.D** [5] | 26 | 3 STP x 0.14 | 0.33 (8.5) | 23.5 (35) | 55.1 (82) |
| | 26 | 3 x 0.14 SHLD | | | |
| **CF113.033.D** [5] | 26 | 4 STP x 0.14 | 0.37 (9.5) | 43.0 (64) | 74.6 (111) |
| | 17 | 2 x 1.0 | | | |
| **CF113.036.D** | 24 | 5 PR x 0.25 | 0.33 (8.5) | 34.3 (51) | 69.2 (103) |
| **CF113.037.D** | 24 | 6 PR x 0.25 | 0.35 (9.0) | 39.0 (58) | 76.6 (114) |
| **CF113.038.D** | 26 | 3 PR x 0.14 | 0.33 (8.5) | 24.2 (36) | 58.5 (87) |
| | 22 | 1 PR x 0.34 | | | |
| **CF113.040.D** | 26 | 14 x 0.14 | 0.39 (10.0) | 59.1 (88) | 104.2 (155) |
| | 22 | 2 x 0.34 | | | |
| | 16 | 2 x 1.5 | | | |

[4] Manufactured without inner jacket
[5] Manufactured without overall shield

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Other types ▶ Page 232




### Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF113.019.D** [4] | 3x(2x0.25)C | brown/green, gray/pink, red/black |
| | (3x0.25) | blue/violet/yellow |
| | 2x1.0 | white, brown |
| **CF113.022.D** | (2x0.25) | white/brown |
| | 5x0.5 | green, yellow, gray, pink, blue |
| **CF113.025.D** | 3x(2x0.14)C | green/yellow, blue/red, gray/pink |
| | (2x0.5)C | white/brown |
| **CF113.027.D** | 5x(2x0.14) | brown/green, yellow/gray, white/violet, red/black, pink/blue |
| | 2x0.5 | white-green, white-red |
| **CF113.028.D** [4] | 2x(2x0.20) | green/yellow, pink/blue |
| | (2x0.38) | red/black |
| **CF113.029.D** | 5x(2x0.25)C | white/brown green/yellow, gray/pink, blue/red, black/violet |
| | (2x0,25+2x0.5) | gray-pink/brown-green/white-green/red-blue |
| **CF113.031.D** | 2x(2x0.25)C | white/brown, green/yellow |
| | 2x1.0 | black no. 1, black no. 2 |
| **CF113.032.D** [5] | 3x(2x0.14)C | green/black, yellow/black, red/black |
| | (3x0.14)C | gray/pink/black |
| **CF113.033.D** [5] | 4x(2x0.14)C | yellow/black, red/black, blue/black, green/black |
| | 2x(1.0)C | white, brown |
| **CF113.036.D** | 5x(2x0.25) | white/brown green/yellow, gray/pink, blue/red, black/violet |
| **CF113.037.D** | 6x(2x0.25) | white/brown, green/yellow, gray/pink, blue/red, black/violet, gray-pink/red-blue |
| **CF113.038.D** | 3x(2x0.14) | white/brown, green/yellow, gray/pink |
| | (2x0.34) | blue/red |
| **CF113.040.D** | 3x(4x0.14) | black/red/white-black/white-red, green/blue/white-green/white-blue, yellow/brown/white-yellow/white-brown |
| | (2x0.14+2x0.34) | violet/orange/white-violet/white-orange |
| | 2x1.5 | white-gray, gray |



chainflex® Measuring system cables in a double-spindle horizontal machining centre.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | TPE outer jacket

# chainflex® CF11.D




Example image

**12,500,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | minimum 6.8 x d |
| | **flexible** | minimum 5 x d |
| | **fixed** | minimum 4 x d |
| Temperature | **e-chain® linear** | -31 °F to +194 °F (-35 °C to +90 °C) |
| | **flexible** | -58 °F to +194 °F (-50 °C to +90 °C) |
| | **fixed** | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| a max. | 328.1 ft/s² (100 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228) |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | According to measuring system specification. |
| Color code | According to measuring system specification.<br>▶ Product range table |
| Element shield | Extremely bending-resistant tinned copper braid.<br>95 % optical coverage |
| Element jacket | TPE mixture on pair shielding adapted to suit the requirements in e-chains®. |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Green (similar to RAL 6018) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF11D |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 12.5 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |
| +5/+158 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 |
| +158/+176 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | TPE outer jacket

# chainflex® CF11.D

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF11.001.D** | 26 | 3 STP x 0.14 | 0,39 (10,0) | 47,7 (71) | 80,0 (119) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF11.002.D** | 26 | 3 STP x 0.14 | 0,39 (10,0) | 49,7 (74) | 84,0 (125) |
| | 20 | 2 SC x 0.5 | | | |
| **CF11.003.D** | 26 | 3 PR x 0.14 | 0,31 (8,0) | 37,6 (56) | 57,8 (86) |
| | 17 | 2 x 1.0 | | | |
| **CF11.004.D** | 26 | 4 PR x 0.14 | 0,43 (11,0) | 52,4 (78) | 85,3 (127) |
| | 26 | 4 x 0.14 SHLD | | | |
| | 20 | 4 x 0.5 | | | |
| **CF11.005.D** | 26 | 4 PR x 0.14 | 0,35 (9,0) | 40,3 (60) | 65,2 (97) |
| | 20 | 4 x 0.5 | | | |
| **CF11.006.D** | 26 | 3 STP x 0.14 | 0,41 (10,5) | 57,1 (85) | 93,4 (139) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.25 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF11.007.D** [2)] | 22 | 2 PR x 0.34 | 0,24 (6,0) | 20,8 (31) | 32,3 (48) |
| **CF11.008.D** | 24 | 3 PR x 0.25 | 0,30 (7,5) | 24,2 (36) | 40,3 (60) |
| **CF11.009.D** | 24 | 4 PR x 0.25 | 0,33 (8,5) | 38,3 (57) | 61,1 (91) |
| | 20 | 2 x 0.5 | | | |
| **CF11.010.D** | 24 | 4 PR x 0.25 | 0,35 (9,0) | 45,7 (68) | 70,6 (105) |
| | 17 | 2 x 1.0 | | | |
| **CF11.011.D** | 22 | 4 PR x 0.34 | 0,39 (10,0) | 54,4 (81) | 83,3 (124) |
| | 20 | 4 x 0.5 | | | |
| **CF11.012.D** | 26 | 3 STP x 0.14 | 0,43 (11,0) | 59,8 (89) | 94,1 (140) |
| | 26 | 3 x 0.14 SHLD | | | |
| | 26 | 6 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CF11.013.D** | 26 | 3 STP x 0.14 | 0,35 (9,0) | 41,7 (62) | 69,9 (104) |
| | 20 | 2 x 0.5 | | | |
| **CF11.014.D** | 24 | 4 STP x 0.25 | 0,43 (11,0) | 57,8 (86) | 92,7 (138) |
| | 20 | 2 x 0.5 | | | |
| **CF11.015.D** | 26 | 4 PR x 0.14 | 0,35 (9,0) | 40,3 (60) | 65,2 (97) |
| | 20 | 4 x 0.5 | | | |

The chainflex® types marked with [2)] are cables designed as a star-quad.

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF11.001.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (2x0.5) | brown-red/brown-blue |
| **CF11.002.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | 2x(0.5)C | black, red |
| **CF11.003.D** | 3x(2x0.14) | white/brown, green/yellow, gray/pink |
| | 2x1.0 | blue, red |
| **CF11.004.D** | 2x(2x(2x0.14)) | (brown/green)/(yellow/violet), (gray/pink)/(red/black) |
| | (4x0.14)C | yellow-black/red-black/green-black/blue-black |
| | (4x0.5) | brown-green/white-green/blue/white |
| **CF11.005.D** | 4x(2x0.14) | white/brown, green/yellow, gray/pink, blue/red |
| | 4x0.5 | black, violet, gray-pink, red-blue |
| **CF11.006.D** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (4x0.25) | brown-yellow/brown-gray/green-black/green-red |
| | (2x0.5) | brown-red/brown-blue |
| **CF11.007.D** [2)] | 4x0.34 | white, green, brown, yellow (star-quad) |
| **CF11.008.D** | 3x(2x0.25) | white/brown, green/yellow, gray/pink |
| **CF11.009.D** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white, brown |
| **CF11.010.D** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x1.0 | white, brown |
| **CF11.011.D** | 4x(2x0.34) | black/brown, red/orange, green/yellow, blue/violet |
| | 4x0.5 | black-white, red-white, yellow-white, blue-white |
| **CF11.012.D** | 3x(2x0.14)C | green/yellow, white/gray, blue/red |
| | (3x0.14)C | red/green/brown |
| | (4x0.14) | gray/yellow/pink/violet |
| | (2x0.14+2x0.5) | blue/brown-blue/gray/brown-red |
| **CF11.013.D** | 3x(2x0.14)C | white/brown, green/yellow, gray/pink |
| | 2x0.5 | blue, red |
| **CF11.014.D** | 4x(2x0.25)C | white/brown, green/yellow, gray/pink, blue/red |
| | (2x0.5) | black no. 1/black no. 2 |
| **CF11.015.D** | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |

Other types ▶ Page 240

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CF11.D

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF11.017.D** [4] | 26 | 4 PR x 0.14 | 0,39 (10,0) | 67,2 (100) | 84,7 (126) |
| | 26 | 4 x 0.14 SHLD | | | |
| | 17 | 4 x 1.0 | | | |
| **CF11.018.D** [4] | 24 | 2 PR x 0.25 | 0,26 (6,5) | 27,6 (41) | 34,3 (51) |
| | 20 | 2 x 0.5 | | | |
| **CF11.019.D** [4] | 24 | 3 STP x 0.25 | 0,39 (10,0) | 62,5 (93) | 80,6 (120) |
| | 24 | 3 x 0.25 | | | |
| | 17 | 2 x 1.0 | | | |
| **CF11.021.D** | 24 | 6 x 0.5 | 0,39 (10,0) | 59,1 (88) | 87,4 (130) |
| | 24 | 5 PR x 0.25 | | | |
| | 20 | 5 PR x 0.5 | | | |
| **CF11.022.D** | 24 | 1 PR x 0.25 | 0,30 (7,5) | 36,3 (54) | 53,1 (79) |
| | 20 | 5 x 0.5 | | | |
| **CF11.025.D** | 26 | 3 STP x 0.14 | 0,39 (10,0) | 48,4 (72) | 82,7 (123) |
| | 20 | 1 STP x 0.5 | | | |
| **CF11.027.D** | 26 | 5 PR x 0.14 | 0,33 (8,5) | 34,9 (52) | 59,1 (88) |
| | 20 | 1 PR x 0.5 | | | |
| **CF11.028.D** | 24 | 2 PR x 0.20 | 0,30 (7,5) | 29,6 (44) | 42,3 (63) |
| | 22 | 2 x 0.38 | | | |
| **CF11.031.D** | 24 | 2 STP x 0.25 | 0,37 (9,5) | 46,4 (69) | 77,9 (116) |
| | 17 | 2 x 1.0 | | | |
| **CF11.032.D** [5] | 26 | 3 STP x 0.14 | 0,31 (8,0) | 23,5 (35) | 47,7 (71) |
| | 26 | 3 x 0.14 SHLD | | | |
| **CF11.033.D** [5] | 26 | 4 STP x 0.14 | 0,37 (9,5) | 43,0 (64) | 69,9 (104) |
| | 17 | 2 x 1.0 | | | |
| **CF11.038.D** | 26 | 3 PR x 0.14 | 0,31 (8,0) | 24,2 (36) | 47,7 (71) |
| | 22 | 1 PR x 0.34 | | | |

[4] Manufactured without inner jacket
[5] Manufactured without overall shield

**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Other types ▶ Page 238

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Core group | Color code |
|---|---|---|
| **CF11.017.D** [4] | 4x(2x0.14) | red/black, brown/green, yellow/violet, gray/pink |
| | (4x0.14)C | blue-black/yellow-black/red-black/green-black |
| | 4x1.0 | white-green, brown-green, blue, white |
| **CF11.018.D** [4] | 2x(2x0.25) | red/black, gray/pink |
| | 2x0.5 | white, brown |
| **CF11.019.D** [4] | 3x(2x0.25)C | brown/green, gray/pink, red/black |
| | (3x0.25) | blue/violet/yellow |
| | 2x1.0 | white, brown |
| **CF11.021.D** | (4x0.25) | white/brown/gray/black |
| | 3x2x0.25 | white/yellow, white/gray, black/orange |
| | 3x2x0.5 | black no. 1/black no. 2, black no. 3/black no. 4, black no. 5/black no. 6 |
| **CF11.022.D** | (2x0.25) | white/brown |
| | 5x0.5 | green, yellow, gray, pink, blue |
| **CF11.025.D** | 3x(2x0.14)C | green/yellow, blue/red, gray/pink |
| | (2x0.5) | white/brown |
| **CF11.027.D** | 5x(2x0.14) | brown/green, yellow/gray, white/violet, red/black, pink/blue |
| | 2x0.5 | white-green, white-red |
| **CF11.028.D** | 2x(2x0.20) | green/yellow, pink/blue |
| | (2x0.38) | red/black |
| **CF11.031.D** | 2x(2x0.25)C | white/brown, green/yellow |
| | 2x1.0 | black no. 1, black no. 2 |
| **CF11.032.D** [5] | 3x(2x0.14)C | green/black, yellow/black, red/black |
| | (3x0.14)C | gray/pink/black |
| **CF11.033.D** [5] | 4x(2x0.14)C | yellow/black, red/black, blue/black, green/black |
| | 2x(1.0)C | white, brown |
| **CF11.038.D** | 3x(2x0.14) | white/brown, green/yellow, gray/pink |
| | (2x0.34) | blue/red |




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# Servo cables/ Hybrid servo cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29350

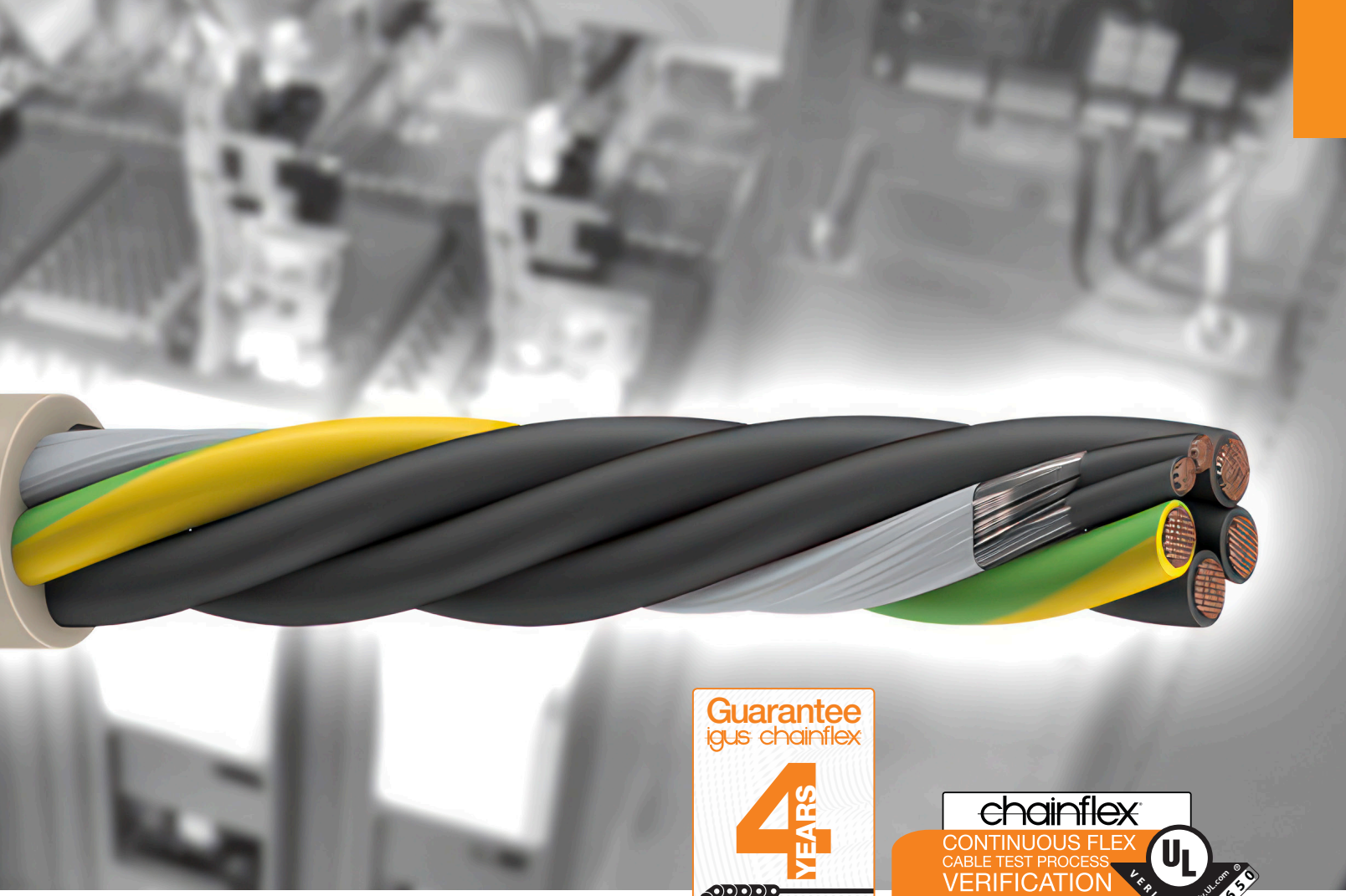
igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · cULus · UL · NFPA · DNV · REACH · RoHS · cleanroom · dry cleanroom tested · DESINA · CE

## Servo cables for energy chains®

Specially designed for use in e-chains®. Various structures with one or two pair, suitable for motor requirements. With the innovative shield pair structure and high-end overall shield for movements. Tested and with up to 4-year chainflex® guarantee

- With the innovative shield pair structure and high-end overall shield for movements
- Various structures with one or two pair, suitable for motor requirements.
- Special core insulation for greater current flow
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online: igus.com/chainflexlife

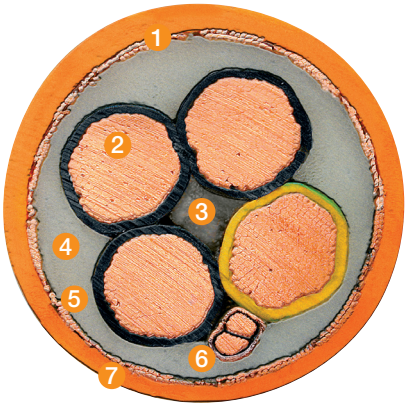



Background

# chainflex® Servo cables design

**Servo cables design**

There are two different shields in the servo cable. One is the overall shield, which ensures that EMC behavior towards the outside is correct. This prevents damage to other machine components. As for the other, the brake and temperature sensor pairs are shielded to ensure that interference from the energy cores does not enter the control circuit of the frequency converter. These shields are designed differently depending on mechanical stress. The greater the cable's mechanical stress level, the higher the quality of shielding design necessary. In practice, this means that, for our high-end cables, the shielding must have much higher mechanical coverage (up to 90%). Moreover, for the control pairs in the cable, we use a special layer that has not only good EMC properties, but also a special design that allows it to be machined very quickly.

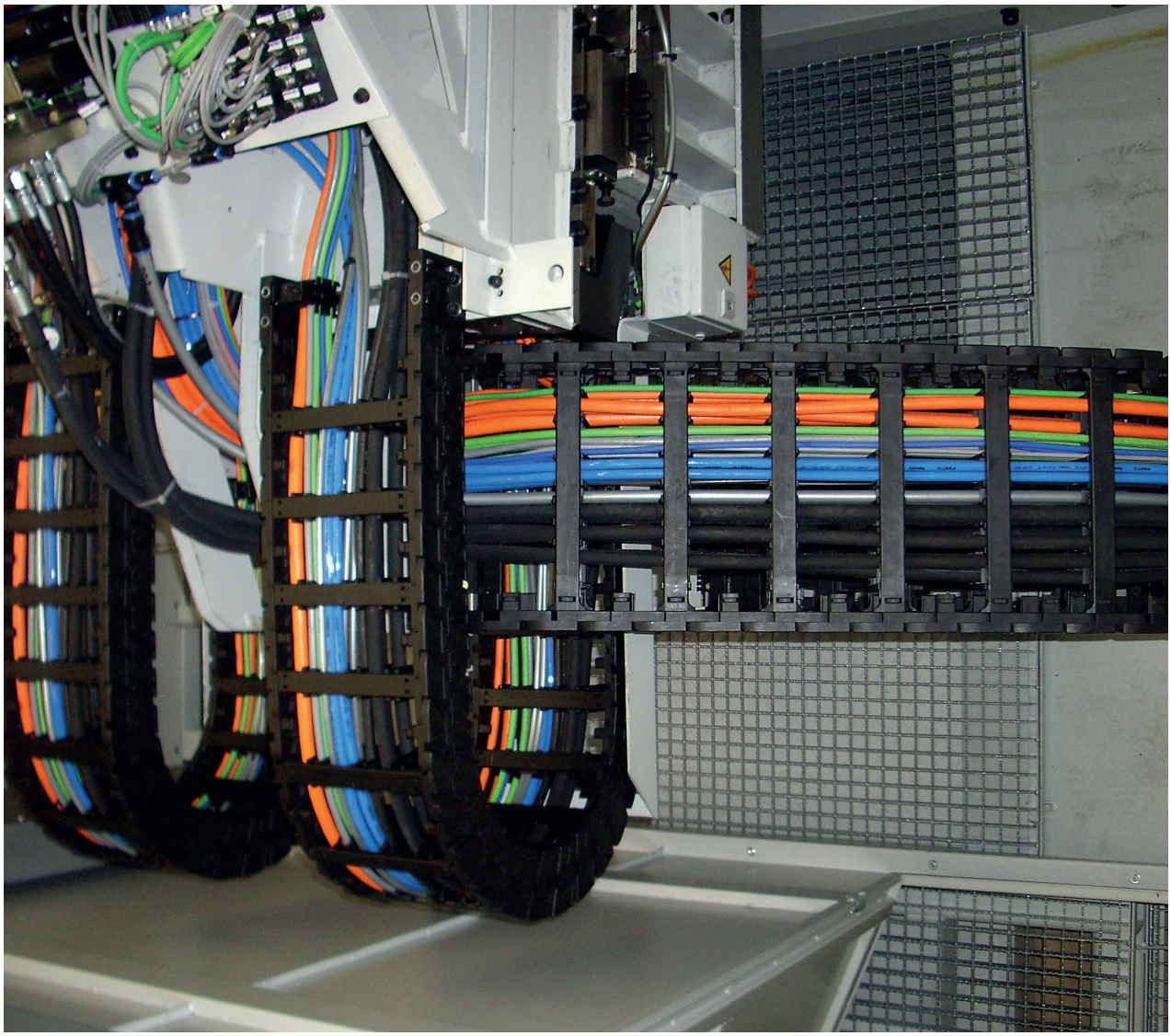



**Design**

1. Overall shield with optimized braiding angle
2. Optimized single wire diameter
3. Tensile stress-resistant center element
4. Gusset-filling extruded inner jacket
5. Cores wound with optimized pitch length and pitch direction
6. Pair braid shield over optimised wound pair
7. Highly abrasion-resistant pressure extruded outer jacket

Application example

# A wide range of applications in the tool industry



An area of application that demonstrates the various capabilities of Servo cables in the chainflex® product range is that of the interlinked machine tool. There is so little room in the various axes of such machines that our CF270.UL.D cable series is usually used.

In the main axis, the radius is frequently larger, which means reduced costs if the CF897 series is used. This series has longer pitch lengths in its stranding and is optimized for larger bend radii. The gantry above the interlinked machines uses e-chains® for long travels, and this application, with its high dynamics and gliding chain, requires an inner jacket, with which the CF27.UL is equipped.

All series have a few things in common that are of elementary importance to machine tools. For one thing, each cable has UL certification, and for another, it has an oil-resistant outer jacket. A third advantage is the up to four-year guarantee with a clear service life declaration of up to 12 million cycles.

Let's embark on this journey together and take advantage of our wide selection to develop the most cost-effective solution. Please feel free to contact our specialists at any time.

# Manufacturer differences

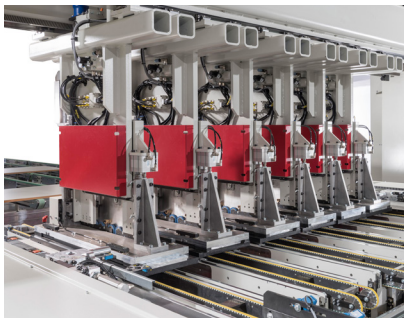
Hybrid technology is the biggest trend in the cable industry in the last few years. Key terms here are One Cable Connection (Siemens) and One Cable Technology (Beckhoff). This technology usually combines four power cores (L1, L2, L3 and PE), a pair for temperature monitoring, for example, and cores for a bus system in a cable. Every large drive manufacturer uses its own bus system. Beckhoff, for example, uses SICK's Hiperface DSL, and Siemens uses an Ethernet derivative. We at igus® have joined this technological trend and optimized the mechanical cable design for energy chains. Our CF220.UL.H and CF280.UL.H Hybrid cables can be connected to drive systems from the major OEMs without any problem.

**What are the advantages and disadvantages of Hybrid cables**

Each drive requires two cables - the motor cable and the encoder cable. The combination in a single cable creates room in the energy chain and the motor connection area, since half of the components can be dispensed with. Disruptions caused by proximity of sensitive data cores to energy cores are avoided if possible. The EMC properties of the shielding in the cables and a good plug concept help out here. We achieve good shielding effects by high coverage of necessary elements and a flat braid angle that ensures that the properties are retained for a long time, even in moving applications.

**Hybrid cables in woodworking**

A major manufacturer of woodworking machines converted its drive technology to the new Beckhoff hybrid technology, capitalizing on the advantages of the



more compact design. The challenge was with the cables, which in their machines have to perform a great many movements with very tight radii. This is where igus® entered the race with a challenging service life test. It was challenging because the requirement was to also measure the Hiperface DSL bus data transmission over its use. That is why we worked very closely with our customer to achieve reliable results for both of us. Feel free to send us a query when you need to test cable solution durability.



Selection table

# chainflex® Servo cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CF887 | PVC | ● | 15 | +41/+158 | 9.84 | - | 65.62 | ≤ 32.81 | 250 |
| CF210.UL New | PVC | ● | 10 | +41/+158 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 252 |
| CF21.UL | PVC | ● | 7.5 | +41/+158 | 32.81 | 16.41 | 262.48 | ≤ 328.1 | 256 |
| CF897 | iguPUR | ● | 15 | -4/+176 | 9.84 | - | 65.62 | ≤ 32.81 | 260 |
| CF270.UL.D New | PUR | ● | 10 | -13/+176 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 262 |
| CF27.D | PUR | ● | 7.5 | -13/+176 | 32.81 | 16.41 | 262.48 | ≤ 328.1 | 266 |
| CF29.D | TPE | ● | 6.8 | -31/+212 | 32.81 | 16.41 | 262.48 | > 1,312 | 270 |
| CF220.UL.H | PVC | ● | 10 | +41/+158 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 272 |
| CF280.UL.H New | PUR | ● | 10 | -13/+176 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 276 |

## Approvals/Resistance

| chainflex® cables | oil | | PTFE FREE | Approvals and standards | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF887 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 250 |
| CF210.UL New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 252 |
| CF21.UL | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 256 |
| CF897 | ● | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 260 |
| CF270.UL.D New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | ● | ● | 262 |
| CF27.D | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | 266 |
| CF29.D | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | 270 |
| CF220.UL.H | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | 272 |
| CF280.UL.H New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | ● | ● | 276 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] for travel distance | | Bending radius min. [factor x d] for travel distance | | Bending radius min. [factor x d] for travel distance | | Page |
|---|---|---|---|---|---|---|---|---|
| | | < 32.81 ft | ≥ 32.81 ft | < 32.81 ft | ≥ 32.81 ft | < 32.81 ft | ≥ 32.81 ft | |
| | | 5 million (1 million) cycles * | | 7.5 million (3 million) cycles * | | 10 million (5 million) cycles * | | |
| **CF887** | +41 / +59 | 17.5 | | 18.5 | | 19.5 | | |
| | +59 / +140 | 15 | | 16 | | 17 | | 250 |
| | +140 / +158 | 17.5 | | 18.5 | | 19.5 | | |
| **CF210.UL New** | +41 / +59 | 12.5 | | 13.5 | | 14.5 | | |
| | +59 / +140 | 10 | | 11 | | 12 | | 252 |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |
| **CF21.UL** | +41 / +59 | 10 | | 11 | | 12 | | |
| | +59 / +140 | 7.5 | | 8.5 | | 9.5 | | 256 |
| | +140 / +158 | 10 | | 11 | | 12 | | |
| **CF897** | -4 / +14 | 17.5 | | 18.5 | | 19.5 | | |
| | +14 / +158 | 15 | | 16 | | 17 | | 260 |
| | +158 / +176 | 17.5 | | 18.5 | | 19.5 | | |
| **CF270.UL.D New** | -13 / +5 | 12.5 | | 13.5 | | 14.5 | | |
| | +5 / +158 | 10 | | 11 | | 12 | | 262 |
| | +158 / +176 | 12.5 | | 13.5 | | 14.5 | | |
| **CF27.D** | -13 / +5 | 10 | | 11 | | 12 | | |
| | +5 / +158 | 7.5 | | 8.5 | | 9.5 | | 266 |
| | +158 / +176 | 10 | | 11 | | 12 | | |
| | | 5 million | | 7.5 million | | 12.5 million | | |
| **CF29.D** | -31 / -13 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| | -13 / +194 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 | 270 |
| | +194 / +212 | 7.5 | 10 | 9.5 | 11 | 10.5 | 12 | |
| | | 5 million | | 7.5 million | | 10 million | | |
| **CF220.UL.H** | +41 / +59 | 12.5 | | 13.5 | | 14.5 | | |
| | +59 / +140 | 10 | | 11 | | 12 | | 272 |
| | +140 / +158 | 12.5 | | 13.5 | | 14.5 | | |
| **CF280.UL.H New** | -13 / +5 | 12.5 | | 13.5 | | 14.5 | | |
| | +5 / +158 | 10 | | 11 | | 12 | | 276 |
| | +158 / +176 | 12.5 | | 13.5 | | 14.5 | | |

*** Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife**
Figures in brackets refer to series CF887 and CF897

# … for single-cable solutions in drive technology

In chainflex® series CF220.UL.H and CF280.UL.H, you will see system cables for intelligent drive concepts for many well known system manufacturers.

To save installation space in e-chain systems® some manufacturers combine the servo cable for power with the measuring system cable for position data to make a so-called Hybrid cable. The feedback of the position data to the servo controller is done frequently by various digital bus technologies.

When combining these two cables into a Hybrid cable, it is necessary to guarantee the data transmission properties and the EMC behavior of the cable for many millions of movement cycles.

High optical coverage shielding designs are used in igus® chainflex® servo Hybrid cables because of the close proximity of the power cores carrying high interference square-wave signals to the bus cores.

A secure transmission of bus signals at maximum cable length and at maximum speed makes high demands on the insulating materials of the bus or data cores.

In the 59,201ft² large igus® laboratory, electrical parameters such as capacitance, impedance, attenuation and crosstalk are measured over the entire test period of several million cycles and monitored for compliance with the specifications.

igus® chainflex® servo Hybrid cables are available in cost-effective PVC and oil-resistant, halogen-free PUR.

As with all chainflex® cables, igus® also offers a guarantee of 4 years or 10 million cycles.

In the chart on the opposite page you will find an overview of all currently available Hybrid cables grouped by system manufacturer.

The companies listed are drive systems manufacturers or technology providers whose rotation sensors are commonly available.



Two become one: Hybrid servo cables combine servo and measuring system cables.

## Selection table Hybrid servo cables

| Hybrid technology/ Manufacturer | CF220.UL.H<br>PVC<br>10 x d<br>Page 272 | CF280.UL.H<br>PUR<br>10 x d<br>Page 276 |
|---|---|---|
| **SICK (HIPERFACE DSL)** | | |
| ABB | CF220.UL.H100-.H102 | CF280.UL.H100-.H102 |
| AMK | | |
| B&R | | |
| Baumüller | | |
| BCB | | |
| Beckhoff | | |
| BMP | | |
| CEDS | | |
| Fertig | | |
| Fine | | |
| Han´s | | |
| Harmonic Drive AG | | |
| Heidrive | | |
| Infranor | | |
| IRT | | |
| Jetter | | |
| KEBA | | |
| Kinavo | | |
| Kollmorgen | | |
| Lafert | | |
| LTi DRiVES | | |
| Mavilor | | |
| Maxsine | | |
| metronix | | |
| NUM | | |
| Parker | | |
| PowerMotor | | |
| ROBOX | | |
| Selema | | |
| Siboni | | |
| Sigmatek | | |
| STEP | | |
| TG-Drives | | |
| WEG | | |
| **SEW cable type A, B, C, D, E** | | |
| SEW | CF220.UL.H203 | CF280.UL.H200-.H206 |
| **MOVILINK DDI** | | |
| SEW | - | CF280.UL.H207 |
| **SINAMICS S210** | | |
| Siemens | CF220.UL.H300-.H304 | CF280.UL.H300-.H304 |
| **IndraDrive / crtlXDRIVE** | | |
| Bosch Rexroth | CF220.UL.H402 | CF280.UL.H400-.H402 |
| **HEIDENHAIN** | | |
| B&R | CF220.UL.H501 | CF280.UL.H501-.H502 |

Servo cable | PVC outer jacket

# chainflex® CF887




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant
- Variable Frequency Drives

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance TPE mixture. |
| Conductor construction | Power conductors and signal pairs cabled together with an optimized pitch length. |
| Color code | **Power conductors**: Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>**1 Control pair**: Black with white numbers. Control Pair Printed 5 and 6<br>**2 Control pairs**: Black with white numbers.<br>Control Pair 1: Printed 5 and 6, Control Pair 2: Printed 7 and 8 |
| Element shield | Foil taping of optimized, bending-resistant foil shield.<br>Coverage approx. 100% optical |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |

# Class 3.1.1.1

| | | |
|---|---|---|
| Basic requirements | low | 1 2 **3** 4 5 6 7 highest |
| Travel distance | unsupported | **1** 2 3 4 5 6 ≥ 1312 ft |
| Oil resistance | none | **1** 2 3 4 highest |
| Torsion | none | **1** 2 3 4 ±360° |

| | |
|---|---|
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF887 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **1 Control pair shielded** | | | | | |
| **CF887.07.05.02.01** | 18 | 4 G 0.75 | 0.39 (10.0) | 46.4 (69) | 80.0 (119) |
| | 20 | 1 STP 0.5 | | | |
| **CF887.15.15.02.01** | 16 | 4 G 1.5 | 0.49 (12.5) | 83.3 (124) | 134.4 (200) |
| | 16 | 1 STP x 1.5 | | | |
| **CF887.25.15.02.01** | 14 | 4 G 2.5 | 0.53 (13.5) | 122.3 (182) | 170.7 (254) |
| | 16 | 1 STP x 1.5 | | | |
| **CF887.40.15.02.01** | 12 | 4 G 4.0 | 0.57 (14.5) | 158.6 (236) | 228.5 (340) |
| | 16 | 1 STP x 1.5 | | | |
| **2 Control pairs shielded** | | | | | |
| **CF887.10.07.02.02** | 17 | 4 G 1.0 | 0.45 (11.5) | 73.9 (110) | 123.6 (184) |
| | 18 | 2 STP x 0.75 | | | |
| **CF887.15.15.02.02** | 16 | 4 G 1.5 | 0.53 (13.5) | 110.2 (164) | 170.0 (253) |
| | 16 | 2 STP x 1.5 | | | |
| **CF887.25.15.02.02** | 14 | 4 G 2.5 | 0.57 (14.5) | 145.8 (217) | 218.4 (325) |
| | 16 | 2 STP x 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

Servo cable | PVC outer jacket

# chainflex® CF210.UL




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- Variable Frequency Drives

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| a max. | 164.1 ft/s² (50 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 | |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Power cores and control pair elements wound with a short pitch length around a high tensile strength center element. |
| Color code | **Power conductors**: Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>**1 Control pair:** Black with white numbers. Control Pair Printed 4 and 5<br>**2 Control pairs:** Black with white numbers.<br>Control Pair 1: Printed 5 and 6 Control Pair 2: Printed 7 and 8 |
| Element shield | Bending-resistant tinned copper braid.<br>80% optical coverage |
| Intermediate layer | Polyester tape over external layer<br>Barrier tape, 100% coverage |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Orange (similar to RAL 2003) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.2.1

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF210UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 12.5 | 13.5 | 14.5 |
| +59/+140 | 10 | 11 | 12 |
| +140/+158 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Servo cable | PVC outer jacket

# chainflex® CF210.UL




Example image

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | **1 Control pair shielded** | | | | | |
| New | **CF210.UL.07.03.02.01** | 18 | 4 G 0.75 | 0.35 (9.0) | 48.4 (72) | 72.6 (108) |
| | | 22 | 1 STP x 0.34 | | | |
| | **CF210.UL.15.15.02.01** | 16 | 4 G 1.5 | 0.49 (12.5) | 103.5 (154) | 164.6 (245) |
| | | 16 | 1 STP x 1.5 | | | |
| | **CF210.UL.25.15.02.01** | 14 | 4 G 2.5 | 0.55 (14.0) | 141.1 (210) | 200.9 (299) |
| | | 16 | 1 STP x 1.5 | | | |
| | **CF210.UL.40.15.02.01** | 12 | 4 G 4.0 | 0.59 (15.0) | 171.4 (255) | 257.4 (383) |
| | | 16 | 1 STP x 1.5 | | | |
| | **CF210.UL.60.15.02.01** | 10 | 4 G 6.0 | 0.65 (16.5) | 230.5 (343) | 327.9 (488) |
| | | 16 | 1 STP x 1.5 | | | |
| | **2 Control pairs shielded** | | | | | |
| | **CF210.UL.15.07.02.02** | 16 | 4 G 1.5 | 0.53 (13.5) | 108.2 (161) | 186.8 (278) |
| | | 18 | 2 STP x 0.75 | | | |
| | **CF210.UL.25.15.02.02** | 14 | 4 G 2.5 | 0.63 (16.0) | 164.0 (244) | 256.0 (381) |
| | | 16 | 2 STP x 1.5 | | | |
| | **CF210.UL.40.15.02.02** | 12 | 4 G 4.0 | 0.67 (17.0) | 223.1 (332) | 287.6 (428) |
| | | 16 | 2 STP x 1.5 | | | |
| | **CF210.UL.60.15.02.02** | 10 | 4 G 6.0 | 0.75 (19.0) | 270.8 (403) | 401.8 (598) |
| | | 16 | 2 STP x 1.5 | | | |
| | **without control pair** | | | | | |
| | **CF210.UL.05.04** | 20 | 4 G 0.5 | 0.28 (7.0) | 22.8 (34) | 42.3 (63) |
| | **CF210.UL.15.04** | 16 | 4 G 1.5 | 0.39 (10.0) | 57.8 (86) | 94.1 (140) |
| | **CF210.UL.25.04** | 14 | 4 G 2.5 | 0.45 (11.5) | 98.1 (146) | 140.4 (209) |
| | **CF210.UL.40.04** | 12 | 4 G 4.0 | 0.51 (13.0) | 131.0 (195) | 193.5 (288) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

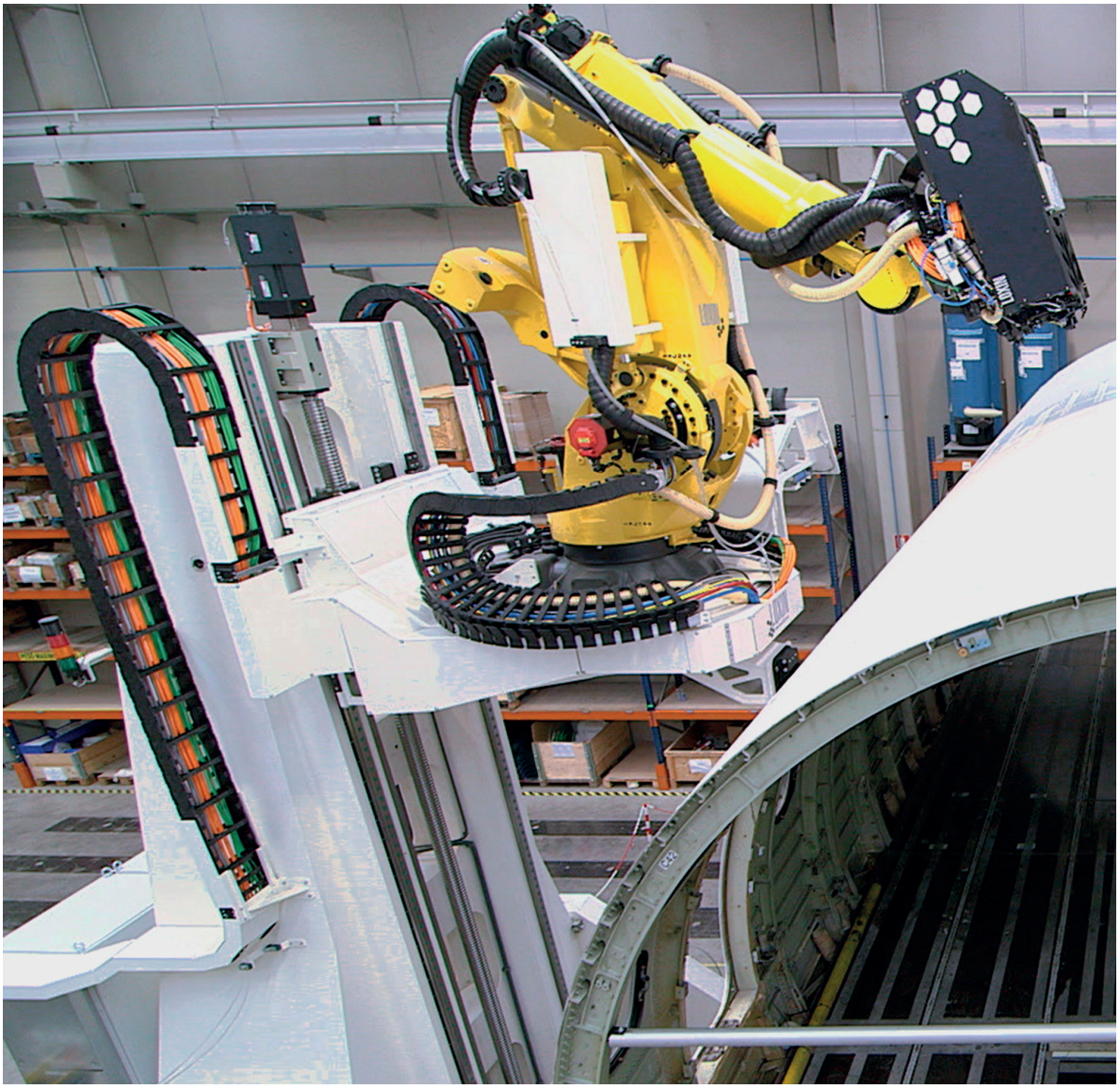
**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |





chainflex® Servo cable in a vertical e-chain®

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Servo cable | PVC outer jacket

# chainflex® CF21.UL




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- Variable Frequency Drives

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | 262.5 ft/s² (80 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Conductor construction** | Power conductors and Signal Pairs cabled with short pitch. |
| **Color code** | **Power conductors**: Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>**1 Control pair:** Black with white numbers.<br>Control Pair Printed 4 and 5<br>**2 Control pairs:** Black with white numbers.<br>Control Pair 1: Printed 5 and 6 Control Pair 2: Printed 7 and 8 |
| **Element shield** | Extremely bending-resistant braiding made of tinned copper wires.<br>90% optical coverage |
| **Inner jacket** | PVC mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Green (similar to RAL 6005) |
| **CFRIP®** | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 5.5.2.1

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF21UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 11 | 12 |
| +59/+140 | 7.5 | 8.5 | 9.5 |
| +140/+158 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

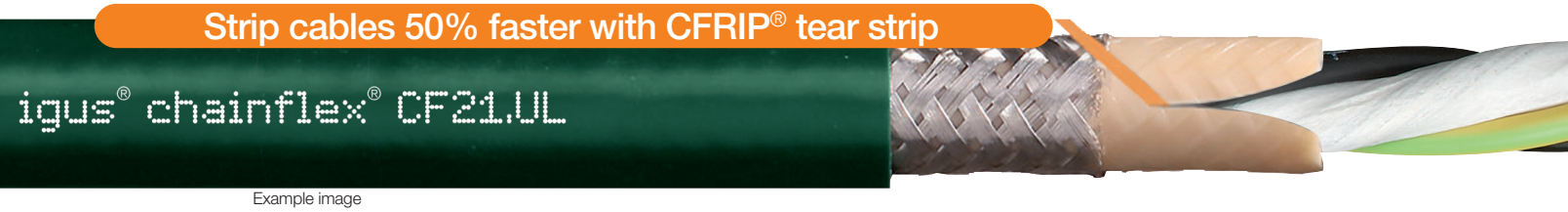
- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Servo cable | PVC outer jacket

# chainflex® CF21.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **1 Control pair shielded** | | | | | |
| **CF21.07.05.02.01.UL** | 18 | 4 G 0.75 | 0.43 (11.0) | 51.1 (76) | 106.8 (159) |
| | 20 | 1 STP x 0.5 | | | |
| **CF21.15.15.02.01.UL** | 16 | 4 G 1.5 | 0.51 (13.0) | 97.4 (145) | 172.0 (256) |
| | 16 | 1 STP x 1.5 | | | |
| **CF21.25.15.02.01.UL** | 14 | 4 G 2.5 | 0.57 (14.5) | 133.7 (199) | 221.7 (330) |
| | 16 | 1 STP x 1.5 | | | |
| **CF21.40.15.02.01.UL** | 12 | 4 G 4.0 | 0.63 (16.0) | 172.0 (256) | 272.8 (406) |
| | 16 | 1 STP x 1.5 | | | |
| **CF21.60.15.02.01.UL** | 10 | 4 G 6.0 | 0.71 (18.0) | 230.5 (343) | 366.9 (546) |
| | 16 | 1 STP x 1.5 | | | |
| **CF21.100.15.02.01.UL** | 8 | 4 G 10.0 | 0.85 (21.5) | 360.2 (536) | 556.4 (828) |
| | 16 | 1 STP x 1.5 | | | |
| **2 Control pairs shielded** | | | | | |
| **CF21.07.03.02.02.UL** | 18 | 4 G 0.75 | 0.49 (12.5) | 69.2 (103) | 139.8 (208) |
| | 22 | 2 STP x 0.34 | | | |
| **CF21.10.07.02.02.UL** | 17 | 4 G 1.0 | 0.53 (13.5) | 99.5 (148) | 180.8 (269) |
| | 18 | 2 STP x 0.75 | | | |
| **CF21.15.07.02.02.UL** | 16 | 4 G 1.5 | 0.57 (14.5) | 112.2 (167) | 207.6 (309) |
| | 18 | 2 STP x 0.75 | | | |
| **CF21.25.15.02.02.UL** | 14 | 4 G 2.5 | 0.67 (17.0) | 170.7 (254) | 291.6 (434) |
| | 16 | 2 STP x 1.5 | | | |
| **CF21.40.15.02.02.UL** | 12 | 4 G 4.0 | 0.71 (18.0) | 207.0 (308) | 346.1 (515) |
| | 16 | 2 STP x 1.5 | | | |
| **CF21.60.15.02.02.UL** | 10 | 4 G 6.0 | 0.83 (21.0) | 276.9 (412) | 467.0 (695) |
| | 16 | 2 STP x 1.5 | | | |
| **CF21.100.15.02.02.UL** | 8 | 4 G 10.0 | 0.91 (23.0) | 397.8 (592) | 621.6 (925) |
| | 16 | 2 STP x 1.5 | | | |
| **CF21.160.15.02.02.UL** | 6 | 4 G 16.0 | 1.04 (26.5) | 590.0 (878) | 864.8 (1287) |
| | 16 | 2 STP x 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair




### Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

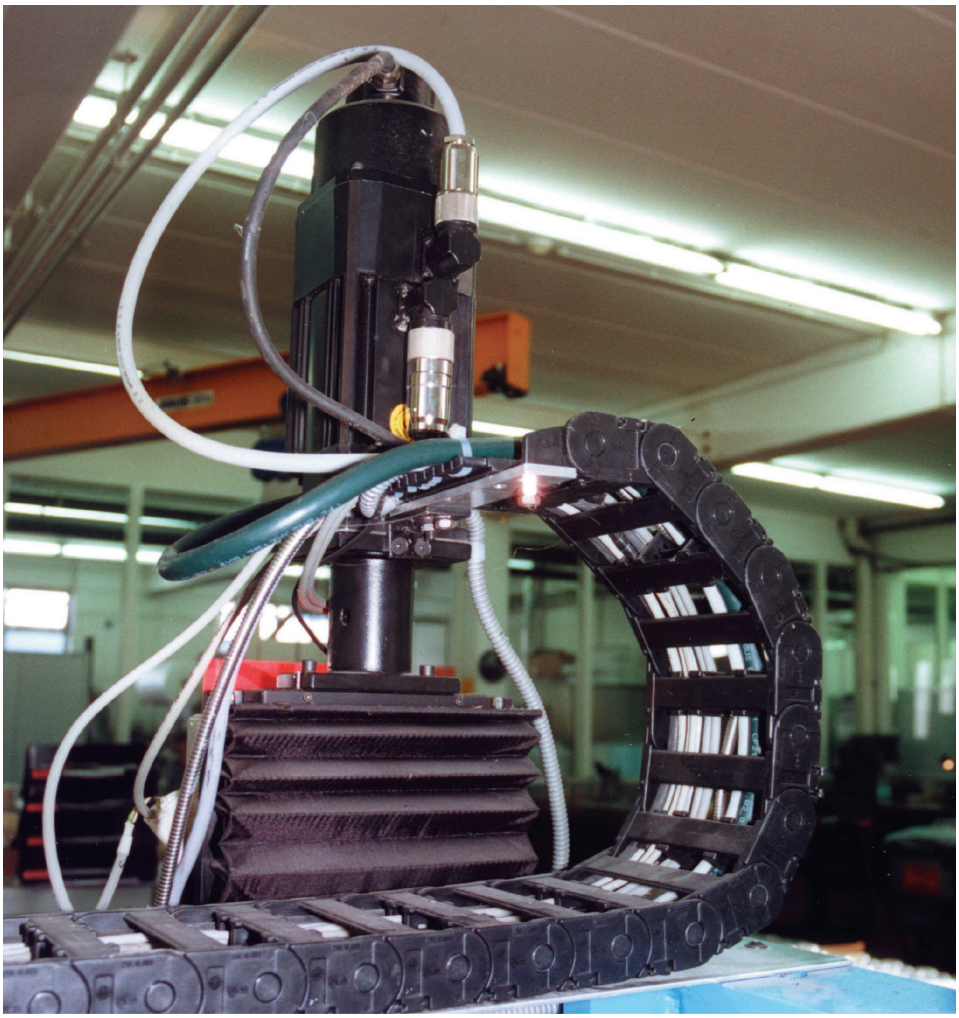
**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |





chainflex® CF21-UL: cables for energy supply systems in spinneret production. e-chain®: E2/000

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Servo cable | iguPUR outer jacket

# chainflex® CF897




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant
- Variable Frequency Drives

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 15 x d |
| | **flexible** | min. 12 x d |
| | **fixed** | min. 8 x d |
| **Temperature** | **e-chain® linear** | -4 °F to +176 °F (-20 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| **v max.** | **unsupported** | 9.84 ft/s (3 m/s) |
| **a max.** | | 65.6 ft/s² (20 m/s²) |
| **Travel distance** | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance TPE mixture. |
| **Conductor construction** | Power conductors and signal pairs cabled together with an optimized pitch length. |
| **Color code** | **Power conductors**: Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>**1 Control pair**: Black with white numbers.<br>Control Pair Printed 5 and 6<br>**2 Control pairs**: Black with white numbers.<br>Control Pair 1: Printed 5 and 6, Control Pair 2: Printed 7 and 8 |
| **Element shield** | Foil taping of optimized, bending-resistant foil shield.<br>Coverage approx. 100% optical |
| **Overall shield** | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| **Outer jacket** | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.3.1

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF897 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 17.5 | 18.5 | 19.5 |
| +14/+158 | 15 | 16 | 17 |
| +158/+176 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **1 Control pair shielded** | | | | | |
| **CF897.15.15.02.01** | 16 | 4 G 1.5 | 0.49 (12.5) | 83.3 (124) | 135.1 (201) |
| | 16 | 1 STP x 1.5 | | | |
| **CF897.25.15.02.01** | 14 | 4 G 2.5 | 0.53 (13.5) | 122.3 (182) | 166.6 (248) |
| | 16 | 1 STP x 1.5 | | | |
| **CF897.40.15.02.01** | 12 | 4 G 4.0 | 0.57 (14.5) | 158.6 (236) | 221.1 (329) |
| | 16 | 1 STP x 1.5 | | | |
| **2 Control pairs shielded** | | | | | |
| **CF897.15.15.02.02** | 16 | 4 G 1.5 | 0.53 (13.5) | 110.2 (164) | 165.3 (246) |
| | 16 | 2 STP x 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

Servo cable | PUR outer jacket

# chainflex® CF270.UL.D




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free
- Variable Frequency Drives

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| **a max.** | 164.1 ft/s² (50 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Conductor construction** | Power cores and control pair elements wound with a short pitch length around a high tensile strength center element. |
| **Color code** | **Power conductors**: Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>**1 Control pair:** Black with white numbers.<br>Control Pair Printed 4 and 5<br>**2 Control pairs:** Black with white numbers.<br>Control Pair 1: Printed 5 and 6 Control Pair 2: Printed 7 and 8 |
| **Element shield** | Bending-resistant tinned copper braid.<br>80% optical coverage |
| **Intermediate layer** | Polyester tape over external layer |
| **Overall shield** | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| **Outer jacket** | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Orange (similar to RAL 2003) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | | ±360° | | |

# Class 4.2.3.1

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF270ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 13.5 | 14.5 |
| +5/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

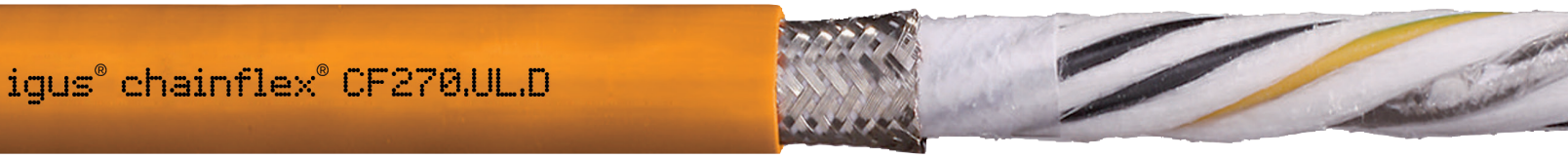
* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Servo cable | PUR outer jacket

# chainflex® CF270.UL.D




Example image

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | **1 Control pair shielded** | | | | | |
| New | **CF270.UL.07.03.02.01.D** | 18 | 4 G 0.75 | 0.35 (9.0) | 48.4 (72) | 72.6 (108) |
| | | 22 | 1 STP x 0.34 | | | |
| | **CF270.UL.15.15.02.01.D** | 16 | 4 G 1.5 | 0.45 (11.5) | 98.1 (146) | 127.7 (190) |
| | | 16 | 1 STP 1.5 | | | |
| | **CF270.UL.25.15.02.01.D** | 14 | 4 G 2.5 | 0.51 (13.0) | 131.0 (195) | 166.6 (248) |
| | | 16 | 1 STP 1.5 | | | |
| | **CF270.UL.40.15.02.01.D** | 12 | 4 G 4.0 | 0.59 (15.0) | 174.7 (260) | 220.4 (328) |
| | | 16 | 1 STP 1.5 | | | |
| | **CF270.UL.60.15.02.01.D** | 10 | 4 G 6.0 | 0.65 (16.5) | 235.2 (350) | 288.9 (430) |
| | | 16 | 1 STP 1.5 | | | |
| | **CF270.UL.100.15.02.01.D** | 8 | 4 G 10.0 | 0.75 (19.0) | 363.5 (541) | 419.3 (624) |
| | | 16 | 1 STP 1.5 | | | |
| | **CF270.UL.160.15.02.01.D** | 6 | 4 G 16.0 | 0.87 (22.0) | 528.2 (786) | 604.8 (900) |
| | | 16 | 1 STP 1.5 | | | |
| | **2 Control pairs shielded** | | | | | |
| | **CF270.UL.07.03.02.02.D** | 18 | 4 G 0.75 | 0.43 (11.0) | 64.5 (96) | 101.5 (151) |
| | | 22 | 2 STP 0.34 | | | |
| | **CF270.UL.10.07.02.02.D** | 17 | 4 G 1.0 | 0.49 (12.5) | 93.4 (139) | 134.4 (200) |
| | | 18 | 2 STP 0.75 | | | |
| | **CF270.UL.15.07.02.02.D** | 16 | 4 G 1.5 | 0.49 (12.5) | 108.9 (162) | 141.1 (210) |
| | | 18 | 2 STP 0.75 | | | |
| | **CF270.UL.25.15.02.02.D** | 14 | 4 G 2.5 | 0.61 (15.5) | 178.1 (265) | 216.4 (322) |
| | | 16 | 2 STP 1.5 | | | |
| | **CF270.UL.40.15.02.02.D** | 12 | 4 G 4.0 | 0.65 (16.5) | 216.4 (322) | 270.8 (403) |
| | | 16 | 2 STP 1.5 | | | |
| | **CF270.UL.60.15.02.02.D** | 10 | 4 G 6.0 | 0.73 (18.5) | 273.5 (407) | 339.3 (505) |
| | | 16 | 2 STP 1.5 | | | |
| | **CF270.UL.100.15.02.02.D** | 8 | 4 G 10.0 | 0.83 (21.0) | 405.9 (604) | 472.4 (703) |
| | | 16 | 2 STP 1.5 | | | |
| | **CF270.UL.160.15.02.02.D** | 6 | 4 G 16.0 | 0.94 (24.0) | 575.9 (857) | 670.0 (997) |
| | | 16 | 2 STP 1.5 | | | |
| | **CF270.UL.250.15.02.02.D** | 4 | 4 G 25.0 | 1.08 (27.5) | 819.1 (1219) | 955.5 (1422) |
| | | 16 | 2 STP 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.3.1

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **without control pair** | | | | | |
| CF270.UL.07.04.D | 18 | 4 G 0.75 | 0.31 (8.0) | 31.6 (47) | 54.4 (81) |
| CF270.UL.10.06.D | 17 | 6 G 1.0 | 0.37 (9.5) | 58.5 (87) | 89.4 (133) |
| CF270.UL.15.04.D | 16 | 4 G 1.5 | 0.35 (9.0) | 52.4 (78) | 77.9 (116) |
| CF270.UL.25.04.D | 14 | 4 G 2.5 | 0.41 (10.5) | 86.7 (129) | 116.3 (173) |
| CF270.UL.40.04.D | 12 | 4 G 4.0 | 0.49 (12.5) | 129.7 (193) | 171.4 (255) |
| CF270.UL.60.04.D | 10 | 4 G 6.0 | 0.57 (14.5) | 199.6 (297) | 239.2 (356) |
| CF270.UL.100.04.D | 8 | 4 G 10.0 | 0.67 (17.0) | 332.6 (495) | 370.3 (551) |
| CF270.UL.160.04.D | 6 | 4 G 16.0 | 0.81 (20.5) | 507.3 (755) | 550.3 (819) |
| CF270.UL.250.04.D | 4 | 4 G 25.0 | 0.98 (25.0) | 750.6 (1117) | 844.0 (1256) |
| CF270.UL.350.04.D | 2 | 4 G 35.0 | 1.10 (28.0) | 1073.1 (1597) | 1139.7 (1696) |
| **Spindle cable/Single core** | | | | | |
| CF270.UL.60.01.D | 10 | 1 x 6.0 | 0.30 (7.5) | 48.4 (72) | 63.8 (95) |
| CF270.UL.100.01.D | 8 | 1 x 10.0 | 0.33 (8.5) | 76.6 (114) | 97.4 (145) |
| CF270.UL.160.01.D | 6 | 1 x 16.0 | 0.37 (9.5) | 119.6 (178) | 140.4 (209) |
| CF270.UL.250.01.D | 4 | 1 x 25.0 | 0.43 (11.0) | 180.8 (269) | 204.3 (304) |
| CF270.UL.350.01.D | 2 | 1 x 35.0 | 0.51 (13.0) | 251.3 (374) | 281.6 (419) |
| CF270.UL.500.01.D | 1 | 1 x 50.0 | 0.59 (15.0) | 352.8 (525) | 389.1 (579) |
| CF270.UL.700.01.D | 2/0 | 1 x 70.0 | 0.67 (17.0) | 504.6 (751) | 540.3 (804) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

## Order example: CF270.UL.40.15.02.01.D - To your required length

CF270.UL.D chainflex® series .40 Code nominal cross section .15 Code nominal cross section signal pairs .02 Identification pairs .01 Number of pairs

Order online ▶ www.igus.com/CF270ULD

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Servo cable | PUR outer jacket

# chainflex® CF27.D

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For very high mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free
- Variable Frequency Drives

**Now with 194°F UL/CSA AWM approval**



Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Power conductors and Signal Pairs cabled with short pitch. |
| Color code | **Power conductors:** Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+ 2. V / L2 3. W / L3 / D / L-<br>**1 Control pair:** Black with white numbers.<br>Control Pair Printed 4 and 5<br>**2 Control pairs:** Black with white numbers.<br>Control Pair 1: Printed 5 and 6, Control Pair 2: Printed 7 and 8<br>**Star-Quad:** yellow, black, red, white |
| Element shield | Extremely bending-resistant braiding made of tinned copper wires.<br>90% optical coverage |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Orange (similar to RAL 2003) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

# Class 6.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF27D |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003XA (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF27D |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 10 | 11 | 12 |
| +5/+158 | 7.5 | 8.5 | 9.5 |
| +158/+176 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

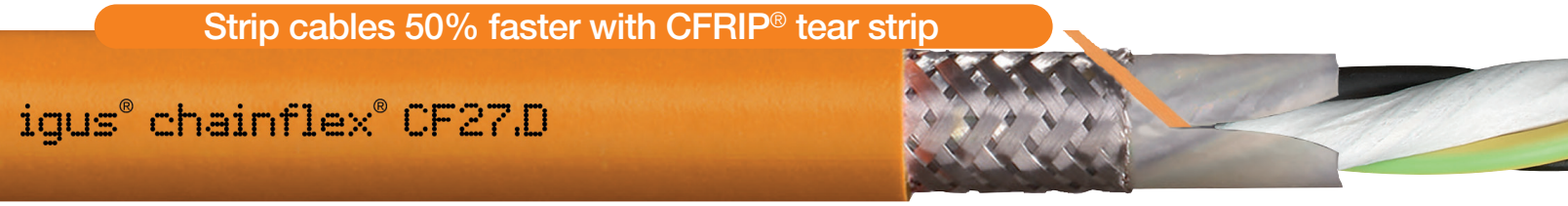
## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

Servo cable | PUR outer jacket

# chainflex® CF27.D

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **1 Control pair shielded** | | | | | |
| **CF27.07.05.02.01.D** | 18 | 4 G 0.75 | 0.45 (11.5) | 51.1 (76) | 113.6 (169) |
| | 20 | 1 STP x 0.5 | | | |
| **CF27.15.15.02.01.D** | 16 | 4 G 1.5 | 0.51 (13.0) | 97.4 (145) | 164.0 (244) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.25.15.02.01.D** | 14 | 4 G 2.5 | 0.57 (14.5) | 133.7 (199) | 205.6 (306) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.40.15.02.01.D** | 12 | 4 G 4.0 | 0.63 (16.0) | 172.0 (256) | 270.8 (403) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.60.15.02.01.D** | 10 | 4 G 6.0 | 0.69 (17.5) | 230.5 (343) | 339.3 (505) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.100.15.02.01.D** | 8 | 4 G 10.0 | 0.83 (21.0) | 360.2 (536) | 501.3 (746) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.160.15.02.01.D** | 6 | 4 G 16.0 | 0.94 (24.0) | 535.6 (797) | 729.8 (1086) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.250.15.02.01.D** | 4 | 4 G 25.0 | 1.10 (28.0) | 788.2 (1173) | 1026.8 (1528) |
| | 16 | 1 STP x 1.5 | | | |
| **CF27.350.15.02.01.D** | 2 | 4 G 35.0 | 1.26 (32.0) | 1087.2 (1618) | 1342.6 (1998) |
| | 16 | 1 STP x 1.5 | | | |
| **2 Control pairs shielded** | | | | | |
| **CF27.07.03.02.02.D** | 18 | 4 G 0.75 | 0.49 (12.5) | 69.2 (103) | 131.7 (196) |
| | 22 | 2 STP x 0.34 | | | |
| **CF27.10.07.02.02.D** | 17 | 4 G 1.0 | 0.53 (13.5) | 99.5 (148) | 164.6 (245) |
| | 18 | 2 STP x 0.75 | | | |
| **CF27.15.07.02.02.D** | 16 | 4 G 1.5 | 0.57 (14.5) | 112.2 (167) | 192.9 (287) |
| | 18 | 2 STP x 0.75 | | | |
| **CF27.25.15.02.02.D** | 14 | 4 G 2.5 | 0.63 (16.0) | 170.7 (254) | 257.4 (383) |
| | 16 | 2 STP x 1.5 | | | |
| **CF27.40.15.02.02.D** | 12 | 4 G 4.0 | 0.69 (17.5) | 207.0 (308) | 308.4 (459) |
| | 16 | 2 STP x 1.5 | | | |
| **CF27.60.15.02.02.D** | 10 | 4 G 6.0 | 0.77 (19.5) | 276.9 (412) | 405.9 (604) |
| | 16 | 2 STP x 1.5 | | | |
| **CF27.100.15.02.02.D** | 8 | 4 G 10.0 | 0.89 (22.5) | 397.8 (592) | 565.8 (842) |
| | 16 | 2 STP x 1.5 | | | |
| **CF27.160.15.02.02.D** | 6 | 4 G 16.0 | 1.02 (26.0) | 590.0 (878) | 821.8 (1223) |
| | 16 | 2 STP x 1.5 | | | |
| **CF27.250.15.02.02.D** | 4 | 4 G 25.0 | 1.22 (31.0) | 840.0 (1250) | 1141.7 (1699) |
| | 16 | 2 STP x 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **1 Star-quad shielded** | | | | | |
| **CF27.15.05.04.D** | 16 | 4 G 1.5 | 0.49 (12.5) | 88.0 (131) | 155.2 (231) |
| | 20 | 4 x 0.5 SHLD | | | |
| **CF27.25.05.04.D** | 14 | 4 G 2.5 | 0.55 (14.0) | 118.3 (176) | 196.2 (292) |
| | 20 | 4 x 0.5 SHLD | | | |
| **CF27.40.05.04.D** | 12 | 4 G 4.0 | 0.63 (16.0) | 164.0 (244) | 252.7 (376) |
| | 20 | 4 x 0.5 SHLD | | | |
| **without control pair** | | | | | |
| **CF27.07.04.D** | 18 | 4 G 0.75 | 0.37 (9.5) | 37.0 (55) | 77.3 (115) |
| **CF27.15.04.D** | 16 | 4 G 1.5 | 0.43 (11.0) | 60.5 (90) | 110.9 (165) |
| **CF27.25.04.D** | 14 | 4 G 2.5 | 0.49 (12.5) | 90.7 (135) | 155.2 (231) |
| **CF27.500.04.D** | 1 | 4 G 50.0 | 1.46 (37.0) | 1507.9 (2244) | 1892.9 (2817) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

## Order example: CF27.40.15.02.01.D - To your required length

CF27.D chainflex® series .40 Code nominal cross section .10 Code nominal cross section signal pairs .02 Identification pairs .01 Number of pairs

Order online ▶ www.igus.com/CF27D

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

## cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF21.UL ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Servo cable | TPE outer jacket

# chainflex® CF29.D




**12,500,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drives

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 6.8 x d |
| | **flexible** | min. 5 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +212 °F (-35 °C to +100 °C) |
| | **flexible** | -58 °F to +212 °F (-50 °C to +100 °C) |
| | **fixed** | -67 °F to +212 °F (-55 °C to +100 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | | 262.5 ft/s² (80 m/s²) |
| **Travel distance** | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Conductor construction** | Power conductors and Signal Pairs cabled with short pitch. |
| **Color code** | **Power conductors:** Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+ 2. V / L2 3. W / L3 / D / L-<br>**1 Control pair:** Black with white numbers.<br>Control Pair Printed 4 and 5 |
| **Element shield** | Extremely bending-resistant braiding made of tinned copper wires.<br>90% optical coverage |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |
| **CFRIP®** | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 7.6.4.1

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF29D (from production date 01/2022) |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | | 7.5 million | | 12.5 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°F] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |
| -13/+194 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 |
| +194/+212 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant, Class 4
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **1 Control pair shielded** | | | | | |
| **CF29.15.15.02.01.D** | 16 | 4 G 1.5 | 0,51 (13,0) | 97,4 (145) | 155,2 (231) |
| | 16 | 1 STP 1.5 | | | |
| **CF29.25.15.02.01.D** | 14 | 4 G 2.5 | 0,55 (14,0) | 133,7 (199) | 195,5 (291) |
| | 16 | 1 STP 1.5 | | | |
| **CF29.40.15.02.01.D** | 12 | 4 G 4.0 | 0,61 (15,5) | 172,0 (256) | 246,6 (367) |
| | 16 | 1 STP 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

Hybrid servo cable | PVC outer jacket

# chainflex® CF220.UL.H




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- Variable Frequency Drives

**New cable suitable for Siemens SINAMICS S210**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | 164.1 ft/s² (50 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 | |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Power cores and control pair elements wound with a short pitch length around a high tensile strength center element. |
| Color code | According to Servo-Hybrid specification.<br>Latest data sheet ▶ www.igus.com/CF220ULH |
| Element shield | Bending-resistant tinned copper braid.<br>80% optical coverage |
| Intermediate layer | polyester tape over external layer |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Orange (similar to RAL 2003)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL)<br>Variants ▶ Product range table |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 4.2.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF220ULH |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |
| **Info** | As Hybrid cables are always designed for specific drive systems, additional electrotechnical data may need to be considered. You will find more information in the latest data sheet for the cable series. |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 12.5 | 13.5 | 14.5 |
| +59/+140 | 10 | 11 | 12 |
| +140/+158 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Hybrid servo cable | PVC outer jacket

# chainflex® CF220.UL.H




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **SICK (HIPERFACE DSL)** | | | | | |
| **CF220.UL.H100.07.04** | 18 | 4 G 0.75 | 0.45 (11.5) | 71.2 (106) | 111.5 (166) |
| | 22 | 1 STP x 0.34 | | | |
| | 22 | 1 STP x 22AWG | | | |
| **CF220.UL.H101.10.04** | 17 | 4 G 1.0 | 0.47 (12.0) | 86.7 (129) | 134.4 (200) |
| | 18 | 1 STP x 0.75 | | | |
| | 22 | 1 STP x 22AWG | | | |
| **CF220.UL.H101.15.04** | 16 | 4 G 1.5 | 0.51 (13.0) | 101.5 (151) | 151.9 (226) |
| | 18 | 1 STP x 0.75 | | | |
| | 22 | 1 STP x 22AWG | | | |
| **CF220.UL.H102.25.04** | 14 | 4 G 2.5 | 0.57 (14.5) | 133.7 (199) | 194.2 (289) |
| | 17 | 1 STP x 1.0 | | | |
| | 22 | 1 STP x 22AWG | | | |
| **SEW Cable type E/1.5** | | | | | |
| **CF220.UL.H203.15.04** | 16 | 4 G 1.5 | 0.45 (11.5) | 89.4 (133) | 135.1 (201) |
| | 17 | 3 x 1.0 | | | |
| **SINAMICS S210** | | | | | |
| **CF220.UL.H300.03.04** | 22 | 4 G 0.34 | 0.39 (10.0) | 52.4 (78) | 86.0 (128) |
| | 22 | 2 x 0.34 SHLD | | | |
| | 26 | 4 x AWG26 SHLD | | | |
| **CF220.UL.H301.07.04** | 18 | 4 G 0.75 | 0.43 (11.0) | 66.5 (99) | 100.1 (149) |
| | 20 | 2 x 0.5 SHLD | | | |
| | 26 | 4 x AWG26 SHLD | | | |
| **CF220.UL.H304.15.04** | 16 | 4 G 1.5 | 0.51 (13.0) | 106.8 (159) | 157.2 (234) |
| | 16 | 2 x 1.5 SHLD | | | |
| | 26 | 4 x AWG26 SHLD | | | |
| **HEIDENHAIN** | | | | | |
| **CF220.UL.H501.15.04** | 16 | 4 G 1.5 | 0.53 (13.5) | 100.8 (150) | 161.3 (240) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 26 | (2x2x0,14)C | | | |
| | 26 | 2 x 0.25 SHLD | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Hybrid technology | Hybrid manufacturer |
|---|---|---|
| **SICK (HIPERFACE DSL)** | | |
| **CF220.UL.H100.07.04** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF220.UL.H101.10.04** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF220.UL.H101.15.04** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF220.UL.H102.25.04** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **SEW Cable type E/1.5** | | |
| **CF220.UL.H203.15.04** | SEW cable type E/1.5 | SEW |
| **SINAMICS S210** | | |
| **CF220.UL.H300.03.04** | SINAMICS S210 | Siemens |
| **CF220.UL.H301.07.04** | SINAMICS S210 | Siemens |
| **CF220.UL.H304.15.04** | SINAMICS S210 | Siemens |
| **HEIDENHAIN** | | |
| **CF220.UL.H501.15.04** | HEIDENHAIN | B&R |

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Hybrid servo cable | PUR outer jacket

# chainflex® CF280.UL.H

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drives

**New cable suitable for Bosch Rexroth ctrlX DRIVE**




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Power cores and control pair elements wound with a short pitch length around a high tensile strength center element. |
| Color code | According to Servo-Hybrid specification.<br>Latest data sheet ▶ www.igus.com/CF280ULH |
| Element shield | Bending-resistant tinned copper braid.<br>80% optical coverage |
| Intermediate layer | Polyester tape over external layer |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Orange (similar to RAL 2003)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL)<br>Variants ▶ Product range table |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | |

# Class 4.2.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF280ULH |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |
| **Info** | As Hybrid cables are always designed for specific drive systems, additional electrotechnical data may need to be considered. You will find more information in the latest data sheet for the cable series. |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 13.5 | 14.5 |
| +5/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Hybrid servo cable | PUR outer jacket

# chainflex® CF280.UL.H




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **SICK (HIPERFACE DSL)** | | | | | |
| **CF280.UL.H100.07.04.D** | 18 | 4 G 0.75 | 0.47 (12.0) | 71.2 (106) | 112.9 (168) |
| | 22 | 2 x 0.34 SHLD | | | |
| | 22 | 1 STP x 22 AWG | | | |
| **CF280.UL.H101.10.04.D** | 17 | 4 G 1.0 | 0.49 (12.5) | 86.7 (129) | 135.7 (202) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 22 | 1 STP x 22 AWG | | | |
| **CF280.UL.H101.15.04.D** | 16 | 4 G 1.5 | 0.51 (13.0) | 101.5 (151) | 153.2 (228) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 22 | 1 STP x 22 AWG | | | |
| **CF280.UL.H102.25.04.D** | 14 | 4 G 2.5 | 0.57 (14.5) | 133.7 (199) | 195.5 (291) |
| | 17 | 2 x 1.0 SHLD | | | |
| | 22 | 1 STP x 22 AWG | | | |
| **CF280.UL.H102.40.04.D** | 12 | 4 G 4.0 | 0.63 (16.0) | 180.1 (268) | 243.9 (363) |
| | 17 | 2 x 1.0 SHLD | | | |
| | 22 | 1 STP x 22 AWG | | | |
| **CF280.UL.H102.60.04.D** | 10 | 4 G 6.0 | 0.69 (17.5) | 230.5 (343) | 319.2 (475) |
| | 17 | 2 x 1.0 SHLD | | | |
| | 22 | 1 STP x 22 AWG | | | |
| **SEW Cable type A, B, C, D, E** | | | | | |
| **CF280.UL.H200.15.07.D** [15)] | 16 | 7 x 1.5 | 0.59 (15.0) | 122.3 (182) | 178.7 (266) |
| | 18 | 2 x 0.75 SHLD | | | |
| **CF280.UL.H200.25.07.D** [15)] | 14 | 7 x 2.5 | 0.71 (18.0) | 176.7 (263) | 247.3 (368) |
| | 18 | 2 x 0.75 SHLD | | | |
| **CF280.UL.H201.15.04.D** [15)] | 16 | 4 G 1.5 | 0.49 (12.5) | 88.7 (132) | 141.1 (210) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 18 | 3 x 0.75 SHLD | | | |
| **CF280.UL.H201.25.04.D** [15)] | 14 | 4 G 2.5 | 0.57 (14.5) | 114.2 (170) | 181.4 (270) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 18 | 3 x 0.75 SHLD | | | |
| **CF280.UL.H203.15.04.D** | 16 | 4 G 1.5 | 0.45 (11.5) | 89.4 (133) | 134.4 (200) |
| | 17 | 3 x 1.0 SHLD | | | |
| **CF280.UL.H203.25.04.D** | 14 | 4 G 2.5 | 0.51 (13.0) | 118.9 (177) | 176.1 (262) |
| | 17 | 3 x 1.0 SHLD | | | |
| **CF280.UL.H204.15.04.D** | 16 | 4 G 1.5 | 0.53 (13.5) | 119.6 (178) | 176.7 (263) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 17 | 3 x 1.0 SHLD | | | |
| **CF280.UL.H206.40.04.D** | 12 | 4 G 4.0 | 0.67 (17.0) | 209.0 (311) | 284.9 (424) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 16 | 3 x 1.5 SHLD | | | |
| **CF280.UL.H206.60.04.D** | 10 | 4 G 6.0 | 0.73 (18.5) | 267.4 (398) | 347.4 (517) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 16 | 3 x 1.5 SHLD | | | |

[15)] Color outer jacket: Black (similar to RAL 9005)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.3.1



| Part No. | Hybrid technology | Hybrid manufacturer |
|---|---|---|
| **SICK (HIPERFACE DSL)** | | |
| **CF280.UL.H100.07.04.D** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF280.UL.H101.10.04.D** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF280.UL.H101.15.04.D** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF280.UL.H102.25.04.D** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF280.UL.H102.40.04.D** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **CF280.UL.H102.60.04.D** | SICK (HIPERFACE DSL) | please see selection table on page 249 |
| **SEW Cable type A, B, C, D, E** | | |
| **CF280.UL.H200.15.07.D** [15)] | SEW cable type A/1.5 | SEW |
| **CF280.UL.H200.25.07.D** [15)] | SEW cable type A/2.5 | SEW |
| **CF280.UL.H201.15.04.D** [15)] | SEW cable type B/1.5 | SEW |
| **CF280.UL.H201.25.04.D** [15)] | SEW cable type B/2.5 | SEW |
| **CF280.UL.H203.15.04.D** | SEW cable type E/1.5 | SEW |
| **CF280.UL.H203.25.04.D** | SEW cable type E/2.5 | SEW |
| **CF280.UL.H204.15.04.D** | SEW cable type D/1.5 | SEW |
| **CF280.UL.H206.40.04.D** | SEW cable type D/4.0 | SEW |
| **CF280.UL.H206.60.04.D** | SEW cable type D/6.0 | SEW |

Other types ▶ Page 280

Hybrid servo cable | PUR outer jacket

# chainflex® CF280.UL.H

igus® chainflex® CF280.UL.H



Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **MOVILINK DDI** | | | | | |
| **CF280.UL.H207.15.04.D** | 16 | 4 G 1.5 | 0.61 (15.5) | 128.3 (191) | 204.3 (304) |
| | 17 | 2x(2x1.0)C | | | |
| | - | HF50-0.9/2.95 SHLD | | | |
| **CF280.UL.H207.25.04.D** | 14 | 4 G 2.5 | 0.65 (16.5) | 155.9 (232) | 237.9 (354) |
| | 17 | 2x(2x1.0)C | | | |
| | - | HF50-0.9/2.95 SHLD | | | |
| **SINAMICS S210** | | | | | |
| **CF280.UL.H300.03.04.D** | 22 | 4 G 0.34 | 0.39 (10.0) | 52.4 (78) | 87.4 (130) |
| | 22 | 2 x 0.34 SHLD | | | |
| | 26 | 4 x 26 AWG SHLD | | | |
| **CF280.UL.H301.07.04.D** | 18 | 4 G 0.75 | 0.43 (11.0) | 66.5 (99) | 101.5 (151) |
| | 20 | 2 x 0.5 SHLD | | | |
| | 26 | 4 x 26 AWG SHLD | | | |
| **CF280.UL.H304.15.04.D** | 16 | 4 G 1.5 | 0.51 (13.0) | 106.8 (159) | 158.6 (236) |
| | 16 | 2 x 1.5 SHLD | | | |
| | 26 | 4 x 26 AWG SHLD | | | |
| **CF280.UL.H304.25.04.D** | 14 | 4 G 2.5 | 0.57 (14.5) | 137.8 (205) | 192.2 (286) |
| | 16 | 2 x 1.5 SHLD | | | |
| | 26 | 4 x 26 AWG SHLD | | | |
| **IndraDrive** | | | | | |
| **CF280.UL.H400.25.05.D** | 14 | 5 x 2.5 | 0.61 (15.5) | 149.2 (222) | 227.1 (338) |
| | 22 | 5 x 0.35 | | | |
| | 22 | 4 x 22 AWG SHLD | | | |
| **ctrlX DRIVE** | | | | | |
| **CF280.UL.H401.07.04.D** | 18 | 4 G 0.75 | 0.49 (12.5) | 71.2 (106) | 129.7 (193) |
| | 20 | 2 x 0.5 SHLD | | | |
| | 24 | 4 x 24 AWG SHLD | | | |
| New **CF280.UL.H402.15.04.D** | 16 | 4 G 1.5 | 0.53 (13.5) | 98.8 (147) | 157.9 (235) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 24 | 4 x 24 AWG SHLD | | | |
| **HEIDENHAIN** | | | | | |
| **CF280.UL.H501.15.04.D** | 16 | 4 G 1.5 | 0.53 (13.5) | 100.8 (150) | 161.3 (240) |
| | 18 | 2 x 0.75 SHLD | | | |
| | 26 | (2x2x0,14)C | | | |
| | 24 | 2 x 0.25 SHLD | | | |
| **CF280.UL.H502.40.04.D** | 12 | 4 G 4.0 | 0.65 (16.5) | 178.7 (266) | 254.0 (378) |
| | 17 | (2x1,0)C | | | |
| | 26 | (2x2x0,14)C | | | |
| | 24 | 2 x 0.25 SHLD | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



| Part No. | Hybrid technology | Hybrid manufacturer |
|---|---|---|
| **MOVILINK DDI** | | |
| **CF280.UL.H207.15.04.D** | MOVILINK DDI | SEW |
| **CF280.UL.H207.25.04.D** | MOVILINK DDI | SEW |
| **SINAMICS S210** | | |
| **CF280.UL.H300.03.04.D** | SINAMICS S210 | Siemens |
| **CF280.UL.H301.07.04.D** | SINAMICS S210 | Siemens |
| **CF280.UL.H304.15.04.D** | SINAMICS S210 | Siemens |
| **CF280.UL.H304.25.04.D** | SINAMICS S210 | Siemens |
| **IndraDrive** | | |
| **CF280.UL.H400.25.05.D** | IndraDrive | Bosch Rexroth |
| **ctrlX DRIVE** | | |
| **CF280.UL.H401.07.04.D** | ctrlX DRIVE | Bosch Rexroth |
| **CF280.UL.H402.15.04.D** | ctrlX DRIVE | Bosch Rexroth |
| **HEIDENHAIN** | | |
| **CF280.UL.H501.15.04.D** | HEIDENHAIN | B&R |
| **CF280.UL.H502.40.04.D** | HEIDENHAIN | B&R |

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

chainflex®

# Motor cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29365

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · cULus · UL · NFPA · DNV · REACH · RoHS · clean-room · dry cleanroom tested · DESINA · CE

## Motor cables for energy chains®

Specially designed for use in e-chains®. Free selection between multi-conductor cables and single conductors. Six different outer jacket materials, shielded and unshielded options. Tested with a chainflex® guarantee of up to 4 years.

- Electric design according to manufacturer standards for bend radius up to 7.5 x d
- Always find the most cost-effective motor cable made from various jacket materials that is guaranteed to work.
- Developed, tested and optimized for longest life in e-chains®
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online:
  **igus.com/chainflexlife**




Background

# Why Motor cables?

**When a professional mentions motor cables, he generally does not just mean the supply cable for a motor. A four-conductor control cable can do that. He is talking about connecting a frequency converter to the motor.**

The requirement for this is that the conductor insulation fulfills the 600/1,000 V voltage levels. This is necessary because the frequency converter uses the principle of pulse width modulation to control frequency and thus motor speed. This leads to voltage peaks, which the insulation must be able to handle. This is why a higher voltage class is chosen than for a control cable.

**Multi-conductor vs. single-core**

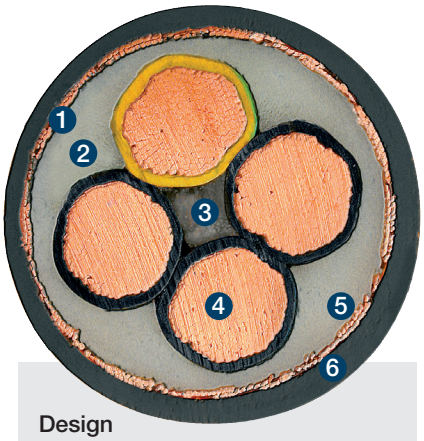
It is now possible to design cables with single conductors, especially for large drives. This solution offers several advantages over classical four-conductor versions. Probably the biggest advantage is the much lower price that can be offered due to a different, more cost-effective manufacturing process. The single-conductor solution is also more robust, making it suitable for small installation spaces in energy chains®, while still delivering a longer service life. This is particularly noticeable on long travels. Thinner single-conductor cables make connection to the motor easier, but they require special bolted

**Benefits**

- Multi-conductor or single-conductor
- Shielded and unshielded
- For the most demanding applications
- Jacket materials: PVC, PUR, TPE
- Tested with a 4-year guarantee

**Typical application areas**

- Storage and retrieval units, machining units/packaging machines, quick handling
- Machine tools
- Indoor cranes
- Outdoor cranes
- Low temperature applications




**Design**

**1.** Overall shield with optimized braiding angle
**2.** Gusset-filling extruded inner jacket
**3.** Tensile stress-resistant center element
**4.** Optimized strand-wire diameter
**5.** Conductors wound with optimized pitch length and pitch direction
**6.** Highly abrasion-resistant pressure extruded outer jacket

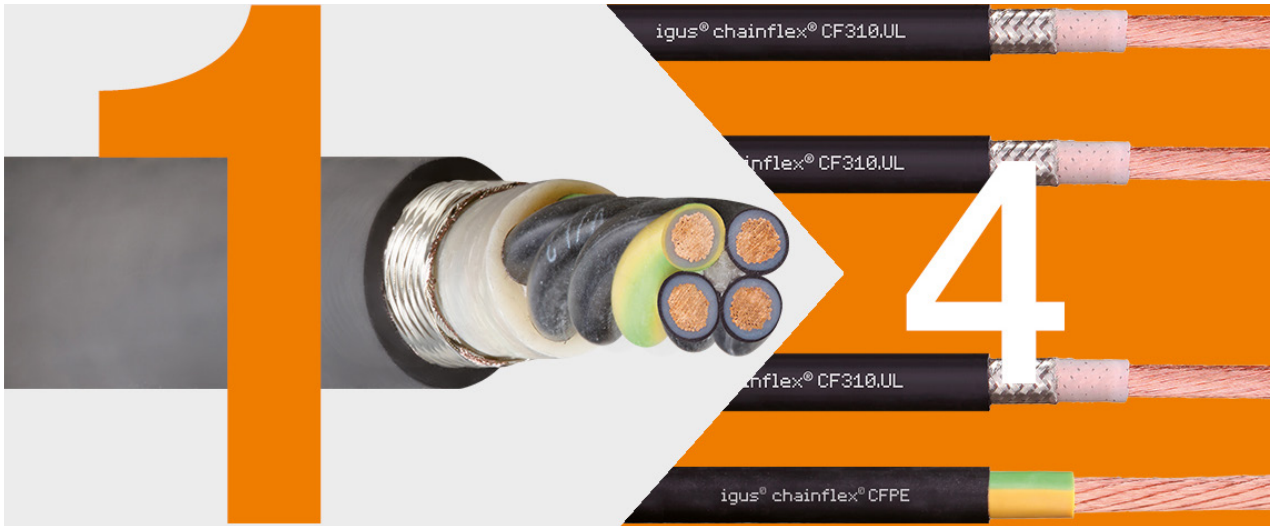
connections. We have plenty of experience with this type of challenge, and we always keep the necessary products in stock to provide a solution. Using individual wires for motors has led to a considerable increase in cable service life in various contexts. Moreover, cable costs have often been reduced significantly. In this section, our aim is to make this knowledge much more widely available and demonstrate some clear solutions.

**Single conductor - multi-conductor Motor cables**

In industrial applications, ruptured conductors or broken shields are a hazard. This often causes machine downtime.
igus® designs its chainflex® cables with mechanically high-quality copper conductors in optimized pitch length to avoid such downtimes. This conductor structure provides a high load capacity compared to conventional Motor cables. For energy chain systems®, it is recommended to switch to single conductors with a conductor cross section of 10 $mm^2$, as these can be used in smaller installation spaces. This also benefits the mechanical design of the entire energy chain system. The two primary characteristics that give a single conductor cable its advantage over a multi-conductor Motor cable are cost-effectiveness and compactness. Single cores can be produced at significantly lower cost than the multi-conductor alternative. The small diameter enables faster processing, resulting in more favorable production costs. In addition to reducing costs, they also take up less space, which is important in tight installation spaces. These two factors make single cores especially attractive for use in energy chains in different applications.

**Advantages of TPE include abrasion resistance, cold resistance and a long service life.**

The majority of our Motor cables have outer jackets made of the TPE high-end material, which is especially well-suited to applications in extreme temperature ranges. The temperature range for TPE Motor cables is defined as -35°C to +90°C in energy chains. This means that this material is ideal for use in deep-freeze areas or very warm environments. Another feature of TPE is its extremely high abrasion resistance. Direct comparisons of TPE with PVC and PUR show that TPE has superior abrasion resistance, making it ideal for high-end applications with the longest service life.



Application example

# Motor cables in crane systems



**Problem**

In Lumut, Malaysia, the planned construction of a new modern coal-fired power plant for the operator Lekir Bulk Terminal Sdn Bhd. is a major project. The coal for the power plant is delivered by ships; for further processing, berths for the cargo ships have been built on an artificial island about 2 km off the coast, which are served by two large ship unloaders. The ship unloaders each have a travel of 441m and were built by the Koch company in Wadgassen in Saarland. For the energy supply system, the operator was looking for a sophisticated system that could also withstand the local environmental conditions and cope with the high load caused by the continuous operation of the plant.

**Solution**

The operator finally decided on an e-chain system® from igus®. The crane operator's cabin is supplied with a chain of type 4040.25.150.0. Due to the high travel speed in combination with the very high fill weight of 41.03 kg/m a 4-band energy chain with 2 extension links was used for the trolley. This application uses role-chains® with stainless steel bearings, which can withstand the highly corrosive salty sea air. The weight of an e-chain® including cables is almost 2.5 tons. The e-chains® are equipped with CFCRANE 50/6.6/10KV medium-voltage cables or CFCRANE 35/6.6/10KV, a Fiber Optic Cable with 6 fibers 62.5/125 as well as a water hose. This is because water mist is constantly used to suppress dust during the unloading of the ships due to the high dust generation. Furthermore, all energy chains are come fully equipped with stainless steel guide troughs and are protected from the weather and high levels of UV radiation by an enclosure.

**Profile**

- **What was needed:** Crane operator cabin: E4/4 e-chain® (4040 series), load carrying equipment (trolley): rol e-chain®
- 5050R.21/21/21.250.0, chainflex® cables, stainless steel guide troughs and enclosure
- **Requirements:** Corrosive environmental conditions, dust generation
- **Industry:** Crane, ship unloader
- **Success for the customer:** complete energy supply solution from one source, reliable solution for highly corrosive ambient conditions

Selection table

# chainflex® Motor cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CF885 | PVC | | 15 | +41/ +158 | 9.84 | - | 65.62 | ≤ 32.81 | 290 |
| CF886 | PVC | ● | 15 | +41/ +158 | 9.84 | - | 65.62 | ≤ 32.81 | 292 |
| CF210.UL New | PVC | ● | 10 | +41/ +158 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 294 |
| CF30 New | PVC | | 7.5 | +41/ +158 | 32.81 | 16.41 | 262.48 | ≤ 328.1 | 296 |
| CF31 New | PVC | ● | 7.5 | +41/ +158 | 32.81 | 16.41 | 262.48 | ≤ 328.1 | 300 |
| CF895 | iguPUR | | 15 | -4/ +176 | 9.84 | - | 65.62 | ≤ 32.81 | 304 |
| CF896 | iguPUR | ● | 15 | -4/ +176 | 9.84 | - | 65.62 | ≤ 32.81 | 306 |
| CF270.UL.D New | PUR | ● | 10 | -13/ +176 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 308 |
| CF27.D New | PUR | ● | 7.5 | -13/ +176 | 32.81 | 16.41 | 262.48 | ≤ 328.1 | 312 |
| CF34.UL.D New | TPE | | 7.5 | -31/ +194 | 32.81 | 19.69 | 262.48 | ≤ 1,312 | 316 |
| CF35.UL New | TPE | ● | 7.5 | -31/ +194 | 32.81 | 19.69 | 262.48 | ≤ 1,312 | 320 |
| CF37.D New | TPE | | 7.5 | -31/ +194 | 32.81 | 19.69 | 262.48 | ≤ 1,312 | 324 |
| CF38 New | TPE | ● | 7.5 | -31/ +194 | 32.81 | 19.69 | 262.48 | ≤ 1,312 | 328 |

## Approvals/Resistance

| chainflex® cables | Approvals and standards | | | | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | oil | | PTFE free | cULus Listed | cUL Listed | UL Listed | cULus | | nec | NFPA | CUPA | DNV | REACH | RoHS | clean-room | dry clean room | DESINA | CE | | |
| CF885 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | | 290 |
| CF886 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | | 292 |
| CF210.UL New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | | 294 |
| CF30 New | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | | 296 |
| CF31 New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | | ● | | 300 |
| CF895 | ● | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | | 304 |
| CF896 | ● | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | | 306 |
| CF270.UL.D New | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | ● | ● | | 308 |
| CF27.D New | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | | 312 |
| CF34.UL.D New | ● | ● | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | | 316 |
| CF35.UL New | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | | 320 |
| CF37.D New | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | | 324 |
| CF38 New | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | | ● | | 328 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] | Bending radius min. [factor x d] | Bending radius min. [factor x d] | Page |
|---|---|---|---|---|---|
| | | 5 million (1 million) cycles * | 7.5 million (3 million) cycles * | 10 million (5 million) cycles * | |
| CF885 | +41 / +59 | 17.5 | 18.5 | 19.5 | |
| | +59 / +140 | 15 | 16 | 17 | 290 |
| | +140 / +158 | 17.5 | 18.5 | 19.5 | |
| CF886 | +41 / +59 | 17.5 | 18.5 | 19.5 | |
| | +59 / +140 | 15 | 16 | 17 | 292 |
| | +140 / +158 | 17.5 | 18.5 | 19.5 | |
| CF210.UL New | +41 / +59 | 12.5 | 13.5 | 14.5 | |
| | +59 / +140 | 10 | 11 | 12 | 294 |
| | +140 / +158 | 12.5 | 13.5 | 14.5 | |
| CF30 New | +41 / +59 | 10 | 11 | 12 | |
| | +59 / +140 | 7.5 | 8.5 | 9.5 | 296 |
| | +140 / +158 | 10 | 11 | 12 | |
| CF31 New | +41 / +59 | 10 | 11 | 12 | |
| | +59 / +140 | 7.5 | 8.5 | 9.5 | 300 |
| | +140 / +158 | 10 | 11 | 12 | |
| CF895 | -4 / +14 | 17.5 | 18.5 | 19.5 | |
| | +14 / +158 | 15 | 16 | 17 | 304 |
| | +158 / +176 | 17.5 | 18.5 | 19.5 | |
| CF896 | -4 / +14 | 17.5 | 18.5 | 19.5 | |
| | +14 / +158 | 15 | 16 | 17 | 306 |
| | +158 / +176 | 17.5 | 18.5 | 19.5 | |
| CF270.UL.D New | -13 / +5 | 12.5 | 13.5 | 14.5 | |
| | +5 / +158 | 10 | 11 | 12 | 308 |
| | +158 / +176 | 12.5 | 13.5 | 14.5 | |
| CF27.D New | -13 / +5 | 10 | 11 | 12 | |
| | +5 / +158 | 7.5 | 8.5 | 8.5 | 312 |
| | +158 / +176 | 10 | 11 | 12 | |
| CF34.UL.D New | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 316 |
| | +176 / +194 | 10 | 11 | 12 | |
| CF35.UL New | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 320 |
| | +176 / +194 | 10 | 11 | 12 | |
| | | 5 million | 7.5 million | 12.5 million | |
| CF37.D New | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 324 |
| | +176 / +194 | 10 | 11 | 12 | |
| CF38 New | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 328 |
| | +176 / +194 | 10 | 11 | 12 | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife
Figures in brackets refer to series CF885/CF886 and CF895/CF896

Selection table

# chainflex® Spindle cables/Single conductors/Medium voltage

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CF885 | PVC | | 15 | +41/ +158 | 9.84 | - | 65.62 | ≤ 32.81 | 332 |
| CF885.PE | PVC | | 15 | +41/ +158 | 9.84 | - | 65.62 | ≤ 32.81 | 334 |
| CF886 | PVC | ● | 15 | +41/ +158 | 9.84 | - | 65.62 | ≤ 32.81 | 336 |
| CF270.UL.D | PUR | ● | 10 | -13/ +176 | 32.81 | 6.56 | 164.05 | ≤ 32.81 | 338 |
| CF300.UL.D | TPE | | 7.5 | -31/ +194 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 340 |
| CFPE | TPE | | 7.5 | -31/ +194 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 344 |
| CF310.UL | TPE | ● | 7.5 | -31/ +194 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 346 |
| CF330.D New | TPE | | 7.5 | -31/ +194 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 350 |
| CF340 New | TPE | ● | 7.5 | -31/ +194 | 32.81 | 19.69 | 328.1 | ≤ 1,312 | 352 |
| CFCRANE.PUR | PUR | ● | 10 | -4/ +176 | 32.81 | 19.69 | 164.05 | ≤ 1,312 | 354 |
| CFCRANE New | igupren | ● | 10 | -4/ +176 | 32.81 | 19.69 | 164.05 | ≤ 1,312 | 356 |

## Approvals/Resistance

| chainflex® cables | oil | | PTFE FREE | Approvals and standards | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF885 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 332 |
| CF885.PE | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 334 |
| CF886 | | | ● | | | | ● | | | ● | | | ● | ● | | | | ● | 336 |
| CF270.UL.D | ● | | ● | | | | ● | | | ● | | | ● | ● | ● | | ● | ● | 338 |
| CF300.UL.D | ● | ● | ● | | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● | 340 |
| CFPE | ● | ● | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | 344 |
| CF310.UL | ● | | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | 346 |
| CF330.D New | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | 350 |
| CF340 New | ● | | ● | | | | | ● | | | | | ● | ● | ● | ● | | ● | 352 |
| CFCRANE.PUR | ● | | ● | | | | | | | | | | ● | ● | | | | ● | 354 |
| CFCRANE New | ● | | ● | | | | | | | | | | ● | ● | | | | ● | 356 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Bending radius min. [factor x d] | Bending radius min. [factor x d] | Bending radius min. [factor x d] | Page |
|---|---|---|---|---|---|
| | | 5 million (1 million) cycles * | 7.5 million (3 million) cycles * | 10 million (5 million) cycles * | |
| CF885 | +41 / +59 | 17.5 | 18.5 | 19.5 | |
| | +59 / +140 | 15 | 16 | 17 | 332 |
| | +140 / +158 | 17.5 | 18.5 | 19.5 | |
| CF885.PE | +41 / +59 | 17.5 | 18.5 | 19.5 | |
| | +59 / +140 | 15 | 16 | 17 | 334 |
| | +140 / +158 | 17.5 | 18.5 | 19.5 | |
| CF886 | +41 / +59 | 17.5 | 18.5 | 19.5 | |
| | +59 / +140 | 15 | 16 | 17 | 336 |
| | +140 / +158 | 17.5 | 18.5 | 19.5 | |
| CF270.UL.D | -13 / +5 | 12.5 | 13.5 | 14.5 | |
| | +5 / +158 | 10 | 11 | 12 | 338 |
| | +158 / +176 | 12.5 | 13.5 | 14.5 | |
| CF300.UL.D | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 340 |
| | +176 / +194 | 10 | 11 | 12 | |
| CFPE | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 344 |
| | +176 / +194 | 10 | 11 | 12 | |
| CF310.UL | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 346 |
| | +176 / +194 | 10 | 11 | 12 | |
| | | 5 million | 7.5 million | 12.5 million | |
| CF330.D New | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 350 |
| | +176 / +194 | 10 | 11 | 12 | |
| CF340 New | -31 / -13 | 10 | 11 | 12 | |
| | -13 / +176 | 7.5 | 8.5 | 9.5 | 352 |
| | +176 / +194 | 10 | 11 | 12 | |
| | | 5 million | 7.5 million | 10 million | |
| CFCRANE.PUR | -4 / +14 | 12.5 | 13.5 | 14.5 | |
| | +14 / +158 | 10 | 11 | 12 | 354 |
| | +158 / +176 | 12.5 | 13.5 | 14.5 | |
| CFCRANE New | -4 / +14 | 12.5 | 13.5 | 14.5 | |
| | +14 / +158 | 10 | 11 | 12 | 356 |
| | +158 / +176 | 12.5 | 13.5 | 14.5 | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife
Figures in brackets refer to series CF885 and CF886

Motor cable | PVC outer jacket

# chainflex® CF885




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| PTFE-free | This cable does not contain PTFE |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 3.1.1.1

| | |
|---|---|
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶www.igus.com/CF885 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF885.15.04** | 16 | 4 G 1.5 | 0.31 (8.0) | 45.0 (67) | 70.6 (105) |
| **CF885.25.04** | 14 | 4 G 2.5 | 0.39 (10.0) | 73.9 (110) | 109.5 (163) |
| **CF885.40.04** | 12 | 4 G 4.0 | 0.45 (11.5) | 117.6 (175) | 164.0 (244) |
| **CF885.60.04** | 10 | 4 G 6.0 | 0.53 (13.5) | 159.3 (237) | 241.9 (360) |
| **CF885.100.04** | 8 | 4 G 10.0 | 0.67 (17.0) | 276.9 (412) | 345.4 (514) |
| **CF885.160.04** | 6 | 4 G 16.0 | 0.79 (20.0) | 463.7 (690) | 575.9 (857) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Motor cable | PVC outer jacket

# chainflex® CF886




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame resistance

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.1.1

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶www.igus.com/CF886 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF886.15.04** | 16 | 4 G 1.5 | 0.35 (9.0) | 55.1 (82) | 80.0 (119) |
| **CF886.25.04** | 14 | 4 G 2.5 | 0.41 (10.5) | 88.7 (132) | 121.6 (181) |
| **CF886.40.04** | 12 | 4 G 4.0 | 0.47 (12.0) | 137.1 (204) | 176.7 (263) |
| **CF886.60.04** | 10 | 4 G 6.0 | 0.57 (14.5) | 180.8 (269) | 253.3 (377) |
| **CF886.100.04** | 8 | 4 G 10.0 | 0.73 (18.5) | 307.8 (458) | 387.7 (577) |
| **CF886.160.04** | 6 | 4 G 16.0 | 0.83 (21.0) | 510.7 (760) | 557.1 (829) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

New

Motor cable | PVC outer jacket

# chainflex® CF210.UL




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- Variable Frequency Drive

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Intermediate layer | polyester tape over external layer |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 4.2.2.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF210UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 12.5 | 13.5 | 14.5 |
| +59/+140 | 10 | 11 | 12 |
| +140/+158 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF210.UL.05.04** | 20 | 4 G 0.5 | 0.28 (7.0) | 22.8 (34) | 42.3 (63) |
| **CF210.UL.15.04** | 16 | 4 G 1.5 | 0.39 (10.0) | 57.8 (86) | 94.1 (140) |
| **CF210.UL.25.04** | 14 | 4 G 2.5 | 0.45 (11.5) | 98.1 (146) | 140.4 (209) |
| **CF210.UL.40.04** | 12 | 4 G 4.0 | 0.51 (13.0) | 131.0 (195) | 193.5 (288) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

New

Motor cable | PVC outer jacket

# chainflex® CF30




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PVC outer jacket
- Oil-resistant
- Flame-retardant

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| a max. | 262.5 ft/s² (80 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 | |
| Torsion | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 | |

## Cable structure

| | |
|---|---|
| Conductor | **16-10 AWG:** Conductor consisting of bare copper wires (according to DIN EN 60228).<br>**8-1 AWG:** Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch length around a high-tensile strength core. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>4. 4 / N<br>5. green/yellow |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Jet black (similar to RAL 9005) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the outer jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Testing voltage | 4,000V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |

# Class 5.5.2.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶www.igus.com/CF30 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 11 | 12 |
| +59/+140 | 7.5 | 8.5 | 9.5 |
| +140/+158 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Light oil influence, Class 2
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PVC outer jacket

# chainflex® CF30

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF30.15.04** | 16 | 4 G 1.5 | 0.31 (8.0) | 41.0 (61) | 69.9 (104) |
| **CF30.25.04** | 14 | 4 G 2.5 | 0.39 (10.0) | 67.2 (100) | 111.5 (166) |
| **CF30.25.05** | 14 | 5 G 2.5 | 0.43 (11.0) | 83.3 (124) | 136.4 (203) |
| **CF30.40.04** | 12 | 4 G 4.0 | 0.45 (11.5) | 109.5 (163) | 167.3 (249) |
| **CF30.40.05** | 12 | 5 G 4.0 | 0.49 (12.5) | 137.1 (204) | 202.9 (302) |
| **CF30.60.04** | 10 | 4 G 6.0 | 0.53 (13.5) | 159.3 (237) | 230.5 (343) |
| **CF30.60.05** | 10 | 5 G 6.0 | 0.59 (15.0) | 199.6 (297) | 275.5 (410) |
| **CF30.100.04** | 8 | 4 G 10.0 | 0.65 (16.5) | 273.5 (407) | 368.2 (548) |
| **CF30.100.05** | 8 | 5 G 10.0 | 0.77 (19.5) | 346.1 (515) | 459.6 (684) |
| **CF30.160.04** | 6 | 4 G 16.0 | 0.79 (20.0) | 434.1 (646) | 555.0 (826) |
| **CF30.160.05** | 6 | 5 G 16.0 | 0.93 (23.5) | 547.7 (815) | 717.0 (1067) |
| **CF30.250.04** | 4 | 4 G 25.0 | 0.98 (25.0) | 681.4 (1014) | 887.0 (1320) |
| **CF30.350.04** | 2 | 4 G 35.0 | 1.12 (28.5) | 967.0 (1439) | 1206.2 (1795) |
| **CF30.500.04** [11)] | 1 | 4 G 50.0 | 1.34 (34.0) | 1384.9 (2061) | 1698.7 (2528) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 5.5.2.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



**Order example: CF30.15.04 - To your required length**
CF30 chainflex® series .15 Code nominal cross section .04 Number of conductors

Order online ▶ www.igus.com/CF30

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

## cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF885 ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PVC outer jacket

# chainflex® CF31

New




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For high mechanical load requirements
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- Variable Frequency Drive

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | **16-10 AWG:** Conductor consisting of bare copper wires (according to DIN EN 60228).<br>**8-2/0 AWG:** Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch length around a high-tensile strength core. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>4. 4 / N<br>5. green/yellow |
| Inner jacket | PVC mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).<br>Color: Jet black (similar to RAL 9005) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 5.5.2.1

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-4-1), Class 2 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF31 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

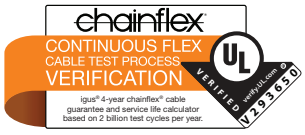
| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 10 | 11 | 12 |
| +59/+140 | 7.5 | 8.5 | 9.5 |
| +140/+158 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Light oil influence, Class 2
- Preferably indoor applications, can be used in outdoor applications with temperatures > 41°F
- Storage and retrieval units for high-bay warehouses, machining units/ packaging machines, quick handling, indoor cranes




UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PVC outer jacket

# chainflex® CF31

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF31.15.04** | 16 | 4 G 1.5 | 0.39 (10.0) | 59.8 (89) | 105.5 (157) |
| **CF31.25.04** | 14 | 4 G 2.5 | 0.45 (11.5) | 89.4 (133) | 148.5 (221) |
| **CF31.25.05** | 14 | 5 G 2.5 | 0.51 (13.0) | 109.5 (163) | 182.1 (271) |
| **CF31.40.04** | 12 | 4 G 4.0 | 0.51 (13.0) | 136.4 (203) | 201.6 (300) |
| **CF31.40.05** | 12 | 5 G 4.0 | 0.57 (14.5) | 173.4 (258) | 237.9 (354) |
| **CF31.60.04** | 10 | 4 G 6.0 | 0.63 (16.0) | 193.5 (288) | 305.7 (455) |
| **CF31.60.05** | 10 | 5 G 6.0 | 0.67 (17.0) | 239.2 (356) | 357.5 (532) |
| **CF31.100.04** | 8 | 4 G 10.0 | 0.73 (18.5) | 314.5 (468) | 450.2 (670) |
| **CF31.100.05** | 8 | 5 G 10.0 | 0.85 (21.5) | 409.2 (609) | 575.9 (857) |
| **CF31.160.04** | 6 | 4 G 16.0 | 0.91 (23.0) | 495.9 (738) | 695.5 (1035) |
| **CF31.250.04** | 4 | 4 G 25.0 | 1.08 (27.5) | 774.8 (1153) | 1065.7 (1586) |
| **CF31.350.04** | 2 | 4 G 35.0 | 1.22 (31.0) | 1069.8 (1592) | 1413.8 (2104) |
| **CF31.500.04** | 1 | 4 G 50.0 | 1.44 (36.5) | 1494.5 (2224) | 1950.1 (2902) |
| **CF31.700.04** | 2/0 | 4 G 70.0 | 1.69 (43.0) | 2152.3 (3203) | 2804.1 (4173) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

### Order example: CF31.15.04 - To your required length

**CF31 chainflex® series .15 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF31

Delivery time 24hrs or today.

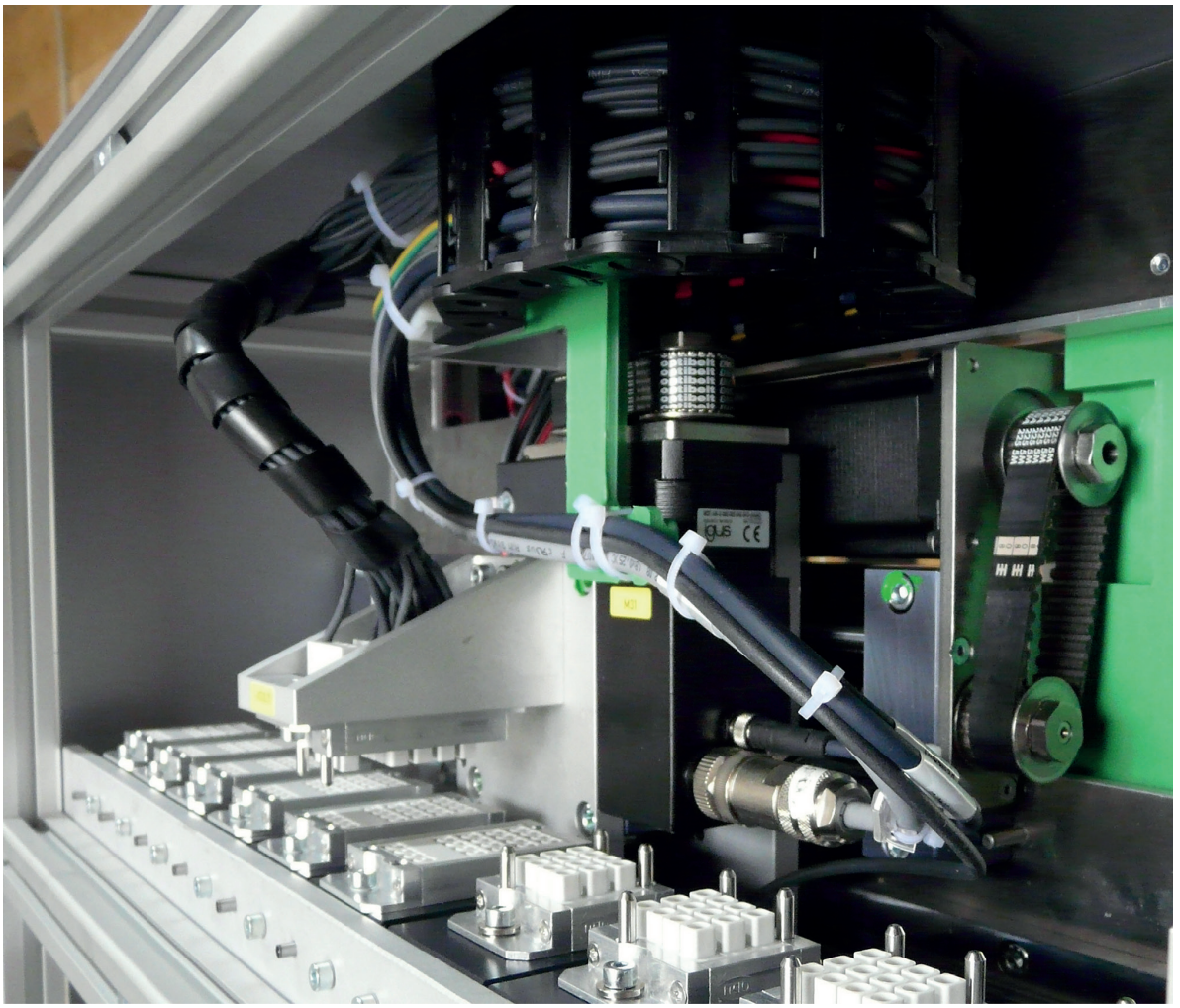
Delivery time means time until goods are shipped.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.5.2.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | **2** | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |





chainflex® CF31 Motor cable in a fast picker

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | iguPUR outer jacket

# chainflex® CF895




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Flame-retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Outer jacket | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF895 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 17.5 | 18.5 | 19.5 |
| +14/+158 | 15 | 16 | 17 |
| +158/+176 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF895.15.04** | 16 | 4 G 1.5 | 0.31 (8.0) | 45.0 (67) | 67.9 (101) |
| **CF895.25.04** | 14 | 4 G 2.5 | 0.39 (10.0) | 73.9 (110) | 102.8 (153) |
| **CF895.40.04** | 12 | 4 G 4.0 | 0.45 (11.5) | 117.6 (175) | 160.6 (239) |
| **CF895.60.04** | 10 | 4 G 6.0 | 0.53 (13.5) | 176.1 (262) | 237.2 (353) |
| **CF895.100.04** | 8 | 4 G 10.0 | 0.67 (17.0) | 293.0 (436) | 364.9 (543) |
| **CF895.160.04** | 6 | 4 G 16.0 | 0.79 (20.0) | 438.8 (653) | 553.7 (824) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Motor cable | iguPUR outer jacket

# chainflex® CF896



Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant
- Variable Frequency Drive

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance TPE mixture. |
| Conductor construction | Conductors cabled with an optimized pitch length. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of iguPUR, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | |

# Class 3.1.3.1

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF896 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 17.5 | 18.5 | 19.5 |
| +14/+158 | 15 | 16 | 17 |
| +158/+176 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF896.07.04** | 18 | 4 G 0.75 | 0.30 (7.5) | 34.9 (52) | 53.1 (79) |
| **CF896.15.04** | 16 | 4 G 1.5 | 0.35 (9.0) | 55.1 (82) | 82.0 (122) |
| **CF896.25.04** | 14 | 4 G 2.5 | 0.41 (10.5) | 88.7 (132) | 116.3 (173) |
| **CF896.40.04** | 12 | 4 G 4.0 | 0.47 (12.0) | 137.1 (204) | 172.7 (257) |
| **CF896.60.04** | 10 | 4 G 6.0 | 0.57 (14.5) | 205.6 (306) | 254.0 (378) |
| **CF896.100.04** | 8 | 4 G 10.0 | 0.73 (18.5) | 307.8 (458) | 438.8 (653) |
| **CF896.160.04** | 6 | 4 G 16.0 | 0.83 (21.0) | 476.4 (709) | 561.1 (835) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Motor cable | PUR outer jacket

# chainflex® CF270.UL.D

New




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free
- Variable Frequency Drive

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Intermediate layer | polyester tape over external layer |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | | ±360° | | |

# Class 4.2.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF270ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardisation |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 13.5 | 14.5 |
| +5/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

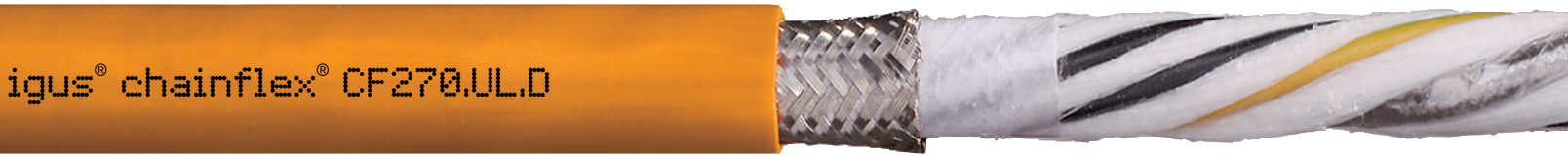
## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PUR outer jacket

# chainflex® CF270.UL.D




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF270.UL.07.04.D | 18 | 4 G 0.75 | 0.31 (8.0) | 31.6 (47) | 54.4 (81) |
| CF270.UL.10.06.D | 17 | 4 G 1.0 | 0.37 (9.5) | 58.5 (87) | 89.4 (133) |
| CF270.UL.15.04.D | 16 | 4 G 1.5 | 0.35 (9.0) | 52.4 (78) | 77.9 (116) |
| CF270.UL.25.04.D | 14 | 4 G 2.5 | 0.41 (10.5) | 86.7 (129) | 116.3 (173) |
| CF270.UL.40.04.D | 12 | 4 G 4.0 | 0.49 (12.5) | 129.7 (193) | 171.4 (255) |
| CF270.UL.60.04.D | 10 | 4 G 6.0 | 0.57 (14.5) | 199.6 (297) | 239.2 (356) |
| CF270.UL.100.04.D | 8 | 4 G 10.0 | 0.67 (17.0) | 332.6 (495) | 370.3 (551) |
| CF270.UL.160.04.D | 6 | 4 G 16.0 | 0.81 (20.5) | 507.3 (755) | 550.3 (819) |
| CF270.UL.250.04.D | 4 | 4 G 25.0 | 0.98 (25.0) | 750.6 (1117) | 844.0 (1256) |
| CF270.UL.350.04.D | 2 | 4 G 35.0 | 1.10 (28.0) | 1073.1 (1597) | 1139.7 (1696) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

## Order example: CF270.UL.07.04.D - To your required length

**CF270.UL.D chainflex® series .07 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF270ULD

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

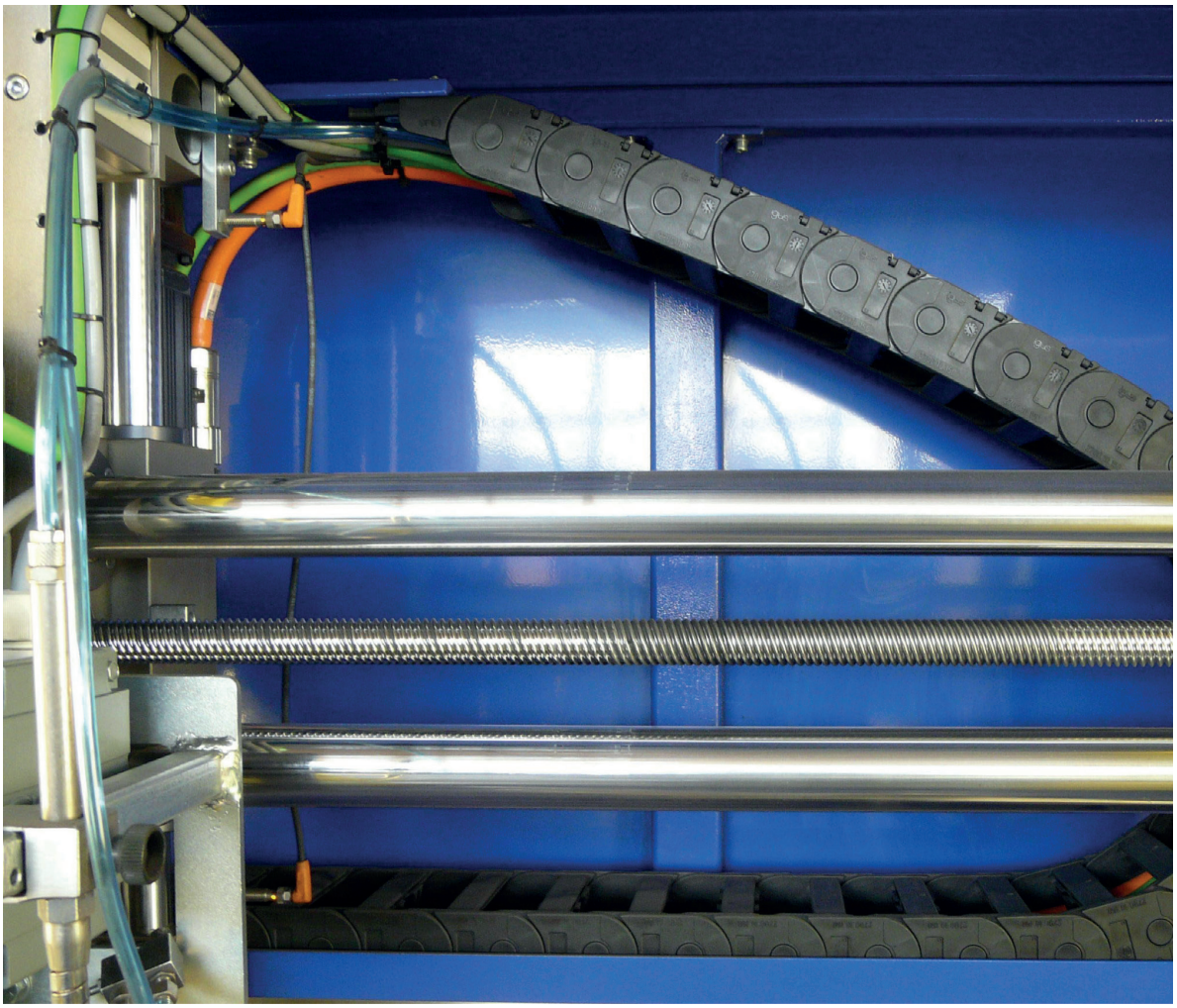
… just one idea for you: Reduce cost with CF31 ...

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 4.2.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |





chainflex® CF270.UL.D Motor cable in a system for sharpening knives

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED E233650 igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PUR outer jacket

# chainflex® CF27.D

New




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**328.1 ft** Travel distance e-chain®

- For very high mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free
- Variable Frequency Drive

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 16.41 ft/s (5 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Cores wound around a high tensile strength center element. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L- |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Orange (similar to RAL 2003) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 6.5.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF27D |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003XA (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF27D |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 10 | 11 | 12 |
| +5/+158 | 7.5 | 8.5 | 9.5 |
| +158/+176 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

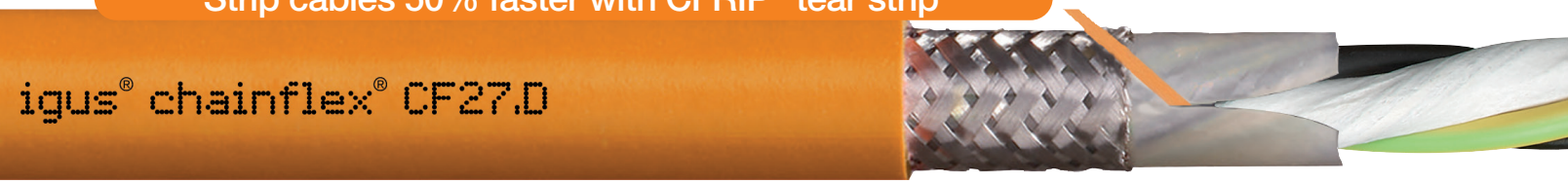
- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PUR outer jacket

# chainflex® CF27.D

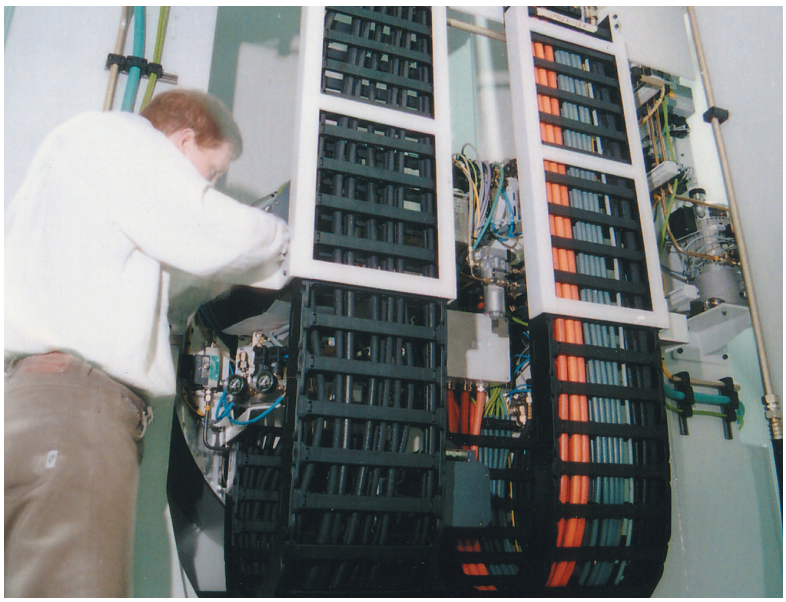
## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF27.07.04.D** | 18 | 4 G 0.75 | 0.37 (9.5) | 37.0 (55) | 77.3 (115) |
| **CF27.15.04.D** | 16 | 4 G 1.5 | 0.43 (11.0) | 60.5 (90) | 110.9 (165) |
| **CF27.25.04.D** | 14 | 4 G 2.5 | 0.49 (12.5) | 90.7 (135) | 155.2 (231) |
| **CF27.500.04.D** | 1 | 4 G 50.0 | 1.46 (37.0) | 1507.9 (2244) | 1892.9 (2817) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core



Modular design, easy to retrofit: igus® E4 e-chain® and chainflex® cables.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.5.3.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



## Order example: CF27.07.04.D - To your required length

**CF27.D chainflex® series .07 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF27D

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**

Do the chainflex® price check ...

www.igus.com/info/cable-price-check

... here's an idea for you: highest abrasion resistance with CF38 ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

DESINA

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | TPE outer jacket

# chainflex® CF34.UL.D

New




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | -31 °F to +194 °F (-35 °C to +90 °C) |
| | **flexible** | -49 °F to +194 °F (-45 °C to +90 °C) |
| | **fixed** | -58 °F to +194 °F (-50 °C to +90 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| a max. | 262.5 ft/s² (80 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |
| Torsion | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 | |

## Cable structure

| | |
|---|---|
| Conductor | **16-10 AWG:** Conductor consisting of bare copper wires (according to DIN EN 60228).<br>**8-4 AWG:** Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch length around a high-tensile strength core. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>4. 4 / N<br>5. green/yellow |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Signal black (similar to RAL 9004) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the outer jacket<br>Video ▶www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF34ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X9 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF34ULD |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | TPE outer jacket

# chainflex® CF34.UL.D

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF34.UL.15.04.D | 16 | 4 G 1.5 | 0.31 (8.0) | 41.0 (61) | 68.5 (102) |
| CF34.UL.25.04.D | 14 | 4 G 2.5 | 0.39 (10.0) | 67.2 (100) | 106.8 (159) |
| CF34.UL.40.04.D | 12 | 4 G 4.0 | 0.45 (11.5) | 109.5 (163) | 158.6 (236) |
| CF34.UL.60.04.D | 10 | 4 G 6.0 | 0.53 (13.5) | 159.3 (237) | 223.1 (332) |
| CF34.UL.60.05.D | 10 | 5 G 6.0 | 0.59 (15.0) | 199.6 (297) | 272.8 (406) |
| CF34.UL.100.04.D | 8 | 4 G 10.0 | 0.65 (16.5) | 273.5 (407) | 360.8 (537) |
| CF34.UL.100.05.D | 8 | 5 G 10.0 | 0.77 (19.5) | 346.1 (515) | 450.2 (670) |
| CF34.UL.160.04.D | 6 | 4 G 16.0 | 0.79 (20.0) | 434.1 (646) | 550.3 (819) |
| CF34.UL.160.05.D | 6 | 5 G 16.0 | 0.89 (22.5) | 547.7 (815) | 678.0 (1009) |
| CF34.UL.250.04.D | 4 | 4 G 25.0 | 0.96 (24.5) | 681.4 (1014) | 854.1 (1271) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 6.6.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



**Order example: CF34.UL.15.04.D - To your required length**
**CF33.UL.D chainflex® series .15 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF34ULD

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF300.UL.D ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

REACH

RoHS

clean-room

DESINA

CE

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED E233650

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | TPE outer jacket

# chainflex® CF35.UL

New




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drive

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -49 °F to +194 °F (-45 °C to +90 °C) |
| | fixed | -58 °F to +194 °F (-50 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 262.5 ft/s² (80 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| Conductor | **20-10 AWG:** Conductor consisting of bare copper wires (according to DIN EN 60228).<br>**8-1 AWG:** Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch length around a high-tensile strength core. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>4. 4 / N<br>5. green/yellow |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Signal black (similar to RAL 9004) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF35UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X9 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF35UL |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | TPE outer jacket

# chainflex® CF35.UL

## Strip cables 50% faster with CFRIP® tear strip




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF35.UL.05.04** | 20 | 4 G 0.5 | 0.30 (7.5) | 28.2 (42) | 53.1 (79) |
| **CF35.UL.07.04** | 18 | 4 G 0.75 | 0.31 (8.0) | 39.0 (58) | 60.5 (90) |
| **CF35.UL.15.04** | 16 | 4 G 1.5 | 0.39 (10.0) | 59.8 (89) | 98.1 (146) |
| **CF35.UL.25.04** | 14 | 4 G 2.5 | 0.45 (11.5) | 89.4 (133) | 139.1 (207) |
| **CF35.UL.40.04** | 12 | 4 G 4.0 | 0.51 (13.0) | 136.4 (203) | 194.9 (290) |
| **CF35.UL.60.04** | 10 | 4 G 6.0 | 0.63 (16.0) | 193.5 (288) | 284.2 (423) |
| **CF35.UL.100.04** | 8 | 4 G 10.0 | 0.73 (18.5) | 314.5 (468) | 424.7 (632) |
| **CF35.UL.160.04** | 6 | 4 G 16.0 | 0.91 (23.0) | 495.9 (738) | 654.5 (974) |
| **CF35.UL.250.04** | 4 | 4 G 25.0 | 1.08 (27.5) | 774.8 (1153) | 995.2 (1481) |
| **CF35.UL.60.03.O.PE** [11)] | 10 | 3 x 6.0 | 0.57 (14.5) | 153.9 (229) | 231.2 (344) |
| **CF35.UL.250.03.O.PE** [11)] | 4 | 3 x 25.0 | 0.96 (24.5) | 591.3 (880) | 781.5 (1163) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



**Order example: CF35.UL.05.04 - To your required length**
**CF35.UL chainflex® series .05 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF35UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF310.UL ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

Motor cable | TPE outer jacket

# chainflex® CF37.D




Example image

**12,500,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +194 °F (-35 °C to +90 °C) |
| | **flexible** | -58 °F to +194 °F (-50 °C to +90 °C) |
| | **fixed** | -67 °F to +194 °F (-55 °C to +90 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | 262.5 ft/s² (80 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |
| **Torsion** | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 | |

## Cable structure

| | |
|---|---|
| **Conductor** | **16-10 AWG:** Conductor consisting of bare copper wires (according to DIN EN 60228).<br>**8-1 AWG:** Conductor cable consisting of pre-leads (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Conductor construction** | Conductors cabled with short pitch length around a high-tensile strength core. |
| **Color code** | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>4. 4 / N<br>5. green/yellow |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |
| **CFRIP®** | Strip 50% faster: a tear strip is molded into the outer jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 7.6.4.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF37D |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee
chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year. VERIFIED E233650

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | TPE outer jacket

# chainflex® CF37.D




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF37.15.04.D** | 16 | 4 G 1.5 | 0.31 (8.0) | 41.0 (61) | 63.8 (95) |
| **CF37.25.04.D** | 14 | 4 G 2.5 | 0.39 (10.0) | 67.2 (100) | 100.1 (149) |
| **CF37.40.04.D** | 12 | 4 G 4.0 | 0.45 (11.5) | 109.5 (163) | 148.5 (221) |
| **CF37.60.04.D** | 10 | 4 G 6.0 | 0.53 (13.5) | 159.3 (237) | 213.0 (317) |
| **CF37.60.05.D** | 10 | 5 G 6.0 | 0.59 (15.0) | 199.6 (297) | 260.1 (387) |
| **CF37.100.04.D** | 8 | 4 G 10.0 | 0.65 (16.5) | 273.5 (407) | 338.0 (503) |
| **CF37.100.05.D** | 8 | 5 G 10.0 | 0.75 (19.0) | 346.1 (515) | 426.0 (634) |
| **CF37.160.04.D** | 6 | 4 G 16.0 | 0.79 (20.0) | 434.1 (646) | 519.4 (773) |
| **CF37.160.05.D** | 6 | 5 G 16.0 | 0.89 (22.5) | 547.7 (815) | 647.1 (963) |
| **CF37.250.04.D** | 4 | 4 G 25.0 | 0.94 (24.0) | 681.4 (1014) | 808.4 (1203) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 7.6.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



## Order example: CF37.15.04.D - To your required length

**CF37.D chainflex® series .15 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF37D

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**

Do the chainflex® price check ...

www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF330.D ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

Motor cable | TPE outer jacket

# chainflex® CF38




Example image

**12,500,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drive

**Now with 194°F UL/CSA AWM approval**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| Temperature | **e-chain® linear** | -31 °F to +194 °F (-35 °C to +90 °C) |
| | **flexible** | -58 °F to +194 °F (-50 °C to +90 °C) |
| | **fixed** | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| a max. | 262.5 ft/s² (80 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| Conductor | **16 - 10 AWG:** Conductor consisting of bare copper wires (according to DIN EN 60228).<br>**8 - 1 AWG:** Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| Conductor construction | Conductors cabled with short pitch length around a high-tensile strength core. |
| Color code | Black with white numbers, one conductor green-yellow.<br>1. U / L1 / C / L+<br>2. V / L2<br>3. W / L3 / D / L-<br>4. 4 / N<br>5. green/yellow |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |
| CFRIP® | Strip 50% faster: a tear strip is molded into the inner jacket<br>Video ▶ www.igus.com/CFRIP |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 7.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶www.igus.com/CF38 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

Motor cable | TPE outer jacket

# chainflex® CF38




Example image

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | **CF38.15.04** | 16 | 4 G 1.5 | 0.39 (10.0) | 59.8 (89) | 94.1 (140) |
| | **CF38.25.04** | 14 | 4 G 2.5 | 0.45 (11.5) | 89.4 (133) | 133.0 (198) |
| | **CF38.40.04** | 12 | 4 G 4.0 | 0.51 (13.0) | 136.4 (203) | 188.2 (280) |
| | **CF38.60.04** | 10 | 4 G 6.0 | 0.63 (16.0) | 193.5 (288) | 274.8 (409) |
| | **CF38.100.04** | 8 | 4 G 10.0 | 0.73 (18.5) | 314.5 (468) | 411.9 (613) |
| | **CF38.160.04** | 6 | 4 G 16.0 | 0.91 (23.0) | 495.9 (738) | 633.7 (943) |
| | **CF38.250.04** | 4 | 4 G 25.0 | 1.06 (27.0) | 774.8 (1153) | 962.3 (1432) |
| New | **CF38.60.03.O.PE** | 10 | 3 x 6.0 | 0.57 (14.5) | 153.9 (229) | 217.0 (323) |
| | **CF38.100.03.O.PE** | 8 | 3 x 10.0 | 0.67 (17.0) | 240.6 (358) | 332.0 (494) |
| | **CF38.160.03.O.PE** | 6 | 3 x 16.0 | 0.81 (20.5) | 379.7 (565) | 512.0 (762) |
| New | **CF38.250.03.O.PE** | 4 | 3 x 25.0 | 0.96 (24.5) | 591.3 (880) | 753.9 (1122) |
| | **CF38.500.03.O.PE** | 1 | 3 x 50.0 | 1.30 (33.0) | 1151.8 (1714) | 1430.6 (2129) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 7.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |



**Order example: CF38.15.04 - To your required length**
**CF38 chainflex® series .15 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF38

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...



...life up

**Reduce cost, improve technology, now!**
Do the chainflex® price check ...
www.igus.com/info/cable-price-check

… just one idea for you: Reduce cost with CF340 ...

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | PVC outer jacket

# chainflex® CF885

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Flame-retardant




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-chain® linear** | min. 15 x d |
| | **flexible** | min. 12 x d |
| | **fixed** | min. 8 x d |
| Temperature | **e-chain® linear** | +41 °F to +158 °F (+5 °C to +70 °C) |
| | **flexible** | +23 °F to +158 °F (-5 °C to +70 °C) |
| | **fixed** | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | **unsupported** | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality PVC mixture. |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>600V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| PTFE-free | This cable does not contain PTFE |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| UL/CSA AWM | See data sheet for details ▶ www.igus.com/CF885 |
| NFPA | Following NFPA 79-2018, chapter 12.9 |
| REACH | In accordance with regulation (EC) No. 1907/2006 (REACH) |

**4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.1.1

**Lead-free** Following 2011/65/EC (RoHS-II/RoHS-III)

**CE** Following 2014/35/EU

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF885.40.01** | 12 | 1 x 4.0 | 0.30 (7.5) | 27.6 (41) | 52.4 (78) |
| **CF885.60.01** | 10 | 1 x 6.0 | 0.31 (8.0) | 41.0 (61) | 67.2 (100) |
| **CF885.100.01** | 8 | 1 x 10.0 | 0.37 (9.5) | 67.2 (100) | 105.5 (157) |
| **CF885.160.01** | 6 | 1 x 16.0 | 0.45 (11.5) | 106.8 (159) | 151.9 (226) |
| **CF885.250.01** | 4 | 1 x 25.0 | 0.49 (12.5) | 166.6 (248) | 218.4 (325) |
| **CF885.350.01** | 2 | 1 x 35.0 | 0.59 (15.0) | 232.5 (346) | 317.8 (473) |
| **CF885.500.01** | 1 | 1 x 50.0 | 0.65 (16.5) | 332.6 (495) | 432.7 (644) |
| **CF885.700.01** | 2/0 | 1 x 70.0 | 0.73 (18.5) | 461.0 (686) | 567.1 (844) |
| **CF885.950.01** | 3/0 | 1 x 95.0 | 0.81 (20.5) | 625.6 (931) | 688.1 (1024) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | PVC outer jacket

# chainflex® CF885.PE

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Flame-retardant




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality PVC mixture. |
| Color code | Green-yellow |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>600V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| PTFE-free | This cable does not contain PTFE |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| UL/CSA AWM | See data sheet for details ▶ www.igus.com/CF885PE |
| NFPA | Following NFPA 79-2018, chapter 12.9 |

**4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 3.1.1.1

**REACH** — In accordance with regulation (EC) No. 1907/2006 (REACH)

**Lead-free** — Following 2011/65/EC (RoHS-II/RoHS-III)

**CE** — Following 2014/35/EU

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF885.PE.25.01** | 14 | 1 G 2.5 | 0.26 (6.5) | 16.8 (25) | 39.6 (59) |
| **CF885.PE.40.01** | 12 | 1 G 4.0 | 0.30 (7.5) | 27.6 (41) | 52.4 (78) |
| **CF885.PE.60.01** | 10 | 1 G 6.0 | 0.31 (8.0) | 41.0 (61) | 67.2 (100) |
| **CF885.PE.100.01** | 8 | 1 G 10.0 | 0.37 (9.5) | 67.2 (100) | 105.5 (157) |
| **CF885.PE.160.01** | 6 | 1 G 16.0 | 0.43 (11.0) | 106.8 (159) | 151.9 (226) |
| **CF885.PE.250.01** | 4 | 1 G 25.0 | 0.49 (12.5) | 166.6 (248) | 218.4 (325) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | PVC outer jacket

# chainflex® CF886




Example image

**5,000,000** Cycles guaranteed

**15 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For low duty flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant
- Variable Frequency Drives

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 15 x d |
| | flexible | min. 12 x d |
| | fixed | min. 8 x d |
| Temperature | e-chain® linear | +41 °F to +158 °F (+5 °C to +70 °C) |
| | flexible | +23 °F to +158 °F (-5 °C to +70 °C) |
| | fixed | +5 °F to +158 °F (-15 °C to +70 °C ) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances up to 32.8 ft (10 m), Class 1 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality PVC mixture. |
| Overall shield | aluminum/polyester tape and tinned cooper braid.<br>60 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in e-chains®.<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>600V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

# Class 3.1.1.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | **3** | 4 | 5 | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | **1** | 2 | 3 | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

## Properties and approvals

| | |
|---|---|
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: "igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year" |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF886 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 1 million | 3 million | 5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| +41/+59 | 17.5 | 18.5 | 19.5 |
| +59/+140 | 15 | 16 | 17 |
| +140/+158 | 17.5 | 18.5 | 19.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For low duty flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- Preferably indoor applications
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF886.160.01** | 6 | 1 x 16.0 | 0.45 (11.5) | 125.0 (186) | 176.1 (262) |
| **CF886.250.01** | 4 | 1 x 25.0 | 0.51 (13.0) | 188.2 (280) | 243.9 (363) |
| **CF886.350.01** | 2 | 1 x 35.0 | 0.61 (15.5) | 264.8 (394) | 359.5 (535) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# chainflex® CF270.UL.D




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**32.8 ft** Travel distance e-chain®

- For medium mechanical load requirements
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free
- Variable Frequency Drives

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| **a max.** | 164.1 ft/s² (50 m/s²) | |
| **Travel distance** | Unsupported travel distances and for gliding applications up to 32.8 ft (10 m), Class 2 | |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Overall shield** | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| **Outer jacket** | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | **4** | 5 | 6 | 7 | highest |
| Travel distance | unsupported | 1 | **2** | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | **1** | 2 | 3 | 4 | | ±360° | | |

# Class 4.2.3.1

| | |
|---|---|
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF270ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -13/+5 | 12.5 | 13.5 | 14.5 |
| +5/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For medium mechanical load requirements, Class 4
- Unsupported travel distances and for gliding applications up to 33 ft (10 m), Class 2
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF270.UL.60.01.D** | 10 | 1 x 6.0 | 0.30 (7.5) | 48.4 (72) | 63.8 (95) |
| **CF270.UL.100.01.D** | 8 | 1 x 10.0 | 0.33 (8.5) | 76.6 (114) | 97.4 (145) |
| **CF270.UL.160.01.D** | 6 | 1 x 16.0 | 0.37 (9.5) | 119.6 (178) | 140.4 (209) |
| **CF270.UL.250.01.D** | 4 | 1 x 25.0 | 0.43 (11.0) | 180.8 (269) | 204.3 (304) |
| **CF270.UL.350.01.D** | 2 | 1 x 35.0 | 0.51 (13.0) | 251.3 (374) | 281.6 (419) |
| **CF270.UL.500.01.D** | 1 | 1 x 50.0 | 0.59 (15.0) | 352.8 (525) | 389.1 (579) |
| **CF270.UL.700.01.D** | 2/0 | 1 x 70.0 | 0.67 (17.0) | 504.6 (751) | 540.3 (804) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Spindle cables/Single cores | TPE outer jacket

# chainflex® CF300.UL.D

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -49 °F to +194 °F (-45 °C to +90 °C) |
| | fixed | -58 °F to +194 °F (-50 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |
| Torsion | | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Signal black (similar to RAL 9004) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |

# Class 6.6.4.2

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF300ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003XC (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF300ULD |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

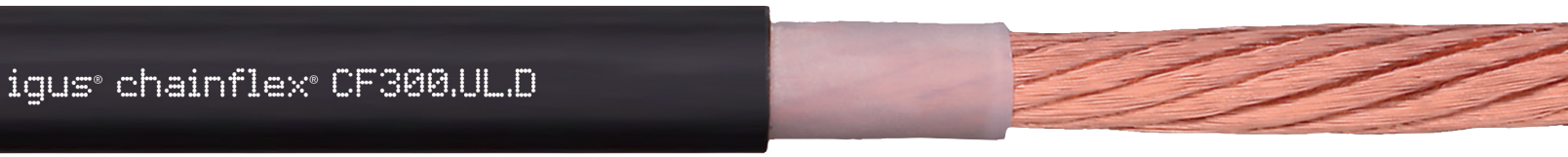
## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | TPE outer jacket

# chainflex® CF300.UL.D




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF300.UL.40.01.D** | 12 | 1 x 4.0 | 0.24 (6.0) | 27.6 (41) | 39.6 (59) |
| **CF300.UL.60.01.D** | 10 | 1 x 6.0 | 0.28 (7.0) | 41.0 (61) | 55.8 (83) |
| **CF300.UL.100.01.D** | 8 | 1 x 10.0 | 0.30 (7.5) | 67.2 (100) | 83.3 (124) |
| **CF300.UL.160.01.D** | 6 | 1 x 16.0 | 0.37 (9.5) | 106.8 (159) | 131.0 (195) |
| **CF300.UL.250.01.D** | 4 | 1 x 25.0 | 0.45 (11.5) | 166.6 (248) | 197.6 (294) |
| **CF300.UL.350.01.D** | 2 | 1 x 35.0 | 0.49 (12.5) | 233.2 (347) | 265.4 (395) |
| **CF300.UL.500.01.D** | 1 | 1 x 50.0 | 0.57 (14.5) | 332.6 (495) | 370.3 (551) |
| **CF300.UL.700.01.D** | 2/0 | 1 x 70.0 | 0.65 (16.5) | 477.1 (710) | 516.7 (769) |
| **CF300.UL.950.01.D** | 3/0 | 1 x 95.0 | 0.79 (20.0) | 629.0 (936) | 700.2 (1042) |
| **CF300.UL.1200.01.D** | 4/0 | 1 x 120.0 | 0.85 (21.5) | 795.6 (1184) | 870.2 (1295) |
| **CF300.UL.1500.01.D** | 300 | 1 x 150.0 | 0.93 (23.5) | 987.1 (1469) | 1061.0 (1579) |
| **CF300.UL.1850.01.D** | 350 | 1 x 185.0 | 1.04 (26.5) | 1295.6 (1928) | 1378.9 (2052) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.6.4.2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |



## Order example: CF300.UL.40.01.D - To your required length

**CF300.UL.D chainflex® series .40 Code nominal cross section .01 Number of conductors**

Order online ▶ www.igus.com/CF300ULD

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year. VERIFIED E233630

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CFPE




Example image

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 7.5 x d |
| | **flexible** | min. 6 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -31 °F to +194 °F (-35 °C to +90 °C) |
| | **flexible** | -49 °F to +194 °F (-45 °C to +90 °C) |
| | **fixed** | -58 °F to +194 °F (-50 °C to +90 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 19.69 ft/s (6 m/s) |
| **a max.** | | 328.1 ft/s² (100 m/s²) |
| **Travel distance** | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |
| **Torsion** | | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Color code** | Green-yellow |
| **Outer jacket** | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Signal black (similar to RAL 9004) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | **2** | 3 | 4 | | | | ±360° |

# Class 6.6.4.2

**UL-verified** — Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
See data sheet for details ▶www.igus.com/CFPEE

**UL/CSA AWM**

**NFPA** — Following NFPA 79-2018, chapter 12.9

**DNV** — Type Approval Certificate TAE00003XC (Issue 04/2025)
Current information in the data sheet ▶ www.igus.com/CFPE

**REACH** — In accordance with regulation (EC) No. 1907/2006 (REACH)

**Lead-free** — Following 2011/65/EC (RoHS-II/RoHS-III)

**Cleanroom** — According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1

**CE** — Following 2014/35/EU

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFPE.15.01** | 16 | 1 G 1.5 | 0.18 (4.5) | 10.8 (16) | 20.8 (31) |
| **CFPE.25.01** | 14 | 1 G 2.5 | 0.22 (5.5) | 16.8 (25) | 28.2 (42) |
| **CFPE.40.01** | 12 | 1 G 4.0 | 0.24 (6.0) | 27.6 (41) | 39.6 (59) |
| **CFPE.60.01** | 10 | 1 G 6.0 | 0.28 (7.0) | 41.0 (61) | 55.8 (83) |
| **CFPE.100.01** | 8 | 1 G 10.0 | 0.30 (7.5) | 67.2 (100) | 83.3 (124) |
| **CFPE.160.01** | 6 | 1 G 16.0 | 0.37 (9.5) | 106.8 (159) | 131.0 (195) |
| **CFPE.250.01** | 4 | 1 G 25.0 | 0.45 (11.5) | 166.6 (248) | 197.6 (294) |
| **CFPE.350.01** | 2 | 1 G 35.0 | 0.49 (12.5) | 233.2 (347) | 265.4 (395) |
| **CFPE.500.01** | 1 | 1 G 50.0 | 0.57 (14.5) | 332.6 (495) | 370.3 (551) |
| **CFPE.700.01** | 2/0 | 1 G 70.0 | 0.65 (16.5) | 487.2 (725) | 546.3 (813) |
| **CFPE.950.01** | 3/0 | 1 G 95.0 | 0.79 (20.0) | 629.0 (936) | 725.7 (1080) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Spindle cables/Single cores | TPE outer jacket

# chainflex® CF310.UL

**10,000,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For very high mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drives




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -49 °F to +194 °F (-45 °C to +90 °C) |
| | fixed | -58 °F to +194 °F (-50 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Signal black (similar to RAL 9004) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.4.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF310UL |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003XC (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF310UL |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For very high mechanical load requirements, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | TPE outer jacket

# chainflex® CF310.UL




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF310.UL.25.01** | 14 | 1 x 2.5 | 0.24 (6.0) | 27.6 (41) | 39.0 (58) |
| **CF310.UL.40.01** | 12 | 1 x 4.0 | 0.26 (6.5) | 38.3 (57) | 51.7 (77) |
| **CF310.UL.60.01** | 10 | 1 x 6.0 | 0.28 (7.0) | 53.8 (80) | 67.9 (101) |
| **CF310.UL.100.01** | 8 | 1 x 10.0 | 0.33 (8.5) | 81.3 (121) | 98.1 (146) |
| **CF310.UL.160.01** | 6 | 1 x 16.0 | 0.39 (10.0) | 123.6 (184) | 149.8 (223) |
| **CF310.UL.250.01** | 4 | 1 x 25.0 | 0.47 (12.0) | 188.2 (280) | 221.1 (329) |
| **CF310.UL.350.01** | 2 | 1 x 35.0 | 0.51 (13.0) | 265.4 (395) | 298.4 (444) |
| **CF310.UL.500.01** | 1 | 1 x 50.0 | 0.59 (15.0) | 360.2 (536) | 394.4 (587) |
| **CF310.UL.700.01** | 2/0 | 1 x 70.0 | 0.71 (18.0) | 523.5 (779) | 571.8 (851) |
| **CF310.UL.950.01** | 3/0 | 1 x 95.0 | 0.83 (21.0) | 682.0 (1015) | 756.0 (1125) |
| **CF310.UL.1200.01** | 4/0 | 1 x 120.0 | 0.87 (22.0) | 853.4 (1270) | 926.0 (1378) |
| **CF310.UL.1500.01** | 300 | 1 x 150.0 | 0.96 (24.5) | 1069.8 (1592) | 1142.3 (1700) |
| **CF310.UL.1850.01** | 350 | 1 x 185.0 | 1.08 (27.5) | 1388.3 (2066) | 1470.9 (2189) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

# Class 6.6.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |



## Order example: CF310.UL.25.01 - To your required length

**CF310.UL chainflex® series .25 Code nominal cross section .01 Number of conductors**

Order online ▶ www.igus.com/CF310UL

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | TPE outer jacket

# chainflex® CF330.D

New

**12,500,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

**Now available with UL approval & 25% longer service life**




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -58 °F to +194 °F (-50 °C to +90 °C) |
| | fixed | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |
| Torsion | | Torsion ±90°, with 3.281ft (1m) cable length, Class 2 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |
| PTFE-free | This cable does not contain PTFE |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** highest | | | |
| Torsion | none | 1 | **2** | 3 | 4 | ±360° | | |

# Class 7.6.4.2

| | |
|---|---|
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CF330D |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 3.281ft (1m) cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CF330.60.01.D** | 10 | 1 x 6.0 | 0.28 (7.0) | 41.0 (61) | 51.7 (77) |
| **CF330.100.01.D** | 8 | 1 x 10.0 | 0.30 (7.5) | 67.2 (100) | 80.0 (119) |
| **CF330.160.01.D** | 6 | 1 x 16.0 | 0.37 (9.5) | 106.8 (159) | 121.6 (181) |
| **CF330.250.01.D** | 4 | 1 x 25.0 | 0.45 (11.5) | 166.6 (248) | 190.8 (284) |
| **CF330.350.01.D** | 2 | 1 x 35.0 | 0.49 (12.5) | 233.2 (347) | 258.7 (385) |
| **CF330.500.01.D** | 1 | 1 x 50.0 | 0.57 (14.5) | 332.6 (495) | 358.8 (534) |
| **CF330.700.01.D** | 2/0 | 1 x 70.0 | 0.65 (16.5) | 477.1 (710) | 506.7 (754) |
| **CF330.950.01.D** | 3/0 | 1 x 95.0 | 0.79 (20.0) | 629.0 (936) | 682.0 (1015) |
| **CF330.1200.01.D** | 4/0 | 1 x 120.0 | 0.85 (21.5) | 795.6 (1184) | 850.0 (1265) |
| **CF330.1500.01.D** | 300 | 1 x 150.0 | 0.93 (23.5) | 987.1 (1469) | 1040.2 (1548) |
| **CF330.1850.01.D** | 350 | 1 x 185.0 | 1.04 (26.5) | 1295.6 (1928) | 1354.7 (2016) |
| New **CF330.2400.01.D** | 450 | 1 x 240.0 | 1.16 (29.5) | 1579.8 (2351) | 1636.9 (2436) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Spindle cables/Single cores | TPE outer jacket

# chainflex® CF340

New

**12,500,000** Cycles guaranteed

**7.5 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum mechanical load requirements
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drives

**Now available with UL approval & 25% longer service life**




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 7.5 x d |
| | flexible | min. 6 x d |
| | fixed | min. 4 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -58 °F to +194 °F (-50 °C to +90 °C) |
| | fixed | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 7.6.4.1

**PTFE-free** — This cable does not contain PTFE

**UL-verified** — Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“

**UL AWM** — See data sheet for details ▶ www.igus.com/CF340

**REACH** — In accordance with regulation (EC) No. 1907/2006 (REACH)

**Lead-free** — Following 2011/65/EC (RoHS-II/RoHS-III)

**Cleanroom** — According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1

**Dry cleanroom** — Tested in "dry cleanroom" according to DIN EN ISO 14644-1

**CE** — Following 2014/35/EU

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 12.5 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -31/-13 | 10 | 11 | 12 |
| -13/+176 | 7.5 | 8.5 | 9.5 |
| +176/+194 | 10 | 11 | 12 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | **CF340.40.01** | 12 | 1 x 4.0 | 0.26 (6.5) | 38.3 (57) | 49.1 (73) |
| New | **CF340.100.01** | 8 | 1 x 10.0 | 0.31 (8.0) | 81.3 (121) | 94.7 (141) |
| | **CF340.160.01** | 6 | 1 x 16.0 | 0.39 (10.0) | 123.6 (184) | 144.5 (215) |
| | **CF340.250.01** | 4 | 1 x 25.0 | 0.47 (12.0) | 188.2 (280) | 214.4 (319) |
| | **CF340.350.01** | 2 | 1 x 35.0 | 0.51 (13.0) | 265.4 (395) | 291.0 (433) |
| | **CF340.500.01** | 1 | 1 x 50.0 | 0.59 (15.0) | 360.2 (536) | 385.7 (574) |
| | **CF340.700.01** | 2/0 | 1 x 70.0 | 0.69 (17.5) | 523.5 (779) | 559.1 (832) |
| | **CF340.950.01** | 3/0 | 1 x 95.0 | 0.83 (21.0) | 682.0 (1015) | 734.5 (1093) |
| | **CF340.1200.01** | 4/0 | 1 x 120.0 | 0.87 (22.0) | 853.4 (1270) | 901.1 (1341) |
| | **CF340.1500.01** | 300 | 1 x 150.0 | 0.96 (24.5) | 1069.8 (1592) | 1103.4 (1642) |
| | **CF340.1850.01** | 350 | 1 x 185.0 | 1.08 (27.5) | 1388.3 (2066) | 1449.4 (2157) |
| | **CF340.2400.01** | 450 | 1 x 240.0 | 1.20 (30.5) | 1724.3 (2566) | 1835.1 (2731) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Medium voltage cable | PUR outer jacket

# chainflex® CFCRANE.PUR

**Phase-out model**




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**1312.4 ft** Travel distance e-chain®

- For maximum voltages and outputs
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -13 °F to +176 °F (-25 °C to +80 °C) |
| | fixed | -22 °F to +176 °F (-30 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | 164.1 ft/s² (50 m/s²) | |
| Travel distance | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 | |

## Cable structure

| | |
|---|---|
| Conductor | Highly-flexible cable consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Inner: semi-conductive rubber. Middle layer: Insulating sheath made of high-quality, heat-resistant and ozone proof Ethylene Propylene Rubber (EPR) Outer: semi-conductive rubber. |
| Overall shield | Extremely bending-resistant wrapping made of tinned copper wires<br>85 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Red |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 6/10kV or 8.7/15kV (following DIN VDE 0250),<br>further voltages upon request. |
| Test voltage | 17 kV (following DIN VDE 0250, Part 813) |

## Properties and approvals

| | |
|---|---|
| UV resistance | Medium |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| Flame resistance | According to IEC 60332-1-2 |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |

**4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.3.1

| | |
|---|---|
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 12.5 | 13.5 | 14.5 |
| +14/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum voltages and outputs, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV-resistant
- Ship to shore, crane applications, Material handling

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFCRANE.PUR.350.01.6/10kV** [11)] | 2 / 6 | (1x35/16)C | 1.02 (26.0) | 381.7 (568) | 572.5 (852) |
| **CFCRANE.PUR.500.01.6/10kV** [11)] | 1 / 6 | (1x50/16)C | 1.06 (27.0) | 485.2 (722) | 688.8 (1025) |
| **CFCRANE.PUR.700.01.6/10kV** [11)] | 2/0 / 6 | (1x70/16)C | 1.14 (29.0) | 632.3 (941) | 839.3 (1249) |
| **CFCRANE.PUR.950.01.6/10kV** [11)] | 3/0 / 6 | (1x95/16)C | 1.22 (31.0) | 783.5 (1166) | 1023.4 (1523) |

[11)] Phase-out model
**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

New

Medium voltage cable | igupren outer jacket

# chainflex® CFCRANE




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**1312 ft** Travel distance e-chain®

- For maximum voltages and outputs
- igupren outer jacket
- Shielded
- Oil-resistant
- Flame retardant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -4 °F to +176 °F (-20 °C to +80 °C) |
| | flexible | -13 °F to +176 °F (-25 °C to +80 °C) |
| | fixed | -22 °F to +176 °F (-30 °C to +80 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6 |

## Cable structure

| | |
|---|---|
| Conductors | Highly-flexible cable consisting of tinned copper wires (according to DIN EN 60228). |
| Conductor insulation | Inner: semi-conductive rubber<br>Middle layer: insulating sheath made of high quality, heat resistant, and ozone proof Ethylene Propylene Rubber (EPR)<br>Outer: semi-conductive Rubber |
| Overall shield | Extremely bending-resistant, tinned copper shield.<br>95 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of iguprene, especially abrasion resistant and highly flexible, adapted to suit the requirements in e-chains®<br>Color: Red |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 6/10kV (following DIN VDE 0250), other voltages upon request. |
| Test voltage | 17 kV (following DIN VDE 0250, Part 813) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | 5 | **6** | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | **1** | 2 | 3 | 4 | | | | ±360° |

# Class 6.6.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404) |
| **Flame resistance** | According to IEC 60332-1-2 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -4/+14 | 12.5 | 13.5 | 14.5 |
| +14/+158 | 10 | 11 | 12 |
| +158/+176 | 12.5 | 13.5 | 14.5 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

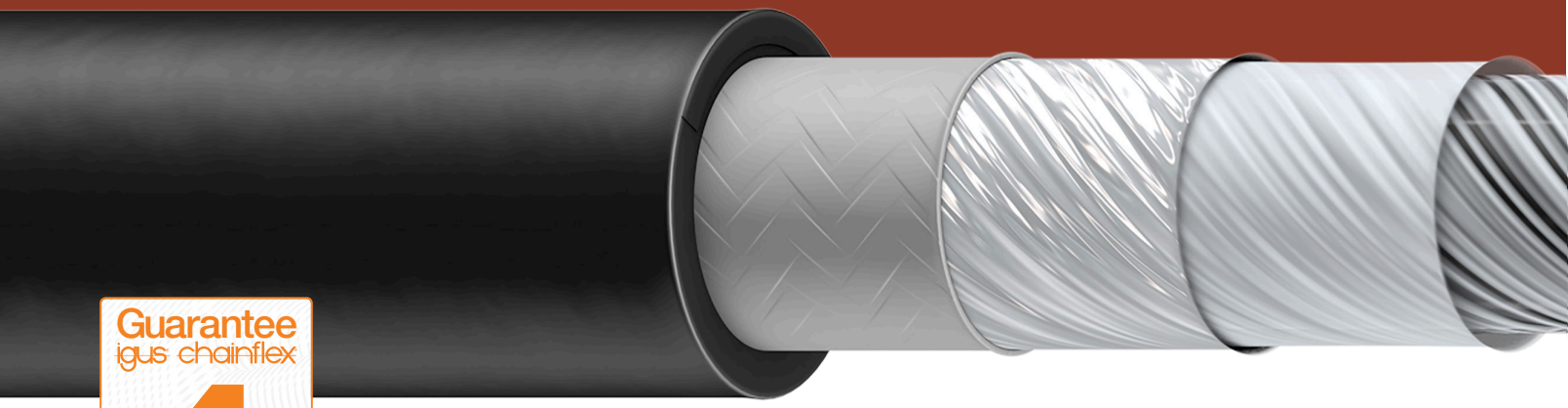
- For maximum voltages and outputs, Class 6
- Unsupported travel distances and for gliding applications up to 1312 ft (400 m) and more, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV-resistant
- Ship to shore crane applications, Conveyor technique

| | Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| New | **CFCRANE1x25/16-6/10kV** | 4 / 6 | (1x25/16)C | 1.00 (25.5) | 353.5 (526) | 656.5 (977) |
| New | **CFCRANE1x35/16-6/10kV** | 2 / 6 | (1x35/16)C | 1.04 (26.5) | 438.8 (653) | 754.6 (1123) |
| New | **CFCRANE1x50/16-6/10kV** | 1 / 6 | (1x50/16)C | 1.08 (27.5) | 454.3 (676) | 859.4 (1279) |
| New | **CFCRANE1x70/16-6/10kV** | 2/0 / 6 | (1x70/16)C | 1.20 (30.5) | 696.2 (1036) | 1092.6 (1626) |
| New | **CFCRANE1x95/16-6/10kV** | 3/0 / 6 | (1x95/16)C | 1.32 (33.5) | 878.3 (1307) | 1345.3 (2002) |
| New | **CFCRANE1X120/16-6/10KV** | 4/0 / 6 | (1x120/16)C | 1.38 (35.0) | 1070.4 (1593) | 1567.0 (2332) |
| New | **CFCRANE1x185/25-6/10kV** | 350 / 6 | (1x185/25)C | 1.54 (39.0) | 1552.9 (2311) | 2177.9 (3241) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

chainflex® CFROBOT

# Twistable cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION UL VERIFIED verifyUL.com V29365

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

PTFE FREE · cULus · NFPA · DNV · REACH · RoHS · clean-room · dry cleanroom tested · DESINA · CE

## Cables for torsion and robot applications

Special design with a unique concept and soft design that absorbs internal movement in the cable, allowing for torsion movements of up to ± 360°. PUR or TPE outer jacket. Tested with a chainflex® guarantee of up to 4 years.

- Special design to withstand torsional motion
- Fail-safe operation on robots and in free movement
- Unique torsion information in the cable industry based on tests in the igus® laboratory
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online:
  **igus.com/chainflexlife**




Background

# chainflex® cables for robots

**Ever more complex sequences of movements in industrial applications demand twistable or multi-axis flexible cables with a long service life, similar to the classic chainflex® cables for use in linear e-chain systems®.**

Stranding, structure, shields and jacket materials must compensate both for major changes in bending load and changes in diameter due to torsional movements. To achieve this, different “soft” structural elements and filling elements that absorb torsion forces are used in chainflex® CFROBOT cables. Special demands are made on the braided shielding in torsion cables.

Torsion-optimized shield structures are chosen that allow compensatory movements thanks to special gliding films.

With twistable bus cables in particular, the transmission characteristics such as attenuation, cable capacitance and signal quality must remain within very tight tolerance ranges over the whole service life. This is achieved through the use of particularly torsion optimized insulating materials and mechanical attenuation elements with matching capacitance values.

**Benefits**
- Up to ± 360° torsion
- With UL and CSA
- Jacket materials: PUR, TPE
- Tested with a 4-year guarantee

**Typical application areas**
- Robots/3D movements
- Handling
- lead screw drives

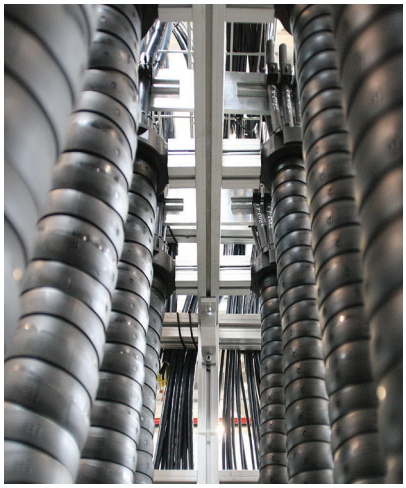
The highly abrasion-resistant, halogen-free and flame-resistant PUR jacket material in motor, hybrid/control cables and bus cables protects the torsion-optimized stranded elements from possible damage. The highly abrasion-resistant, halogen-free TPE jacket achieves the special requirements of the twistable FOC and individual as well as the single core cables.

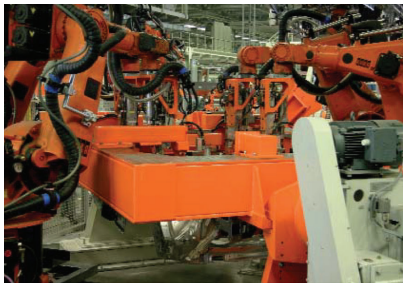
Unlike cables for linear e-chain systems®, the mechanical stress on these cables is in the combination of bending, torsion and centrifugal forces that cannot usually be determined by design or during use by means of measurement. For this reason, and unlike the situation with linear e-chain® applications, a clear “yes/no” statement cannot be made about the use of a particular cable in torsion applications.

To enable evaluation to take place, based on sensible and comparable test results, the igus® “torsion test standard” was developed.
According to this standard, all chainflex® CFROBOT cables of a triflex® energy chain are twisted with a fixed point distance of one metre and a torsion of ±180° at least 5 million times. In addition, a test is carried out on a test bench with a chain length of approx. 2,500mm with 270° torsion with an extreme load through centrifugal forces and heavy blows such as those that can occur on an industrial robot. All the non-shielded, gusset-filling extruded standard chainflex® control cables of the series CF130.UL, CF5, CF9 and CF9.UL correspond to the above igus® standard and have been approved for use in torsion applications.

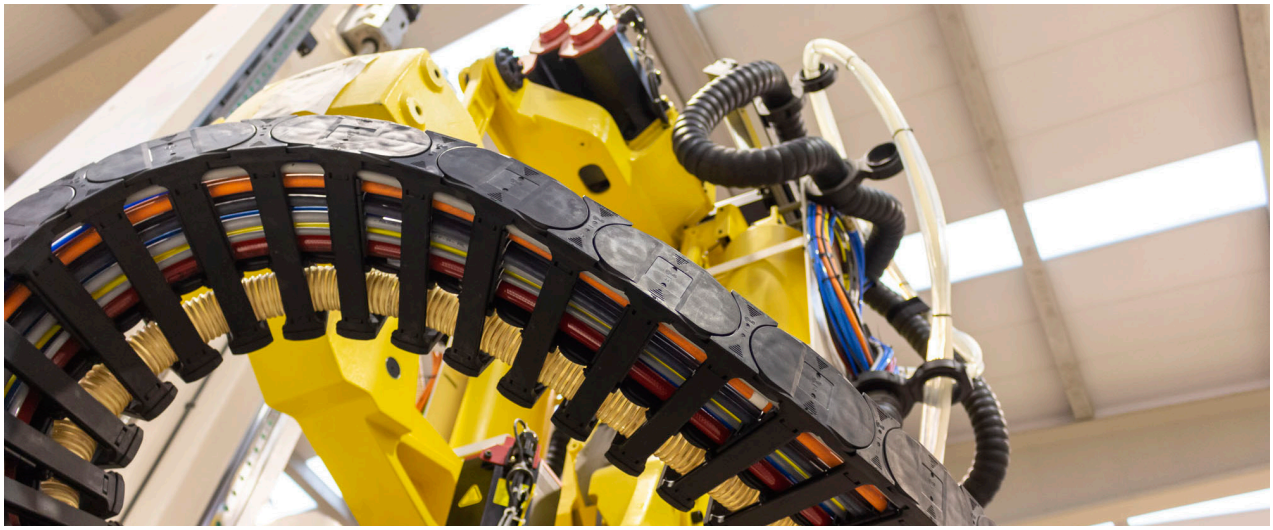
The following twistable CFROBOT cable types are currently available:
- Control cable (shielded and unshielded)
- Data and measuring system cables
- Fiber Optic Cable (FOC)
- Motor and servo cables
- Bus cables
- Hybrid cables

We can also offer you chainflex® CFROBOT cables pre-harnessed with the connectors of your choice as a readycable®, or as a ready-to-install readychain® system.









# Completely twisted!

**chainflex® cables for e-chain system® are designed for application in linear movements and their efficiency has been proved a million times.**

But industrial applications and their motion sequences are becoming increasingly complex, so that special cables are needed more and more for torsional movements. The service life of the different designs are even harder to calculate for torsion applications, as there are no fixed parameters such as radii, travels etc. Shielded cables however are particularly vulnerable in torsion applications. Braided shields are generally braided in the opposite directions. Whether a cable survives the torsional demands is very strongly dependent on the application and type of installation.

Unshielded cables, particularly bundled chainflex® types, can be successfully used in many twisted applications.

In twisting movements with a braided shield, the strand wires wound in one direction are in tension and the other direction in compression. This leads quickly to shield breakage.

The igus® development of a new twistable, shielded single core cable accounts for this and ensures, due to its special shield design and structure, that no, or absolutely minimal, forces act on the shield wire.

As the test clearly shows, massive service life extension can be observed when compared, for example, to a CF310.250.01. The new CFROBOT cable was tested at the igus® laboratory in a specially developed torsion test rig. The torsion angle is ±270° for a total cable length of about 2.5 m (tested within different versions of the triflex® R).

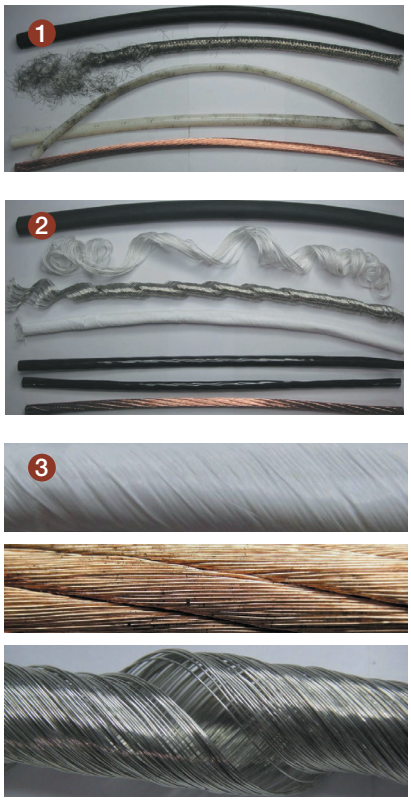
**Cables tested were:**

- 3 cables of CFROBOT.037
- 3 cables of the series CF310.250.01.UL
- 3 cables of the series CF310.250.01

The initial test sample of the CF310 with braided shield and the CFROBOT were taken after 250,000 movements with a torsion angle of ± 270°.

The cable dissection was undertaken in three areas of the cable length. In the sample illustrated in Picture 1, distinct damage to the overall shield is noticeable in the upper third of the cable.
The samples (picture 2) of the CFROBOT.037 (so far samples were taken after 250,000, 1.5 million and 3 million movements) showed no damage in the area of the cable or the overall shield even after above 3 million torsional movements of ± 270°.

The detailed analyses (picture 3) of the shield wires, buffer fibers, film and the cable show no damage. The test is being continued further to determine the maximum service life of the cable.






Selection table

# chainflex® twistable cables

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [°/s] twisted | a max. [°/s²] twisted | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|
| CF77.UL.D | PUR | | 6.8 | -13/+176 | 180 | 60 | ≤ 32.81 | 364 |
| CFROBOT2 | PUR | ● | 10 | -13/+176 | 180 | 60 | ≤ 32.81 | 368 |
| CFROBOT3 | PUR | ● | 10 | -13/+176 | 180 | 60 | ≤ 328.1 | 370 |
| CFROBOT4 | PUR | ● | 10 | -13/+176 | 180 | 60 | ≤ 32.81 | 372 |
| CFROBOT5 | TPE | | 10 | -31/+176 | 180 | 60 | ≤ 32.81 | 376 |
| CFROBOT6 | PUR | | 10 | -13/+176 | 180 | 60 | ≤ 328.1 | 378 |
| CFROBOT7 | PUR | ● | 10 | -13/+176 | 180 | 60 | > 1,312 | 380 |
| CFROBOT | TPE | ● | 10 | -31/+194 | 180 | 60 | ≤ 32.81 | 384 |
| CFROBOT8 | PUR | ● | 10 | -13/+158 | 180 | 60 | ≤ 32.81 | 386 |
| CFROBOT8.PLUS | PUR | ● | 10 | -13/+158 | 360 | 60 | ≤ 32.81 | 390 |
| CFROBOT9 | PUR | ● | 10 | -13/+176 | 180 | 60 | ≤ 32.81 | 394 |

## Approvals/Resistance

| chainflex® cables | oil | | PTFE free | Approvals and standards | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF77.UL.D | ● | ● | ● | | | | ● | | | ● | | ● | ● | ● | ● | | | ● | ● | 364 |
| CFROBOT2 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 368 |
| CFROBOT3 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 370 |
| CFROBOT4 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 372 |
| CFROBOT5 | ● | ● | ● | | | | | | | | | | ● | ● | ● | ● | | | ● | 376 |
| CFROBOT6 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 378 |
| CFROBOT7 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 380 |
| CFROBOT | ● | ● | | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 384 |
| CFROBOT8 | ● | ● | ● | | | | ● | | | | | | ● | ● | ● | | | | ● | 386 |
| CFROBOT8.PLUS | ● | ● | ● | | | | ● | | | | | | ● | ● | ● | | | | ● | 390 |
| CFROBOT9 | ● | ● | ● | | | | ● | | | ● | | | ● | ● | ● | | | | ● | 394 |

## Guaranteed service life

| chainflex® cables | Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] | Page |
|---|---|---|---|---|---|
| | | 5 million cycles* | 7.5 million cycles* | 10 million cycles* | |
| CF77.UL.D | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 364 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT2 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 368 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT3 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 370 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT4 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 372 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT5 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 376 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT6 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 378 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT7 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 380 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT | -31 / -5 | ±150 | ±90 | ±30 | |
| | -13 / +158 | ±180 | ±120 | ±60 | 384 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT8 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 386 |
| | +158 / +176 | ±150 | ±90 | ±30 | |
| CFROBOT8.PLUS | -13 / -5 | ±330 | ±240 | ±150 | |
| | -5 / +158 | ±360 | ±270 | ±180 | 390 |
| | +158 / +176 | ±330 | ±240 | ±150 | |
| CFROBOT9 | -13 / -5 | ±150 | ±90 | ±30 | |
| | -5 / +158 | ±180 | ±120 | ±60 | 394 |
| | +158 / +176 | ±150 | ±90 | ±30 | |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

Control cable | PUR outer jacket

# chainflex® CF77.UL.D




Example image

**10,000,000** Cycles guaranteed

**6.8 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For high mechanical load requirements
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 6.8 x d |
| | **flexible** | min. 5 x d |
| | **fixed** | min. 4 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 16.41 ft/s (5 m/s) |
| **a max.** | | 262.5 ft/s² (80 m/s²) |
| **Travel distance** | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |
| **Torsion** | | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 (except for 5-core types ≥ 4.0 mm² ▶ Product range table |

## Cable structure

| | |
|---|---|
| **Conductor** | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality TPE mixture. |
| **Conductor construction** | **Number of conductors < 12:** Conductors cabled in a layer with short pitch length. **Number of conductors ≥ 12:** Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure. |
| **Color code** | **24-22 AWG** Color code in accordance with DIN 47100. **20-4 AWG** Black with white numbers, one conductor green-yellow. **CF77-UL-02-04-INI:** brown, blue, black **CF77-UL-03-04-INI:** brown, blue, black, white **CF77-UL-03-05-INI:** brown, blue, black, white, green-yellow |
| **Outer jacket** | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Color: Gray (similar to RAL 7040) Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 300/500V (following DIN VDE 0298-3) **Number of conductors < 12:** **Cores > 20 AWG:** 300 (following UL) **Cores ≤ 20 AWG:** 1000 V (following UL) **Number of conductors ≥ 12:** 1000 V (following UL) |
| **Test voltage** | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | 1 | 2 | **3** | 4 | ±360° | | | |

# Class 5.1.3.3

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CF77ULD |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00003X1 (Issue 04/2025)<br>Current information in the data sheet ▶ www.igus.com/CF77ULD |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1 |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

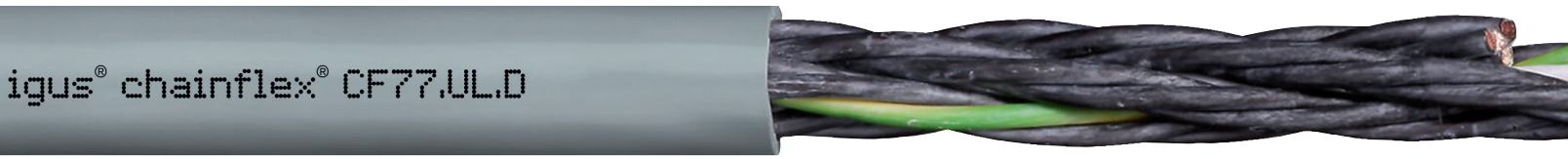
## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PUR outer jacket

# chainflex® CF77.UL.D




Example image

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF77.UL.02.03.INI [12)] | 24 | 3 x 0.25 | 0.20 (5.0) | 6.0 (9) | 19.5 (29) |
| CF77.UL.02.04.D | 24 | 4 x 0.25 | 0.22 (5.5) | 7.4 (11) | 23.5 (35) |
| CF77.UL.02.05.D | 24 | 5 x 0.25 | 0.24 (6.0) | 8.7 (13) | 26.2 (39) |
| CF77.UL.02.07.D | 24 | 7 x 0.25 | 0.26 (6.5) | 12.1 (18) | 34.3 (51) |
| CF77.UL.02.12.D | 24 | 12 x 0.25 | 0.35 (9.0) | 21.5 (32) | 52.4 (78) |
| CF77.UL.02.18.D | 24 | 18 x 0.25 | 0.41 (10.5) | 31.6 (47) | 85.3 (127) |
| CF77.UL.02.25.D | 24 | 25 x 0.25 | 0.45 (11.5) | 42.3 (63) | 104.2 (155) |
| CF77.UL.03.04.INI [12)] | 22 | 4 x 0.34 | 0.24 (6.0) | 10.1 (15) | 24.2 (36) |
| CF77.UL.03.05.INI [12)] | 22 | 5 x 0.34 | 0.24 (6.0) | 12.8 (19) | 29.6 (44) |
| CF77.UL.03.05.INI.D | 22 | 5 x 0.34 | 0.24 (6.0) | 12.8 (19) | 29.6 (44) |
| CF77.UL.05.04.D | 20 | 4 G 0.5 | 0.24 (6.0) | 14.1 (21) | 30.9 (46) |
| CF77.UL.05.05.D | 20 | 5 G 0.5 | 0.26 (6.5) | 17.5 (26) | 35.6 (53) |
| CF77.UL.05.07.D | 20 | 7 G 0.5 | 0.30 (7.5) | 26.2 (39) | 52.4 (78) |
| CF77.UL.05.12.D | 20 | 12 G 0.5 | 0.39 (10.0) | 42.3 (63) | 87.4 (130) |
| CF77.UL.05.18.D | 20 | 18 G 0.5 | 0.47 (12.0) | 63.2 (94) | 123.6 (184) |
| CF77.UL.05.25.D | 20 | 25 G 0.5 | 0.55 (14.0) | 86.7 (129) | 163.3 (243) |
| CF77.UL.05.30.D | 20 | 30 G 0.5 | 0.59 (15.0) | 104.2 (155) | 211.7 (315) |
| CF77.UL.07.03.D | 18 | 3 G 0.75 | 0.26 (6.5) | 15.5 (23) | 34.9 (52) |
| CF77.UL.07.04.D | 18 | 4 G 0.75 | 0.28 (7.0) | 20.8 (31) | 39.6 (59) |
| CF77.UL.07.05.D | 18 | 5 G 0.75 | 0.30 (7.5) | 25.5 (38) | 47.7 (71) |
| CF77.UL.07.07.D | 18 | 7 G 0.75 | 0.33 (8.5) | 36.3 (54) | 67.2 (100) |
| CF77.UL.07.12.D | 18 | 12 G 0.75 | 0.47 (12.0) | 61.1 (91) | 121.0 (180) |
| CF77.UL.07.18.D | 18 | 18 G 0.75 | 0.53 (13.5) | 90.0 (134) | 160.6 (239) |
| CF77.UL.07.20.D | 18 | 20 G 0.75 | 0.57 (14.5) | 100.1 (149) | 180.8 (269) |
| CF77.UL.07.25.D | 18 | 25 G 0.75 | 0.63 (16.0) | 125.0 (186) | 225.8 (336) |
| CF77.UL.07.36.D | 18 | 36 G 0.75 | 0.75 (19.0) | 187.5 (279) | 340.0 (506) |
| CF77.UL.07.42.D | 18 | 42 G 0.75 | 0.83 (21.0) | 229.1 (341) | 389.7 (580) |
| CF77.UL.10.02.D | 17 | 2 x 1.0 | 0.26 (6.5) | 14.1 (21) | 34.3 (51) |
| CF77.UL.10.03.D | 17 | 3 G 1.0 | 0.26 (6.5) | 20.8 (31) | 39.0 (58) |
| CF77.UL.10.04.D | 17 | 4 G 1.0 | 0.28 (7.0) | 27.6 (41) | 49.1 (73) |
| CF77.UL.10.05.D | 17 | 5 G 1.0 | 0.31 (8.0) | 33.6 (50) | 60.5 (90) |
| CF77.UL.10.07.D | 17 | 7 G 1.0 | 0.35 (9.0) | 47.7 (71) | 80.6 (120) |
| CF77.UL.10.12.D | 17 | 12 G 1.0 | 0.49 (12.5) | 80.6 (120) | 147.8 (220) |
| CF77.UL.10.18.D | 17 | 18 G 1.0 | 0.59 (15.0) | 120.3 (179) | 211.0 (314) |
| CF77.UL.10.25.D | 17 | 25 G 1.0 | 0.69 (17.5) | 166.6 (248) | 289.6 (431) |
| CF77.UL.10.42.D | 17 | 42 G 1.0 | 0.89 (22.5) | 291.0 (433) | 469.7 (699) |

[12)] Color outer jacket: Yellow (RAL 1021)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 5.1.3.3

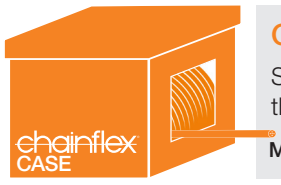
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | ±360° | | |



| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CF77.UL.15.03.D | 16 | 3 G 1.5 | 0.28 (7.0) | 30.9 (46.0) | 47.7 (71.0) |
| CF77.UL.15.04.D | 16 | 4 G 1.5 | 0.30 (7.5) | 41.0 (61.0) | 59.1 (88.0) |
| CF77.UL.15.05.D | 16 | 5 G 1.5 | 0.31 (8.0) | 50.4 (75.0) | 70.6 (105.0) |
| CF77.UL.15.07.D [17] | 16 | 7 G 1.5 | 0.37 (9.5) | 70.6 (105.0) | 102.1 (152.0) |
| CF77.UL.15.12.D | 16 | 12 G 1.5 | 0.51 (13.0) | 120.3 (179.0) | 199.6 (297.0) |
| CF77.UL.15.18.D | 16 | 18 G 1.5 | 0.67 (17.0) | 180.1 (268.0) | 272.1 (405.0) |
| CF77.UL.15.25.D | 16 | 25 G 1.5 | 0.77 (19.5) | 199.6 (297.0) | 379.0 (564.0) |
| CF77.UL.15.36.D | 16 | 36 G 1.5 | 0.93 (23.5) | 370.3 (551.0) | 569.8 (848.0) |
| CF77.UL.25.03.D | 14 | 3 G 2.5 | 0.33 (8.5) | 50.4 (75.0) | 88.7 (132.0) |
| CF77.UL.25.04.D | 14 | 4 G 2.5 | 0.37 (9.5) | 63.8 (95.0) | 112.2 (167.0) |
| CF77.UL.25.05.D | 14 | 5 G 2.5 | 0.39 (10.0) | 83.3 (124.0) | 131.7 (196.0) |
| CF77.UL.25.07.D [17] | 14 | 7 G 2.5 | 0.47 (12.0) | 116.9 (174.0) | 181.4 (270.0) |
| CF77.UL.25.12.D | 14 | 12 G 2.5 | 0.67 (17.0) | 199.6 (297.0) | 321.9 (479.0) |
| CF77.UL.40.04.D [90] | 12 | 4 G 4.0 | 0.45 (11.5) | 110.9 (165.0) | 164.6 (245.0) |
| CF77.UL.40.05.D [90] | 12 | 5 G 4.0 | 0.47 (12.0) | 133.0 (198.0) | 190.8 (284.0) |
| CF77.UL.60.05.D [90] | 10 | 5 G 6.0 | 0.53 (13.5) | 199.6 (297.0) | 276.9 (412.0) |

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.
[90] Torsion ± 90°

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

## Order example: CF77.UL.02.04.D - To your required length

**CF77.UL.D chainflex® series .02 Code nominal cross section .04 Number of conductors**

Order online ▶ www.igus.com/CF77ULD

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Control cable | PUR outer jacket

# chainflex® CFROBOT2




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | Black with white numbers, one conductor green-yellow. |
| Overall shield | Extremely torsion-resistant tinned braided copper shield.<br>85 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |

# Class 6.1.3.3

| | |
|---|---|
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT2 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFROBOT2.07.04.C** | 18 | 4 G 0.75 | 0.31 (8.0) | 28.9 (43) | 52.4 (78) |
| **CFROBOT2.07.05.C** | 18 | 5 G 0.75 | 0.33 (8.5) | 34.3 (51) | 60.5 (90) |
| **CFROBOT2.07.07.C** | 18 | 7 G 0.75 | 0.39 (10.0) | 47.7 (71) | 80.6 (120) |
| **CFROBOT2.07.12.C** | 18 | 12 G 0.75 | 0.55 (14.0) | 82.0 (122) | 143.8 (214) |
| **CFROBOT2.07.18.C** | 18 | 18 G 0.75 | 0.65 (16.5) | 124.3 (185) | 202.3 (301) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

Data cable | PUR outer jacket

# chainflex® CFROBOT3

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle




Example image

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Twisted Pairs cabled together with short pitch lengths. |
| Color code | Color code in accordance with DIN 47100. |
| Overall shield | Extremely torsion-resistant tinned braided copper shield.<br>85 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |

# Class 6.1.3.3

| | |
|---|---|
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT3 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFROBOT3.02.03.02** | 24 | 3 PR x 0.25 | 0.35 (9.0) | 22.2 (33) | 56.4 (84) |
| **CFROBOT3.02.04.02** | 24 | 4 PR x 0.25 | 0.41 (10.5) | 25.5 (38) | 69.2 (103) |
| **CFROBOT3.02.06.02** | 24 | 6 PR x 0.25 | 0.45 (11.5) | 34.9 (52) | 85.3 (127) |
| **CFROBOT3.02.08.02** | 24 | 8 PR x 0.25 | 0.53 (13.5) | 44.3 (66) | 114.2 (170) |
| **CFROBOT3.05.05.02** | 20 | 5 PR x 0.5 | 0.49 (12.5) | 53.8 (80) | 114.2 (170) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

Measuring system cable | PUR outer jacket

# chainflex® CFROBOT4

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant




Example image

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in especially bending-resistant version consisting of tinned copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | According to measuring system specification.<br>▶ Product range table |
| Element shield | Extremely torsion-resistant tinned braided copper shield.<br>80 % optical coverage |
| Overall shield | Extremely torsion-resistant tinned braided copper shield.<br>85 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011)<br>Variants ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |

# Class 6.1.3.3

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT4 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Measuring system cable | PUR outer jacket

# chainflex® CFROBOT4




Example image

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFROBOT4.001** | 26 | 3 STP x 0.14 | 0.41 (10.5) | 41.7 (62.0) | 77.3 (115.0) |
| | 26 | 4 x 0.14 | | | |
| | 20 | 2 x 0.5 | | | |
| **CFROBOT4.006** | 26 | 3 STP x 0.14 | 0.45 (11.5) | 49.7 (74.0) | 90.7 (135.0) |
| | 26 | 4 x 0.14 | | | |
| | 24 | 4 x 0.22 | | | |
| | 20 | 2 C x 0.5 | | | |
| **CFROBOT4.009** | 24 | 4 PR x 0.25 | 0.35 (9.0) | 32.3 (48.0) | 60.5 (90.0) |
| | 20 | 2 x 0.5 | | | |
| **CFROBOT4.015** | 26 | 4 PR x 0.14 | 0.35 (9.0) | 32.9 (49.0) | 61.1 (91.0) |
| | 20 | 4 x 0.5 | | | |
| **CFROBOT4.028** [13)] | 24 | 4 PR x 0.20 | 0.30 (7.5) | 29.6 (44.0) | 48.4 (72.0) |
| | 22 | 2 x 0.38 | | | |

[13)] Color outer jacket: Yellow-green (similar to RAL 6018)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.1.3.3

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |



| Part No. | Core group | Color code |
|---|---|---|
| **CFROBOT4.001** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | 4x0.14 | gray/blue/white-yellow/white-black |
| | 2x0.5 | brown-red/brown-blue |
| **CFROBOT4.006** | 3x(2x0.14)C | green/yellow, black/brown, red/orange |
| | (4x0.14) | gray/blue/white-yellow/white-black |
| | (4x0.22) | yellow-brown/gray-brown/green-black/green-red |
| | (2x0.5) | brown-red/brown-blue |
| **CFROBOT4.009** | 4x(2x0.25) | brown/green, blue/violet, gray/pink, red/black |
| | 2x0.5 | white, brown |
| **CFROBOT4.015** | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |
| **CFROBOT4.028** [13)] | 2x(2x0.20) | green/yellow, pink/blue |
| | (2x0.38) | red/black |

**Order example: CFROBOT4.009 - To your desired length**
**CFROBOT4 chainflex® series .009 Code measuring system type**

Online order ▶ www.igus.com/CFROBOT4

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Fiber Optic Cable | TPE outer jacket

# chainflex® CFROBOT5




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- TPE outer jacket
- Oil and bio-oil-resistant
- UV-resistant
- Low-temperature-flexibility
- Hydrolysis and microbe-resistant
- PVC and halogen-free

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -31 °F to +176 °F (-35 °C to +80 °C) |
| | flexible | -58 °F to +176 °F (-50 °C to +80 °C) |
| | fixed | -67 °F to +176 °F (-55 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Fiber Optic Cable | 50/125 µm, 62.5/125 µm special fixed fiber elements with aramid strain relief |
| Conductor construction | Optical Fibers cabled with high-tensile aramid dampers around a central reinforced filler element. |
| Color code | ▶ Product range table |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |
| PTFE-free | This cable does not contain PTFE |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| REACH | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| Lead-free | Following 2011/65/EC (RoHS-II/RoHS-III) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | | | | highest |
| Torsion | none | 1 | 2 | **3** | 4 | | | | ±360° |

# Class 6.1.4.3

**Cleanroom** — According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1

**Dry cleanroom** — Tested in "dry cleanroom" according to DIN EN ISO 14644-1

**CE** — Following 2014/35/EU

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -31/-13 | ±150 | ±90 | ±30 |
| -13/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling

| Part No. | Fiber Count | Fiber diameter | Outer diameter (d) max. [In. (mm)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|
| **CFROBOT5.500** [11)] | 2 | 62.5/125 | 0.33 (8.5) | 35.6 (53) |
| **CFROBOT5.501** | 2 | 50/125 | 0.33 (8.5) | 35.6 (53) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

| Part No. | Bandwidth [MHz x km] @ 650nm | Attenuation [dB/km] @ 650nm | Bandwidth [MHz x km] @ 850nm | Attenuation [dB/km] @ 850nm | Fiber identification |
|---|---|---|---|---|---|
| **CFROBOT5.500** [11)] | ≥ 200 | ≤ 3.0 | ≥ 500 | ≤ 0.7 | orange with white numbers |
| **CFROBOT5.501** | ≥ 500 | ≤ 2.5 | ≥ 500 | ≤ 0.7 | blue with white numbers |




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PUR outer jacket

# chainflex® CFROBOT6

**Phase-out model**



Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | Black with white numbers 1-2, one conductor green-yellow. |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |

# Class 6.1.3.3

| | |
|---|---|
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT6 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFROBOT6.160.03** [11)] | 6 | 3 G 16 | 0.71 (18.0) | 319.2 (475) | 388.4 (578) |
| **CFROBOT6.250.03** [11)] | 4 | 3 G 25 | 0.87 (22.0) | 495.2 (737) | 602.1 (896) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Motor cable | PUR outer jacket

# chainflex® CFROBOT7



Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | **Power conductors:** Black with white numbers, one conductor green-yellow. **2 Control pairs:** Black with white numbers. Control Pair 1: Printed 5 and 6 Control Pair 2: Printed 7 and 8 **4 Control pairs:** Color code in accordance with DIN 47100 |
| Overall shield | Extremely torsion-resistant tinned braided copper shield.<br>85 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |

# Class 6.1.3.3

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT7 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Motor cable | PUR outer jacket

# chainflex® CFROBOT7




Example image

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **2 Control pairs** | | | | | |
| **CFROBOT7.07.03.02.02.C** [11)] | 18 | 4 G 0.75 | 0.45 (11.5) | 59.1 (88.0) | 104.2 (155.0) |
| | 22 | 2 PR x 0.34 | | | |
| **CFROBOT7.15.15.02.02.C** | 16 | 4 G 1.5 | 0.65 (16.5) | 132.4 (197.0) | 204.3 (304.0) |
| | 16 | 2 PR x 1.5 | | | |
| **CFROBOT7.25.15.02.02.C** | 14 | 4 G 2.5 | 0.65 (16.5) | 163.3 (243.0) | 234.5 (349.0) |
| | 16 | 2 PR x 1.5 | | | |
| **4 Control pairs** | | | | | |
| **CFROBOT7.40.02.02.04.C** | 12 | 4 G 4.0 | 0.67 (17.0) | 170.0 (253.0) | 245.9 (366.0) |
| | 14 | 4 PR 0.25 | | | |
| **without control pair** | | | | | |
| **CFROBOT7.15.03.C** | 16 | 3 G 1.5 | 0.33 (8.5) | 41.0 (61.0) | 65.9 (98.0) |
| **CFROBOT7.15.04.C** | 16 | 4 G 1.5 | 0.37 (9.5) | 51.7 (77.0) | 80.6 (120.0) |
| **CFROBOT7.25.03.C** | 14 | 3 G 2.5 | 0.39 (10.0) | 62.5 (93.0) | 95.4 (142.0) |
| **CFROBOT7.25.04.C** | 14 | 4 G 2.5 | 0.43 (11.0) | 80.0 (119.0) | 116.3 (173.0) |
| **CFROBOT7.60.04.C** | 10 | 4 G 6.0 | 0.59 (15.0) | 186.8 (278.0) | 251.3 (374.0) |

[11)] Phase-out model

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.1.3.3

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |



**Order example: CFROBOT7.15.03.C – To your required length**
**CFROBOT7 chainflex® series .15 Code nominal cross section .03 Number of conductors**

Online order ▶ www.igus.com/CFROBOT7

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION VERIFIED E233650

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Spindle cables/Single cores | TPE outer jacket

# chainflex® CFROBOT




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC-free
- UV-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -49 °F to +212 °F (-45 °C to +100 °C) |
| | fixed | -58 °F to +212 °F (-50 °C to +100 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Extremely bend-resistant cable. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Overall shield | Extremely torsion-resistant tinned braided copper shield.<br>90 % optical coverage |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| UV resistance | High |
| Oil resistance | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| Flame resistance | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| UL-verified | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | 1 | 2 | **3** | 4 | ±360° | | | |

# Class 6.1.4.3

| | |
|---|---|
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -31/-13 | ±150 | ±90 | ±30 |
| -13/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFROBOT.035** | 8 | 1 x 10.0 | 0.41 (10.5) | 84.0 (125) | 130.4 (194) |
| **CFROBOT.036** | 6 | 1 x 16.0 | 0.47 (12.0) | 127.0 (189) | 180.8 (269) |
| **CFROBOT.037** | 4 | 1 x 25.0 | 0.57 (14.5) | 200.2 (298) | 263.4 (392) |
| **CFROBOT.038** | 2 | 1 x 35.0 | 0.61 (15.5) | 270.8 (403) | 354.8 (528) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

Phase-out model

Bus cable | PUR outer jacket

# chainflex® CFROBOT8




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +158 °F (-25 °C to +70 °C) |
| | flexible | -40 °F to +158 °F (-40 °C to +70 °C) |
| | fixed | -58 °F to +158 °F (-50 °C to +70 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in especially bending-resistant version consisting of tinned or bare copper wires (following DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Intermediate layer | polyester tape over external layer |
| Overall shield | Torsion resistant tinned braided copper shield.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | 1 | 2 | **3** | 4 | | | | ±360° |

# Class 6.1.3.3

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT8 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+140 | ±180 | ±120 | ±60 |
| +140/+158 | ±150 | ±90 | ±30 |

* Higher number of cycles? Service life calculation online ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Phase-out model

Bus cable | PUR outer jacket

# chainflex® CFROBOT8




| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | | | |
| **CFROBOT8.001** [11)] | 22 | 1 PR x 0.35 | 0.31 (8.0) | 18.8 (28.0) | 42.3 (63.0) |
| **CAN-Bus** | | | | | |
| **CFROBOT8.022** [11)] | 20 | 2 PR x 0.5 | 0.30 (7.5) | 27.6 (41.0) | 52.4 (78.0) |
| **DeviceNet** | | | | | |
| **CFROBOT8.030** [11)] | 24 | 1 PR x 24 AWG | 0.37 (9.5) | 20.8 (31.0) | 51.7 (77.0) |
| | 22 | 1 PR x 22 AWG | | | |
| **Ethernet/CAT5e/PoE** | | | | | |
| **CFROBOT8.045** [11)] | 26 | 4 STP x 0.15 | 0.37 (9.5) | 32.3 (48.0) | 64.5 (96.0) |
| **Ethernet/CAT6/PoE** | | | | | |
| **CFROBOT8.049** [11)] | 26 | 4 STP x 0.15 | 0.37 (9.5) | 32.3 (48.0) | 64.5 (96.0) |
| **Ethernet/CAT7** | | | | | |
| **CFROBOT8.052** [11)] | 26 | 4 STP x 0.15 | 0.41 (10.5) | 34.3 (51.0) | 90.0 (134.0) |

[11)] Phase-out model (new generation CFROBOT8.PLUS ▶ Page 390)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

**Technical note on bus cables**
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

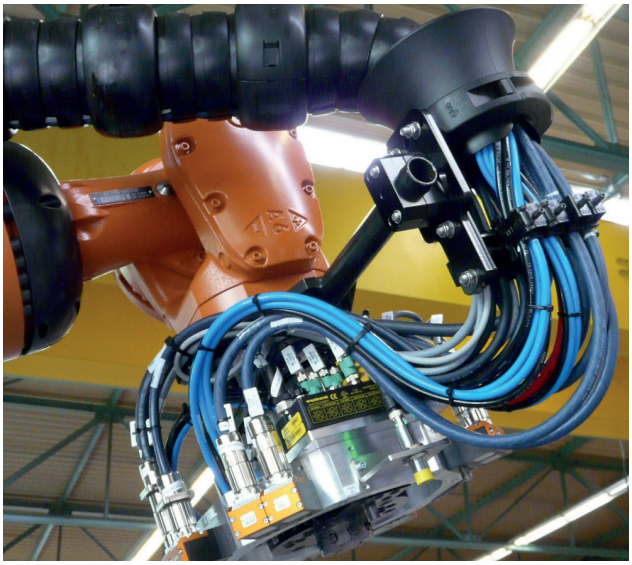
4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.1.3.3

Basic requirements: low 1 2 3 4 5 **6** 7 highest
Travel distance: unsupported **1** 2 3 4 5 6 ≥ 1312 ft
Oil resistance: none 1 2 **3** 4 highest
Torsion: none 1 2 **3** 4 ±360°



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CFROBOT8.001** | 150 | 2x0.35 | red, green |
| **CAN-Bus** | | | |
| **CFROBOT8.022** | 120 | 4x0.5 | white, green, brown, yellow (star-quad) |
| **DeviceNet** | | | |
| **CFROBOT8.030** | 120 | (2xAWG24)C | white/blue |
| | | (2xAWG22)C | red/black |
| **Ethernet/CAT5e/PoE** | | | |
| **CFROBOT8.045** | 100 | 4x(2x0.15)C | white-green/green, white-orange/orange, white-blue/blue, white-brown/brown |
| **Ethernet/CAT6/PoE** | | | |
| **CFROBOT8.049** | 100 | 4x(2x0.15)C | white-green/green, white-orange/orange, white-blue/blue, white-brown/brown |
| **Ethernet/CAT7** | | | |
| **CFROBOT8.052** | 100 | 4x(2x0.15)C | white-green/green, white-orange/orange, white-blue/blue, white-brown/brown |



**CFROBOT® cables used in robots for the automated systems in fuel tank production. The cable packages are supplied as harnessed readychain® systems.**

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | PUR outer jacket

# chainflex® CFROBOT8.PLUS




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±360°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +158 °F (-25 °C to +70 °C) |
| | flexible | -40 °F to +158 °F (-40 °C to +70 °C) |
| | fixed | -58 °F to +158 °F (-50 °C to +70 °C) |
| v max. | twisted | 360 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±360°, with 3.281ft (1m) cable length, Class 4 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | According to bus specification. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Intermediate layer | polyester tape over external layer |
| Overall shield | Torsion resistant tinned braided copper shield.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>30V (following UL) |
| Test voltage | 500 V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | | highest |
| Torsion | none | 1 | 2 | 3 | **4** | | | | ±360° |

# Class 6.1.3.4

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT8PLUS |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±330 | ±240 | ±150 |
| +5/+140 | ±360 | ±270 | ±180 |
| +140/+158 | ±330 | ±240 | ±150 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±360°, with 3.281ft (1m) cable length, Class 4
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Bus cable | PUR outer jacket

# chainflex® CFROBOT8.PLUS




Example image

| | Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| | **Profibus (1x2x0.64mm)** | | | | | |
| PROFIBUS | **CFROBOT8.PLUS.001** | 24 | 1 PR x 0.25 | 0.35 (9.0) | 20.2 (30.0) | 53.8 (80.0) |
| | **CAN-Bus** | | | | | |
| | **CFROBOT8.PLUS.022** | 20 | 2 PR x 0.5 | 0.37 (9.5) | 31.6 (47.0) | 69.2 (103.0) |
| | **Ethernet/CAT5e/PoE** | | | | | |
| | **CFROBOT8.PLUS.045** | 26 | 4 STP x 0.15 | 0.30 (7.5) | 21.5 (32.0) | 45.0 (67.0) |
| | **Ethernet/CAT6/PoE** | | | | | |
| | **CFROBOT8.PLUS.049** | 26 | 4 STP x 0.15 | 0.30 (7.5) | 21.5 (32.0) | 45.0 (67.0) |
| | **Ethernet/CAT6A** | | | | | |
| | **CFROBOT8.PLUS.050** | 26 | 4 STP x 0.15 | 0.41 (10.5) | 32.9 (49.0) | 77.3 (115.0) |
| | **Ethernet/CAT7** | | | | | |
| New | **CFROBOT8.PLUS.052** | 26 | 4 STP x 0.15 | 0.41 (10.5) | 32.9 (49.0) | 77.3 (115.0) |
| | **Profinet** | | | | | |
| PROFINET EtherCAT | **CFROBOT8.PLUS.060** [2] | 22 | 2 PR x 0.34 | 0.28 (7.0) | 21.5 (32.0) | 43.0 (64.0) |

The chainflex® types marked with [2] are cables designed as a star-quad.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

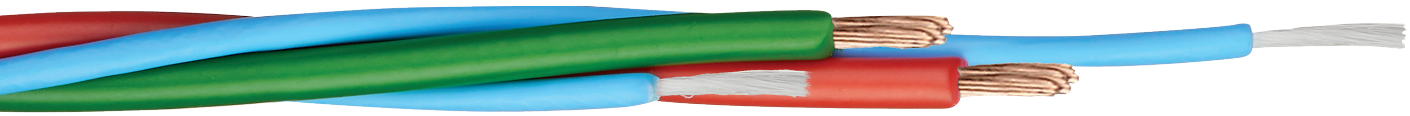
**More on this online:** www.igus.com/cf-case

**Technical note on bus cables**
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.1.3.4

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | | highest |
| Torsion | none | 1 | 2 | 3 | **4** | | | ±360° |



| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Profibus (1x2x0.64mm)** | | | |
| **CFROBOT8.PLUS.001** | 150 | (2x0.25)C | red, green |
| **CAN-Bus** | | | |
| **CFROBOT8.PLUS.022** | 120 | (4x0.5)C | white, green, brown, yellow (star-quad) |
| **Ethernet/CAT5e/PoE** | | | |
| **CFROBOT8.PLUS.045** | 100 | (4x(2x0.15))C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6/PoE** | | | |
| **CFROBOT8.PLUS.049** | 100 | (4x(2x0.15))C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT6A** | | | |
| **CFROBOT8.PLUS.050** | 100 | 4x(2x0.15)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Ethernet/CAT7** | | | |
| **CFROBOT8.PLUS.052** | 100 | 4x(2x0.15)C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Profinet** | | | |
| **CFROBOT8.PLUS.060** [2] | 100 | (4x0.34)C | white, orange, blue, yellow (star-quad) |

**Order example: CFROBOT8.PLUS.060 – To your required length**
**CFROBOT8.PLUS chainflex® series .060 Code Bus type**

Order online ▶ www.igus.com/CFROBOT8PLUS

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Hybrid cable | PUR outer jacket

# chainflex® CFROBOT9




Example image

**10,000,000** Cycles guaranteed

**10 x d** Bend radius e-chain®

**±180°/3.281 ft** Torsion angle

- For torsion applications
- PUR outer jacket
- Unshielded/shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® twisted | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® twisted | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max. | twisted | 180 °/s |
| a max. | twisted | 60 °/s² |
| Travel distance | Especially for robots and 3D movements | |
| Torsion | Torsion ±180°, with 3.281ft (1m) cable length, Class 3 | |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | ▶ Product range table |
| Element shield | Extremely torsion-resistant tinned braided copper shield. |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/500V (following DIN VDE 0298-3)<br>300V (following UL) |
| Test voltage | 2000 V (following DIN EN 50395) |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | | highest | | |
| Torsion | none | 1 | 2 | **3** | 4 | | ±360° | | |

# Class 6.1.3.3

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFROBOT9 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Guaranteed service life (details see page 14-15)

| Cycles* | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°F] | Torsion max. [°/m] | Torsion max. [°/m] | Torsion max. [°/m] |
| -13/+5 | ±150 | ±90 | ±30 |
| +5/+158 | ±180 | ±120 | ±60 |
| +158/+176 | ±150 | ±90 | ±30 |

* Higher number of cycles? Online lifetime calculation ▶ www.igus.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 3.281ft (1m) cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

Hybrid cable | PUR outer jacket

# chainflex® CFROBOT9




Example image

| Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFROBOT9.007** | 24 | 15 STP x 0.25 | 0.73 (18.5) | 153.9 (229.0) | 248.0 (369.0) |
| | 24 | 2 PR x 0.25 SHLD | | | |
| **CFROBOT9.010** | 24 | 4 STP x 0.25 | 0.41 (10.5) | 42.3 (63.0) | 77.9 (116.0) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core




## Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

**More on this online:** www.igus.com/cf-case

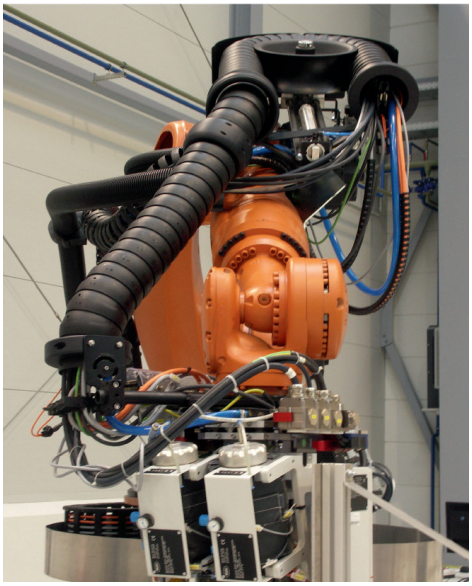
4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

# Class 6.1.3.3

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | **6** | 7 | highest |
| Travel distance | unsupported | **1** | 2 | 3 | 4 | 5 | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | 1 | 2 | **3** | 4 | ±360° | | | |



| Part No. | Core group | Color code |
|---|---|---|
| **CFROBOT9.007** | 15x(2x0.25)C | Color code in accordance with DIN 47100 |
| | (4x0.25)C | white/green/brown/yellow (CAN-Bus) |
| **CFROBOT9.010** | 4x(2x0.25)C | white/brown, green/yellow, gray/pink, blue/red |

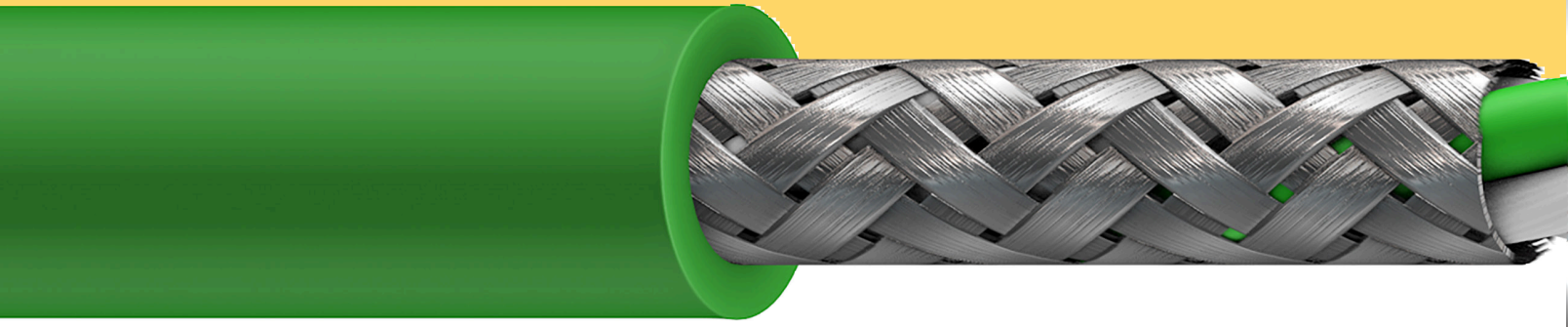


igus® chainflex® cables in application of a multi-dimensional moving energy chain triflex® R for 6-axis robots

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

chainflex®

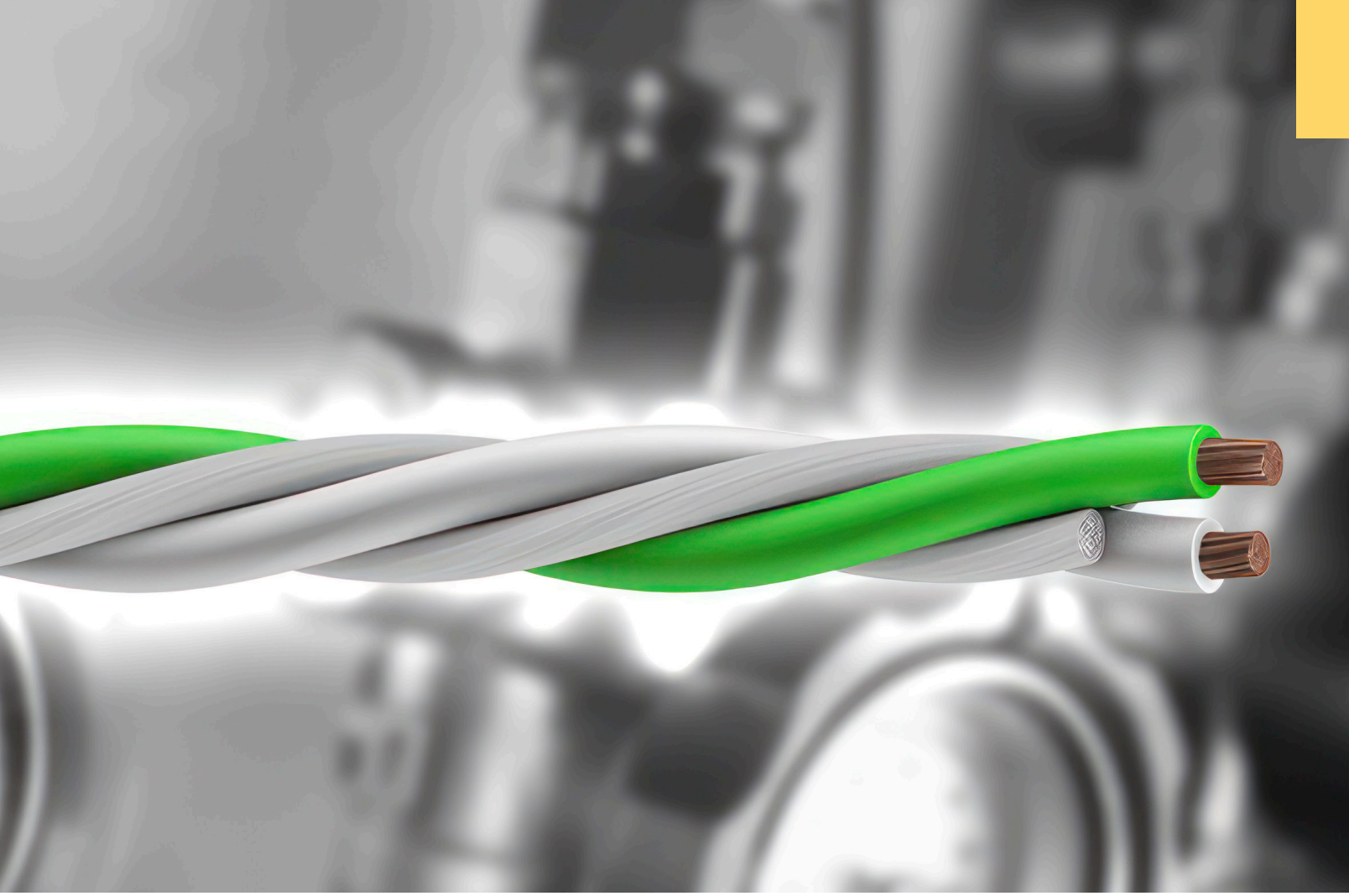
# Special cables



## Cables for special applications

igus® developed the CFSPECIAL cable group for use in special applications. For special moving applications, only special cables can be used as they go beyond normal energy supply. However, this always means a minimum production quantity, which is usually unrealistic, especially for maintenance customers or very small applications. What is special about the CFSPECIAL family is that it is available as standard catalogue cables and can therefore be supplied quickly. This product range is slightly narrower, but we can expand it quickly if required. So, if you have trouble finding the right cable for your specific application, we would be pleased to hear from you directly.

- Cables for special applications, developed from our extensive cable expertise
- Tailored to specific challenges
- Experience from over two billion test cycles in the igus® test laboratory
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment



## Background

# The suitable cable for every challenge

The constantly growing program of chainflex® special cables is in response to our customer requirements.

At the same time this can be an inspiration for users. igus® can make cables for special applications using many different materials and production processes. Depending on the construction this is already possible from a length of 500 m.

Use our comprehensive knowledge about cables plus the experience of 2 billion test cycles that are annually achieved in the company's chainflex® laboratory.

The technical and material details of the CFSPECIAL families are documented in data sheets and are available on the internet. The respective web links can be recalled on the summary pages of the CFSPECIAL cables.

**Thermal compensation cable**
A thermal compensation cable is the connection between a thermocouple and a measuring instrument.

The thermal compensation cable must have the same materials as the thermocouple. The measurement would otherwise be distorted due to unwanted additional thermoelectric voltages.

**CFFLAT**
This cable has been specially developed for small installation spaces where large core cross sections are required. We use a flat cable design with a braided conductor in the core.

**Cable for high-tensile-strength applications**
Article Number CFSPECIAL.182 features our high-tensile-strength cable. The aramid braid built into the outer jacket allows this cable to withstand tensile forces of up to 15,000% higher than the norm.

**Cable for axis 7 on robots**
A cable for supplying the entire robot when it is mounted on a so-called seventh axis. This axis allows a robot to move along with the workpiece. The structure of the cable complies with the electrical specifications of the robot manufacturer.

**Cables for top drive systems**
Service loops for top drive systems must withstand dynamic loads caused by vibrations and environmental influences.

The specially developed and tested chainflex® CFSPECIAL.5xx-series is the perfect solution for vertical applications with high tensile forces.
With DNV approval, this series also offers tested safety for these applications.



# chainflex® special cables

| chainflex® cables | | Page |
|---|---|---|
| CFTHERMO New | Thermocouple cable | 402 |
| CFFLAT | Single core flat cable | 404 |
| CFSPECIAL.182 | Bus cable for hanging applications | 406 |
| CFSPECIAL.192 | Hybrid cable for hanging applications | 408 |
| CFSPECIAL.532 | Data cable for top drive applications | 410 |
| CFSPECIAL.562.PE | Motor cable for top drive applications | 412 |
| CFSPECIAL.572 | Motor cable for top drive applications | 414 |
| CFSPECIAL.592 | Hybrid cable for top drive applications | 416 |
| CFSPECIAL.792 | Cable for axis 7 on robots | 418 |

## Mechanical parameters

| chainflex® cables | Jacket | Shield | Bending radius min., e-chain® [factor x d] | Temperature, e-chain® from/to [°F] | v max. [ft/s] unsupported | v max. [ft/s] gliding | a max. [ft/s²] | Travel distance [ft] | Page |
|---|---|---|---|---|---|---|---|---|---|
| CFTHERMO New | PUR | ● | 12.5 | -13/+176 | 6.56 | 3.28 | 65.6 | ≤ 164.1 | 402 |
| CFFLAT | TPE | | 5 | -31/+194 | 32.81 | 19.69 | 328.1 | ≤ 328.1 | 404 |
| CFSPECIAL.182 | PUR | ● | 10 | -13/+176 | 32.81 | 19.69 | 328.1 | ≤ 164.1 | 406 |
| CFSPECIAL.192 | PUR | ● | 10 | -13/+176 | 32.81 | 6.56 | 164.1 | ≤ 164.1 | 408 |
| CFSPECIAL.532 | PUR | ● | 10 | -13/+176 | 32.81 | 6.56 | 164.1 | ≤ 164.1 | 410 |
| CFSPECIAL.562.PE | PUR | | 10 | -13/+176 | 32.81 | 6.56 | 164.1 | ≤ 164.1 | 412 |
| CFSPECIAL.572 | PUR | ● | 10 | -13/+176 | 32.81 | 6.56 | 164.1 | ≤ 164.1 | 414 |
| CFSPECIAL.592 | PUR | ● | 10 | -13/+176 | 32.81 | 6.56 | 164.1 | ≤ 164.1 | 416 |
| CFSPECIAL.792 | PUR | ● | 10 | -13/+176 | 9.84 | 6.56 | 65.6 | ≤ 328.1 | 418 |

## Approvals/Resistance

| chainflex® cables | oil | | PTFE free | Approvals and standards | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CFTHERMO New | ● | | ● | | | | | | | | | | | ● | ● | ● | | | ● | 402 |
| CFFLAT | ● | | ● | | | | | | | | | | | ● | ● | ● | ● | | ● | 404 |
| CFSPECIAL.182 | ● | | ● | | | | ● | | | ● | | | | ● | ● | | | | ● | 406 |
| CFSPECIAL.192 | ● | | ● | | | | ● | | | ● | | | | ● | ● | | | ● | ● | 408 |
| CFSPECIAL.532 | ● | | ● | | | | ● | | | ● | | ● | | ● | ● | | | | ● | 410 |
| CFSPECIAL.562.PE | ● | | ● | | | | ● | | | ● | | ● | | ● | ● | | | | ● | 412 |
| CFSPECIAL.572 | ● | | ● | | | | ● | | | ● | | ● | | ● | ● | | | | ● | 414 |
| CFSPECIAL.592 | ● | | ● | | | | ● | | | ● | | ● | | ● | ● | | | | ● | 416 |
| CFSPECIAL.792 | ● | | ● | | | | ● | | | ● | | | | ● | ● | | | | ● | 418 |

## chainflex® guarantee

As these are special cables for special applications, we ask you to contact us for information on the guaranteed lifetime:

**Phone 800-521-2747**

Thermocouple cable | PUR outer jacket

# chainflex® CFTHERMO




Example image

- For high mechanical load requirements
- PUR outer jacket
- Oil-resistant and coolant-resistant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 12.5 x d |
| | flexible | min. 10 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) |
| v max. | unsupported | 6.56 ft/s (2 m/s) |
| | gliding | 3.28 ft/s (1 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 164.1 ft (50 m), Class 4 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of a flexible special alloy.<br>▶ Product range table |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Conductor construction | Conductors are cabled in layers with short pitch lengths. |
| Color code | According to thermo specification.<br>▶ Product range table |
| Intermediate layer | Fleece taping over the external layer. |
| Overall shield | Extremely bending-resistant tinned copper braid.<br>90 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: According to thermo specification ▶ Product range table |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300 V (following DIN VDE 0298-3) |
| Test voltage | 1500 V |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | **5** | 6 | 7 | highest |
| Travel distance | unsupported | 1 | 2 | 3 | **4** | 5 | 6 | | ≥ 1312 ft |
| Oil resistance | none | 1 | 2 | **3** | 4 | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

# Class 5.4.3.1

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For high mechanical load requirements, Class 5
- Unsupported travel distances and for gliding applications up to 164 ft (50 m), Class 4
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFTHERMO.J.001** | 24 | 1 PR x 0.23 | 0.22 (5.5) | 6.0 (9) | 24.2 (36) |
| **CFTHERMO.K.001** | 24 | 1 PR x 0.23 | 0.22 (5.5) | 6.0 (9) | 24.9 (37) |
| **CFTHERMO.K.002** * | 24 | 1 STP x 0.23 | 0.30 (7.5) | 16.1 (24) | 45.0 (67) |
| | 20 | 3 x 0.5 | | | |
| New **CFTHERMO.N.001** | 24 | 1 PR x 0.23 | 0.22 (5.5) | 9.4 (14) | 26.2 (39) |

* The cross-section of the copper conductor is equivalent to the electrically effective cross-section.

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair
**PR =** Twisted Pair

| Part No. | Jacket Color | Thermo materials | Core group | Color code |
|---|---|---|---|---|
| **CFTHERMO.J.001** * | black | Fe-CuNi | (2x0.23)C | + black, - white |
| **CFTHERMO.K.001** | green | NiCr-Ni | (2x0.23)C | + green, - white |
| **CFTHERMO.K.002** | green | NiCr-Ni | (2x0.23)C | + green, - white |
| | | Cu | 3G0.5 | brown, blue, yellow-green |
| **CFTHERMO.N.001** | pink | NiCrSi-NiSi | (2x0.23)C | + pink, - white |

Single core flat cable | PUR outer jacket

# chainflex® CFFLAT




Example image

- For maximum mechanical load requirements
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 5 x d |
| | flexible | min. 4 x d |
| | fixed | min. 3 x d |
| Temperature | e-chain® linear | -31 °F to +194 °F (-35 °C to +90 °C) |
| | flexible | -58 °F to +194 °F (-50 °C to +90 °C) |
| | fixed | -67 °F to +194 °F (-55 °C to +90 °C ) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Highly flexible braided special conductor. |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Outer jacket | Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®.<br>Color: Dark blue (similar to RAL 5011) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1000 V (following DIN VDE 0298-3) |
| Test voltage | 4000 V (following DIN EN 50395) |

# Class 7.5.4.1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basic requirements | low | 1 | 2 | 3 | 4 | 5 | 6 | **7** | highest |
| Travel distance | unsupported | 1 | 2 | 3 | 4 | **5** | 6 | ≥ 1312 ft | |
| Oil resistance | none | 1 | 2 | 3 | **4** | highest | | | |
| Torsion | none | **1** | 2 | 3 | 4 | ±360° | | | |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **Dry cleanroom** | Tested in "dry cleanroom" according to DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For maximum mechanical load requirements, Class 7
- Unsupported travel distances and for gliding applications up to 328 ft (100 m), Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, small installation spaces, small radii, Machining units/ machine tools, quick handling, Cleanroom, semiconductor insertion, low temperature applications

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFFLAT.40.01** | 12 | 1 x 4.0 | 0.55x0.22 (14.0 x 5.5) | 32.3 (48) | 78.6 (117) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Bus cable for hanging applications | PUR outer jacket

# chainflex® CFSPECIAL.182




Example image

- For increased tensile load
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 328.1 ft/s² (100 m/s²) |
| Travel distance | | For hanging applications up to 164.1 ft (50 m) |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Core insulation | According to bus specification. |
| Core structure | According to bus specification. |
| Core identification | According to bus specification. |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.<br>**Reinforcement:** High tensile strength aramid braid embedded in the outer jacket.<br>**2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in hanging applications (following DIN EN 50363-10-2).<br>Color: jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 50V<br>300V (following UL) |
| Test voltage | 500 V |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (in accordance with DIN EN 50363-10-2) |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAK182 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For increased tensile load
- For hanging applications up to 50 m
- Almost unlimited resistance to oil
- Storage and retrieval units for high-bay warehouses, hanging control units, Elevators

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFSPECIAL.182.045** | 26 | 4 PR x 0.15 | 0.37 (9.5) | 28.2 (42) | 91.4 (136) |
| **CFSPECIAL.182.060** [13] PROFINET EtherCAT | 22 | 2 PR x 0.38 | 0.33 (8.5) | 24.9 (37) | 84.0 (125) |

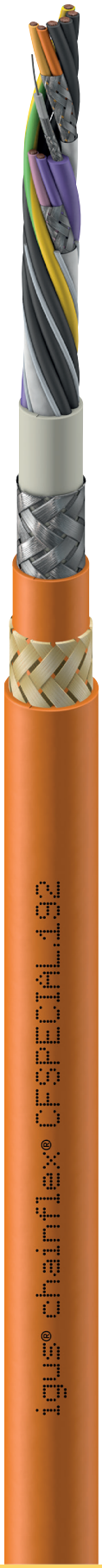
[13] Color outer jacket: Yellow-green (RAL 6018)

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**PR =** Twisted Pair

| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Ethernet/CAT5e/PoE** | | | |
| **CFSPECIAL.182.045** | 100 | (4x(2x0.15))C | white-blue/blue, white-orange/orange, white-green/green, white-brown/brown |
| **Profinet** | | | |
| **CFSPECIAL.182.060** | 100 | (4x0.38)C | white, orange, blue, yellow (star-quad) |

Hybrid cable for hanging applications | PUR outer jacket

# chainflex® CFSPECIAL.192




Example image

- For high tensile loads
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

**Especially for MOVILINK® DDI technology from SEW-EURODRIVE**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | For hanging applications up to 164.1 ft (50 m) |

## Cable structure

| | |
|---|---|
| Conductor | Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality, especially low-capacitance XLPE mixture.<br>**HF50-0.9/2.95:** Special PE mixture. |
| Conductor construction | Power cores and control pair elements wound with a short pitch length around a high tensile strength center element. |
| Color code | According to Servo-Hybrid specification.<br>Current data sheet ▶ www.igus.com/CFSPECIAL192 |
| Element shield | Bending-resistant braiding made of tinned copper wires. |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.<br>**Reinforcement:** High tensile strength aramid braid embedded in the outer jacket.<br>**2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in hanging applications (following DIN EN 50363-10-2).<br>Color: Pastel orange (similar to RAL 2003) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4,000V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAL192 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **DESINA** | According to VDW, DESINA standardization |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For high tensile loads
- For hanging applications up to 50 m
- Almost unlimited resistance to oil
- Storage and retrieval units, hanging control units, lifts

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFSPECIAL.192.**<br>**H207.15.04.D** | 16 | 4 G 1.5 | 0.67 (17.0) | 133.7 (199) | 253.3 (377) |
| | 17 | 2x(2x1.0)C | | | |
| | - | HF50-0.9/2.95 SHLD | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Data cable for top drive applications | PUR outer jacket

# chainflex® CFSPECIAL.532




Example image

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

**Now with DNV approval for top drive hanging applications up to 164 ft**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| **a max.** | 164.1 ft/s² (50 m/s²) | |
| **Travel distance** | For top drive hanging applications up to 164.1 ft (50 m) | |

## Cable structure

| | |
|---|---|
| **Conductor** | Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Conductor construction** | Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths. |
| **Color code** | Black cores with white numbers. |
| **Inner jacket** | Mechanically high-quality TPE mixture. |
| **Overall shield** | Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90% |
| **Outer jacket** | **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.<br>**Reinforcement:** High tensile strength aramid braid embedded in the outer jacket.<br>**2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2).<br>Color: jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3) |
| **Test voltage** | 4,000V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (in accordance with DIN EN 50363-10-2) |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAL532 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00004G4 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For high tensile loads
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50 m

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFSPECIAL.532.15.08.02** | 16 | 8 STP x 1.5 | 1.18 (30.0) | 344.7 (513) | 681.4 (1014) |
| **CFSPECIAL.532.15.16.02** | 16 | 16 STP x 1.5 | 1.44 (36.5) | 653.2 (972) | 1121.5 (1669) |
| **CFSPECIAL.532.15.18.02** | 16 | 18 STP x 1.5 | 1.57 (40.0) | 753.9 (1122) | 1325,1 (1972) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

Motor cable for top drive applications | PUR outer jacket

# chainflex® CFSPECIAL.562.PE




Example image

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

**Now with DNV approval for top drive hanging applications up to 164 ft**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | For top drive hanging applications up to 164.1 ft (50 m) |

## Cable structure

| | |
|---|---|
| Conductor | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | Green-yellow |
| Outer jacket | **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.<br>**Reinforcement:** High tensile strength aramid braid embedded in the outer jacket.<br>**2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2).<br>Color: jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3) |
| Test voltage | 4,000V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (in accordance with DIN EN 50363-10-2) |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAL562PE |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00004G3 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For high tensile loads
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFSPECIAL.562.PE.700.01** | 2/0 | 1 G 70.0 | 0.77 (19.5) | 479.1 (713) | 582.6 (867) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Motor cable for top drive applications | PUR outer jacket

# chainflex® CFSPECIAL.572




Example image

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

**Now with DNV approval for top drive hanging applications up to 164 ft**

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| v max. | unsupported | 32.81 ft/s (10 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 164.1 ft/s² (50 m/s²) |
| Travel distance | | For top drive hanging applications up to 164.1 ft (50 m) |

## Cable structure

| | |
|---|---|
| Conductor | Conductor cable consisting of pre-leads (following DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Overall shield | Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.<br>**Reinforcement:** High tensile strength aramid braid embedded in the outer jacket.<br>**2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2).<br>Color: jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3) |
| Test voltage | 4,000V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (in accordance with DIN EN 50363-10-2) |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAL572 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00004G3 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For high tensile loads
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Multi core Motor cables** | | | | | |
| **CFSPECIAL.572.25.37** | 3 | 37 x 25 | 1.56 (39.5) | 729.8 (1086) | 1277.4 (1901) |
| **CFSPECIAL.572.40.07** | 1 | 7 x 40 | 0.77 (19.5) | 235.2 (350) | 362,9 (540) |
| **Spindle cables/Single cores** | | | | | |
| **CFSPECIAL.572.2400.01** | 450 | 1 x 240 | 1.36 (34.5) | 1734.4 (2581) | 2070.3 (3081) |
| **CFSPECIAL.572.3000.01** | 600 | 1 x 300 | 1.48 (37.5) | 2142.9 (3189) | 2552.8 (3799) |
| **CFSPECIAL.572.4000.01** | 750 | 1 x 400 | 1.65 (42.0) | 2868.6 (4269) | 3364.5 (5007) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

Hybrid cable for top drive applications | PUR outer jacket

# chainflex® CFSPECIAL.592




Example image

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

**Now with DNV approval for top drive hanging applications up to 164 ft**

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-chain® linear** | min. 10 x d |
| | **flexible** | min. 8 x d |
| | **fixed** | min. 5 x d |
| **Temperature** | **e-chain® linear** | -13 °F to +176 °F (-25 °C to +80 °C) |
| | **flexible** | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | **fixed** | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| **v max.** | **unsupported** | 32.81 ft/s (10 m/s) |
| | **gliding** | 6.56 ft/s (2 m/s) |
| **a max.** | 164.1 ft/s² (50 m/s²) | |
| **Travel distance** | For top drive hanging applications up to 164.1 ft (50 m) | |

## Cable structure

| | |
|---|---|
| **Conductor** | Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| **Conductor insulation** | Mechanically high-quality, especially low-capacitance XLPE mixture. |
| **Inner jacket** | Mechanically high-quality TPE mixture. |
| **Overall shield** | Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90% |
| **Outer jacket** | **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.<br>**Reinforcement:** High tensile strength aramid braid embedded in the outer jacket.<br>**2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2).<br>Color: jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| **Test voltage** | 4,000V (following DIN EN 50395) |

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (in accordance with DIN EN 50363-10-2) |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAL592 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type Approval Certificate TAE00004KR |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For high tensile loads
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| CFSPECIAL.592.001 | 12 | 30 G 4.0 | 1.73 (44.0) | 0.7 (1) | 1767.3 (2630) |
| | 16 | 4 STP x 1.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core
**STP =** Individually shielded Twisted Pair

Cable for the 7th robot axis | PUR outer jacket

# chainflex® CFSPECIAL.792




Example image

- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | e-chain® linear | min. 10 x d |
| | flexible | min. 8 x d |
| | fixed | min. 5 x d |
| Temperature | e-chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
| | flexible | -40 °F to +176 °F (-40 °C to +80 °C) (following DIN EN 60811-504) |
| | fixed | -58 °F to +176 °F (-50 °C to +80 °C ) (following DIN EN 50305) |
| v max. | unsupported | 9.84 ft/s (3 m/s) |
| | gliding | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (20 m/s²) |
| Travel distance | | Unsupported travel distances and for gliding applications up to 328.1 ft (100 m), Class 5 |

## Cable structure

| | |
|---|---|
| Conductor | Conductor consisting of bare copper wires (according to DIN EN 60228). |
| Conductor insulation | Mechanically high-quality TPE mixture. |
| Color code | ▶ Product range table |
| Inner jacket | TPE mixture adapted to suit the requirements in e-chains®. |
| Overall shield | Bending-resistant tinned copper braid.<br>80 % optical coverage |
| Outer jacket | Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Color: Jet black (similar to RAL 9005) |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 600/1,000V (following DIN VDE 0298-3)<br>1,000V (following UL) |
| Test voltage | 4000 V (following DIN EN 50395) |

## Properties and approvals

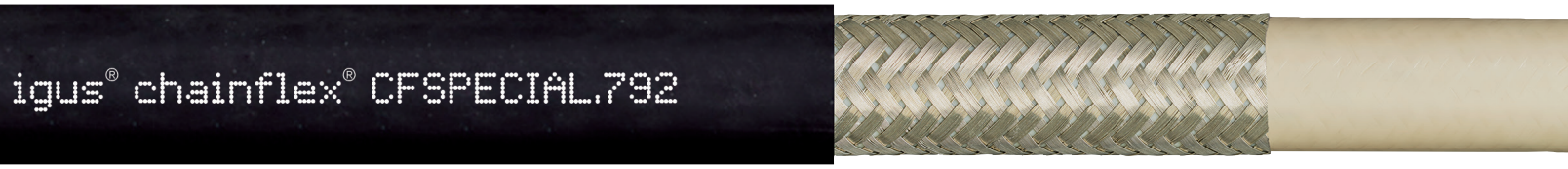
| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2016 |
| **Flame resistance** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PTFE-free** | This cable does not contain PTFE |
| **UL/CSA AWM** | See data sheet for details ▶ www.igus.com/CFSPECIAL792 |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **CE** | Following 2014/35/EU |

## Typical application areas

- Reliable e-chain® cable for the seventh robot axis
- Electrical properties in line with Kuka (.011/.013/.014), ABB (.012) and Fanuc (.015/.016)

Cable for the 7th robot axis | PUR outer jacket

# chainflex® CFSPECIAL.792




Example image

| Part No. | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|
| **ABB** | | | | |
| **CFSPECIAL.792.012** | (18G2.5)C | 1.00 (25.5) | 366.2 (545) | 592.7 (882) |
| **Fanuc** | | | | |
| **CFSPECIAL.792.015** | (7x(6x2.0))C | 1.44 (36.5) | 671.3 (999) | 1173.9 (1747) |
| **CFSPECIAL.792.016** | (5x(4x0.25)+10x(3x0.75))C | 1.04 (26.5) | 283.6 (422) | 589.3 (877) |
| **KUKA** | | | | |
| **CFSPECIAL.792.011** | (5x(2x6.0+2x2.5)+2x(6x1.0)C)C | 1.40 (35.5) | 840.0 (1250) | 1366.1 (2033) |
| **CFSPECIAL.792.013** | ((6x1.5)C+3x(3x4)+1G6)C | 1.10 (28.0) | 456.3 (679) | 819.8 (1220) |
| **CFSPECIAL.792.014** | (2x(3x1.5)C+3x(3x10)+1G10)C | 1.40 (35.5) | 900.4 (1340) | 1425.9 (2122) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core



| Part No. | AWG | Core group | Color code |
|---|---|---|---|
| **ABB** | | | |
| **CFSPECIAL.792.012** | 14 | (18G2.5)C | Black cores with white numbers 1-17, one green-yellow core |
| **Fanuc** | | | |
| **CFSPECIAL.792.015** | 14 | (7x(6x2.0))C | Cores black with white digits 1-29<br>Cores blue with white digits 1-4<br>Cores yellow with black digits 1-9 |
| **CFSPECIAL.792.016** | 24 | 5x(4x0.25) | (blue/violet/brown/green), (gray/violet/yellow/brown), (gray/blue/brown/green), (gray/blue/green/yellow), (green/violet/brown/yellow) |
| | 18 | 10x(3x0.75) | Cores brown with white digits 1, 7, 24 & 30<br>Cores black with white digits 16-21<br>Cores blue with white digits 2, 8 & 25<br>Cores green with black digits 3, 9 & 26<br>Cores yellow with black digits 5, 22 & 28<br>Cores red with white digits 11-15<br>Cores violet with white digits 4, 10 & 27<br>Cores gray with black digits 6, 23 & 29 |
| **KUKA** | | | |
| **CFSPECIAL.792.011** | 10 | 10x6.0 | Black cores with white numbers 1-9, one green-yellow core |
| | 14 | 10x2.5 | Black cores with white numbers 10-18, one green-yellow core |
| | 17 | 2x(6x1.0)C | Black cores with white numbers 19-30 |
| **CFSPECIAL.792.013** | 16 | (6x1.5)C | Black cores with white numbers 10-15 |
| | 12 | 3x(3x4) | Black cores with white numbers 1-9 |
| | 10 | 1G6 | Green-yellow core |
| **CFSPECIAL.792.014** | 16 | 2x(3x1.5)C | Black cores with white numbers 10-15 |
| | 8 | 3x(3x10) | Black cores with white numbers 1-9 |
| | 8 | 1G10 | Green-yellow core |

chainflex®

# CFCLEAN



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

chainflex CONTINUOUS FLEX CABLE TEST PROCESS VERIFICATION

igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year.

UL VERIFIED verifyUL.com V29350

## Cables for cleanroom applications

Developed for use with the e-skin® flat, the CFCLEAN cable elements can be used very flexibly and replaced quickly. Omitting the outer jacket makes them 39% thinner and 43% lighter. All industry-standard core/cross-section combinations (data, bus, control, motor) are available from stock, with a guarantee of up to four years (40 million cycles guaranteed at a bend radius of 70 mm).

- Extremely bend-resistant, therefore very low reset forces
- Flexible and cost-effective thanks to cable elements that can be replaced in seconds
- Test 5497: Interim status: 130 million strokes (test continues successfully)
- Very thin (16% smaller diameter) and light (21% lower weight, for significant reduction in installation space)
- Configure and request CFCLEAN with e-skin® flat in just a few steps




Background

# Highest flexibility and reliability in cleanrooms

The e-skin® flat cable guidance system, in combination with the CFCLEAN chainflex® cable solution, represents a logical further development of the commercially available PTFE trackless cables for cable guidance in flat panel displays (FPD) and semiconductor production, as well as in the production of microelectronic components and medical technology. The strengths of the PTFE flat ribbon cables have been enhanced and the weaknesses eliminated. The new e-skin® flat cable guide system is the result of this development.

- No bending of the system due to stiff jacket cables
- Low forces thanks to highly flexible stranded structure
  ... special conductors
  ... and no outer jacket
- chainflex® CFCLEAN cables adapted to the application with up to 21% weight reduction compared to conventional cables
- Approx. 16% smaller diameter compared to standard cables with jacket
- Minimum order length 1m
- All industry-standard core/cross-section combinations: data, bus, control and motor - available from stock, with a guarantee of up to four years

**Benefits**

- Made for the e-skin® flat
- Great flexural strength thanks to very finely stranded special conductors
- Protected by highly abrasion-resistant heat-sealed film
- Has no outer jacket, so it is thin and lightweight
- Transmits power, bus and data
- Available from stock

# Team power for cleanrooms

The chainflex® CFCLEAN elements together with the e-skin® flat form a strong team for the moving energy supply in the cleanroom. Both in the semiconductor industry, display production and medical technology. In order to make the cable lighter and more flexible, the outer jacket was dispensed with. The e-skin® flat performs this function. The CFCLEAN elements are therefore designed for use in the e-skin® flat, as this constitutes the outer jacket.

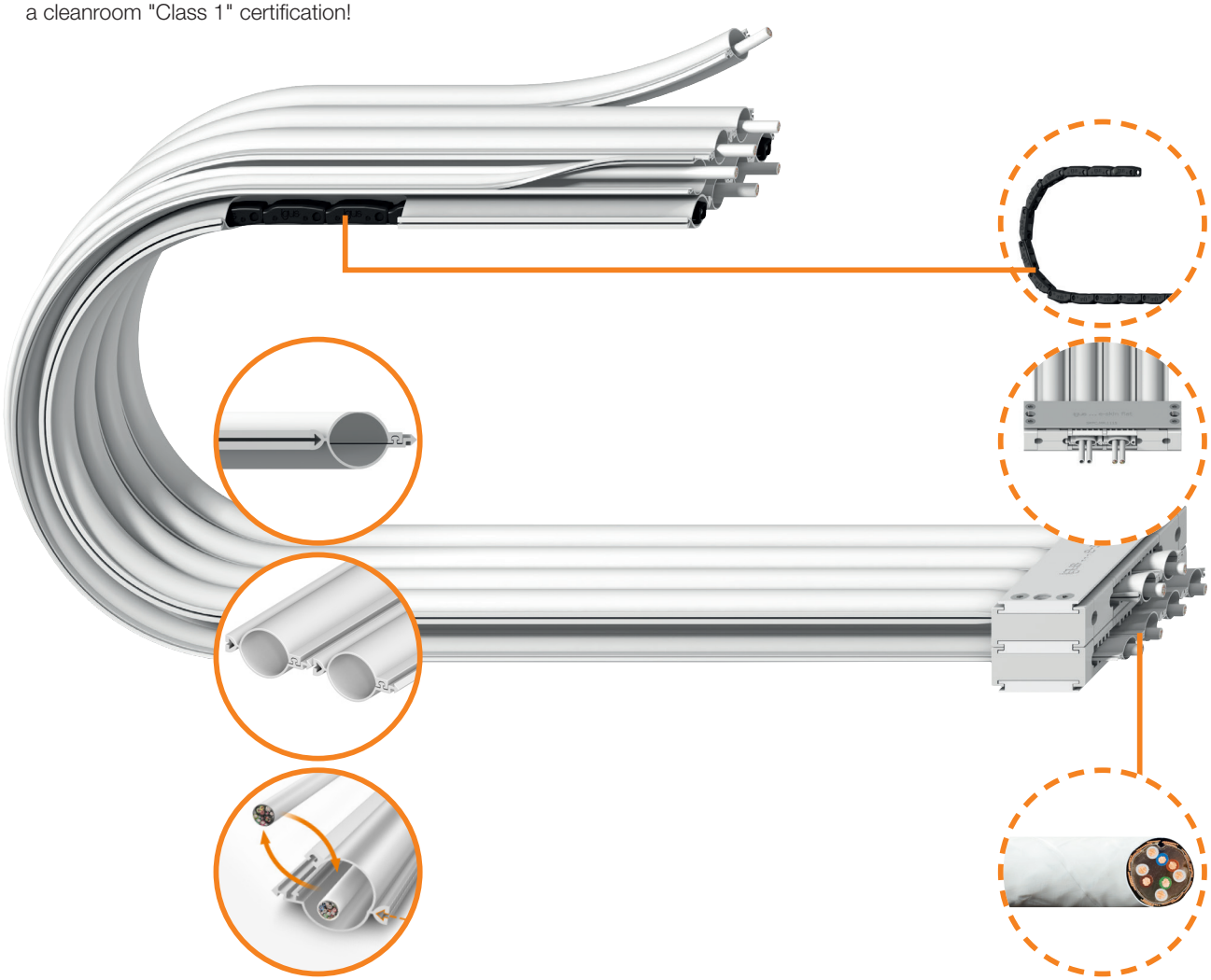
The big advantage over conventional flat cable solutions: thanks to the modular design of the e-skin® flat, replacing chambers and cable structures is easy. The combination of CFCLEAN and e-skin® flat has even a cleanroom "Class 1" certification!

**Further advantages of CFCLEAN:**
By omitting the outer jacket, it is 39% thinner and 43% lighter. The durability and sustainability of the CFCLEAN has been further proven through extensive ongoing test program with coordinated test procedures in the igus® laboratory (5,000m$^2$-large testing area)! As a result, igus® can now offer a service life guarantee of 40 million strokes with a radius of just 70mm. And that in combination with the new, increased chainflex® guarantee period of four years.

**Higher current carrying capacity**
Due to the high-temperature insulation materials used, a 20% higher current load is now permitted (compared to comparable cables with PVC insulation, calculated with a cross section of 1.0 mm$^2$). The consequence of this is that in many cases it is possible to switch to a smaller cross-section.

**Current carrying capacity CFCLEAN**

| Nominal cross section | Current carrying |
|---|---|
| 0.14 mm$^2$ | 4A |
| 0.25 mm$^2$ | 7A |
| 0.34 mm$^2$ | 9A |
| 0.5 mm$^2$ | 12A |
| 0.75 mm$^2$ | 15A |
| 1 mm$^2$ | 18A |
| 1.5 mm$^2$ | 22 A |
| 2.5 mm$^2$ | 30A |



# CFCLEAN elements for cleanroom applications

## Mechanical parameters

| chainflex® cables | Shield | Bend radius e-skin® flat min. [in.] | Temperature e-skin® flat from/to [°F] | v max. [ft/s] unsupported | a max. [ft/s²] | Page |
|---|---|---|---|---|---|---|
| CFCLEAN1 | ● | 2.76 | +14/+176 | 6.56 | 131.2 | 426 |
| CFCLEAN2 | ● | 2.76 | +14/+176 | 6.56 | 131.2 | 428 |
| CFCLEAN3 | ● | 2.76 | +14/+176 | 6.56 | 131.2 | 430 |
| CFCLEAN4 | ● | 2.76 | +14/+176 | 6.56 | 131.2 | 432 |
| CFCLEAN7 | ● | 2.76 | +14/+176 | 6.56 | 131.2 | 434 |
| CFCLEAN8 | ● | 2.76 | +14/+176 | 6.56 | 131.2 | 436 |

## Approvals/Resistance

| chainflex® cables | oil | 8 x | PTFE FREE | Approvals and standards | | | | | | | | | | | | | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CFCLEAN1 | | | | | | | | ● | | | | | ● | ● | ● | | | ● | | ● | 426 |
| CFCLEAN2 | | | | | | | | | | | | | ● | ● | ● | | | ● | | ● | 428 |
| CFCLEAN3 | | | | | | | | ● | | | | | ● | ● | ● | | | ● | | ● | 430 |
| CFCLEAN4 | | | | | | | | ● | | | | | ● | ● | ● | | | ● | | ● | 432 |
| CFCLEAN7 | | | | | | | | ● | | | | | ● | ● | ● | | | ● | | ● | 434 |
| CFCLEAN8 | | | | | | | | ● | | | | | ● | ● | ● | | | ● | | ● | 436 |

# chainflex® CFCLEAN1




Example image

**40,000,000**
Cycles guaranteed

**Min. 2.76 in. (70 mm)**
Bend radius e-skin® flat

**9.84 ft. (3 m)**
Travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-skin® flat linear** | min. 2.76 in. (70 mm)<br>(further radii in preparation, please see data sheet) |
| | **fixed** | minimum 3 x d |
| Temperature | **e-skin® linear** | +14 °F to +176 °F (-10 °C to +80 °C) |
| | **fixed** | -13 °F to +194 °F (-25 °C to +90 °C) |
| v max. | **unsupported** | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (40 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space in an e-skin® flat |

## Cable structure

| | |
|---|---|
| Conductor | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| Conductor insulation | Mechanically high-quality FEP mixture. |
| Conductor construction | Cores wound in a layer with especially short pitch length. |
| Color code | **24-22 AWG:** Color code in accordance with DIN 47100.<br>**20-17 AWG:** White cores with black numbers, one green-yellow core. |
| Overall shield | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat.<br>Color: White |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V<br>300V (following UL) |
| Test voltage | 2,000V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

## Properties and approvals

| | |
|---|---|
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CFCLEAN1 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the standards for wires and cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted in e-skin® flat.

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFCLEAN1.02.04** | 24 | 4 x 0.25 | 0.14 (3.5) | 14.1 (21) | 18.1 (27) |
| **CFCLEAN1.03.02** | 22 | 2 x 0.34 | 0.14 (3.5) | 11.4 (17) | 14.8 (22) |
| **CFCLEAN1.03.07** | 22 | 7 x 0.34 | 0.20 (5.0) | 26.9 (40) | 33.6 (50) |
| **CFCLEAN1.05.04** | 20 | 4 G 0.5 | 0.20 (5.0) | 24.2 (36) | 32.9 (49) |
| **CFCLEAN1.07.04** | 18 | 4 G 0.75 | 0.20 (5.0) | 33.6 (50) | 42.3 (63) |
| **CFCLEAN1.07.05** | 18 | 5 G 0.75 | 0.22 (5.5) | 39.0 (58) | 49.7 (74) |
| **CFCLEAN1.10.02** | 17 | 2 x 1.0 | 0.20 (5.0) | 24.9 (37) | 32.9 (49) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CFCLEAN2




Example image

**40,000,000**
Cycles guaranteed

**Min. 2.76 in. (70 mm)**
Bend radius e-skin® flat

**9.84 ft. (3 m)**
Travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-skin® flat linear** | min. 2.76 in. (70 mm)<br>(further radii in preparation, please see data sheet) |
| | **fixed** | minimum 3 x d |
| Temperature | **e-skin® linear** | +14 °F to +176 °F (-10 °C to +80 °C) |
| | **fixed** | -13 °F to +194 °F (-25 °C to +90 °C) |
| v max. | **unsupported** | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (40 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space in an e-skin® flat |

## Cable structure

| | |
|---|---|
| Conductor | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| Conductor insulation | Mechanically high-quality PTFE mixture. |
| Conductor construction | Cores wound in a layer with especially short pitch length. |
| Color code | White core with black imprint ▶ Product range table |
| Overall shield | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat.<br>Color: White |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V |
| Test voltage | 2,000V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

## Properties and approvals

| | |
|---|---|
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

| Part No. | AWG | Compatible with plug type | Coaxial elements [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|---|
| **CFCLEAN2.KOAX1.03** | 30 | RG 179 | 3 | 0.26 (6.5) | 15.5 (23) | 38.3 (57) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

| Part No. | Characteristic wave impedance approx. [Ω] | Conductor/Core diameter nominal [mm] | Core identification |
|---|---|---|---|
| **CFCLEAN2.KOAX1.03** | 75 | 0.3/1.6 | Coax 75Ohm -1-, Coax 75Ohm -2-, Coax 75Ohm -3- |

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CFCLEAN3



Example image

**40,000,000**
Cycles guaranteed

**Min. 2.76 in. (70 mm)**
Bend radius e-skin® flat

**9.84 ft. (3 m)**
Travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-skin® flat linear** | min. 2.76 in. (70 mm)<br>(further radii in preparation, please see data sheet) |
| | **fixed** | minimum 3 x d |
| Temperature | **e-skin® linear** | +14 °F to +176 °F (-10 °C to +80 °C) |
| | **fixed** | -13 °F to +194 °F (-25 °C to +90 °C) |
| v max. | **unsupported** | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (40 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space in an e-skin® flat |

## Cable structure

| | |
|---|---|
| Conductor | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| Conductor insulation | Mechanically high-quality FEP mixture. |
| Conductor construction | Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths. |
| Color code | ▶ Product range table |
| Overall shield | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat.<br>Color: White |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V<br>300V (following UL) |
| Test voltage | 2,000V |

## Properties and approvals

| | |
|---|---|
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CFCLEAN3 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFCLEAN3.01.05.02** | 26 | 5 PR x 0.14 | 0.20 (5.0) | 22.2 (33) | 28.9 (43) |
| **CFCLEAN3.01.06.02** | 26 | 6 PR x 0.14 | 0.22 (5.5) | 24.2 (36) | 33.6 (50) |
| **CFCLEAN3.01.08.02** | 26 | 8 PR x 0.14 | 0.24 (6.0) | 31.6 (47) | 41.0 (61) |
| **CFCLEAN3.02.03.02** | 24 | 3 PR x 0.25 | 0.20 (5.0) | 22.8 (34) | 29.6 (44) |
| **CFCLEAN3.02.04.02** | 24 | 4 PR x 0.25 | 0.22 (5.5) | 28.2 (42) | 39.0 (58) |
| **CFCLEAN3.02.05.02** | 24 | 5 PR x 0.25 | 0.22 (5.5) | 33.6 (50) | 42.3 (63) |
| **CFCLEAN3.02.06.02** | 24 | 6 PR x 0.25 | 0.24 (6.0) | 34.9 (52) | 47.0 (70) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

| Part No. | Core identification |
|---|---|
| **CFCLEAN3.01.05.02** | brown/white, green/white, yellow/white, gray/white, pink/white |
| **CFCLEAN3.01.06.02** | brown/white, green/white, yellow/white, gray/white, pink/white, blue/white |
| **CFCLEAN3.01.08.02** | brown/white, green/white, yellow/white, gray/white, pink/white, blue/white, red/white black/white |
| **CFCLEAN3.02.03.02** | brown/white, green/white, yellow/white |
| **CFCLEAN3.02.04.02** | brown/white, green/white, yellow/white, gray/white |
| **CFCLEAN3.02.05.02** | brown/white, green/white, yellow/white, gray/white, pink/white |
| **CFCLEAN3.02.06.02** | brown/white, green/white, yellow/white, gray/white, pink/white, blue/white |

# chainflex® CFCLEAN4




Example image

**40,000,000**
Cycles guaranteed

**Min. 2.76 in. (70 mm)**
Bend radius e-skin® flat

**9.84 ft. (3 m)**
Travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-skin® flat linear** | min. 2.76 in. (70 mm)<br>(further radii in preparation, please see data sheet) |
| | **fixed** | minimum 3 x d |
| Temperature | **e-skin® linear** | +14 °F to +176 °F (-10 °C to +80 °C) |
| | **fixed** | -13 °F to +194 °F (-25 °C to +90 °C) |
| v max. | **unsupported** | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (40 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space in an e-skin® flat |

## Cable structure

| | |
|---|---|
| Conductor | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| Conductor insulation | Mechanically high-quality FEP mixture. |
| Conductor construction | According to measuring system specification. |
| Color code | According to measuring system specification. |
| Overall shield | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat.<br>Color: White |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V<br>300V (following UL) |
| Test voltage | 2,000V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

## Properties and approvals

| | |
|---|---|
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CFCLEAN4 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFCLEAN4.015** | 26 | 4 PR x 0.14 | 0.26 (6.5) | 40.3 (60) | 51.7 (77) |
| | 20 | 4 x 0.5 | | | |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

| Part No. | Core group | Color code |
|---|---|---|
| **CFCLEAN4.015** | 4x(2x0.14) | brown/green, yellow/violet, gray/pink, red/black |
| | 4x0.5 | blue, white, brown-green, white-green |

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CFCLEAN7




Example image

**40,000,000**
Cycles guaranteed

**Min. 2.76 in. (70 mm)**
Bend radius e-skin® flat

**9.84 ft. (3 m)**
Travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

## Dynamic Information

| | | |
|---|---|---|
| **Bend radius** | **e-skin® flat linear** | min. 2.76 in. (70 mm)<br>(further radii in preparation, please see data sheet) |
| | **fixed** | minimum 3 x d |
| **Temperature** | **e-skin® linear** | +14 °F to +176 °F (-10 °C to +80 °C) |
| | **fixed** | -13 °F to +194 °F (-25 °C to +90 °C) |
| **v max.** | **unsupported** | 6.56 ft/s (2 m/s) |
| **a max.** | | 65.6 ft/s² (40 m/s²) |
| **Travel distance** | | Short, very fast applications with small radii and restricted installation space in an e-skin® flat |

## Cable structure

| | |
|---|---|
| **Conductor** | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| **Conductor insulation** | Mechanically high-quality FEP mixture. |
| **Conductor construction** | Cores wound in a layer with especially short pitch length. |
| **Color code** | **Power cores:** White cores with black numbers 1-3, one green-yellow core.<br>**1 Control pair:** white, black |
| **Overall shield** | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| **Outer jacket** | Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat.<br>Color: White |

## Electrical Information

| | |
|---|---|
| **Nominal voltage** | 600/1,000V<br>600V (following UL) |
| **Test voltage** | 3,000V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

## Properties and approvals

| | |
|---|---|
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CFCLEAN7 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **CFCLEAN7.15.03.02.01** | 16 | 4 G 1.5 | 0.37 (9.5) | 84.7 (126) | 118.3 (176) |
| | 22 | 2 PR x 0.34 | | | |
| **CFCLEAN7.15.04** | 16 | 4 G 1.5 | 0.31 (8.0) | 63.2 (94) | 88.0 (131) |
| **CFCLEAN7.PE.25.01** | 14 | 1 G 2.5 | 0.18 (4.5) | 27.6 (41) | 49.1 (73) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CFCLEAN8




Example image

**40,000,000**
Cycles guaranteed

**Min. 2.76 in. (70 mm)**
Bend radius e-skin® flat

**9.84 ft. (3 m)**
Travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

## Dynamic Information

| | | |
|---|---|---|
| Bend radius | **e-skin® flat linear** | min. 2.76 in. (70 mm)<br>(further radii in preparation, please see data sheet) |
| | **fixed** | minimum 3 x d |
| Temperature | **e-skin® linear** | +14 °F to +176 °F (-10 °C to +80 °C) |
| | **fixed** | -13 °F to +194 °F (-25 °C to +90 °C) |
| v max. | **unsupported** | 6.56 ft/s (2 m/s) |
| a max. | | 65.6 ft/s² (40 m/s²) |
| Travel distance | | Short, very fast applications with small radii and restricted installation space in an e-skin® flat |

## Cable structure

| | |
|---|---|
| Conductor | Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires. |
| Conductor insulation | Mechanically high-quality FEP mixture. |
| Conductor construction | According to bus specification. |
| Color code | According to bus specification.<br>▶ Product range table |
| Overall shield | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage linear approx. 70%, optical approx. 90% |
| Outer jacket | Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat.<br>Color: White |

## Electrical Information

| | |
|---|---|
| Nominal voltage | 300/300V |
| Test voltage | 2,000V |

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

## Properties and approvals

| | |
|---|---|
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **UL-verified** | Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | See data sheet for details ▶ www.igus.com/CFCLEAN8 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 |
| **CE** | Following 2014/35/EU |

## Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

| Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [In. (mm)] | Copper index [lbs/mft (kg/km)] | Weight [lbs/mft (kg/km)] |
|---|---|---|---|---|---|
| **Ethernet/CAT5e** | | | | | |
| **CFCLEAN8.045** | 26 | 4 PR x 0.14 | 0.22 (5.5) | 22.8 (34) | 31.6 (47) |

**Note:** The given outer diameters are maximum values.
**G =** with green-yellow earth core **x =** without earth core

**PR =** Twisted Pair

| Part No. | Characteristic wave impedance approx. [Ω] | Core group | Color code |
|---|---|---|---|
| **Ethernet/CAT5e** | | | |
| **CFCLEAN8.045** | 100 | 4x(2x0.14) | white/blue, white/orange, white/green, white/brown |

UL-verified chainflex® guarantee ... www.igus.com/ul-verified

# chainflex® CFAIR



- For maximum mechanical load requirements
- PUR hose
- Oil-resistant and coolant-resistant
- Abrasion-resistant
- Outside-toleranced
- PVC-free/halogen-free

## Dynamic Information

| | | | |
|---|---|---|---|
| Bend radius | | flexible | minimum 10 x d |
| | | fixed | minimum 7.5 x d |
| Temperature | | flexible | -13 °F to +176 °F (-25 °C to +80 °C) |
| | | fixed | -40 °F to +185 °F (-40 °C to +85 °C) |
| v max. | | unsupported | 32.81 ft/s (10 m/s) |
| | | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 164.1 ft/s2 (50 m/s²) | |

## Technical data

| | |
|---|---|
| Material | Abrasion-resistant on the basis of Polyurthane adapted to suit the requirements in e-chains®.<br>Color: Blue |
| Dimensions | Outside-toleranced |
| Operating pressure | 174 psi at 68 °F (20 °C) |
| Vacuum | -14.5 psi at 68 °F (20°C) |

## Properties and approvals

| | |
|---|---|
| Oil resistance | Oil-resistant |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |
| PTFE-free | This cable does not contain PTFE |
| Lead-free | Following 2011/65/EC (RoHS-II) |

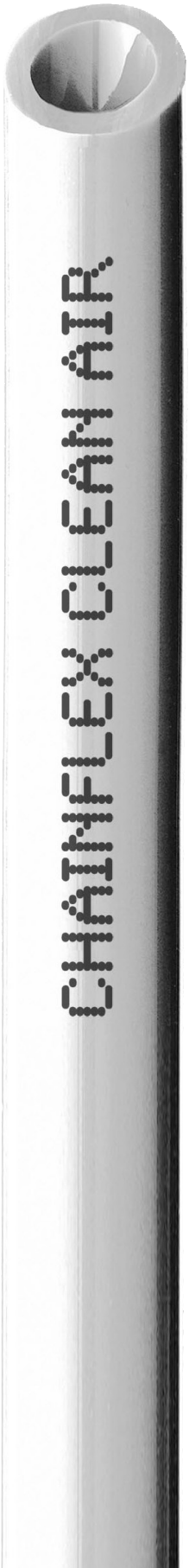
Example image

| Part No. | Internal diameter approx. | | Wall thickness approx. | | Outer diameter max. | | Weight | |
|---|---|---|---|---|---|---|---|---|
| | [in.] | [mm] | [in.] | [mm] | [in.] | [mm] | [lbs/mft] | [kg/km] |
| **CAPU.A.04.0** | 0.11 | 2.7 | 0.03 | 0.65 | 0.16 | 4.0 | 5.4 | 8 |
| **CAPU.A.06.0** | 0.16 | 4.0 | 0.04 | 1.00 | 0.24 | 6.0 | 12.8 | 19 |
| **CAPU.A.08.0** | 0.22 | 5.7 | 0.05 | 1.15 | 0.31 | 8.0 | 20.1 | 30 |
| **CAPU.A.10.0** | 0.28 | 7.0 | 0.06 | 1.50 | 0.39 | 10.0 | 32.2 | 48 |
| **CAPU.A.12.0** | 0.31 | 8.0 | 0.08 | 2.00 | 0.47 | 12.0 | 51.0 | 76 |
| **CAPU.A.16.0** | 0.43 | 11.0 | 0.10 | 2.50 | 0.63 | 16.0 | 85.2 | 127 |
| | | | | | | | | |
| **CAPU.I.02** | 0.16 | 4.0 | 0.05 | 1.15 | 0.25 | 6.4 | 15.0 | 22 |
| **CAPU.I.03** | 0.19 | 4.8 | 0.06 | 1.50 | 0.31 | 8.0 | 26.0 | 39 |
| **CAPU.I.04** | 0.25 | 6.4 | 0.06 | 1.50 | 0.38 | 9.7 | 32.0 | 48 |
| **CAPU.I.06** | 0.31 | 8.0 | 0.09 | 2.29 | 0.50 | 12.7 | 45.0 | 67 |
| **CAPU.I.08** | 0.41 | 10.4 | 0.11 | 2.7 | 0.63 | 16.0 | 58.0 | 86 |



igus® chainflex® CFAir pneumatic hoses were tested over several million bending cycles in e-chains®. Their outstanding features include flexibility, high abrasion resistance and very good resistance to oil and coolants.

# chainflex® CFCleanAIR




Example image

- For maximum mechanical load requirements
- PE hose
- Oil-resistant and coolant-resistant
- Highly abrasion-resistant
- Outside-toleranced
- PVC-free/halogen-free

## Dynamic Information

| | | | |
|---|---|---|---|
| Bend radius | | flexible | minimum 10 x d |
| | | fixed | minimum 7.5 x d |
| Temperature | | flexible | -13 °F to +140 °F (-25 °C to +60 °C) |
| | | fixed | -22 °F to +149 °F (-30 °C to +65 °C) |
| v max. | | unsupported | 32.81 ft/s (10 m/s) |
| | | gliding | 19.69 ft/s (6 m/s) |
| a max. | | 164.1 ft/s2 (50 m/s²) | |

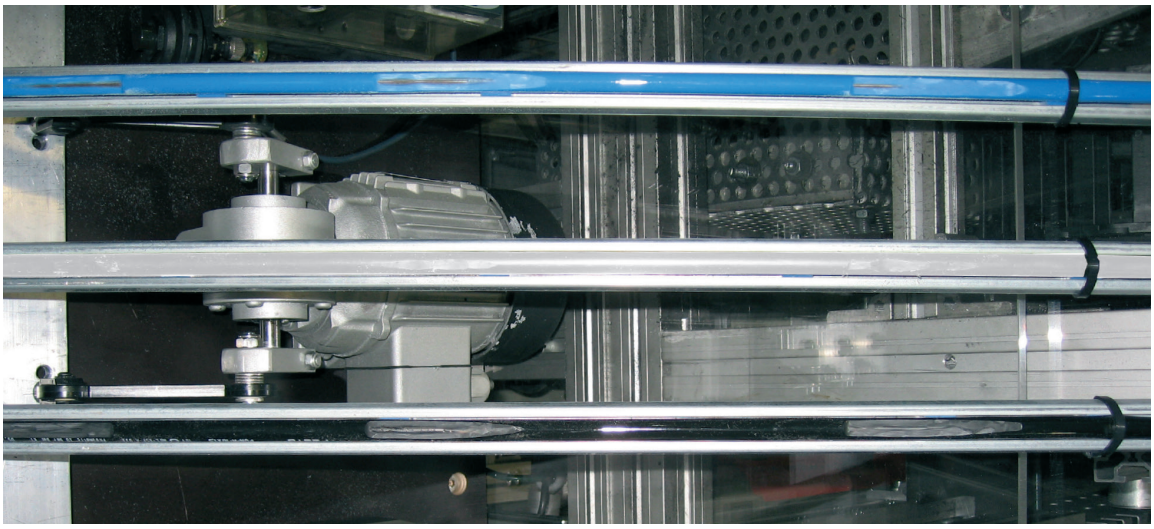
## Technical data

| | |
|---|---|
| Material | Highly abrasion-resistant on the basis of Polyethylene adapted to suit the requirements in e-chains®.<br>Color: White |
| Dimensions | Outside-toleranced |
| Operating pressure | 174 psi at 68 °F (20 °C) |
| Vacuum | -14.5 psi at 68 °F (20 °C) |

## Properties and approvals

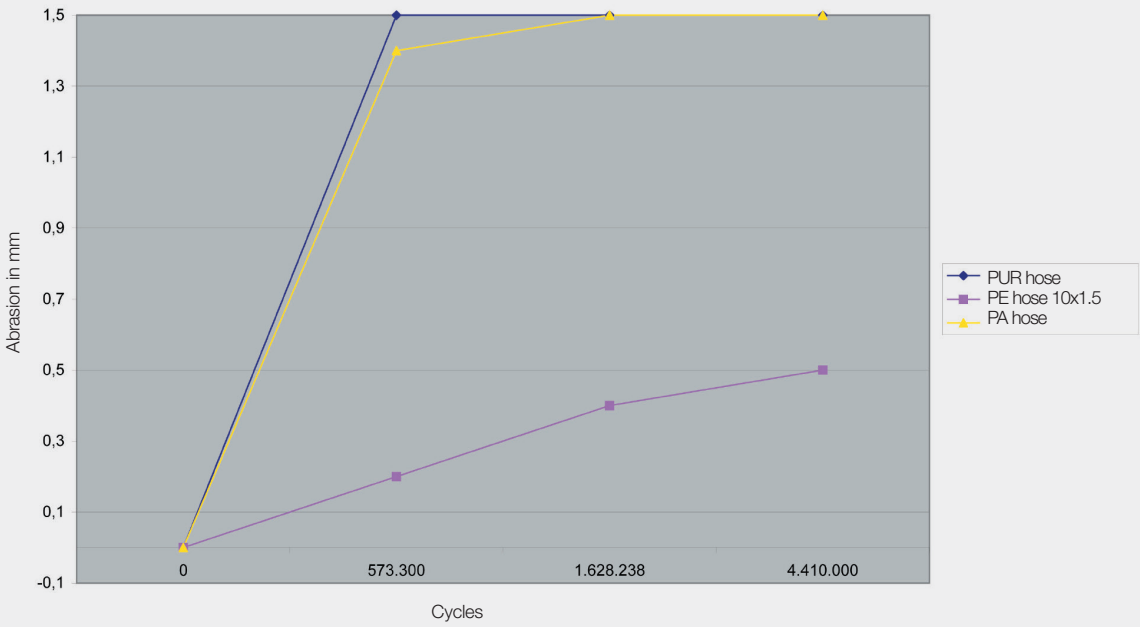
| | |
|---|---|
| Oil resistance | Oil-resistant |
| Silicone-free | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| Halogen-free | Following DIN EN 60754 |
| PTFE-free | This cable does not contain PTFE |
| Lead-free | Following 2011/65/EC (RoHS-II) |
| Cleanroom | According to ISO Class 1, material/hose tested by IPA according to DIN EN ISO standard 14644-1 |

| Part No. | Max. package length | | Internal diameter approx. | | Wall thickness approx. | | Outer diameter max. | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [mi] | [km] | [in.] | [mm] | [in.] | [mm] | [in.] | [mm] | [lbs/mft] | [kg/km] |
| CAPE-A-04-0 | 0.621 | 1.0 | 0.11 | 2.7 | 0.03 | 0.65 | 0.16 | 4.0 | 5.4 | 8 |
| CAPE-A-06-0 | 0.311 | 0.5 | 0.16 | 4.0 | 0.04 | 1.00 | 0.24 | 6.0 | 12.8 | 19 |
| CAPE-A-08-0 | 0.311 | 0.5 | 0.22 | 5.7 | 0.05 | 1.15 | 0.31 | 8.0 | 20.1 | 30 |
| CAPE-A-10-0 | 0.186 | 0.3 | 0.28 | 7.0 | 0.06 | 1.50 | 0.39 | 10.0 | 32.2 | 48 |
| CAPE-A-12-0 | 0.124 | 0.2 | 0.31 | 8.0 | 0.08 | 2.00 | 0.47 | 12.0 | 51.0 | 76 |
| CAPE-A-16-0 | 0.062 | 0.1 | 0.43 | 11.0 | 0.10 | 2.50 | 0.63 | 16.0 | 85.2 | 127 |



igus® material abrasion test

Comparison: Abrasion of pneumatic hoses PUR, PE und PA in combination with igus® e-chain® (with crossbar 450.30)



readycable® and readychain®

# Harnessed solutions



## Minimise process costs, everything from one source

igus® offers a wide range of harnessing options for cables. A key element is the use of highly flexible chainflex® cables with a guarantee of up to 4 years. These cables can be fitted with connectors from reputable manufacturers.
readychain® systems are completely pre-assembled energy chain modules including cable/hose packages that are specially tailored to customer requirements. They help save time and effort during assembly on site and optimize production processes.

- Everything from one source: cable, connector, expertise
- Reduce your throughput times from days to hours and reduce overhead costs
- 100% inspection of harnessed products and guarantee of up to 4 years
- One order, one invoice, one delivery
- Individual service life calculation online:
  igus.com/readychain

# Ready-to-install harnessed energy supplies



**Ready-to-install systems, from connectors through harnessed cables up to complex energy supply modules.**

The harnessing of cables is one of the core competencies of igus®. The cables are manufactured according to individual specifications or industrial standards. igus® uses highly flexible chainflex® cables, which are used in combination with products from well-known connector manufacturers such as HARTING, Binder, TE Intercontec, Yamaichi and many others. Upon request, igus® can also produce customized harnessed cables according to application requirements (no minimum order quantity). Another advantage of the harnessed igus® cables is the wide range of jacket materials, which are optimally tailored to the respective application and can therefore help you save costs.

readychain® is an innovative concept from igus® that improves efficiency and reliability in cable harnessing and energy chain systems. It offers pre-assembled cable and hose packages that are specifically adapted to your requirements. By using readychain® systems, you save time and effort during on-site harnessing. Overall, readychain® is an efficient solution for cable harnessing and helps you optimize production processes.

**readycable®**
Industrial cable harnessing involves cutting the cable to a defined length and attaching clearly specified connectors. Standardized processes and maximum machine optimization result in cables that are ready for connection.

**readychain®**
To ensure easy installation and long, safe operation of a machine, it is extremely important that the energy chain and cables work together perfectly.
In the readychain® area, all components are planned, assembled and tested together and are usually ready for connection upon receipt.



**Customized production**



**From one off to mass production**



The igus® readychain® factory in Cologne covers more than 37,600ft²

## The igus® readychain® factory

# 100% safety thanks to industrial harnessing

**Experience the readycable® factory in its diversity**
Harnessed and ready-to-connect cables in energy chains or on robots require unique specifications to operate flawlessly over long periods of time despite many cycles, high speeds and accelerations as well as challenging environmental conditions.

The chainflex® cables used for readycable® products are thoroughly tested in the company's own 59,201ft² test laboratory, the largest in the industry.

Cable assembly from igus® guarantees a long and predictable service life thanks to extensive testing, quality checks in our own laboratory and more than 25 years of experience in cable assembly.

**Benefits**
- Large stocks
- No minimum order quantity
- 100% tested
- Long product life
- The product range is available over the long term
- Ready to ship within five working days
- Capacity for 750,000 harnessed cables per year
- Over 18,000 test programs
- 2,500 test adapters





Up-to-date production processes, custom-build or serial production



Customized cable assembling



Full service from system acceptance to installation

# You decide on ...
## the degree of harnessing
# ... igus® provides
## harnessed energy chain modules

## 3 Benefits: readychain® basic



1. Everything from one source
2. Reduced assembly time
3. Reduce failures

## 6 Benefits: readychain® standard



4. No electrical termination needed
5. 100% digitally tested
6. No cable surplus

## 9 Benefits: readychain® standard+



7. Reduce interfaces
8. Optimize points of connection/interfaces
9. Ready-to-install multi-axis system

## 13 Benefits: readychain® premium



10. Optimize your transport/assembly
11. One single assembly
12. One Part No./Product group
13. Plug & Play

# Configured ... fitted ... with system guarantee

1

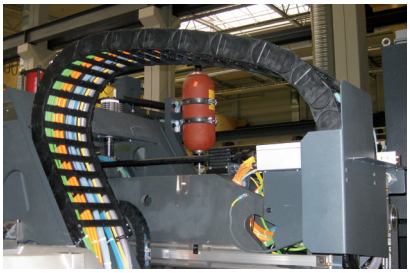
## System acceptance

### readychain® service

- We visit you
- Define interfaces
- Planning and logistics
- Cycle integration
- Time schedule







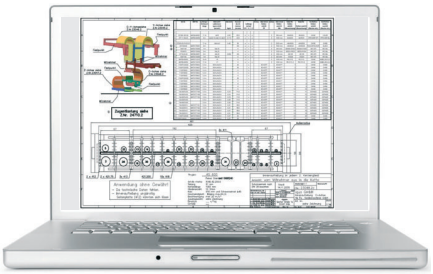
2

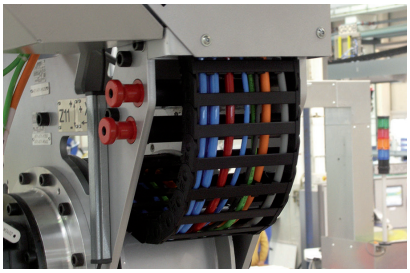
## Project phase

### readychain® service

- Component selection
- Interface optimization
- Documentation
- Integrated project management
- Cost optimization







3

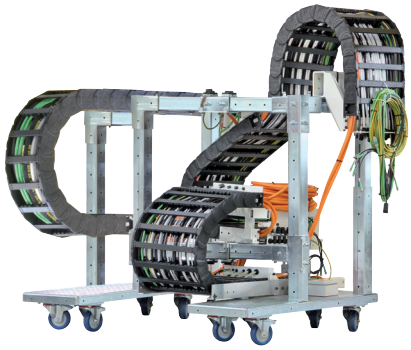
## Initial acceptance of prototype

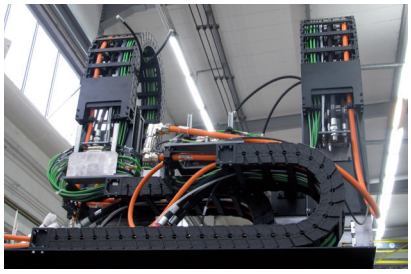
### Remote service

- Initial acceptance from your work place
- Build your prototype with an igus® project engineer, live in your meeting
- Your requests for changes explained with a model

... or visit us for production acceptance







4

## igus® installation

### Assembly

- System installation by igus® specialists
- igus® supervision service for your own installation
- Transparent, fixed price







**▶ igus.com/ready-to-install**

# Industrial camera technology



## Harnessed video cables for e-chains®

Harnessed cables for use in all aspects of industrial camera technology. From USB 2.0, USB 3.0 to FireWire and GigE, DVI/ HDMI to coax cables, we offer all connection options for the most common camera systems. Thanks to the use of chainflex® cables, these ready-to-connect cables are ideal for dynamic applications.

- Ready-to-connect, harnessed and optimized for continuous use in energy chains
- Always find the video cable that works for less
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Long-lasting cable materials, high-quality plug-in connectors
- Individual service life calculation online: igus.com/readycable

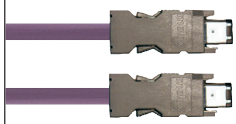
# Harnessed Video cables

## Harnessed Bus and Coax cables



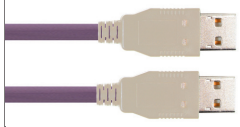
### Keyence
Harnessed connection cables suitable for Keyence

| | |
|---|---|
| Jacket | **PVC/PUR** |
| Bend radius, e-chain® | **Min. 7.5 x d** |
| Number of variants | **37** |



### FireWire
Harnessed cable

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 12.5 x d** |
| Number of variants | **10** |



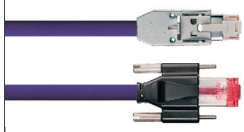
### USB 2.0
Harnessed cables according to USB 2.0 specification

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 12.5 x d** |
| Number of variants | **12** |



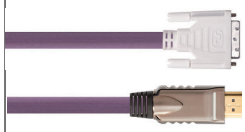
### USB 3.0
Harnessed cables according to USB 3.0 specification

| | |
|---|---|
| Jacket | **PVC/PUR** |
| Bend radius, e-chain® | **Min. 12.5 x d** |
| Number of variants | **8** |



### GigE
Harnessed cables according to GigE specification

| | |
|---|---|
| Jacket | **PUR-ROBOT/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **4** |



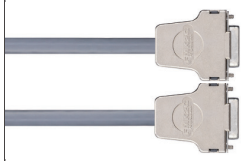
### DVI-D/HDMI
Harnessed cable according to DVI-D/HDMI specification

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 12.5 x d** |
| Number of variants | **3** |



### Coax
Harnessed coax cable (BNC/SMA)

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **24** |



### VGA
Harnessed VGA cable

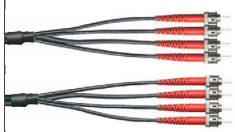
| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **4** |

## Harnessed Fiber Optic Cables for cameras



### FOC
2 fibers

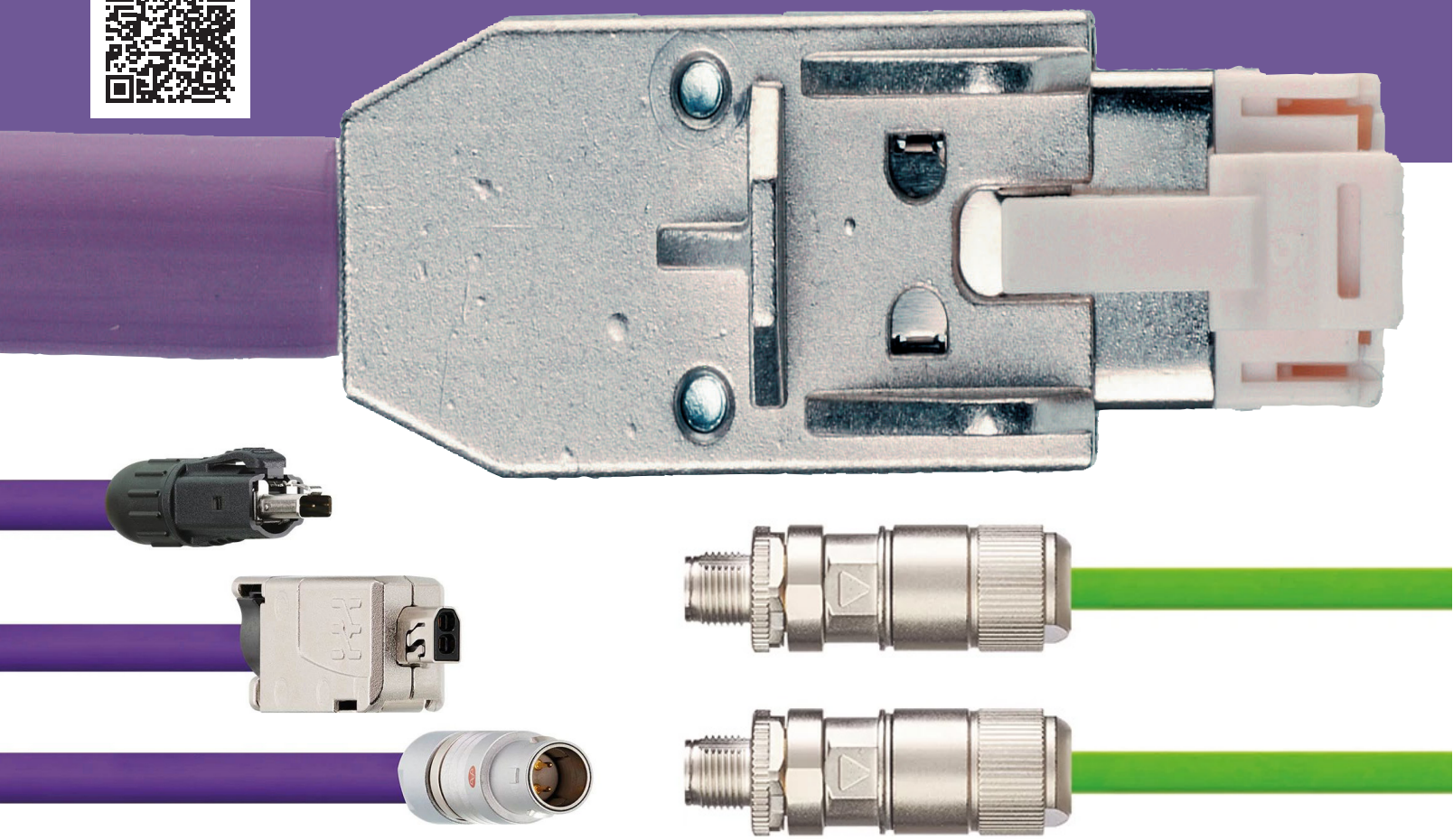
| | |
|---|---|
| Jacket | **PVC/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **24** |



### FOC
4 fibers

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **6** |

# Network technology



## Harnessed network cables for e-chains®

The appropriately harnessed Ethernet, FOC, and bus cable for all data volumes and motion patterns. Your machine can be networked at optimal cost from CAT5 to CAT7 to Single Pair Ethernet and the selection of the outer jacket material.
All harnessed cables are 100% tested before shipping, which increases your safety even further.

- Ready-to-connect, harnessed and optimized for continuous use in energy chains
- Always find the network cable that works for less
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Long-lasting cable materials, high-quality plug-in connectors
- Individual service life calculation online:
  igus.com/readycable

# The right cable for every bus system, ready to connect!

**Harnessed Single Pair Ethernet (SPE cables)**
Digitalization and data exchange have become indispensable in modern production. With only one core pair in the Single Pair Ethernet, igus® offers you the possibility of a guaranteed future data exchange. Transmission rates of up to 1GBit/s are easily possible and reducing the cable to only one pair of cores offers further advantages. You can use the 25% thinner cable compared to the CAT5e cable (CFBUS.PUR.045) in a confined installation space. It saves a lot of space, which has a great influence on dynamic motion sequences in the machinery.

The newly developed, industrial-grade plug-in connectors from Yamaichi and Weidmüller offer an excellent shield connection and thus reduce electromagnetic interference (EMC). igus® offers a chainflex® type with a highly abrasion-resistant and notch-resistant PUR outer jacket, which is sold by the meter. All ready-to-connect Single Pair Ethernet (SPE) cables are 100% tested by igus® and ensure safe and reliable data communication.

**Harnessed Ethernet cables**
For your system, we offer ready-to-connect Ethernet cables from CAT5 to CAT7 so that you have the right solution for all data volumes. With that you can safely use Bus systems such as Ethernet/IP, Profinet, EtherCAT, Sercos and many other derivatives. The different qualities of cable (CAT5, CAT5e, CAT6, CAT6A, CAT7) mean that there are opportunities for very large savings or for the cabling of your equipment in a way that meet your needs in the future.

Another special feature of this data cable harnessed with the Yamaichi Y-Con 40 PP is that the RJ45 specification also includes two additional, fully integrated contacts for the power supply. This means that the industrial plug-in connector for Industrial Ethernet, Profinet and field bus can reliably transmit up to 3.1A without an additional power supply.

Behind the harnessed Drive Cliq cable is a measuring system cable, which is usually easy to recognize on every drive unit due to its bright green color. This color has its origin in DESINA and in the meantime has established itself beyond machine tools.

**Harnessed Profinet cables**
igus® offers industrially harnessed Profinet cables with M12 D coded connectors in your required lengths. Transfer your dynamic application data securely and in real time. With the 4-year chainflex® guarantee, you can choose the right product from over seven cable qualities that is guaranteed to last for your application.

**Harnessed DeviceNet cables**
Ready-to-connect igus® cables enable you to securely transmit the field bus data in your system. Industrial, process-optimized cable harnessing enables us to offer high-quality cables at required lengths, no minimum order quantity.








# Harnessed network cables

## Harnessed Ethernet cables



### CAT5

Harnessed Ethernet cables according to CAT5 and CAT5e specification

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **194** |



### CAT6

Harnessed Ethernet cables according to CAT6 and CAT6A specification

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **62** |



### CAT7

Harnessed Ethernet cables according to CAT7 specification

| | |
|---|---|
| Jacket | **PUR/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **10** |

## Harnessed Profibus cables

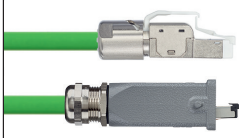


### Profibus

Harnessed Profibus cables with M12 connectors

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **90** |

## Harnessed Profinet cables



### Profinet

Harnessed Profinet cables with RJ45- and M12 connectors

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **120** |



### Industrial Profinet

molded

| | |
|---|---|
| Jacket | **PVC/PUR** |
| Bend radius, e-chain® | **12.5 x d** |
| Number of variants | **18** |

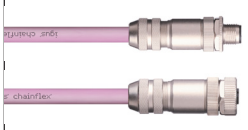


### Profinet

moulded

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **12** |

## Harnessed DeviceNet cables



### DeviceNet

with Binder M12 A-coded

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 10 x d** |
| Number of variants | **1** |

# Harnessed Fiber Optic Cables for network



**FOC**
6 fibers

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **12** |

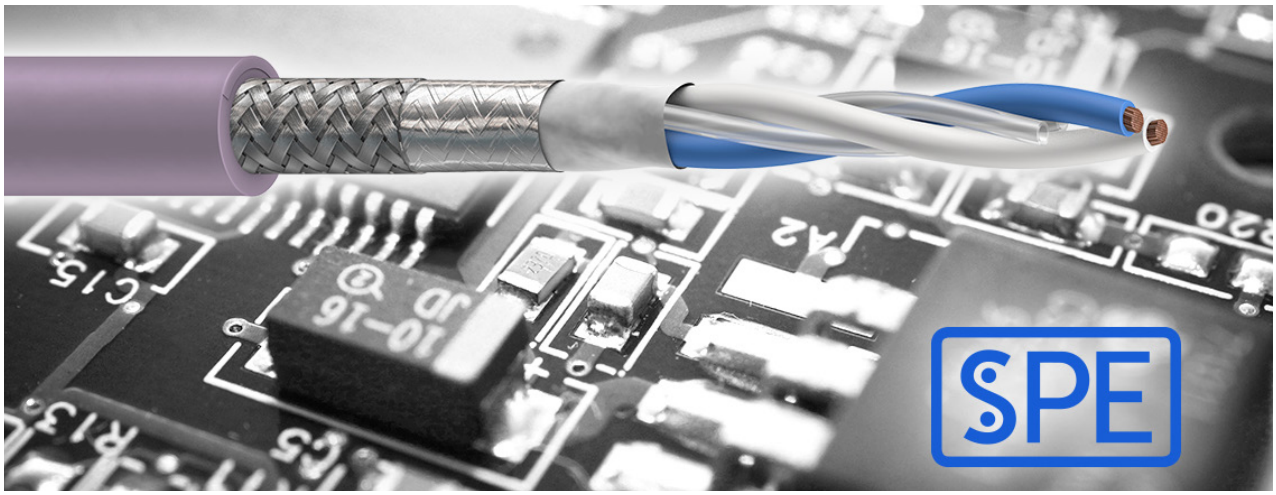


**FOC**
12 fibers

| | |
|---|---|
| Jacket | **TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **12** |

The SPE Industrial Partner Network

## igus® continues to advance SPE together with strong partners




**Single Pair Ethernet allows maximum data transmission with just one core pair, ideal for small installation spaces**

Single Pair Ethernet is the infrastructure foundation that makes IIoT and Industry 4.0 possible. In order to promote Single Pair Ethernet technology for the rapidly growing IIoT market, igus® is participating in the SPE Industrial Partner Networks with other established partners such as HARTING and TE Connectivity.

For the reliable establishment of the entire future SPE ecosystem, standards for transmission protocols, cabling and device components are also jointly developed and adopted and published in IEEE 802.3 and IEC SC46C.

In this way, the new cable could also be constructed in partnership for the T1 connector interface. As a result, the durable shield has reliable transference to the connector, ensuring optimal high electromagnetic compatibility (EMC). The combination of chainflex® cable and SPE connector is extremely robust: igus® uses a highly abrasion-resistant and notch-resistant PUR jacket, and the connector has tough metal latches with a PCB socket.



**Single Pair Ethernet (SPE)**
Harnessed Single Pair Ethernet cables

| | |
|---|---|
| Jacket | **PUR** |
| Bend radius, e-chain® | **Min. 12.5 x d** |
| Number of variants | **4** |

# Sensor cable

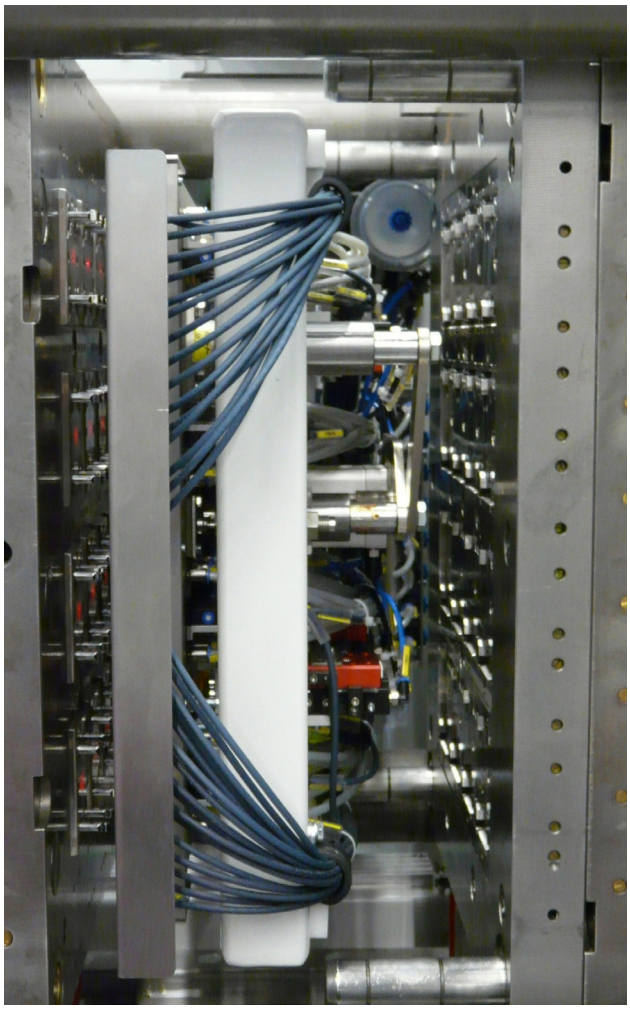


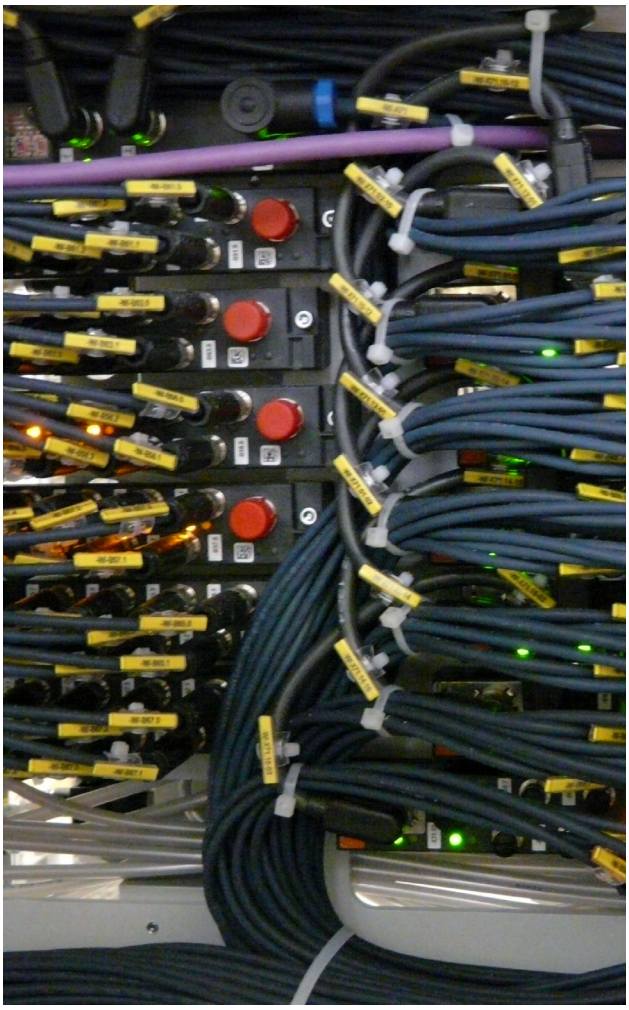
## Harnessed sensor cables for e-chains®

Sensor cables, also called sensor/actuator cables, provide the connection between the control unit and various sensors - or if the measuring principle is reversed - actuators. Frequently used abbreviations include ini or ini cable (plural: inis).

- Ready-to-connect, harnessed and optimized for continuous use in energy chains
- Extremely small bend radii of up to 3xd make automation possible in the smallest of spaces
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Long-lasting cable materials, high-quality plug-in connectors
- Individual service life calculation online: igus.com/readycable

# Sensor/actuator cables





**chainflex® CF9.INI cables in a high-speed automation for plastics processing with cycle times in seconds**

Sensor or measurement transducers transform physical quantities such as rotation, speed, distance or length into analogue electric impulses. In the case of an actuator, the measured electric current (symbol: I, unit: ampere; A) or voltage (symbol: U, unit: volt; V) is transformed into temperature, pressure or torque.

The connection cable consists of at least three cores (3-pole sensor cable) up to 5-pole sensor cables with a relatively small cross-section of between 0.14mm$^2$ and 0.34mm$^2$. In the simplest case, two cores are required for supplying the voltage, while the last core transmits an I/O signal. For sensitive applications, there are shielded versions in addition to the traditional ini cables to avoid EMC disruptions (electromagnetic compatibility).

Sensor and actuator cables for energy chains are cables for bend radii from 3xd. The CF.INI cables are tested with many millions of cycles in e-chains®. They have various approvals and conformities, such as UL, CSA, CE Desina as well as oil resistance. Various cable ends are available for the sensor and actuator cables.

Connector sizes vary from M8 to M12 and even up to M23 for a corresponding sensor cable.

**Benefits**

- Optimized and tested for continuous operation in e-chains®
- Smallest bend radii: minimum 3 x d

**Typical application areas**

- Automation Technology and Robotics
- Industrial machinery and equipment
- Vehicle technology

# Harnessed sensor/actuator cables

## Sensor/ actuator CF9 - CF.INI

Bend radius min. 5 x d



### Connection cable M12 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4, 5** |
| Cable length | **3, 5, 7, 10, 15m** |



### Connection cable M12 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4, 5** |
| Cable length | **3, 5, 7, 10, 15m** |



### Linking cable M12 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4, 5** |
| Cable length | **2, 5, 10m** |



### Linking cable M12 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4, 5** |
| Cable length | **2, 5, 10m** |



### Connection cable M12 x 1
straight, LED

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4** |
| Cable length | **3, 5, 7, 10, 15m** |



### Connection cable M12 x 1
angled, LED

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4** |
| Cable length | **3, 5, 7, 10, 15m** |



### Connection cable M8 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3, 4** |
| Cable length | **3, 5, 7, 10, 15m** |



### Connection cable M8 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3, 4** |
| Cable length | **3, 5, 7, 10, 15m** |



### Linking cable M8 x1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3, 4** |
| Cable length | **2, 5, 10m** |



### Linking cable M8 x1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3, 4** |
| Cable length | **2, 5, 10m** |



### Connection cable M8 x 1
angled, LED

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3** |
| Cable length | **3, 5, 7, 10, 15m** |

## Sensor/ actuator CF10 - CF.INI

Bend radius
min. 5 x d
360° shielded



Connection cable M12 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **5 (4+PE)** |
| Cable length | **3, 5, 7, 10, 15m** |



Connection cable M12 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **5 (4+PE)** |
| Cable length | **3, 5, 7, 10, 15m** |



Linking cable M12 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **5 (4+PE)** |
| Cable length | **2, 5, 10m** |



Linking cable M12 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **5 (4+PE)** |
| Cable length | **2, 5, 10m** |

## Sensor/ actuator CF98-PLUS - CF.INI

Bend radius
min. 3 x d



Connection cable M12 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4** |
| Cable length | **3, 5, 7, 10, 15m** |



Connection cable M12 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4** |
| Cable length | **3, 5, 7, 10, 15m** |



Linking cable M12 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4** |
| Cable length | **2, 5, 10m** |



Linking cable M12 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **4** |
| Cable length | **2, 5, 10m** |



Connection cable M8 x 1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3** |
| Cable length | **3, 5, 7, 10, 15m** |



Connection cable M8 x 1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3** |
| Cable length | **3, 5, 7, 10, 15m** |

# Harnessed sensor/actuator cables



### Linking cable M8 x1
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3** |
| Cable length | **2, 5, 10m** |



### Linking cable M8 x1
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **3** |
| Cable length | **2, 5, 10m** |

## Sensor/ actuator distribution box



### Connection cable M23
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **16+3** |
| Cable length | **variable** |



### Connection cable M23
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **16+3** |
| Cable length | **variable** |



### Connection cable M23
angled

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **16+3** |
| Cable length | **variable** |



### Connection cable M12
straight

| | |
|---|---|
| Jacket | **TPE** |
| Number of poles | **8, 12** |
| Cable length | **variable** |

drylin® drive technology

# Simple and cost-effective automation

## Drive technology roadshow

- All drylin® drive technology products including all innovations in your company
- drylin® linear axes, motors and motor controls you can try out directly
- Individual on-site consultation

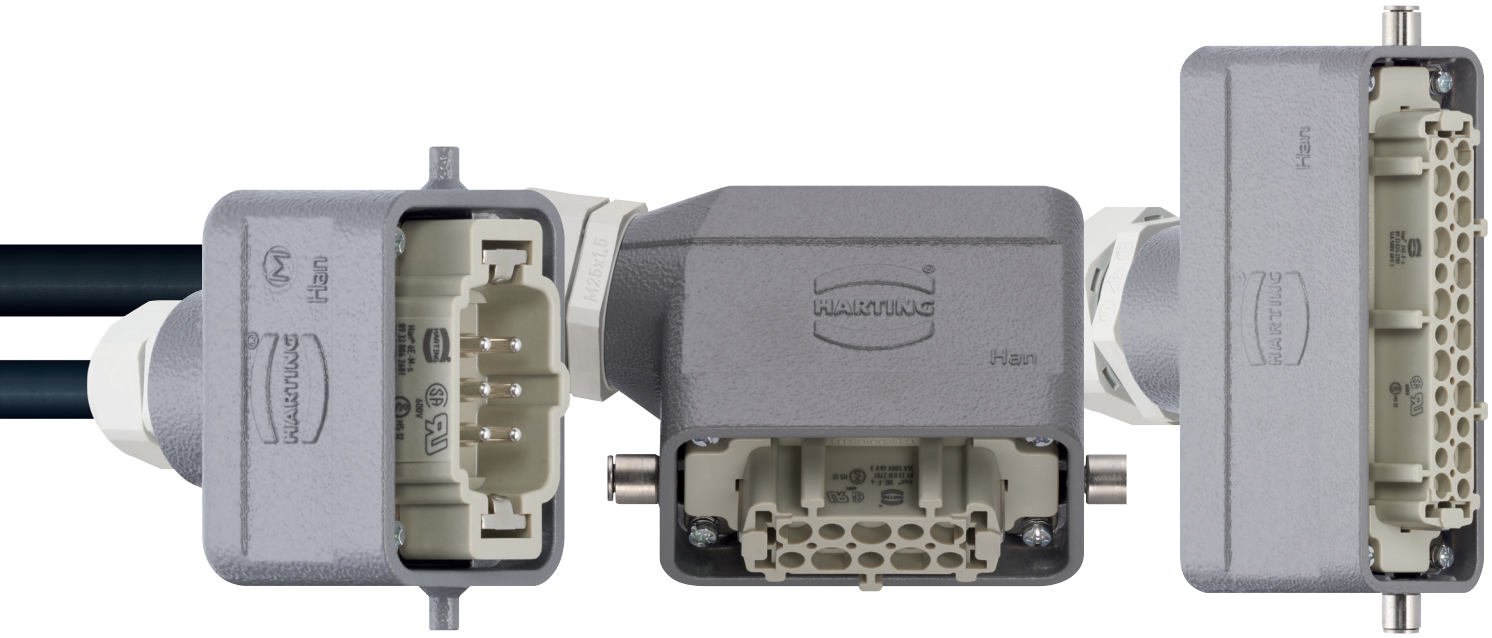



Further information and booking

**igus.com/drylin-roadshow**

readycable® cables with industrial connectors

# Industrial control cables




## Harnessed cables with HARTING plug-in connectors

Industrial cable harnessing of chainflex® cables with industrial connectors from HARTING. Whether harnessed control cables or individually tailored solutions from batch size 1 - the thoroughly tested chainflex® cable quality combined with the HARTING types of connector Han 3A, 6B, 10B, 16B and 24B as a ready-to-connect readycable® solution for industrial applications, helps avoid time-consuming connector assembly and guarantees reliable components.

- Ready to connect directly from the cable manufacturer
- No minimum order value. No minimum order quantity
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- To your required length, with centimeter accuracy, without over-dimensioning
- Individual service life calculation online:
  igus.com/readycable

# Monoblock or modular system



Variable cable harnessing based on Han-Modular in all conventional installation sizes (3A, 6B, 10B, 16B and 24B)

**What is monoblock technology?**
Only one insert is installed per connector housing. We offer housing sizes 6B, 10B, 16B and 24B for these HARTING plug-in connectors.

The HARTING plug-in connectors of the Han EE series are designed for 500V contamination degree 3 when fully assembled. A modified contact arrangement allows use in the same degree of contamination for higher voltages of up to 1,000V.

When the HARTING plug-in connectors are fully assembled, a higher reference voltage is also possible, but with a lower degree of contamination.

**What does modular system mean?**
Han-Modular combines several HARTING connector modules within a single housing. It is possible to combine signals, power, data and even pneumatics in one connector housing.
The standard housing sizes remain the same and instead of a monoblock, various inserts can be combined within one housing.
In addition, space requirements are reduced, as the number of housings is reduced and functionality is increased at the same time.

**Would you also like to configure your modular system?**
Then feel free to contact us.

**Benefits**
- Ready to connect directly from the cable manufacturer
- To your required length, with centimeter accuracy
- No minimum order value, from quantity 1
- Ready to ship within five working days
- Custom assembly is part of our daily business

# Harnessed industrial control cables

## HARTING Han 6B



**Han 6B connector housing (pin) to Han 6B connector housing (socket)**
single locking lever at both ends, straight

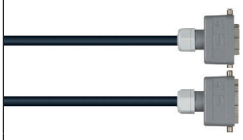
| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 6B connector housing (pin) to Han 6B connector housing (socket)**
single locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |

## HARTING Han 10B



**Han 10B connector housing (pin) to Han 10B connector housing (socket)**
single locking lever at both ends, straight

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 10B connector housing (pin) to Han 10B connector housing (socket)**
single locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 10B connector housing (pin) to Han 10B connector housing (socket)**
double locking lever at both ends, straight

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 10B connector housing (pin) to Han 10B connector housing (socket)**
double locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |

## HARTING Han 16B



**Han 16B connector housing (pin) to Han 16B connector housing (socket)**
single locking lever at both ends, straight

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 16B connector housing (pin) to Han 16B connector housing (socket)**
single locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 16B connector housing (pin) to Han 16B connector housing (socket)**
double locking lever at both ends, straight

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |

# HARTING
## Han 24B



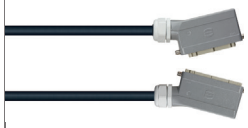
**Han 16B connector housing (pin) to Han 16B connector housing (socket)**
double locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 24B connector housing (pin) to Han 24B connector housing (socket)**
single locking lever at both ends, straight

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 24B connector housing (pin) to Han 24B connector housing (socket)**
single locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 24B connector housing (pin) to Han 24B connector housing (socket)**
double locking lever at both ends, straight

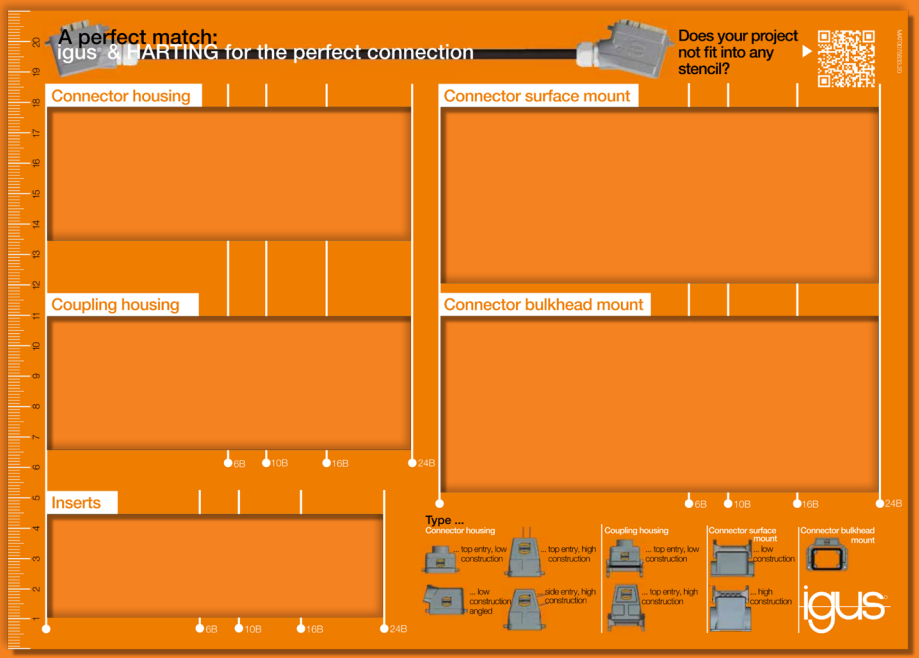
| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |



**Han 24B connector housing (pin) to Han 24B connector housing (socket)**
double locking lever at both ends, angled

| | |
|---|---|
| Jacket | **PVC/PUR/TPE** |
| Bend radius, e-chain® | **Min. 5 x d** |
| Number of variants | **8** |

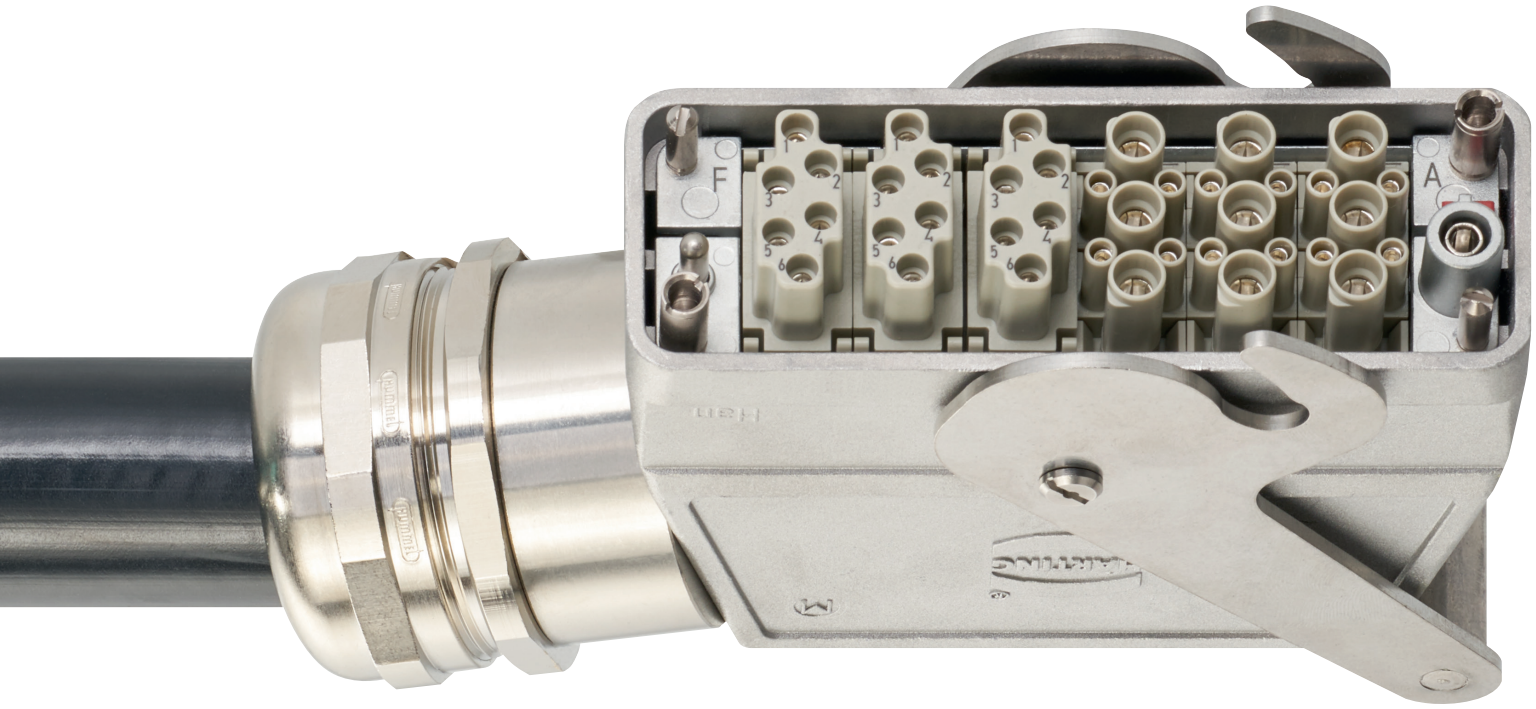
# Measuring template for rectangular connectors




The template allows you to quickly and easily determine the type and size of rectangular connectors in everyday use. To do so, hold the rectangular connector in the template and read the size. In addition, a small explanation helps you identify the design.

Request your personal copy now: **igus.com/measuring-template**

# Robotics and automation




## Moving energy made easy – even for robot applications

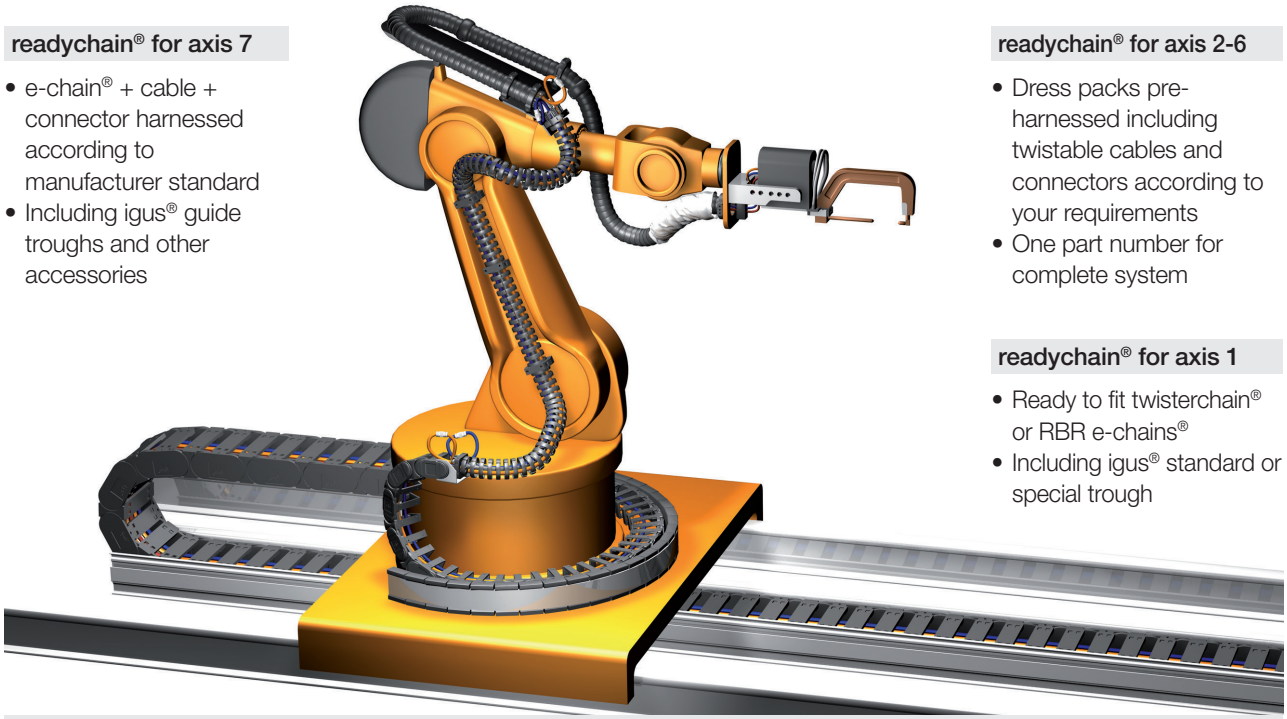
Harnessed, ready-to-connect cables suitable for common industrial robots from Kuka, Fanuc and ABB.
The AIDA (Automation Initiative of German Automobile Manufacturers) was formed to establish standardized cables for the German automobile industry. Here we offer harnessed cables according to the AIDA standard for dynamic applications.

- Assembled energy supply systems, connectors and cables from igus®
- Everything from one source, direct from the manufacturer
- Optional system guarantee
- Worldwide readychain® specialists and production sites for fast support and short transport routes
- Individual service life calculation online:
  igus.com/readycable

# Harnessed dress packs and cables for robots

**readychain® for axis 7**

- e-chain® + cable + connector harnessed according to manufacturer standard
- Including igus® guide troughs and other accessories



**readychain® for axis 2-6**

- Dress packs pre-harnessed including twistable cables and connectors according to your requirements
- One part number for complete system

**readychain® for axis 1**

- Ready to fit twisterchain® or RBR e-chains®
- Including igus® standard or special trough

**Additional services for you**

- Survey of existing systems on your robot by our sales engineers
- Optional system guarantee
- Worldwide readychain® specialists and 14 production sites for fast maintenance and spare part support

## Harnessed cables for robots



**readycable® Kuka**
Harnessed cables for KUKA robots

suitable for Kuka Quantec, Fortec and Titan

Number of variants **26**



**readycable® Fanuc**
Harnessed cables for Fanuc robots

suitable for Fanuc M-900iB and R-2000iC

Number of variants **9**



**readycable® ABB**
Harnessed cables for ABB robots

suitable for ABB IRB 6620, IRB 6640, IRB 6650S, IRB 7600 and IRB 8700

Number of variants **13**

## Cables according to AIDA specifications



**readycable® AIDA**
Harnessed connection and extension cables according to AIDA specifications

suitable for AIDA Power, Profinet, signal

Number of variants **19**

readycable® cables for drive technology

# Suitable for 40 manufacturers




## Harnessed cables for drive technology

Extensive readycable® product range for drive technology with over 6,000 ready-to-connect, harnessed and quality-checked motor, servo, signal and encoder cables suitable for 40 manufacturer standards.
Ready to ship in 5 working days, in the desired length, with no minimum order quantity, without cutting charges, industrially harnessed and available for online calculation and order 24/7.

- The seven qualities always give you the most cost-effective cable that is guaranteed to work in your application
- Reduce storage space: ready to ship in 5 business days, to your required length, no minimum order quantity, no cutting charges
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Individual service life calculation, exactly what you need
- Get the right drive cable in just two steps, online: igus.com/readycable

# Almost 6,000 drive cables ready for connection with a guarantee of up to 4 years

Suitable for

Allen Bradley
B&R
Baumer Thalheim
Baumüller
Beckhoff
Berger Lahr
Bonfiglioli
Bosch Rexroth
Control Techniques/Nidec Drives
Danfoss
Delta
ELAU/Schneider Electric
FAGOR
FANUC

Suitable for

Festo
Harmonic Drive
Heidenhain
Heidrive
Hengstler
Jetter
KEB
KEBA
Koco Motion
Kollmorgen / Danaher Motion
Lenze
LinMot
LTi DRiVES
Mitsubishi

Suitable for

Moog
Motor Power Company
NUM
Omron
Panasonic
Parker
Schunk
SEW-EURODRIVE
Siemens
Sigmatek
Stöber
Wittenstein

Utilize igus® manufacturing capacities and respond flexibly to order fluctuations. We are happy to support you with state-of-the-art manufacturing technology and specialized employees, which in turn frees up resources to support your manufacturing capacities.

**Flexible production planning**
Special tools used across projects and customers guarantee consistent quality at low cost. All employees are trained for both readychain® assembly and cable harnessing. Flexible production planning secures your delivery times.

**readycable® factories worldwide**
igus® manufactures more than 12,500 readycable® each week at 14 readycable® factories around the world. In the Cologne factory alone, 180 people are available to manufacture readychain® and readycable®. The goal is to reduce transport routes, time, and resources while ensuring consistently high quality. The same production standards apply at all 14 sites.

**Benefits**
- Customized length
- Up to 7 cable qualities
- Industrial, machine-supported cable harnessing with crimp force and depth monitoring
- 14 globally networked production sites
- 100% functional check with digital and logic test

**Typical application areas**
- Woodworking
- Machine Tool industry
- Outdoor areas

# Get the right drive cable in just two steps

The readycable® Product Finder was developed to quickly find the right cable from a large selection (40 drive manufacturers and up to seven cable qualities).

In just a few clicks, or by entering the drive manufacturer number, you can use this finder to reduce the selection to a minimum. Finally, choose the quality that is right for your application from one of the seven cable qualities. Nowhere else is this faster or easier.

**EPLAN Makros for readycable® drive cables suitable for eight manufacturers**

Load our readycable® quickly and easily via the EPLAN data portal into your electrical design using EPLAN macros. These macros already contain parts lists and assignment diagrams.

Siemens, SEW, Bosch Rexroth are now followed by five other manufacturers. By adding Allen Bradley, Beckhoff, B&R, Heidenhain, and FANUC, we are expanding our online range by 2,046 data sets. This means that with the new macros, the customer can already bring complete readycable® product data into their EPLAN during the electrical design phase and complete their parts list.

While the electrical details are being worked out in the design department, the user can go online to the EPLAN data portal and filter for e.g. 0198 9308 and find all igus® cables in the known qualities, which can then be selected according to their application and use in their personal product range.

- Automatic generation of cable plan, parts list and further design documents in CAE system
- 7 qualities per cable directly available in EPLAN







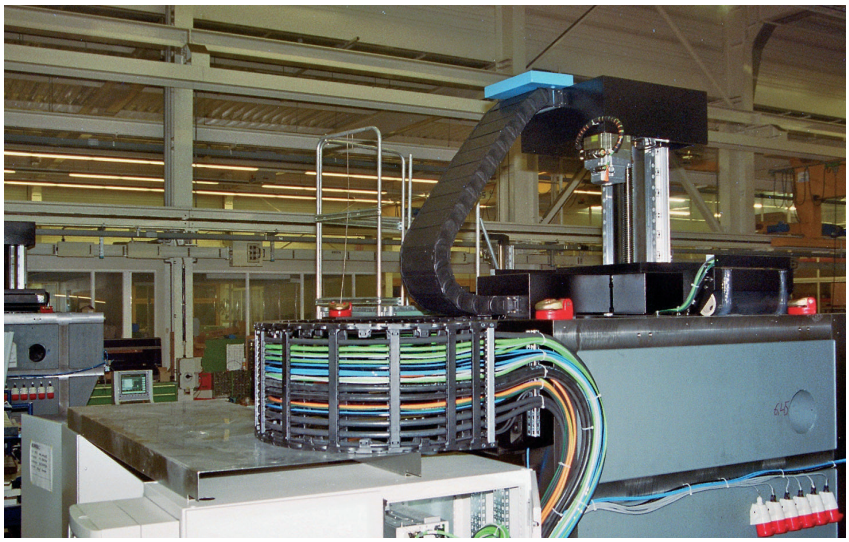
- Select cables, calculate service life and order online: **www.igus.com/readycable**
- Reduce design time by 50% with ready-to-use EPLAN macros
- Easily designed digitally & can be ordered online immediately
- No minimum quantity surcharges, no cutting charges
- 4-year guarantee on cables sold by the meter
- Predefined modules or macros directly usable in EPLAN as can be seen in the video tutorial:

# Harnessed cables for drive technology



**Example: chainflex® PVC cables for the woodworking industry**

Typical application areas – PVC
- For heavy duty applications
- Light oil influence
- Preferably indoor applications, but also outdoor ones at temperatures > 41 °F
- Unsupported travels and up to 328 ft (100 m) for gliding applications
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes, woodworking



**Example: chainflex® PUR cables for the machine tools industry**

Typical application areas – PUR
- For heaviest duty applications
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Unsupported travels and up to 328 ft (100 m) for gliding applications
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications



**Example: chainflex® TPE cables for outdoor use**

Typical application areas – TPE
- For heaviest duty applications
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- Unsupported travels and up to 400m and more for gliding applications
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, cleanroom, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

# Harnessed cables for drive technology

## Harnessed drive cables suitable for ...



### Allen Bradley
Motor cables, Servo cables, Hybrid Servo cables, Brake cables, Feedback cables, Adapter cables (Transition cable)

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **257** |



### B&R
Motor cables, Servo cables, EnDat cables, Encoder cables, Resolver cables, Bus cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **75** |



### Baumer Thalheim
Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **9** |



### Baumüller
Servo cables, Resolver cables, Pulse Encoder cables
SpeedTec: Servo cables, Resolver cables, Pulse Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **858** |



### Beckhoff
Motor cables, Servo cables, Hybrid Servo cables, Encoder cables, Thermal protection cables, Resolver cables, Network cables, EtherCat

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **89** |



### Berger Lahr
Servo cables, Resolver cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **22** |



### Bonfiglioli
Servo cables

| | |
|---|---|
| Cable quality | **PVC/PUR** |
| Number of variants | **6** |



### Bosch Rexroth
Motor cables, Servo cables, Hybrid Servo cables, Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **541** |



### Control Techniques/Nidec Drives
Motor cables, Servo cables, Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **210** |



### Danfoss
Servo cables

| | |
|---|---|
| Cable quality | **PVC/PUR** |
| Number of variants | **10** |



### Delta
Measuring system cables, Servo cables, Motor cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **8** |



**ELAU/Schneider Electric**
Servo cables, Hybrid Servo cables, Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **34** |



**Fagor**
Path measuring cables

| | |
|---|---|
| Cable quality | **PUR/TPE** |
| Number of variants | **30** |



**Fanuc**
Motor cables, Servo cables, Brake cables, Signal cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **123** |



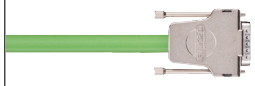
**Festo**
Servo cables, Control cables, Encoder cables, Data cables, Bus cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **48** |



**Harmonic Drive**
Measuring system cables, Servo cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **24** |



**Heidenhain**
Servo cables, Adapter cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **118** |



**Heidrive**
Data cables, Servo cables

| | |
|---|---|
| Cable quality | **PVC/PUR** |
| Number of variants | **15** |



**Hengstler**
Measuring system cables

| | |
|---|---|
| Cable quality | **PVC/PUR** |
| Number of variants | **24** |



**Jetter**
Motor cables, Servo cables, Resolver cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **43** |



**KEB**
Measuring system cables, Servo cable

| | |
|---|---|
| Cable quality | **PVC/PUR** |
| Number of variants | **8** |



**KEBA**
Data cables, Servo cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **4** |



**Koco Motion**
Data cables, Servo cables

| | |
|---|---|
| Cable quality | **PVC/PUR** |
| Number of variants | **5** |

# Harnessed cables for drive technology



## Kollmorgen/Danaher Motion

Motor cables, Servo cables, Signal cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 499 |



## Lenze

Servo cables, Fan cables, Decoder cables, Encoder cables, Feedback cables, Resolver cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 258 |



## LinMot

Motor cables, Servo cables

| | |
|---|---|
| Cable quality | PVC/PUR |
| Number of variants | 7 |



## LTiDRiVES

Servo cable, Encoder cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 54 |



## Mitsubishi Electric

Motor cables, Control cables, Encoder cables

| | |
|---|---|
| Cable quality | PVC/PUR |
| Number of variants | 40 |



## Moog

Data cables, Servo cables

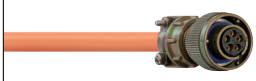
| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 7 |



## Motor Power Company

Servo cables

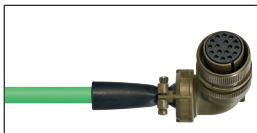
| | |
|---|---|
| Cable quality | PVC/PUR |
| Number of variants | 5 |



## NUM

Power cables, Servo cables, Fan cables, Encoder cables

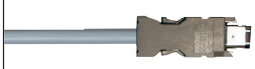
| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 49 |



## Omron

Motor cables, Control cables, Encoder cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 59 |



## Panasonic

Servo cables, Motor cables, Control cables, Data cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 8 |



## Parker

Motor cables, Resolver cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 60 |



## Schunk

Bus cables, Data cables, Control cables

| | |
|---|---|
| Cable quality | PVC/PUR/TPE |
| Number of variants | 11 |



**SEW-EURODRIVE**
Motor cables, Servo cables, Hybrid Servo cables, Control cables, Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **304** |



**Siemens**
Power cables, Servo cables, Signal cables, Signal cables DriveCliq SpeedTec: Power cables, Servo cables, Signal cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **1,172** |



**Sigmatek**
Servo cables, Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **8** |



**Stöber**
Servo cable, Encoder cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **52** |



**Wittenstein**
Servo cables, Motor cables, Measuring system cables, Data cables

| | |
|---|---|
| Cable quality | **PVC/PUR/TPE** |
| Number of variants | **13** |

# Find and order the right drive cable online in 2 steps

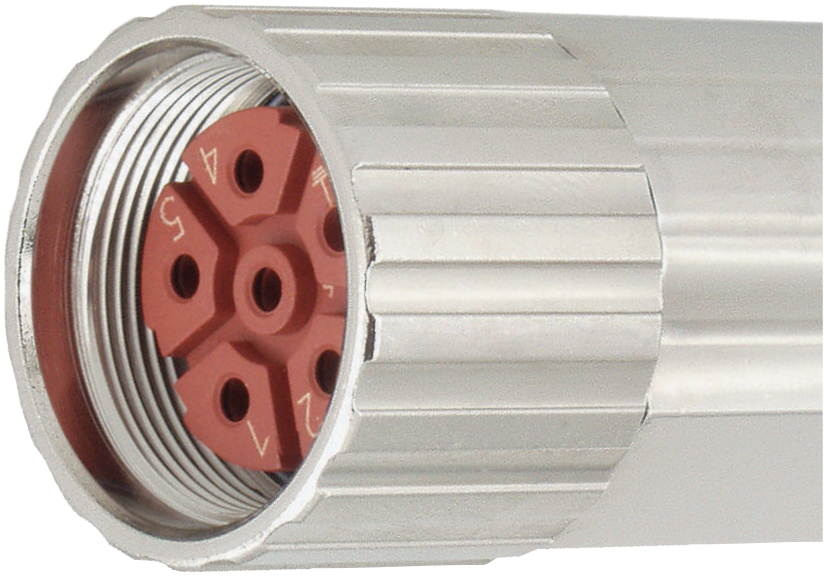
## Select with the new readycable® finder, ready to ship in 5 working days



igus® connectors

# Industrial plug-in connectors



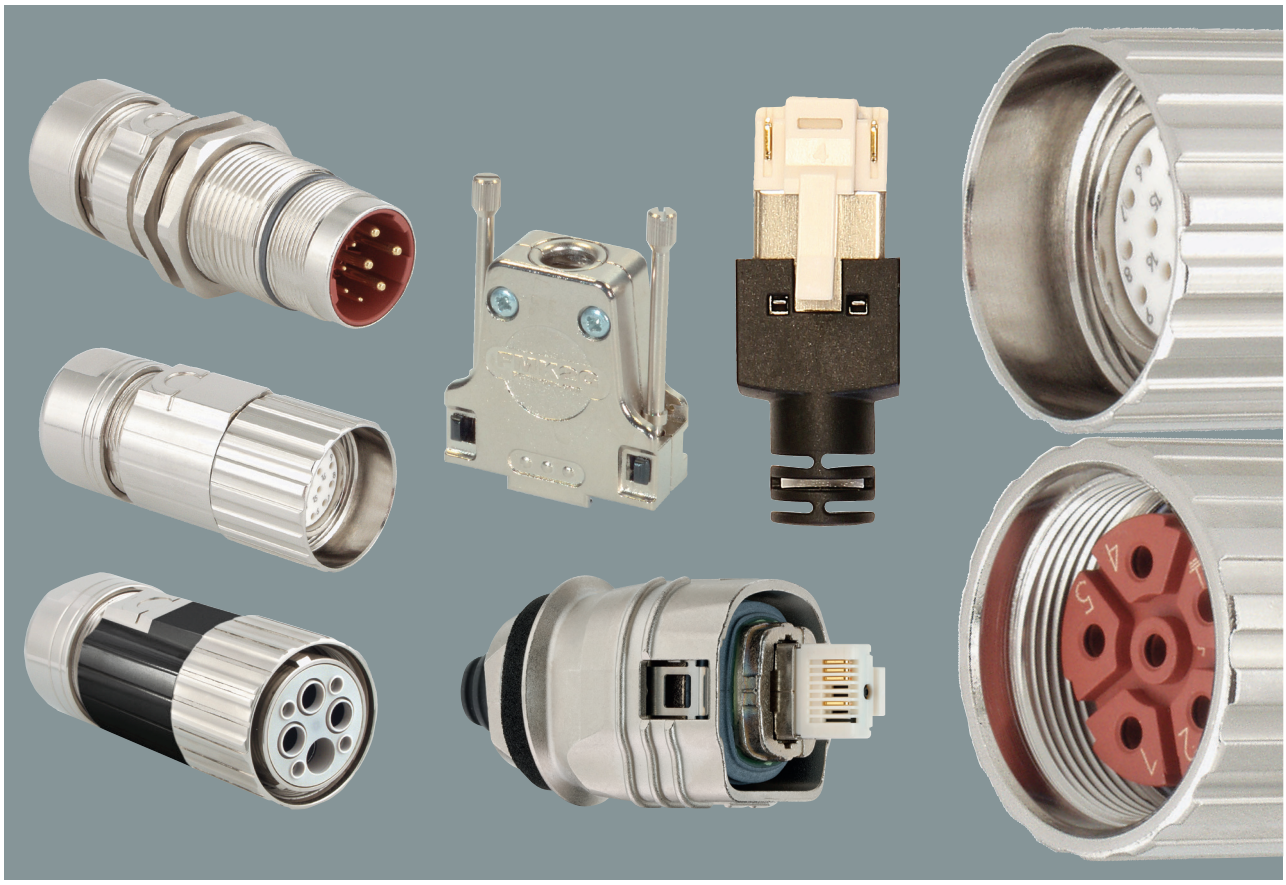


## The wide variety of industrial plug-in connectors at igus®

High-performance connectors, signal connectors and several thousands of connector components – the range of industrial connectors in stock allows igus® to provide a high level of availability with short delivery times.

- Thousands of plug-in connectors from leading manufacturers
- High material availability and fast delivery reduce logistics work for customers
- Proven in countless industrial applications
- From batch size 1 to high volumes for optimum application dimensioning, fully harnessed upon request
- Order the complete product range of plug-in connectors online: igus.com/connectors

# Benefits of igus® connectors



**With plug-in connectors, igus® relies on companies that have proven that they can provide the necessary product quality and reliability. From the product range of TE Connectivity (Intercontec), Harting, FCT, Binder, Hummel, Yamaichi, igus® offers industrial plug-in connectors that also meet demanding tasks.**

As a leading manufacturer of cables for signal transmission in machines, igus® naturally also focuses on the quality and reliability of the industrial plug-in connectors on offer. We source all plug-in connectors for power and signals from manufacturers who have proven their capabilities on the market and deliver high-quality products. The igus® online shop offers products from the tried-and-tested companies Intercontec, HARTING, HUMMEL, FCT electronic and Yamaichi.

**What are the advantages of machine-supported soldering or solder connections?**

If machine engineers and system integrators cannot rely entirely on crimp connections, they have to pay special attention to the quality of the solder connections. That is the only way to ensure constant electric conductivity over a long period of time and to permanently protect the connection point, e.g. against gases or liquids.

**Benefits**

- Fast delivery
- High level of availability
- Useful tools, such as for crimping
- Can also be harnessed with cables
- Quantities from 1 to high volume production

# Soldering is a skill that must be learned



**Soldering makes it easy to harness cables and produce electrical connections. However, special skill is required to meet the individual wishes of igus® customers.**

Soldering is particularly advantageous when a permanent seal and electrical conductivity are required. Reproducibility is firmly in focus.

What exactly is a soldered joint? What happens during soldering? It seems simple: it is a thermal process in which a solder is used to create a permanent bond between materials. A distinction is generally made between soft soldering and hard soldering. While soft soldering takes place at temperatures below 842°F, hard soldering exceeds this range and can reach up to 1652°F. However, upon closer inspection, it becomes clear that all of this is not as simple as it seemed at first glance. Soldering is a complicated process that requires learning. There are various soldering processes involving a wide range of materials, all of which have their own advantages and disadvantages and influence the quality.

**Would you like to know more?**
Our white paper explains things in detail: we describe the complex soldering process and demonstrate the differences between the various soldering methods and materials. The factors influencing the quality of solder joints are also considered. We focus on the most common mistakes made during soldering and how to avoid them. You can find out how clean soldering processes also offer economic benefits - read our white paper!



One connector module instead of many individual connectors

# The fast *interface*

Safe and efficient.






The Module Connect is a new type of connector for connecting electrical cables, Fiber Optic cables and pneumatic hoses. Due to its space-saving, flat housing, it is used wherever a large number of cables are to be plugged into the smallest possible space.

**igus.com/module-connect**

# Plug-in connectors & accessories

## igus® connectors



### TE Connectivity series A 623
**Signal plug-in connector**
M23 standard [6 to 19-pole]
standard or Speedtec

| | |
|---|---|
| Number of poles | **6, 7, [8+1], 9, 10, 12, 16, 17, [16+3]** |
| Number of variants | **39** |



### TE Connectivity series B 923
**Signal plug-in connector**
Size 1 [6, 8 and 9-pole]
standard or Speedtec

| | |
|---|---|
| Number of poles | **6, 8, 9** |
| Number of variants | **24** |



### TE Connectivity series C 940
**Power plug-in connector**
Size 1.5 [6, 8 and 9-pole]
standard or Speedtec

| | |
|---|---|
| Number of poles | **6, 8, 9** |
| Number of variants | **12** |



### TE Connectivity series D 958
**Power plug-in connector**
Size 3 [6 and 8-pole]
standard

| | |
|---|---|
| Number of poles | **6, 8** |
| Number of variants | **4** |



### TE Connectivity series 615
**Signal and power plug-in connector**
Signal [12-pole] and power connector [9-pole] plastic/metal clamping ring

| | |
|---|---|
| Number of poles | **12** |
| Number of variants | **14** |



### TE Connectivity series 915
**Signal and power plug-in connector**
Signal [12-pole] and power connector [9-pole] plastic/metal clamping ring

| | |
|---|---|
| Number of poles | **9** |
| Number of variants | **14** |



### TE Connectivity series M17 617
**Signal plug-in connector**
M17 signal [17-pole] and power connector [4 to 9-pole] standard/Speedtec

| | |
|---|---|
| Number of poles | **4, 7, 9** |
| Number of variants | **4** |



### TE Connectivity series 917
**Power plug-in connector**
Standard or Speedtec

| | |
|---|---|
| Number of poles | **17** |
| Number of variants | **12** |



### TE Connectivity series S 623
**Power plug-in connector**
Standard

| | |
|---|---|
| Number of poles | **1** |
| Number of variants | **2** |



### FCT Molex SUB-D
**Signal plug-in connector**
Standard (straight) or angular connector

| | |
|---|---|
| Number of poles | Standard: **9, 15, 25**<br>High Density: **15, 26, 44** |
| Number of variants | **24** |



### Yamaichi
**Y-CONKIT**
Zinc die-casting and PA66

| | |
|---|---|
| Number of poles | **4, 4+2** |
| Number of variants | **11** |



HARTING connector sets
Standard and Premium

| | |
|---|---|
| Number of poles | **6, 10, 12, 16, 24** |
| Number of variants | **24** |



Binder plug-in connector
Series 768
PBT/PA/CuZn (brass)

| | |
|---|---|
| Number of poles | **3, 4** |
| Number of variants | **12** |



Binder plug-in connector
Series 820

| | |
|---|---|
| Number of poles | **3+PE, 4+PE** |
| Number of variants | **4** |



Binder plug-in connector
Series 825

| | |
|---|---|
| Number of poles | **4** |
| Number of variants | **4** |



Binder plug-in connector
Series 713

| | |
|---|---|
| Number of poles | **3, 4, 5, 8** |
| Number of variants | **22** |



Hummel cable glands
Cable glands
and counter nuts

| | |
|---|---|
| Protection class | **IP 68 – 10 bar / IP 69K** |
| Number of variants | **84** |

# Tools/ accessories



Tools/accessories
and connector packs
Individual connector sets
from quantity 1

| | |
|---|---|
| Number of variants | **33** |



igus® ibow®
angle adapter
Slide on connector, bend the cable, fix it, done

for power connector 923 and signal connector 623



Module Connect
Modular connector system
Connect your energy supply with just ONE connector

| | |
|---|---|
| Number of modules | **48** |
| Suitable for | **Power & signal, Data/bus, pneumatics** |

Facts, figures and data

# Technical appendix



# Technical appendix

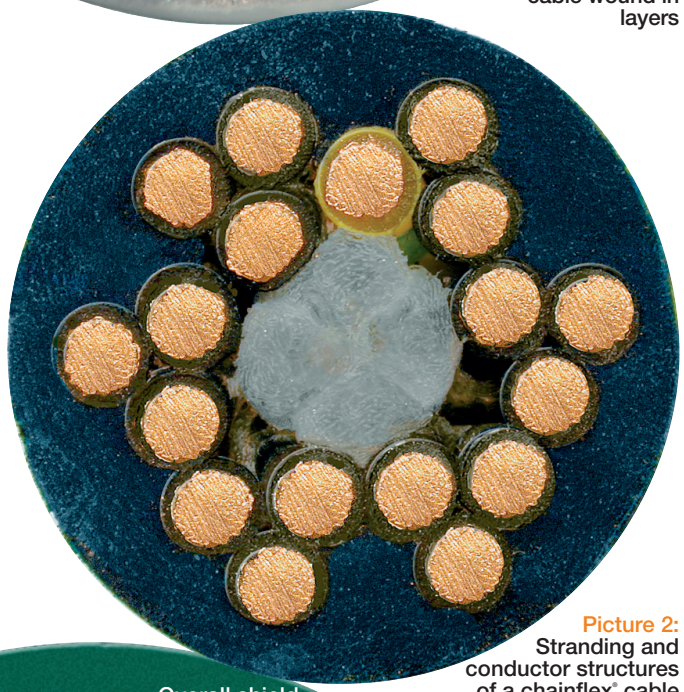

| | Page |
|---|---|
| **The tricks and features of the chainflex® design** | |
| Know-how from testing | 482 |
| Results from the tests | 484 |
| Construction and sectional views through the chainflex® cable types | 486 |
| **Data** | |
| DIN 47100 color code/copper wire dimensions according to AWG numbers | 488 |
| Calculation of the copper surcharge | 489 |
| Load-carrying capacity of cores | 490 |
| Chemical resistance | 494 |
| **Designing with igus®** | |
| Cables and hoses - General rules for cables and hoses in e-chains® | 498 |
| Cables and hoses - Separation in e-chains® | 499 |
| Cables and hoses - Further information on the separation of cables | 500 |
| Electrical round cables | 501 |
| Electrical round cables - information on assembly and strain relief of round electrical cables | 502 |
| Pneumatic hoses | 503 |
| **Information** | |
| Approvals and standards | 504 |
| General conditions | 510 |
| User information, disclaimer, KTG, product illustrations | 510 |
| Technical notes | 511 |
| Table of contents according to part number | 514 |
| **igus® contacts** | |
| igus® worldwide - International map | 512 |

# chainflex®...

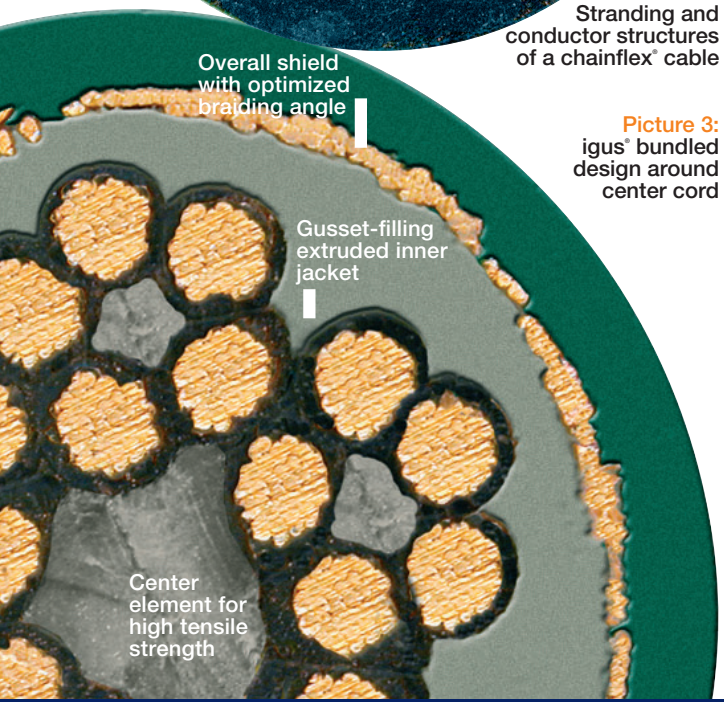
## The tricks and ingenious features of...




**Picture 1:** Chain-suitable cable wound in layers



**Picture 2:** Stranding and conductor structures of a chainflex® cable




**Picture 3:** igus® bundled design around center cord

From the customer's point of view, a flexible energy supply system needs to function properly. However, this demand assumes the perfect operation of all components, including the cables being used in this system. And this is exactly where problems came up in the early 1980s. Due to constantly increasing loads resulting from the constant movement, guided cables often failed even though the energy supply system itself was functioning perfectly. In extreme cases, failures caused by "corkscrews" and conductor ruptures brought the entire production process to a standstill and resulted in high costs.

In order to find a solution to this problem for its customers, igus® decided to take the initiative. As the first worldwide company to do so, igus® began to develop complete energy chain systems. chainflex® cables and energy chains are now being offered from one source and with a system guarantee depending on the individual application. Based on the increasing know-how gained since 1989 and on the very sophisticated series of tests that have been conducted since then, design principles were, and still are, being developed that help prevent machine downtime in factories throughout the world today.

## How can "corkscrews" be prevented?

Here, the term "corkscrew" does not refer to a useful instrument for wine connoisseurs. Instead, it refers to the permanent deformation of guided, moving cables caused by excessive strain - which, in most cases, results in conductor rupture almost immediately afterwards. How does this happen? How can "corkscrews" be prevented? An important factor here - in addition to a sensible design of the total energy chain system - is the construction of the cables. Simply speaking, a clear distinction can be made between cables braided in bundles and cables wound in layers ▶ see pictures 1 and 2.

## Properties of winding in layers

Winding in layers is significantly easier to produce and is therefore offered on the market in so-called "chain-suitable" cables at low cost. But what appears to be tempting at first glance can quickly turn into an expensive mistake when a "corkscrew" immobilizes the system being operated with these cables. How do these problems arise? Looking at the cable structure can be quite helpful ▶ see picture 1.

In the case of grouping in layers, the conductors are mostly wound more or less firmly and relatively long in several layers around a center element and are then provided with a jacket extruded to the form of a tube. In the case of shielded cables, the conductors are wrapped up with fleece or foils. But what happens to a similarly structured 12-conductor cable, for example, during normal operation?

The bending process compresses the inner radius of the cable and stretches the outer radius. Initially, this works quite well because the elasticity of the material is sufficient. But very soon, material fatigue causes permanent deformations, and then, due to excursion from the specified paths, the conductors make their own compression and tension zones: The corkscrew is created, often followed rather quickly by conductor ruptures.

# ... lasts or your money back!

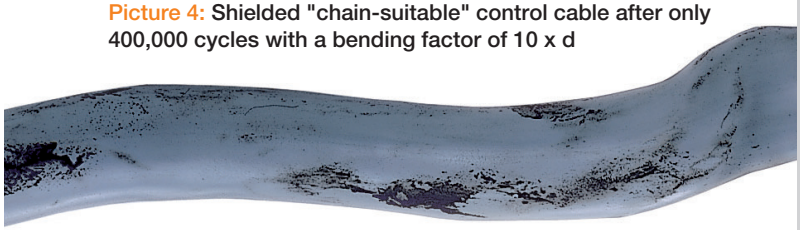
## ...the chainflex® design and why we feel so confident about this design

### Bundled design tried and tested millions of times since 1989

The bundled design eliminates these problems by means of its very sophisticated, internal structure. Here, the copper strands are wound with a special pitch length first and then the resulting conductors are bundled. For large cross sections, this is done around a strain relief element. The next step is the winding of these bundles around a tension-proof center cord ▶ see picture 2.

Due to this multiple winding of the conductors, all conductors move through the inner radius and the outer radius of the cable several times at identical spacing distances. Tensile and compressive forces balance one another around the high-tensile center cord giving the structure its stability. In this way, the structure remains stable even under maximum bending stress ▶ see picture 3.

Picture 4: **Shielded "chain-suitable" control cable after only 400,000 cycles with a bending factor of 10 x d**



### What are EMC problems and shield wire breakage?

In principle, cable shields must fulfill two tasks:
- Preventing interference getting into the cable
- Preventing interference being transmitted out of the cable

Both tasks are equally important because faulty signals can cause considerable consequential damage in the system itself as well as to any external systems. Furthermore, this is especially problematic due to the fact that incorrect shielding usually cannot be detected from outside, and this is something that makes the trouble-shooting procedure extremely difficult. How do these kinds of problems arise in the first place? Once again, the answer is to be found in the internal structure of the cable itself: Is the shielding designed for the movements of the cable? Although it may be very easy to shield a fixed cable, it is much more difficult to guarantee the permanent shielding of a moving cable.

In the case of so-called "chain-suitable" cables, for example, an intermediate layer is formed with foils or fleeces. This layer is supposed to guarantee the separation between the cores and the shield braid. But something that functions quite well for the fixed installation of cables is quite insufficient for moving cables. This has to do with the fact that the foils and fleeces do not stay put between the conductors, shield and jacket and may fall apart under stress. Consequently, the metallic shield then rubs on the insulation of the conductors - short circuits can then be expected.

# Dictionary of defects

### Broken wires

Failure of electric conductivity due to broken copper wires as a result of subjecting the individual conductors to mechanical load under constant bending stress. In most cases, the causes are incorrect strand wires and/or incorrect stranding pitch directions and lengths.

### Insulation damage

Short circuits due to damage to the insulation around the conductor. The cause can be material fatigue under constant bending stress or material abrasion within the conductor structure. Single wire breakage of the conductor or the shield braid result in perforation of the insulation.

### Corkscrew

An externally detectable corkscrew-like deformation of the entire cable due to broken copper wires as the result of subjecting the individual conductors to mechanical load during the bending process. In most cases, the causes are poor structure (winding in layers, missing center, loose jackets extruded to the form of a "tube") and subjecting the cables to high bending stress.

### Jacket abrasion

The jacket is abraded down to the conductors or to the shield. In most cases, the causes are incorrect selection of materials and/or unfavorable extrusion processes resulting in poor surface properties such that abrasion is an unavoidable effect.

### Jacket swelling/jacket breakage

Jacket becomes soft and deformed or breaks until the conductors/shield can be seen. The cause can be the incorrect selection of materials with respect to the oils or other chemical substances being used.

### Shielding losses/EMC problems

Electromagnetic interferences inside or outside an electric cable. In most cases, the cause is shield wire breakage due to mechanical overload with incorrect shield braid angles. Other causes include loose braids over foils without supporting effects or very open coverings.



Jacket breakage of (36x0.14mm²) after only 900,000 cycles with a bend radius factor of 7.8 x d

Picture 1: Optimized shield braiding angle over gusset-filling extruded inner jacket

# chainflex®...

## The tricks and ingenious features of...

The production of the shield itself is very time-consuming and cost-intensive and may have been the reason for the use of open braid shields or even simple wire wrappings. The disadvantages are obvious: open shields only possess a limited shielding effect when moving - motion reduces this effect even further. The type of shield is therefore an important point that is not even mentioned in some catalogs.

In its approx. 70% linear and approx. 90% optical coverage cables, igus® eliminates these weaknesses by means of an optimized internal structure. In virtually all shielded chainflex® cables, a gusset-filling extruded inner jacket over the core structure is used. This "second jacket" fulfills two tasks:

- It holds the core structure together and guides the individual cores as in a channel.
- It serves as a firm, round base for a very tight-fitting shield. ▶ see picture 1.

### Shield wire breakage - and how this can be prevented

Even during the production of the shield, there are many things that can be done correctly - or incorrectly. Here, an important parameter is the braiding angle.
In the case of "chain-suitable" cables, tensile strain on the shield wires in the outer radius of the cable must be taken into account. If an unfavorable braiding angle is used, the tensile strain increases even further and shield wire breakage is the result. The consequences range from reduced shielding effects right up to short circuits whenever the sharp wire ends penetrate through the fleeces or foils into the cores. Here is a useful tip: If, after the insulation has been stripped off, the shield can be easily pushed back over the jacket, the shield is then usually unsuitable for use in moving energy supply systems! This is a problem that igus® has now solved with its novel approach:

- The shield braiding angle determined in long-term tests efficiently neutralizes the tensile strengths and is therefore highly suitable for energy chains.
- Due to the stable inner jacket, the shield cannot become uncontrolled.
- The shield itself has a torsion protection effect on the wound structure.

### Jacket abrasion/jacket breakage

Whilst defects in the internal structure are hardly detectable on the outside, jacket problems are immediately obvious. The jacket is the first protection for the complicated internal structure. This is why broken, worn and swollen jackets are a serious quality defect. To prevent this problem, the igus® customer can select from 7 jacket materials to adapt their energy chain cables to suit the conditions of the respective environment.

# ... lasts or your money back!

## ...the chainflex® design and why we feel so confident about this design

### Gusset-filling extruded jacket

Here, not only is the material an important factor but also the production process. In the case of the so-called "chain-suitable" cables, the jackets are usually produced extruded to the form of a tube and therefore do not provide the structure with the necessary support for constant bending. The wound structure can fall apart.

Therefore, igus® is the first manufacturer of energy chain systems to offer the so-called the "gusset-filling extruded" jacket.

Here, the jacket material is injected between the conductor structure powdered with talc and ensures that the conductor structure does not open up and also makes sure that the conductors are guided as in a channel. The special characteristic of this type of production is that the intermediate spaces created between the cores during the winding process, are completely filled with jacket material by the high extrusion pressure. As a result, the jacket material creates a channel-like guide which ensures the cores have a defined longitudinal movement. The jacket also provides a supporting function for the structure. ▶ see picture 2.

### The quality bundles of igus® chainflex® cables

- Strain-relieving center
- Conductors in bundles
- Gusset-filling extruded inner jacket in shielded cables
- Enclosed shield braid
- Optimized shield braiding angle
- Gusset-filling extruded jacket



Picture 2:
**Gusset-filling extruded jacket**

# 7 basic rules for a good cable

### 1. Strain-relieving center element

Clear space is created in the center of a cable according to the number of conductors and the cross section of each cable. This center should be filled, as far as possible, with a genuine center cord (and not, as frequently the case, with fillers or dummy cores consisting of waste materials). These measures will then efficiently protect the structure and prevent it from wandering into the middle of the cable.

### 2. Copper stranding

With respect to the selection of conductor strand wires, the maximum flexibility has proved to be the best solution. Although very flexible conductors can be made using very thin individual wires, these conductors can allow formation of kinks. Long-term testing provided the result of a combination of strand wire diameter, pitch length and pitch direction as the best overall bending-resistant solution.

### 3. Conductor insulation

The insulation materials must be made so that they do not stick to one another within the cable. Furthermore, the insulation is also required to support the stranded individual wires of the conductor. Accordingly, only the highest-quality, high-pressure-extruded PVC, XLPE, or TPE materials that have proved their tested reliability in millions of test cycles are then used in energy chain applications.

### 4. Structure

The structure must be wound around a stable, tension-proof center element with an optimized short pitch length. However, due to the insulating materials being used, this wound structure should still be used. Starting from a quantity of 12 conductors, a bundled design should be used.

### 5. Inner jacket

A gusset-filling extruded inner jacket must be used instead of inexpensive fleeces, fillers or accessory fillers. This measure ensures that the conductor structure is efficiently guided in longitudinal direction. Moreover, the wound structure cannot fall apart or wander off.

### 6. Shielding

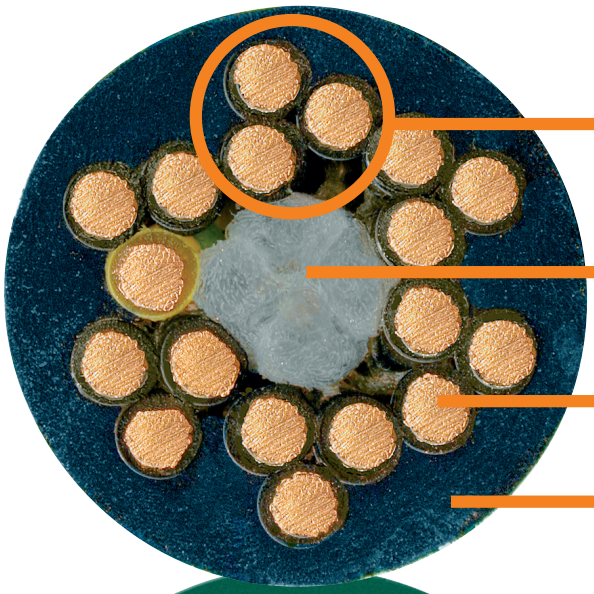
The overall shield should be made tight using an optimized shield braiding angle over an extruded inner jacket. Loose open braids or wrapped stranding reduce the EMC protection considerably and can fail very quickly due to shield wire breakage. A tight total braid shield also has a torsion protection effect on the wound structure.

### 7. Outer jacket

The material-optimized outer jacket can fulfill many different requirements: from UV-resistant to low-temperature-flexible, and from oil-resistant to cost-optimized. But these outer jackets must have one thing in common: A jacket material must be highly abrasion-resistant but not be allowed to stick to anything. It must be flexible but also provide a supporting function. In any case, the jacket should also be extruded under pressure (gusset-filling).

# Sectional views through the

## Detailed structure of igus® control, data, servo and motor cables



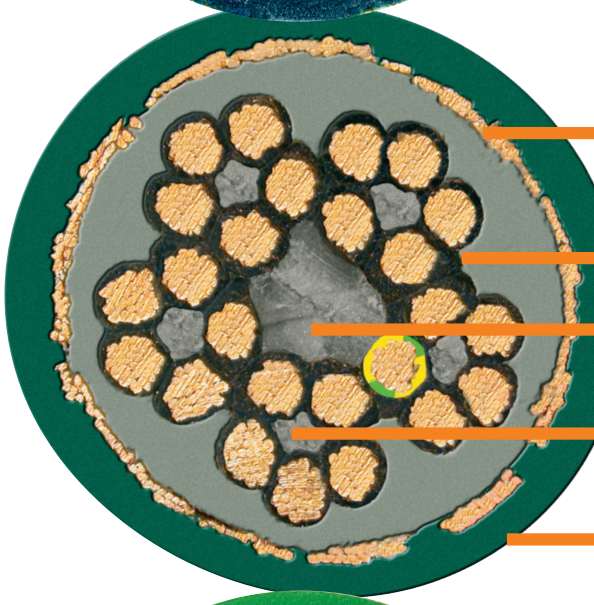
### chainflex® control cable, unshielded

Individual bundles with optimized pitch length and pitch direction

Center element for high tensile strength

Strand wire diameter optimized for energy chains

Highly abrasion-resistant, gusset-filling extruded jacket



### chainflex® control cable, shielded

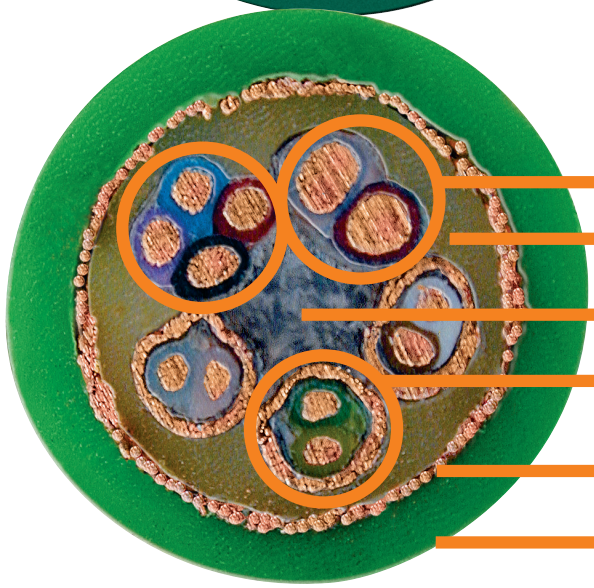
Overall shield with optimized braiding angle (approx. 70% linear, approx. 90% optical coverage)

Gusset-filling extruded inner jacket supports bundles

Center element for high tensile strength

Center element for high tensile strength in the individual bundles

Pressure-extruded outer jacket



### chainflex® data/sensor cable, shielded

Stranded elements with optimized pitch length and pitch direction

Gusset-filling extruded inner jacket supports bundles

Center element for high tensile strength

Pair braided shield

Overall shield with optimized braiding angle (approx. 70% linear, approx. 90% optical coverage)

Pressure-extruded outer jacket

# igus® chainflex® cable types

## chainflex® FOC graded index glass-fiber cable

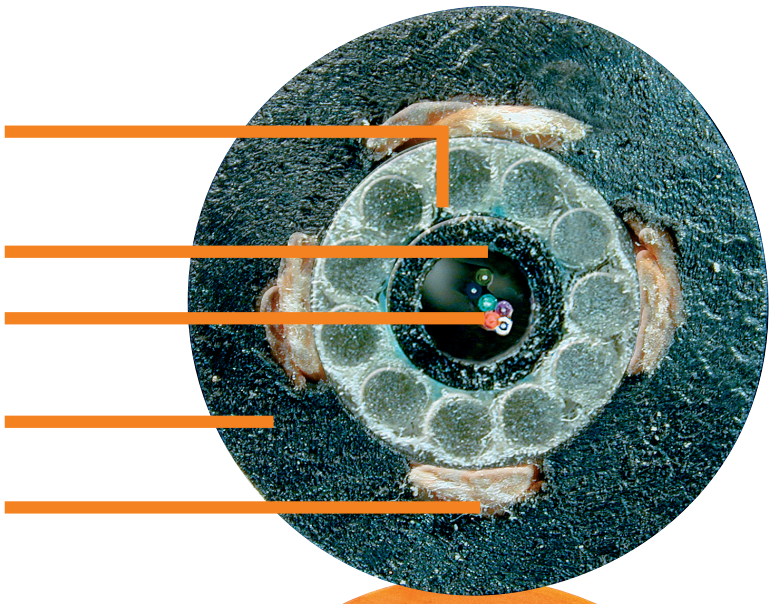
Supporting braid made of glass-yarn GRP rods

Gel-filled fiber tube

FOC fibers

Highly abrasion-resistant TPE jacket

Integrated torsion protection



## chainflex® servo cable, shielded

Overall shield with optimized braiding angle (approx. 70% linear, approx. 90% optical coverage)

Optimized strand-wire diameter

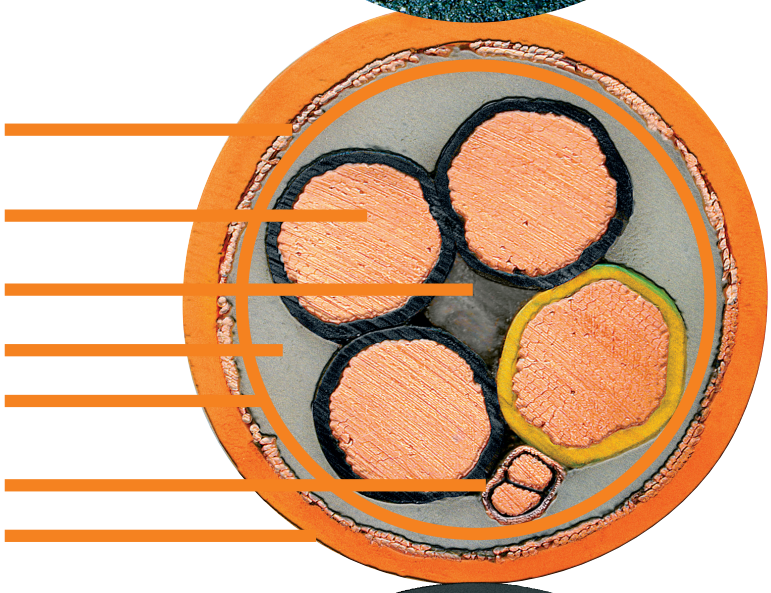
Center element for high tensile strength

Gusset-filling extruded inner jacket

Conductors wound with optimized pitch length and pitch direction

Pair braid shield over optimized wound pair

Highly abrasion-resistant pressure extruded jacket



## chainflex® motor cable, shielded

Overall shield with optimized braiding angle (approx. 70% linear, approx. 90% optical coverage)

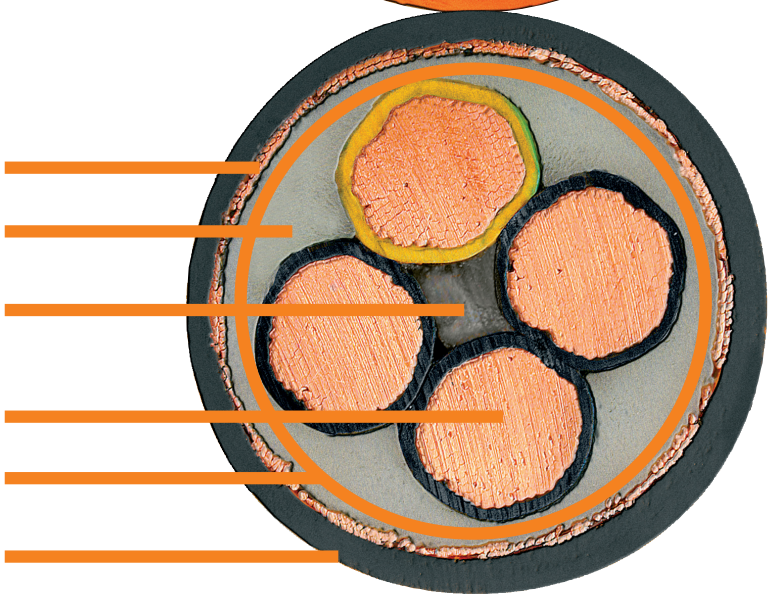
Gusset-filling extruded inner jacket

Center element for high tensile strength

Optimized strand-wire diameter

Conductors wound with optimized pitch length and pitch direction

Highly abrasion-resistant pressure extruded jacket



# DIN 47100 color code

## DIN 47100 color code
## (however, deviating from DIN: without color repetition after 44th core)*

| | |
|---|---|
| 1 | white |
| 2 | brown |
| 3 | green |
| 4 | yellow |
| 5 | gray |
| 6 | pink |
| 7 | blue |
| 8 | red |
| 9 | black |
| 10 | violet |
| 11 | gray-pink |
| 12 | red-blue |
| 13 | white-green |
| 14 | brown-green |
| 15 | white-yellow |
| 16 | yellow-brown |
| 17 | white-gray |
| 18 | gray-brown |
| 19 | white-pink |
| 20 | pink-brown |
| 21 | white-blue |
| 22 | brown-blue |
| 23 | white-red |
| 24 | brown-red |
| 25 | white-black |
| 26 | brown-black |
| 27 | gray-green |
| 28 | yellow-gray |
| 29 | pink-green |
| 30 | yellow-pink |
| 31 | green-blue |
| 32 | yellow-blue |
| 33 | green-red |
| 34 | yellow-red |
| 35 | green-black |
| 36 | yellow-black |
| 37 | gray-blue |
| 38 | pink-blue |
| 39 | gray-red |
| 40 | pink-red |
| 41 | gray-black |
| 42 | pink-black |
| 43 | blue-black |
| 44 | red-black |
| 45 | white-brown-black |
| 46 | yellow-green-black |
| 47 | gray-pink-black |
| 48 | red-blue-black |
| 49 | white-green-black |
| 50 | brown-green-black |
| 51 | white-yellow-black |
| 52 | yellow-brown-black |
| 53 | white-gray-black |
| 54 | gray-brown-black |
| 55 | white-pink-black |
| 56 | pink-brown-black |
| 57 | white-blue-black |
| 58 | brown-blue-black |
| 59 | white-red-black |
| 60 | brown-red-black |
| 61 | black-white |

*Exception: 4-core cables are braided in the color sequence white, green, brown, yellow.

The first color indicates the basic color of the core insulation, and the second color indicates the color of the printed-on ring. In the case of three colors, the second and colors are printed on the basic color.

# Copper wire dimensions (AWG)

Copper wire dimensions according to Anglo-American AWG numbers

| AWG No. | Diameter [mm] | Cross section [mm²] |
|---|---|---|
| 500 | 17.96 | 253.00 |
| 350 | 15.03 | 177.00 |
| 250 | 12.70 | 127.00 |
| 4/0 | 11.88 | 107.20 |
| 3/0 | 10.40 | 85.00 |
| 2/0 | 9.27 | 67.50 |
| 1/0 | 8.25 | 53.50 |
| 1 | 7.35 | 42.40 |
| 2 | 6.54 | 33.60 |
| 4 | 5.19 | 21.20 |
| 6 | 4.12 | 13.30 |
| 8 | 3.26 | 8.37 |
| 10 | 2.59 | 5.26 |
| 12 | 2.05 | 3.31 |
| 14 | 1.63 | 2.08 |
| 16 | 1.29 | 1.31 |

| AWG No. | Diameter [mm] | Cross section [mm²] |
|---|---|---|
| 18 | 1.024 | 0.823 |
| 20 | 0.813 | 0.519 |
| 22 | 0.643 | 0.324 |
| 24 | 0.511 | 0.205 |
| 26 | 0.405 | 0.128 |
| 28 | 0.320 | 0.0804 |
| 30 | 0.255 | 0.0507 |
| 32 | 0.203 | 0.0324 |
| 34 | 0.160 | 0.0200 |
| 36 | 0.127 | 0.0127 |
| 38 | 0.102 | 0.00811 |
| 40 | 0.079 | 0.00487 |
| 42 | 0.064 | 0.00317 |
| 44 | 0.051 | 0.00203 |

# Load-carrying capacity of cores

| | | Control/data cables | | | Motor/servo cables | | | Single-core cables | |
|---|---|---|---|---|---|---|---|---|---|
| chainflex® type | | CF5, CF6, CF2, CF150.UL, CF160.UL | CF880, CF881, CF130.UL, CF140.UL, CF890, CF891, CF240, CF211, CF884 | CF77.UL.D, CF78.UL, CF9, CF10, CF9.UL, CF10.UL, CF98.PLUS, CF99.PLUS, CF112, CF11, CF12, CF894, CF113.D, CF111.D, CF11.D, CFROBOT2, CFROBOT3, CFROBOT9 | CF885, CF886, CF30, CF31, CF887, CF897, CF210.UL, CF220.UL.H, CF21.UL , CF895, CF896 | CFROBOT6, CFROBOT7 | CF34.UL.D, CF35.UL, CF37.D, CF38, CF270.UL.D, CF280.UL.H, CF27.D, CF29.D | CF885, CF885.PE, CF886 | CF270.UL.D, CF300.UL, CF310.UL, CF330.D, CF340, CFPE, CFROBOT |
| **Insulation material** | | PVC | TPE | TPE | TPE/XLPE | TPE | XLPE | PVC | TPE |
| **Loaded conductors** | | 2 or 3 | 2 or 3 | 2 or 3 | 2 or 3 | 2 or 3 | 2 or 3 | 1 | 1 |
| Nominal cross section of copper core [mm²] | AWG size | Load capacity [A] | Load capacity [A] | Load capacity [A] | Load capacity [A] | Load capacity [A] | Load capacity [A] | Load capacity [A] | Load capacity [A] |
| **0.14** | 26 | 2.5 | 2.5 | 2.5 | - | - | - | - | - |
| **0.25** | 24 | 4 | 5 | 5 | - | 5 | - | - | - |
| **0.34** | 22 | 5 | 7 | 7 | 7 | 7 | - | - | - |
| **0.5** | 20 | 8 | 10 | 10 | 10 | 10 | 11 | - | - |
| **0.75** | 18 | 12 | 13 | 14 | 13 | 14 | 14 | - | - |
| **1** | 17 | 15 | 15 | 17 | 15 | 17 | 17 | - | - |
| **1.5** | 16 | 18 | 19 | 21 | 19 | 21 | 21 | - | 25 |
| **2.5** | 14 | 26 | 27 | 30 | 27 | 30 | 30 | 30 | 34 |
| **4** | 12 | - | 37 | 41 | 37 | 41 | 41 | 41 | 46 |
| **6** | 10 | - | 48 | 53 | 48 | 53 | 53 | 53 | 58 |
| **10** | 8 | - | - | 74 | 69 | 74 | 74 | 74 | 81 |
| **16** | 6 | - | - | 99 | 92 | 99 | 99 | 99 | 110 |
| **25** | 4 | - | - | 131 | 121 | 131 | 131 | 131 | 144 |
| **35** | 2 | - | - | 162 | 152 | - | 162 | 162 | 179 |
| **50** | 1 | - | - | - | 191 | - | 202 | 202 | 228 |
| **70** | 2/0 | - | - | - | 239 | - | - | 250 | 285 |
| **95** | 3/0 | - | - | - | - | - | - | 301 | 348 |
| **120** | 4/0 | - | - | - | - | - | - | - | 394 |
| **150** | 300MCM | - | - | - | - | - | - | - | 466 |
| **185** | 350MCM | - | - | - | - | - | - | - | 532 |
| **240** | 500MCM | - | - | - | - | - | - | - | 610 |
| **300** | 600MCM | - | - | - | - | - | - | - | 754 |
| **400** | 750MCM | - | - | - | - | - | - | - | 903 |

**Table 1:** Load-carrying capacity for chainflex® cables fixed or moving in e-chains® and e-tubes

# Load-carrying capacity of cores

The values in these tables have been taken from the standard DIN VDE 0298, Part 4. These values have been simplified and only apply approximately. For each application, it is advisable to obtain and comply with the regulations that apply to each individual case (e.g. measures for protection in case of indirect contact in accordance with DIN VDE 0100 Part 410, overcurrent protective devices in accordance with DIN VDE 0100 Part 430 or voltage drop in accordance with DIN VDE 0100 Part 520). It is not possible to provide all the regulations or overviews in this catalog. Due to the harmonization that has been carried out, it is possible that different load-carrying values may be permissible for the same cable in some cases. For the selection of the relevant cross section, the load capacity in undisturbed operation is the determining factor, i.e. the use with permissible operating temperature or permissible maximum temperature on the conductor.

The load-carrying capacity according to **Table 1** applies to operating-current-carrying cores.

Normally, these are 2 loaded conductors in the case of 2-conductor and 3-conductor cables, as well as 3 loaded conductors in the case of 4-conductor and 5-conductor cables. Please take this into account when planning for the use of multi-conductor cables in electrical installation conduits or energy chains. This information is based on an ambient temperature of 86°F and a non-loaded cable. Please apply the conversion factors according to **Table 2** if the air temperature is increased due to the heat loss of the cables (please take thermal radiation into account as well, e.g. effects of exposure to the sun).

The possible cable installation types in energy chains result in such a broad range of loading profiles that no generalized conversion factors can be offered for this large range of cables. The installation type and the conversion factors must be taken from **Table 3**, according to each individual application.

| Ambient temperature [°C] | Conversion factor | |
|---|---|---|
| | PVC insulation | TPE /XLPE insulation |
| 10 | 1.22 | 1.15 |
| 15 | 1.17 | 1.12 |
| 20 | 1.12 | 1.08 |
| 25 | 1.06 | 1.04 |
| 30 | 1.00 | 1.00 |
| 35 | 0.94 | 0.96 |
| 40 | 0.87 | 0.91 |
| 45 | 0.79 | 0.87 |
| 50 | 0.71 | 0.82 |
| 55 | 0.61 | 0.76 |
| 60 | 0.50 | 0.71 |
| 65 | – | 0.65 |
| 70 | – | 0.58 |
| 75 | - | 0.50 |
| 80 | – | 0.41 |
| 85 | – | 0.29 |
| 90 | - | 0.14 |

**Table 2:** Conversion factors in case of varying ambient temperature

| Loaded cores | Conversion factor |
|---|---|
| 5 | 0.75 |
| 7 | 0.65 |
| 10 | 0.55 |
| 14 | 0.50 |
| 19 | 0.45 |
| 24 | 0.40 |
| 40 | 0.35 |
| 61 | 0.30 |

**Table 3:** Conversion factors for multi-core cables with cable cross sections up to 10 $mm^2$

# Current carrying capacity CFCLEAN elements

| | Cable elements |
|---|---|
| chainflex® type | CFCLEAN1, CFCLEAN2, CFCLEAN3, CFCLEAN4, CFCLEAN7, CFCLEAN8 |
| **Loaded cores** | 2 or 3 |
| Nominal cross section of copper core [mm²] | Load capacity [A] |
| **0.14** | 4 |
| **0.25** | 7 |
| **0.34** | 9 |
| **0.5** | 12 |
| **0.75** | 15 |
| **1** | 18 |
| **1.5** | 22 |
| **2.5** | 30 |

**Table 1:** Load-carrying capacity for chainflex® cables fixed or moving in e-chains® and e-tubes

# Load-carrying capacity of cores

The values in these tables have been taken from the standard DIN VDE 0298, Part 4. These values have been simplified and only apply approximately. For each application, it is advisable to obtain and comply with the regulations that apply to each individual case (e.g. measures for protection in case of indirect contact in accordance with DIN VDE 0100 Part 410, overcurrent protective devices in accordance with DIN VDE 0100 Part 430 or voltage drop in accordance with DIN VDE 0100 Part 520). It is not possible to provide all the regulations or overviews in this catalog. Due to the harmonization that has been carried out, it is possible that different load-carrying values may be permissible for the same cable in some cases. For the selection of the relevant cross section, the load capacity in undisturbed operation is the determining factor, i.e. the use with permissible operating temperature or permissible maximum temperature on the conductor.
The load-carrying capacity according to **Table 1** applies to operating-current-carrying cores.

Normally, these are 2 loaded conductors in the case of 2-conductor and 3-conductor cables, as well as 3 loaded conductors in the case of 4-conductor and 5-conductor cables. Please take this into account when planning for the use of multi-conductor cables in electrical installation conduits or energy chains. This information is based on an ambient temperature of 86°F and a non-loaded cable. Please apply the conversion factors according to **Table 2** if the air temperature is increased due to the heat loss of the cables (please take thermal radiation into account as well, e.g. effects of exposure to the sun).

The possible cable installation types in energy chains result in such a broad range of loading profiles that no generalized conversion factors can be offered for this large range of cables. The installation type and the conversion factors must be taken from **Table 3**, according to each individual application.

| Ambient temperature [°C] | Conversion factor | |
|---|---|---|
| | PVC insulation | TPE /XLPE insulation |
| 10 | 1.22 | 1.15 |
| 15 | 1.17 | 1.12 |
| 20 | 1.12 | 1.08 |
| 25 | 1.06 | 1.04 |
| 30 | 1.00 | 1.00 |
| 35 | 0.94 | 0.96 |
| 40 | 0.87 | 0.91 |
| 45 | 0.79 | 0.87 |
| 50 | 0.71 | 0.82 |
| 55 | 0.61 | 0.76 |
| 60 | 0.50 | 0.71 |
| 65 | - | 0.65 |
| 70 | - | 0.58 |
| 75 | - | 0.50 |
| 80 | - | 0.41 |
| 85 | - | 0.29 |
| 90 | - | 0.14 |

**Table 2:** Conversion factors in case of varying ambient temperature

| Loaded cores | Conversion factor |
|---|---|
| 5 | 0.75 |
| 7 | 0.65 |
| 10 | 0.55 |
| 14 | 0.50 |
| 19 | 0.45 |
| 24 | 0.40 |
| 40 | 0.35 |
| 61 | 0.30 |

**Table 3:** Conversion factors for multi-core cables with cable cross sections up to 10 $mm^2$

# Chemical resistance

| Group | chainflex® cable | Jacket material | 1 | 2 | 3 | 4 | 5 | Page |
|---|---|---|---|---|---|---|---|---|
| **Control cables** | | | | | | | | |
| Control cable | CF880 | PVC | ● | | | | | 26 |
| Control cable | CF881 | PVC | ● | | | | | 30 |
| Control cable | CF130US | PVC | ● | | | | | 34 |
| Control cable | CF140US | PVC | ● | | | | | 38 |
| Control cable | CF130.UL | PVC | ● | | | | | 42 |
| Control cable | CF140.UL | PVC | ● | | | | | 46 |
| Control cable | CF150.UL | PVC | | ● | | | | 50 |
| Control cable | CF160.UL | PVC | | ● | | | | 54 |
| Control cable | CF5 | PVC | | ● | | | | 58 |
| Control cable | CF6 | PVC | | ● | | | | 62 |
| Control cable | CFSOFT1 | PVC | | ● | | | | 66 |
| Control cable | CFSOFT2 | PVC | | ● | | | | 68 |
| Control cable | CF890 | iguPUR | | | ● | | | 70 |
| Control cable | CF891 | iguPUR | | | ● | | | 74 |
| Control cable | CF77.UL.D | PUR | | | | ● | | 78 |
| Control cable | CF78.UL | PUR | | | | ● | | 82 |
| Control cable | CF2 | PUR | | | | ● | | 86 |
| Control cable | CF9.UL | TPE | | | | | ● | 90 |
| Control cable | CF10.UL | TPE | | | | | ● | 94 |
| Control cable | CF9 | TPE | | | | | ● | 98 |
| Control cable | CF10 | TPE | | | | | ● | 102 |
| Control cable | CF98.PLUS | TPE | | | | | ● | 106 |
| Control cable | CF99.PLUS | TPE | | | | | ● | 110 |
| **Data cables** | | | | | | | | |
| Data cable | CF240 | PVC | | ● | | | | 118 |
| Data cable | CF240.PUR | PUR | | | | ● | | 122 |
| Data cable | CF211 | PVC | | ● | | | | 126 |
| Data cable | CF211.PUR | PUR | | | | ● | | 130 |
| Data cable | CF11 | TPE | | | | | ● | 134 |
| Data cable | CF112 | PUR | | | | ● | | 138 |
| Data cable | CF12 | TPE | | | | | ● | 142 |
| Data cable | CFKoax | TPE | | | | | ● | 144 |
| **Bus cables** | | | | | | | | |
| Bus cable | CF888 | PVC | ● | | | | | 156 |
| Bus cable | CFBUS.PVC | PVC | | ● | | | | 160 |
| Bus cable | CF898 | iguPUR | | | ● | | | 164 |
| Bus cable | CFBUS.PUR | PUR | | | | ● | | 168 |
| Bus cable | CF14US | PUR | | | | ● | | 172 |
| Bus cable | CFBUS | TPE | | | | | ● | 174 |
| Bus cable | CFBUS.LB | TPE | | | | | ● | 180 |
| **Fiber Optic Cables** | | | | | | | | |
| Fiber Optic Cable | CFLK | PUR | | | | ● | | 188 |
| Fiber Optic Cable | CFLG88 | PVC | ● | | | | | 190 |
| Fiber Optic Cable | CFLG.LB.PUR | PUR | | | | ● | | 192 |
| Fiber Optic Cable | CFLG.LB | TPE | | | | | ● | 196 |
| Fiber Optic Cable | CFLG.G | TPE | | | | | ● | 200 |
| **Measuring system cables** | | | | | | | | |
| Measuring system cable | CF884 | PVC | ● | | | | | 210 |
| Measuring system cable | CF211 | PVC | | ● | | | | 214 |
| Measuring system cable | CF894 | iguPUR | | | ● | | | 220 |
| Measuring system cable | CF111.D | PUR | | | | ● | | 224 |
| Measuring system cable | CF113.D | PUR | | | | ● | | 230 |
| Measuring system cable | CF11.D | TPE | | | | | ● | 236 |

# Chemical resistance

| Group | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Inorganic chemicals** | | | | | |
| **Aqueous solutions, neutral** | | | | | |
| Water | + | + | O | + | + |
| Common salt (10%) | + | + | O | + | + |
| Glauber's salt (10%) | + | + | O | + | + |
| **Aqueous solutions, alkaline** | | | | | |
| Soda (10%) | O | + | + | O | + |
| **Aqueous solutions, acid** | | | | | |
| Sodium bisulfate (10%) | O | + | + | O | + |
| **Aqueous solutions, oxidising** | | | | | |
| Hydrogen peroxide (10%) | + | + | O | + | + |
| Potassium permanganate (2%) | + | + | O | + | + |
| **Inorganic acids** | | | | | |
| Hydrochloric acid, concentrated | – | – | - | – | - |
| Hydrochloric acid (10%) | O | O | + | O | + |
| Sulfuric acid, concentrated | – | – | - | – | - |
| Sulfuric acid (10%) | O | O | + | O | + |
| Nitric acid, concentrated | - | - | - | - | – |
| Nitric acid (10%) | O | O | + | - | O |
| **Inorganic caustic solutions** | | | | | |
| Sodium hydroxide, concentrated | - | - | - | – | O |
| Soda lye (10%) | O | O | + | O | + |
| Caustic potash, concentrated | - | - | – | – | O |
| Caustic potash (10%) | O | O | + | O | + |
| Ammonia, concentrated | O | O | – | O | + |
| Ammonia (10%) | + | + | + | + | + |
| **Organic chemicals** | | | | | |
| **Organic acids** | | | | | |
| Acetic acid, concentrated (glacial acetic acid) | – | - | - | - | O |
| Acetic acid(10% in $H_2O$) | O | + | + | O | + |
| Tartaric acid (10% in $H_2O$) | O | + | + | + | + |
| Citric acid (10% in $H_2O$) | O | + | + | + | + |
| **Ketone** | | | | | |
| Acetone | - | – | - | - | O |
| Methyl ethyl ketone (MEK) | - | – | – | - | O |
| **Alcohols** | | | | | |
| Ethyl alcohol (spirit) | - | O | + | O | + |
| Isopropyl alcohol | – | O | + | O | + |
| Diethylene glycol | O | O | + | + | + |
| **Aromatic compounds** | | | | | |
| Toluol | – | – | - | O | - |
| Xylol | - | – | - | O | – |
| **Fuels** | | | | | |
| Gasoline | - | O | O | + | + |
| Diesel fuel | - | O | O | + | + |
| **Synthetic oils** | | | | | |
| **Lubricating oil** | | | | | |
| ASTM oil #2 | O | + | + | + | + |
| **Hydraulic oil** | | | | | |
| Mineral oil base | – | O | + | + | + |
| Glycol base | O | O | + | + | + |
| Synthetic ester base | - | O | – | + | + |
| **Vegetable oils** | | | | | |
| Rapeseed oil | O | + | O | + | + |
| Olive oil | O | + | O | + | + |
| Soya bean oil | O | + | O | + | + |
| **Cold cleaning agent** | | | | | |
| Cold cleaning agent | – | O | + | + | O |

\+ no or minimum negative influence
O medium reciprocal effect, short-term exposure permissible
– unstable, material partly destroyed

**All information applies to room temperature**

# Chemical resistance

| Group | chainflex® cable | Jacket material | 1 | 2 | 3 | 4 | 5 | Page |
|---|---|---|---|---|---|---|---|---|
| **Servo cables** | | | | | | | | |
| Servo cable | CF887 | PVC | ● | | | | | 250 |
| Servo cable | CF210.UL | PVC | | ● | | | | 252 |
| Servo cable | CF21.UL | PVC | | ● | | | | 256 |
| Servo cable | CF897 | iguPUR | | | ● | | | 260 |
| Servo cable | CF270.UL.D | PUR | | | | ● | | 262 |
| Servo cable | CF27.D | PUR | | | | ● | | 266 |
| Servo cable | CF29.D | TPE | | | | | ● | 270 |
| Servo cable | CF220.UL.H | PVC | | ● | | | | 272 |
| Servo cable | CF280.UL.H | PUR | | | | ● | | 276 |
| **Motor cables** | | | | | | | | |
| Motor cable | CF885 | PVC | ● | | | | | 290 |
| Motor cable | CF886 | PVC | ● | | | | | 292 |
| Motor cable | CF210.UL | PVC | | ● | | | | 294 |
| Motor cable | CF30 | PVC | | ● | | | | 296 |
| Motor cable | CF31 | PVC | | ● | | | | 300 |
| Motor cable | CF895 | iguPUR | | | ● | | | 304 |
| Motor cable | CF896 | iguPUR | | | ● | | | 306 |
| Motor cable | CF270.UL.D | PUR | | | | ● | | 308 |
| Motor cable | CF27.D | PUR | | | | ● | | 312 |
| Motor cable | CF34.UL.D | TPE | | | | | ● | 316 |
| Motor cable | CF35.UL | TPE | | | | | ● | 320 |
| Motor cable | CF37.D | TPE | | | | | ● | 324 |
| Motor cable | CF38 | TPE | | | | | ● | 328 |
| Spindle cable/Single core | CF885 | PVC | ● | | | | | 332 |
| Spindle cable/Single core | CF885.PE | PVC | ● | | | | | 334 |
| Spindle cable/Single core | CF886 | PVC | ● | | | | | 336 |
| Spindle cable/Single core | CF270.UL.D | PUR | | | | ● | | 338 |
| Spindle cable/Single core | CF300.UL.D | TPE | | | | | ● | 340 |
| Spindle cable/Single core | CFPE | TPE | | | | | ● | 344 |
| Spindle cable/Single core | CF310.UL | TPE | | | | | ● | 346 |
| Spindle cable/Single core | CF330.D | TPE | | | | | ● | 350 |
| Spindle cable/Single core | CF340 | TPE | | | | | ● | 352 |
| Medium voltage cable | CFCRANE.PUR | PUR | | | | | ● | 354 |
| Medium voltage cable | CFCRANE | igupren | | | | | ● | 356 |
| **Twistable cables** | | | | | | | | |
| Twistable cable | CF77.UL.D | PUR | | | | ● | | 364 |
| Twistable cable | CFROBOT2 | PUR | | | | ● | | 368 |
| Twistable cable | CFROBOT3 | PUR | | | | ● | | 370 |
| Twistable cable | CFROBOT4 | PUR | | | | ● | | 372 |
| Twistable cable | CFROBOT5 | TPE | | | | | ● | 376 |
| Twistable cable | CFROBOT6 | PUR | | | | ● | | 378 |
| Twistable cable | CFROBOT7 | PUR | | | | ● | | 380 |
| Twistable cable | CFROBOT | TPE | | | | | ● | 384 |
| Twistable cable | CFROBOT8 | PUR | | | | ● | | 386 |
| Twistable cable | CFROBOT8.PLUS | PUR | | | | ● | | 390 |
| Twistable cable | CFROBOT9 | PUR | | | | ● | | 394 |
| **Special cables** | | | | | | | | |
| Special cable | CFTHERMO | PUR | | | | ● | | 402 |
| Special cable | CFFLAT | TPE | | | | | ● | 404 |
| Special cable | CFSPECIAL.182 | PUR | | | | ● | | 406 |
| Special cable | CFSPECIAL.192 | PUR | | | | ● | | 408 |
| Special cable | CFSPECIAL.532 | PUR | | | | ● | | 410 |
| Special cable | CFSPECIAL.562.PE | PUR | | | | ● | | 412 |
| Special cable | CFSPECIAL.572 | PUR | | | | ● | | 414 |
| Special cable | CFSPECIAL.592 | PUR | | | | ● | | 416 |
| Special cable | CFSPECIAL.792 | PUR | | | | ● | | 418 |

# Chemical resistance

| Group | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Inorganic chemicals** | | | | | |
| **Aqueous solutions, neutral** | | | | | |
| Water | + | + | O | + | + |
| Common salt (10%) | + | + | O | + | + |
| Glauber's salt (10%) | + | + | O | + | + |
| **Aqueous solutions, alkaline** | | | | | |
| Soda (10%) | O | + | + | O | + |
| **Aqueous solutions, acid** | | | | | |
| Sodium bisulfate (10%) | O | + | + | O | + |
| **Aqueous solutions, oxidising** | | | | | |
| Hydrogen peroxide (10%) | + | + | O | + | + |
| Potassium permanganate (2%) | + | + | O | + | + |
| **Inorganic acids** | | | | | |
| Hydrochloric acid, concentrated | - | – | – | – | - |
| Hydrochloric acid (10%) | O | O | + | O | + |
| Sulfuric acid, concentrated | – | – | - | - | – |
| Sulfuric acid (10%) | O | O | + | O | + |
| Nitric acid, concentrated | – | – | – | - | - |
| Nitric acid (10%) | O | O | + | - | O |
| **Inorganic caustic solutions** | | | | | |
| Sodium hydroxide, concentrated | - | - | – | - | O |
| Soda lye (10%) | O | O | + | O | + |
| Caustic potash, concentrated | – | - | - | - | O |
| Caustic potash (10%) | O | O | + | O | + |
| Ammonia, concentrated | O | O | - | O | + |
| Ammonia (10%) | + | + | + | + | + |
| **Organic chemicals** | | | | | |
| **Organic acids** | | | | | |
| Acetic acid, concentrated (glacial acetic acid) | - | – | - | – | O |
| Acetic acid(10% in $H_2O$) | O | + | + | O | + |
| Tartaric acid (10% in $H_2O$) | O | + | + | + | + |
| Citric acid (10% in $H_2O$) | O | + | + | + | + |
| **Ketone** | | | | | |
| Acetone | – | – | – | – | O |
| Methyl ethyl ketone (MEK) | - | - | – | – | O |
| **Alcohols** | | | | | |
| Ethyl alcohol (spirit) | - | O | + | O | + |
| Isopropyl alcohol | - | O | + | O | + |
| Diethylene glycol | O | O | + | + | + |
| **Aromatic compounds** | | | | | |
| Toluol | - | – | – | O | - |
| Xylol | - | – | – | O | - |
| **Fuels** | | | | | |
| Gasoline | - | O | O | + | + |
| Diesel fuel | – | O | O | + | + |
| **Synthetic oils** | | | | | |
| **Lubricating oil** | | | | | |
| ASTM oil #2 | O | + | + | + | + |
| **Hydraulic oil** | | | | | |
| Mineral oil base | – | O | + | + | + |
| Glycol base | O | O | + | + | + |
| Synthetic ester base | - | O | - | + | + |
| **Vegetable oils** | | | | | |
| Rapeseed oil | O | + | O | + | + |
| Olive oil | O | + | O | + | + |
| Soya bean oil | O | + | O | + | + |
| **Cold cleaning agent** | | | | | |
| Cold cleaning agent | - | O | + | + | O |

\+ no or minimum negative influence
O medium reciprocal effect, short-term exposure permissible
– unstable, material partly destroyed

**All information applies to room temperature**

# Cables and hoses

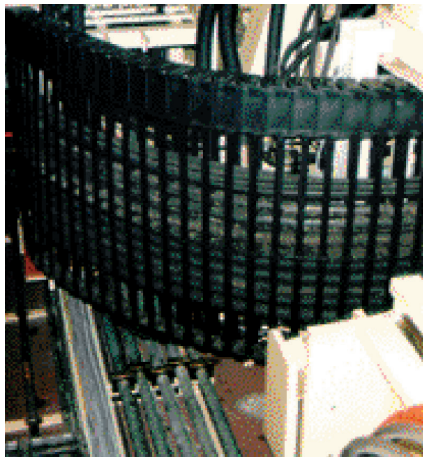
Rules for:
- Maximum cable diameters
- Separation
- Bend radius

## General rules for cables and hoses in e-chains®

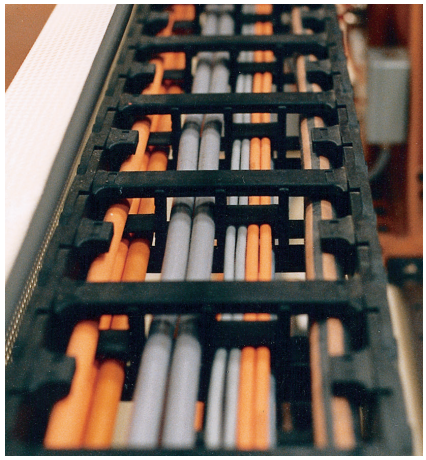
### Data and energy supply in all forms – in an energy chain system®

The key advantage of an igus® e-chain system® is the safe accommodation of various forms of data cables and energy supply in one system. We recommend the optimal separation layout of the cables and hoses in the e-chain®, but you, the customer, are still afforded the final choice. It is possible, for instance, to maintain minimum distances between bus and motor cables and mix pneumatics, electric and hydraulics in the same compartments.

In addition to the quality of the cables used, the arrangement of each service within the e-chain® and the space allowed, are important for the service life of the system. Various separation options enable the adaptation of the e-chains® to the specific requirements of each respective application. Generalized rules such as "No more than 80% of the clear space of energy chains should be used" no longer make sense given the complexity of present-day applications. In this chapter, we give you detailed recommendations. Due to the variety of the application parameters, we strongly recommend you take advantage of our free consultation services. Simply give us a list of your cable requirements (or merely the required electrical or other services) and you will receive our recommendation.



Hydraulics and electric cables are separated from one another in this example



Well ordered cables with igus® interior separation

## Maximum cable and hose diameters

The maximum cable and/or hose diameter corresponds to the inner height of the selected e-chain®/e-tube, with additional minimum clearance. This minimum clearance would be, for example, 10% for round electrical cables, 20% for hydraulic hoses. An e-chain® is ideal if a minimum lateral gap to the next cable or hose has been factored in. Depending on the nature of the cables, the dynamics, and the expected service life, more clearance must be allowed. In specific cases, clearances may be altered further. Please contact us.

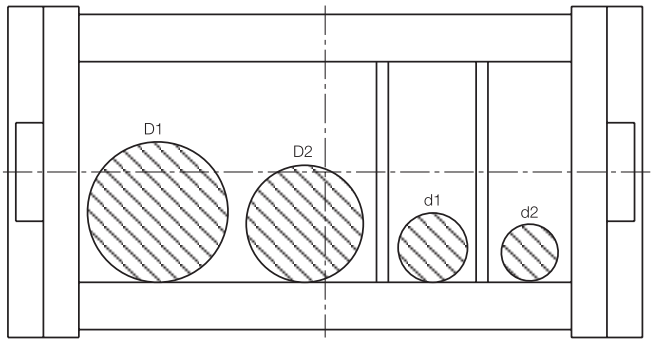
Electrical cables need at least 10% clearance space all around, hydraulic hoses need 20%

The maximum cable diameter is specified for each series in its respective chapter

# Cables and hoses

## Distribution in e-chains®

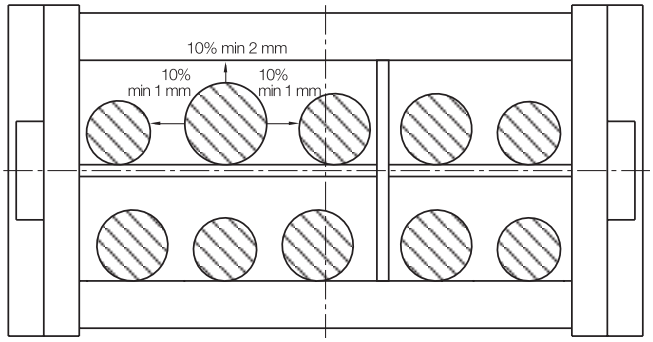
- Cables and hoses with very different diameters should be laid separately. The separation is achieved using modular separators.
- Cables and hoses must under no circumstances have the opportunity to tangle. Therefore, the clearance height of a compartment with several similar cables or hoses next to one another must **not amount to more than one and a half times the cable/hose diameter.**




**D1 + D2 > 1.2 x hi** **d1 + d2 ≤ 1.2 x hi**

**Expressed in rules, this means:**

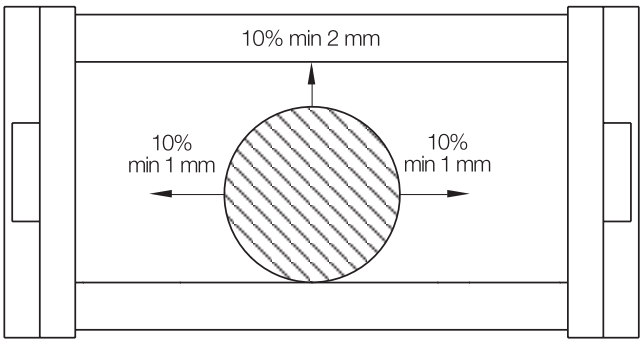
**Rule 1:**
If D1 + D2 > 1.2 x e-chain® inner height, no separation between the two cables/ hoses is necessary. Two cables/ hoses should never be left unguided on top of one another or be allowed to become tangled.




**d1 + d2 ≤ 1.2 x hi**

**Rule 2:**
if d1 + d2 ≤ 1.2 x e-chain® inner height, a vertical separator or a horizontal shelf must be used to reduce the inner height. Thereby preventing the entanglement of d1 and d2.

**The reason for this rule is:**
**The cables and hoses must be laid so that they can move freely at all times and so that no tensile force is exerted at the radius of the e-chains®.**




**Clearance space for round electrical cables**

For high-speed applications and high cycles, cables or hoses **must not be laid on top of each other without horizontal separation**. The standard values for this are:

Travel speed over **0.5m/s** and cycles over **10,000 p.a.**

igus® interior separation offers a safe solution for this situation.

**Clearance space in % for various cables**

| Cables | Clearance space |
|---|---|
| Round electrical cables | **10%** |
| Electrical flat cables | **10%** |
| Pneumatics | **5-10%** |
| Hydraulics | **20%** |
| Media hoses | **15-20%** |

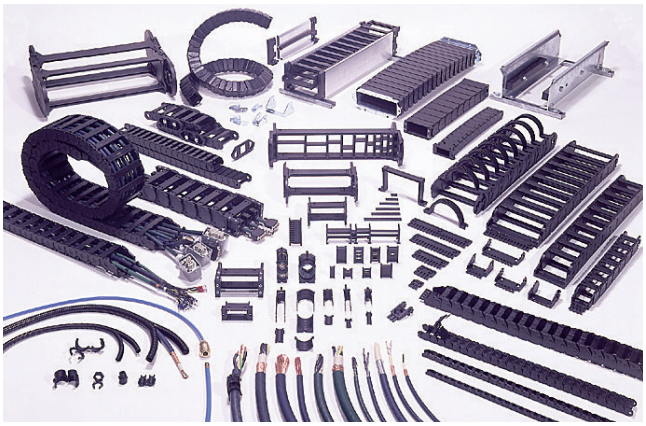
# Cables and hoses

## Further guidelines for distribution

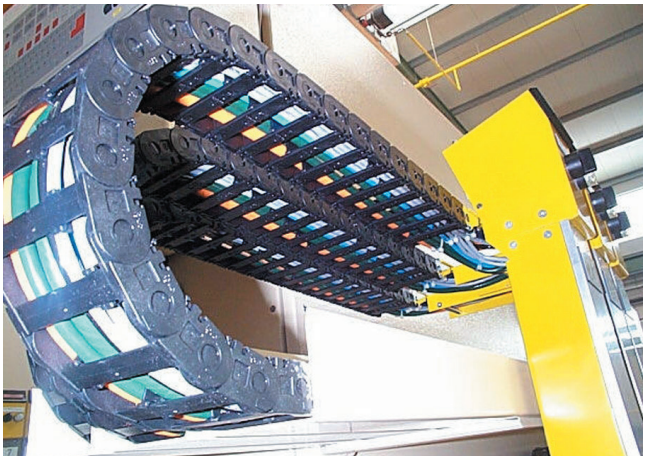
- The cable weight should be symmetrically distributed across the width of the e-chain®.
- Cables with different outer jacket materials must not be allowed to rub together. If necessary, they must be laid separately. All igus® chainflex® cables can be combined with each other and other brands of cables.
- The cables should always be fixed at the moving end. The fixed end should also always have strain relief. Exceptions are made only for certain hydraulic hoses with length compensation issues or other high pressure hoses. (refer to "hydraulic hoses").
- Generally, the faster and more frequently the e-chain® operates, the more important the exact positioning of the cables and hoses inside the e-chain® becomes. Due to the wide variety of the possibilities, we strongly recommend you take advantage of our free consultation services for your specific applications.

## Bend radius R

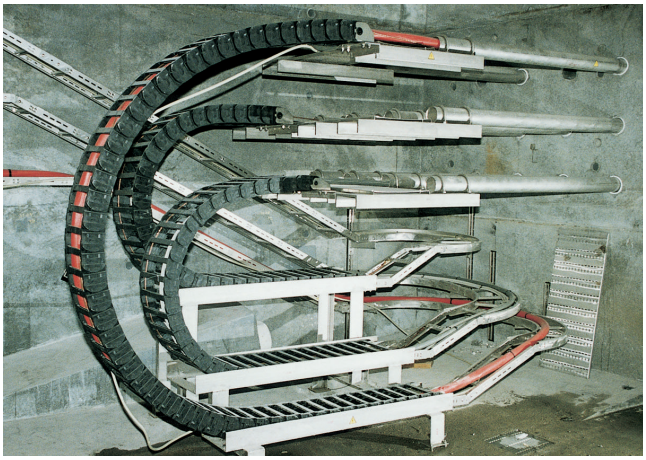
- The bend radius of your e-chain® depends on the thickest or stiffest cable or hose in your application.
- The bend radii of the e-chains® should be adjusted to the recommendations of the cable or hose manufacturer. The selection of a larger radius than the minimum will positively affect service life.
- The specification of minimum bend radii for cables refers to use at normal temperatures. Other bend radii may be recommended. Please ask your cable supplier for details.



**The igus® construction kit of energy chain systems solves all the requirements for interior separation known today.**



**igus® chainflex® cables permit the smallest bend radius of 5 x d for one million strokes.**



**The igus® product range offers up to 12 different bend radii for each chain series from stock. Here series 50 in the Storebaelt bridge project.**

We recommend complete e-chain systems®, - where bend radii for all cables and hoses, interior separation and service life are optimally matched. Also ask for the igus® system guarantee. ▶ readychain® **from page 442**

# Electrical round cables

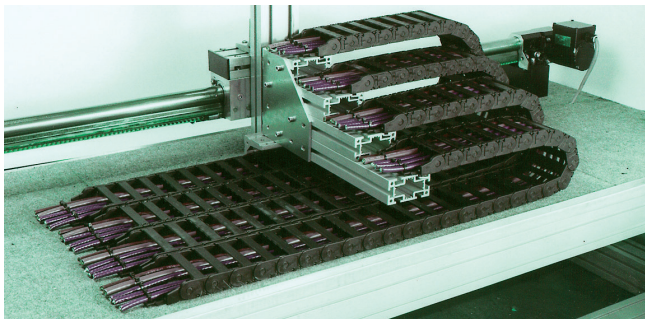
## Electrical round cables

For electrical cables, the round cable is a safe, modular and cost-effective solution for e-chain systems®. We recommend the following criteria for selecting the proper round electrical cables:

**Selection criteria:**

- Small minimum bend radii and mounting heights
- Long service life at minimum bend radius
- Service life expectations for your application (short or long travel, hanging)
- Test data on service life from realistic tests
- Uncomplicated installation process - no hanging, laying out, etc, of cables required
- Strain relief integrated directly into the mounting bracket
- Flexible shields for shielded cables
- Abrasion-resistant and non-adhesive outer jackets
- Large selection to avoid expensive custom designs

For bus cables and fiber optic cables, special attention must be paid to how effective transmission rates and shielding remain after millions of cycles at the minimum bend radius.



**Example at igus® test laboratory: constant development and testing of chainflex® cables**

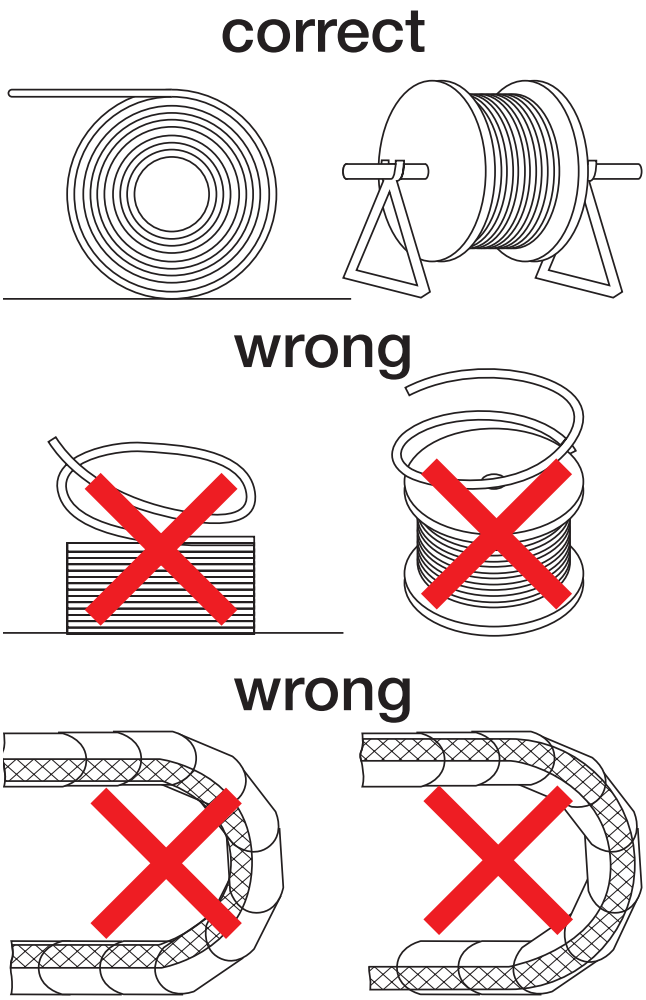
# Electrical round cables

## Installation and strain relief of electrical round cables

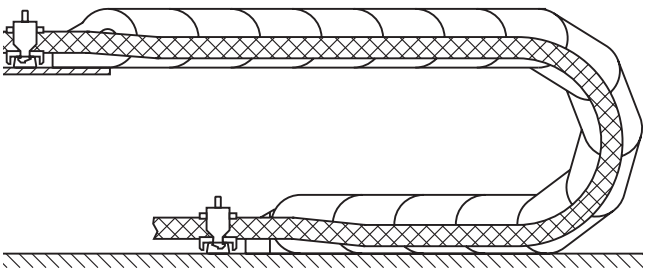
1. The cables must be laid straight, without twisting. Cables must not be uncoiled from the top of the spool. igus® chainflex® cables are immediately ready for fitting directly into the e-chain®. They need not be disconnected or laid out before installation.
2. The cables must be laid so that each individual cable can move freely from side to side.
3. The cables must be able to move freely along the radius. This must be double-checked if the upper run operates at the cable's maximum bend radius.
4. The division of the e-chains® interior using igus® interior separators or shelves is necessary if several cables and/or hoses with varying diameters are laid out. It is important to prevent cables and hoses from tangling.
5. For cables and hoses with different jacket materials, it is important to prevent them from "sticking" to one another. If necessary, they should be separated. igus® chainflex® cables can be combined with all others.
6. Round electrical cables must be secured with strain relief at both ends. In exceptional cases, the cables may be fixed with strain relief at the moving end of the e-chain® only. A gap of 10-30 x cable diameter between the end of the bend segment and the fixed point is recommended for most cables. chainflex® cables can, on the other hand, be secured directly to the mounting bracket with strain relief (this has been confirmed with testing).

We will be pleased to provide you with recommendations for complete e-chain systems®:
"readychain®: chain-cable harnessing".

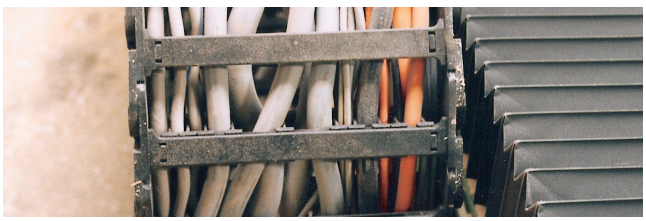
▶ readychain® **from page 442**




**The cables must be able to move freely along the radius**



**chainflex® cables can be strain-relieved directly at the mounting bracket.**

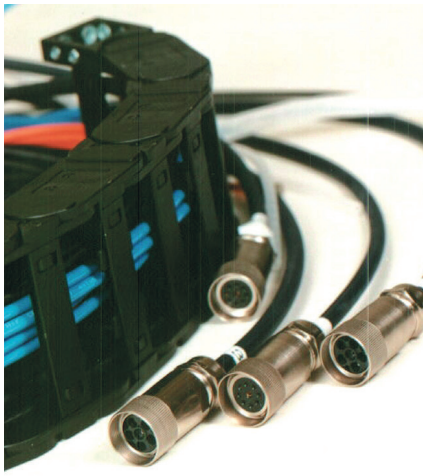


**Corkscrewing: an effect of improper cable and hose placement in an e-chain®**

# Pneumatic hoses

## Pneumatic hoses

In principle, the same rules apply for pneumatic hoses as for round cables. In practice, it has been demonstrated that pneumatic hoses are less susceptible to wear. After consultation, they can be laid together more closely than the "10% all-around clearance" rule. A double-sided strain relief is required under these conditions. For pneumatic hoses made of rubber, we recommend strictly following the "10% clearance" rule because they tend to adhere to each other and to other cables and hoses.



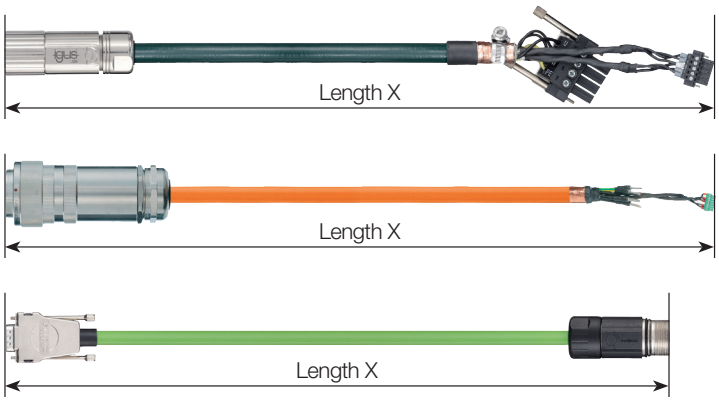
**Fully pre-assembled e-chain system® with several pneumatic and hydraulic hoses.**

**The igus® product range also offers thermo polymer pneumatic hoses called "chainflex® CFAir and CFCleanAir" ▶ Page 438**

# Design parameters | **Definition of length**

## Harnessed cables

igus® GmbH defines cable length as entire length including connectors or open harnessing.
Further length definitions possible on request. Feel free to contact us!



# Welcome to the world ...

## The chainflex® approvals and their significance:
## www.igus.com/chainflex-certificates

### UL Marketing Claim Verification

Today, plant safety or availability can be the decisive reason to choose one machine over another.

As the complexity of the machines and number of electrical parts increases, the difficulty for designers to choose the best product also increases.

This is not helped by the fact that there is a lot of marketing information given, which is not norm based, and therefore difficult for the designer to verify the facts.

This is where the UL Marketing Claim Verification initiated by UL will help the designer.

This is because UL checks the marketing statements of the supplier for the technical data and accuracy.

The UL verified label now proves that the guarantee and quality statements for chainflex® cables and their durability, service life and functionality have been certified by UL. For companies that use these cables in their equipment, they offer more safety from purchasing parts for machine construction, customs clearance and shipping of the machines to America, right through to commissioning. Those who use chainflex® cables in energy chains can have confidence in terms of parameters such as temperature, type of movement, torsion, media influence or minimum bend radius.

The complex certification procedure for the claim (Diagram 1) for the claim "igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year" was carried out by auditors of the US institute at the igus® location in Cologne.

To achieve this, the processes and logic of service life determination were evaluated in a comprehensive audit program of the 5,500 m² chainflex® test laboratory, which has over 800 parallel running tests and over 2 billion test cycles per year.

The following four areas were scrutinized:

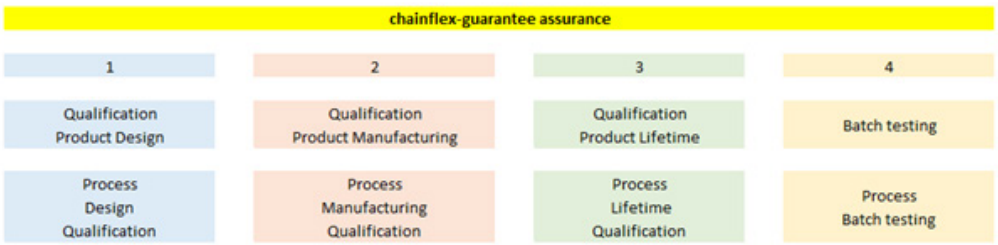
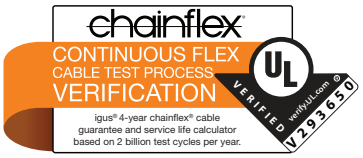



Figure 1: The complex process to get the UL marketing certificate (source: igus®)




**More details online:**
verify.ul.com/verifications/368

# Approvals and standards

## UL listed

Cables for applications that can be fully described in a standard are certified as "UL Listed". Example: A cable for a washing machine power supply can be clearly described for its application; therefore a normative description of the application of the cable and the associated test setup can be clearly defined. To certify that the cable is in accordance with "UL Listed" and then to manufacture, test and mark according to "UL Listed". It is not permissible to use a different kind of cable in such a clearly described application in the USA.

## UL/CSA Recognized

The "UL/CSA Recognized" certification marks are issued for components of larger systems. In this case, only components that are not intended for a single, precisely defined installation or application are certified.
Cables for applications that cannot be described normatively and completely are then certified according to "UL/CSA Recognized" (AWM).

Example: Cables for use in energy chains are so diverse and complex that a normative description is impossible. This is where the " UL/CSA Recognized" certification is applicable. It allows cable developers a whole range of different combinable options with respect to insulation material, jacket material and design. From this cable manufacturers develop a combination that works, which means that it can be used for a specific customer application.

**Be aware**: "UL/CSA Recognized" describes a large, extremely varied range of applications. Here, it is the responsibility of the designer and manufacturer of such an "AWM cable" to work out and carry out appropriate additional tests to prove a specific application, e.g. in an energy chain.

## UL

The institution responsible for approval in the USA is Underwriters Laboratories (UL). The Canadian Standards Association (CSA) is responsible for it in Canada. Certification guidelines and certification processes differ in their complexity, depending on the market and country. A so-called Memorandum of Understanding allows use in both countries, regardless of the place of certification. Both testing organizations distinguish between the so-called "UL/CSA Listed" and "UL/CSA Recognized" certification, both of which fulfill normative safety requirements that are verified by test procedures.

**More details online:**
iq.ul.com/

# Approvals and standards

## NFPA

The US **N**ational **F**ire **P**rotection **A**ssociation (NFPA), is a non-profit organization that has been active in fire protection since 1896.
NFPA publishes numerous safety standards including electrical standards that are used in the USA today.
These include the "NFPA 79 - Electrical Standard for Industrial Machinery". The subject of the standard is primarily the correct application of electrical systems in industrial machinery and equipment used in the USA. With the help of the standard, designers can develop safe machines with the highest level of protection for operating personnel.
NFPA 79-2018 includes the topic "*Special Cables and Conductors*" relevant for chainflex cables in section 12.9.

**More details online:**
www.nfpa.org/

## CLPA

The **C**C-**L**ink **P**artner **A**ssociation is an organization based in Japan and represented in 11 regions of the world.
The purpose of CLPA is to spread and establish the industry network "CC-Link" standard worldwide.
In addition to the marketing of this standard, CC-Link products that are to be used for this standard are tested by this organization and, if they are technically compliant with the corresponding certificates, are approved for use in CC-Link networks.

**More details online:**
www.cc-link.org/sch/c012List?userSeqNo=76&menuSeqNo=2

## DNV approval

The maritime economy is developing towards more automation and digitalization: Whether vessel manufacture, shipping companies or the gas and oil industry - ships are becoming autonomous factories, shipping companies are becoming fully-fledged logistics providers, and refineries are becoming automated conveyor systems.
DNV is responsible for certifications in the maritime environment, offshore facilities, gas and oil pipelines, and onshore applications such as wind, tidal or solar energy. The classification society was formed in 2012 through the merger of the Norwegian company Det Norske Veritas (DNV) and Germanischer Lloyd (GL).
The components used in maritime environments have to meet different requirements than those of classic factory automation on land.
This requires a separate approval for the operation of these components. The certification society checks compliance with international standards and guidelines, which are applied accordingly to these components. If existing regulations or standards do not describe the application sufficiently, additional testing measures are defined or developed.

If products have DNV approval, it simplifies and speeds up their use in the maritime sector, as it is not necessary to test individual components.

**More details online:**
www.dnv.com

# Approvals and standards

## REACH directive

The term REACH stands for a regulation called **R**egistration, **E**valuation, **A**uthorization and Restriction of **Ch**emicals.

Its scope covers manufacturers or importers of more than one tonne of substances per year into the European Union.

The REACH directive is only partially valid for igus®: As a manufacturer of cables, the company is defined as a so-called "downstream user" with regard to the value add chain. Nevertheless, the contents of the REACH directive and its rules for the production and processing of chemical substances are observed at igus®. For example, no chemicals are used in the production of chainflex® cables that are above the valid REACH limits. The entire range of chainflex® cables is free from materials such as sodium peroxometaborates, cadmium sulphides or also dihexyl phthalates.

**More details online:**
echa.europa.com/de/regulations/reach/understanding-reach

## RoHS-II / RoHS-III

**More safety for people and the environment**

The abbreviation RoHS stands for **R**estriction **o**f **H**azardous **S**ubstances and regulates the use of selected hazardous substances in electrical and electronic equipment, which includes cables. By complying with this directive, companies prove that problematic materials such as lead, mercury or phthalates - known as plasticizers - have been banned from electronic waste and also from working environments. One example is lead. It occurs, among other things, in the form of solder on circuit boards, which are installed in complex machine systems in a variety of ways.

Materials research in recent years has also produced new jacket materials which, among other things, do not contain hazardous plasticizers and thus function flexibly in dynamic applications. Until now, plasticizers have been used in industry mainly where plastics had to remain particularly pliable, soft and elastic in use.

igus® develops and tests special jacket materials for use in e-chains in its own laboratory, which are RoHS II /III compliant according to the respective requirements.

**More details online:**
ec.europa.com/environment/waste/rohs_eee/legis_en.htm

# Approvals and standards

## CE mark

The CE marking makes it clear that the manufacturer of a product such as chainflex® cables complies with the applicable EU directives. The CE marking is not a seal of approval or quality mark and was created for trade in the European Economic Area.

- The CE certification basis has come to encompass more than 25 EU directives (issue 2020).
- The CE certificate is a kind of voluntary commitment.
- The CE mark on a machine and the corresponding signature confirms that this machine was planned, designed and built in accordance with the applicable standards.
- The CE marking is part of further regulations. These include the Machinery Directive, the Electromagnetic Compatibility (EMC) Directive, the Low Voltage Directive (often referred to as LVD), RoHS substance restrictions and protective equipment, etc.

CE conformity is based on a complex risk assessment.

**Risk assessment - the iterative procedure consists of:**

- Verification of the intended use of e.g. e-chain® and chainflex® cables
- Analysis of conceivable, foreseeable misuse
- Determination of relevant and valid standards for the production of chainflex® cables and e-chains®
- Determination of specific requirements and conditions for the use of chainflex® cables
- Research of the responsible "notified body", e.g. at the accreditation body DAkkS (Institute for the monitoring of all certification, testing and inspection bodies)
- (Laboratory) tests of the chainflex® cables and e-chains®
- Data evaluation
- Preparation of technical documentation and translation into target languages
- Creation of the certificate/provision for download
- Attaching the CE mark

**More details online:**
c.europa.com/growth/single-market/ce-marking_de

# Approvals and standards

## igus® chainflex® cables for DESINA

DESINA: **DE**central and **S**tandardized **IN**st**A**llation technique is a recommendation of the Verein Deutscher Werkzeugmaschinenfabriken (VDW = Association of German machine tool industry) for the purpose of standardizing components, interfaces and connecting systems.
DESINA describes an extensive whole concept for standardization and decentralization of the fluid technical and electrical installation of machines and plants.
**For further information: www.desina.de**

## Det Norske Veritas

**For further information: www.dnv.com**

## Underwriters Laboratories Inc.

**For further information: www.ul-europe.com**

## Canadian Standards Association

**For further information: www.csa.ca**

## Commission Électrotechnique Internationale

## Communauté Européenne

# General

## General conditions

The General Conditions of Sale of igus® shall apply. Excessive and short deliveries of ± 10% for cables conform with contractual agreements. Deliveries can be made in part-lengths. Statutory VAT must be added to the prices. The General Conditions of Sale and Delivery of igus® GmbH, Cologne, can be found online under www.igus.com.
The prices quoted in the catalogue or other media are subject to alteration. igus® can modify the prices at any time at their own discretion.

## User information

Since our products are constantly being developed further in the interest of our customers, we reserve the right to make technical alterations at any time. With the issue of this catalogue, all previous publications lose their validity. Subject to printing errors.

## Disclaimer

The terms "igus", "chainflex", "CFRIP", "readycable", "readychain", "e-chain", "e-chain systems", "e-ketten", "e-kettensysteme", "flizz", "iglidur", "drylin" are legally protected trademarks in the Federal Republic of Germany and in case also in foreign countries.

## Outer jacket color according to RAL

chainflex® cable jacket colours are given with the similar RAL color number; for example yellowgreen, similar to RAL 6018. Slight differences can occur from the exact RAL color, depending on the cable jacket material. However, this has no effect on the quality or functionality of the cable.
A RAL number is used to describe different shades of color more consistently. For example, RAL 7040 is light gray and RAL 7016 is a dark gray. The RAL number describes the color, but cannot guarantee the same shade in different applications.

RAL: German Institute for Quality Assurance and Certification e.V. ▶ www.RAL.de

## KTG

If cable drums are to be used, please visit KTG directly online.▶ www.kabeltrommel.de

## Product illustrations

The products illustrated are photos showing examples for whole series, i.e. the original cable can deviate from the cable shown.

## Technical notes

The USB, FireWire and GigE cables listed on this page have been developed and manufactured for the mechanically demanding industrial application in e-chain systems®. High resistance against oil and lubricants are guaranteed, and also a high protection against electro-magnetic interference fields. This high mechanical service life was reached with the usage of high quality materials which even care for the electrical safeness.
In single cases communication errors can occur, if very different hardware and software is combined. We recommend tests with all components and the cables before starting serial production, to get the proof for a perfectly running system.
Of course we support you with the details of these electrical tests.

The specifications in the catalogue referring to temperature range, bend radius and travel must be seen as limiting value specifications. If two limiting value specifications are combined, this can lead to a reduction of the cable's service life.

The term "oil-resistant" refers to a few selected oil types which have been tested accordingly. This does not mean, however, that the products are automatically resistant to all the oils on the market.

Length printing: Respective printing of the meter length is already on many cables. These are not calibrated measurements, they are only intended as an orientation aid.
Just give us a call!

# igus® worldwide

## igus® Offices

## igus® Distributors

### 1 Germany

**igus® GmbH**
Spicher Str. 1a
51147 Cologne
PO Box 90 61 23
51127 Cologne
Phone 02203 9649-0
Fax 02203 9649-222
info@igus.de

### 2 Argentina

**Borintech SRL**
Av. Elcano 4971
C1427CIH Buenos Aires
Phone +5411 4556 1000
igus@borintech.com

### 3 Australia

**igus® Australia Pty. Ltd.**
109 Wicks Road
Macquarie Park NSW 2113
Phone +61 1300 726 244
au-sales@igus.net

### 3 Australia

**Treotham Automation Pty. Ltd.**
14 Sydenham Road
Brookvale NSW 2100
Phone +61 2 9907-17 88
Fax +61 2 9907-1778
info@treotham.com.au

### 4 Austria

**igus® polymer Innovationen GmbH**
Photo-Play-Straße 1
4860 Lenzing
Phone +43 7662 57763
Fax +43 7662 57751
igus-austria@igus.de

### 5 Belgium/Luxemburg

**igus® B.V.B.A.**
Jagersdreef 4A
2900 Schoten
Phone +32 3 330 13 60
Fax +32 3 313 79 91
info@igus.be

### 6 Bosnia + Herzegowina

**HENNLICH industrijska tehnika d.o.o.**
Zujevinska br. 10
71210 Ilidža - Sarajevo
Phone +387 33 451 439
Fax +387 33 451 439
info@hennlich.ba

### 7 Brazil

**igus® do Brasil Ltda.**
Rua Antônio Christi, nº 611
Parque Industrial III – FAZGRAN
Jundiaí – CEP 13213-183 – SP
Phone +55 11 3531-44 87
Fax +55 11 3531-44 88
vendas@igus.com.br

### 8 Bulgaria

**Hennlich OOD**
4204 Tsaratsovo, Bulgaria
17 Golyamokonarsko shose Str.
Phone +359 32 511 326
Fax +359 32 621 929
office@hennlich.bg

### 9 Canada

**igus® Office Canada**
Suite 100-180
Bass Pro Mills Dr
Vaughan, ON L4K 5W4
Phone +1 905 7608448
Fax +1 905 7608688
webmaster@igus.com

### 10 Chile

**Vendortec**
Avda. Los Pajaritos 3195,
Oficina 1410
Edificio Centro Maipú
Maipú – Santiago
Phone +56 22 710 58 25
+56 23 245 02 00
ventas@vendortec.cl

### 11 China

**igus® Shanghai Co., Ltd.**
No.50, North Huancheng Road
Fengxian district
Shanghai 201401
Phone +86 21 8036 6999
Fax +86 21 8036 6116
cnmaster@igus.net

### 12 Colombia

**PRODUCTOS I SAS**
Carrera 28a, 15-18 Local 1,
Paloquemao, Bogotá
Phone +57 1 561 2959
ext. 113
igus@igus.com.co

### 13 Costa Rica

**Enesa Equipos Neumaticos S.A.**
Del Colegio Marista
100 este, 200 sur, 25 este
Urbanizacion Ciruelas
Alajuela
Phone +506 2440-2393
Fax +506 2440-2393
equiposneumaticos@enesa.net

### 14 Côte d'Ivoire

**igus Côte d'Ivoire SASU**
Abidjan XL Plateau Centre
Avenue Dr. Crozet
Immeuble XL, 6ème&7ème étage
01 BP 2785 Abidjan 01
Plateau Abidjan
Phone +225 0710619970
ci-info@igus.net

### 15 Croatia

**Hennlich, Industrijska d.o.o.**
Stupničkoobreška 17
Stupnički Obrež
10255 Gornji Stupnik
Phone +385 1 3874334
Fax +385 1 3874336
hennlich@hennlich.hr

### 16 Cyprus

**G.C.V. Spare Parts & Services Ltd (HQ)**
Industrial Area Anatoliko
8068 Pafos
Phone +357 26 812444
Fax +357 26 812447
igus@gcv-parts.com

### 17 Czech Republic

**HENNLICH s.r.o.**
Českolipská 9
412 01 Litoměřice
Phone e-ketten®
+420 416 711332
Phone Gleitlager
+420 416 711339
Fax +420 416 711999
lin-tech@hennlich.cz

### 18 Denmark

**igus® ApS**
Lysholt Alle 8
DK-7100 Vejle
Phone +45 86 603373
Fax +45 86 603273
info@igus.dk

### 19 Ecuador

**Ecuainsetec**
Yugoeslavia N34-110 y Azuay
Quito
Phone +593 2 2253757
Fax +593 2 2461833
infouio@ecuainsetec.com.ec

### 20 Egypt (Non-port business)

**IEE International Company for Electrical Engineering**
2nd floor, 25 Orabi St
Down Town, Cairo
Phone +20 2 25767370
Fax +20 2 25767375
sales@iee-egypt.com

### 20 Egypt (Port business)

**Fedicom Trading & Engineering**
12 El Mahaad El Swissri St,
Zamalek
11561 Cairo
Phone +20 2 27362537
mohamed.fayed@fedicom.com

### 21 Estonia

**igus® OÜ**
Vana-Tartu mnt 79a
75312 Peetri
Phone +372 667 5600
info@igus.ee

### 22 Finland

**OEM Finland OY**
Fiskarsinkatu 3
20750 Turku
PL 9, 20101 Turku
Phone +358 20 7499499
Fax +358 20 7499456
info@oem.fi

### 23 France

**igus® SAS**
1, avenue Edouard Herriot
94260 Fresnes
Phone +33 1 49840404
Fax +33 1 49840394
info@igus.fr

### 24 Greece

**J. & E. Papadopoulos S.A.**
12 Polidefkous str
Piraeus, 185 40
Phone +30 210 4113133
Fax +30 210 4116781
sales@papadopoulos-sa.com

### 25 Hong Kong

**Sky Top Enterprises Ltd.**
Room 1806 ; Block C; Wah Tat Industrial Center; Wah Sing Street; Kwai Chung Hong Kong
Phone +852 23318928
Fax +852 24269738
info@skytop.com.cn

### 26 Hungary

**igus® Hungária Kft.**
Ipari Park u.10.
1044 Budapest
Phone +36 1 3066486
Fax +36 1 4310374
info@igus.hu

### 26 Hungary

**Tech-Con Kft.**
Vésö utca 9-11
1133 Budapest
Phone +36 1 4124161
Fax +36 1 412 4171
tech-con@tech-con.hu

### 27 India

**igus® (India) Pvt. Ltd.**
#1 & 2, Survey No. 34,
Mandur-Devanahalli Road,
Mandur, Bidarahalli Hobli,
Bangalore - 560049
Karnataka
Phone +91 80 68127800
Fax +91 80 68127802
info-in@igus.net

### 28 Indonesia

**PT igus® Indonesia**
Headquarter Indonesia
Taman Tekno BSD
Blok J1 No. 12 & 15
Tangerang Selatan 15314
Phone +62 21 7588 1933
Fax +62 21 7588 1932
id-info@igus.net

### 29 Ireland

**igus® Ireland**
Caswell Rd
Northampton NN4 7PW
Phone +44-1604 677240
Fax +44-1604 677242
sales@igus.ie

### 30 Israel

**Conlog LTD**
PO Box 3265
17 Hamefalssim Str.
Industrial Zone Kiryat Arie
Petach-Tikva 49130
Phone +972 3 9269595
Fax +972 3 9233367
conlog@conlog.co.il

### 31 Italy

**igus® S.r.l.**
Via delle Rovedine, 4
23899 Robbiate (LC)
Phone +39 039 5906.1
Fax +39 039 5906.222
igusitalia@igus.it

### 32 Japan

**igus® k.k.**
Arcacentral 15F, 1-2-1 Kinshi,
Sumida-ku Tokyo JAPAN
Zip 130-0013
Phone +81 358 192030
Fax +81 358 192055
info@igus.co.jp

### 33 Kazakhstan

**HENNLICH TOO**
Kamali Dyusembekova
Street 1/5
100022 Kazybek Bi R-N,
Karaganda City
Phone +7 701 419 0756
+7 7212 78 06 70
igus@hennlich.kz

### 34 Kenya

**Mantrad Ltd.**
Sterling House, 1St. Floor
Moi Avenue, Mombasa
Phone + 254 722 706 830
Fax + 254 720 765 566
info@mantrad.co.ke

### 35 Latvia

**Techvitas SIA**
Daugavas iela 38-3
Mārupe, LV-2167
Phone +371 22 325 004
i_igusLettland_G@igus.de

### 36 Lebanon

**Mecanix Shops SAL**
Horsh Tablet - Ste Rita blvd
P.O.Box: 55384 Beirut
Phone +961 1 486701
Fax +961 1 490929
sales@mecanixshops.com

### 37 Lithuania

**Hitech UAB**
Terminalo g. 3
54469 Biruliskiu k. (Kauno LEZ)
Kauno raj.
Phone +370 37 323271
Fax +370 37 203273
info@hitech.lt

### 38 Mazedonien, Albania, Kosovo

**Hennlich doo Beograd**
Radomira Markovića 1/3
11222 Beograd
Phone +381 11 63 098 17
Fax +381 11 63 098 20
office@hennlich.rs

### 39 Malaysia

**igus® Malaysia Sdn Bhd**
Suite 1601-1, Level 16,
Tower 2, Wisma AmFirst,
Jalan SS 7/15 (Jalan Stadium),
47301 Kelana Jaya, Selangor
Phone +603 7803 0618
Fax +603 7886 1328
my-info@igus.net

### 40 Morocco

**igus® SASU**
131 Bd Anfa, Résidence Azur
21000 Casablanca
Phone +212 520 00 30 12
Ma-info@igus.net

### 41 Mexiko

**igus® México S. de R.L. de C.V.**
Boulevad Aeropuerto Miguel
Alemán 160 Int. 135
Col. Corredor Industrial Toluca Lerma
Lerma, Estado de México C.P. 52004
Phone +52 728284 3185
Fax +52 728284 3187
ventas@igus.net

### 42 Middle East

**igus® Middle East FZE**
Office 0616, Tower A
Jafza One Building
Jabal Ali Free Zone
Dubai, United Arab Emirates
Phone +971 4 228 6383
Mobile+971 54 2000 959
info@igus.net

### 42 Middle East

**JISigus Middle East FZE**
FF07, Jebel Ali Free Zone
PO Box- 17483
Dubai, United Arab Emirates
Phone +971 4222 1185
Fax +971 4222 1186
info@jisigus.com

### 43 Myanmar

**Sea Lion Co. Ltd.**
181 Bo Myat Tun St
Botataung Yangon
11161 Myanmar
Phone +95 1 29 97 97
Fax +95 1 20 27 51
zaw.m.thant@sealionmyanmar.com

### 44 Netherlands

**igus® B.V.**
Sterrenbergweg 9
3769 BS Soesterberg
Phone +31 346 353932
Fax +31 346 353849
info@igus.nl

### 44 Netherlands – dry-tech®

**Elcee B.V.**
Kamerlingh Onnesweg 28
NL-3316 GL Dordrecht
Phone +31 (0)78-654 47 77
Fax +31 (0)78-654 47 33
info@elcee.nl

### 45 Nigeria

**Deepee Industrials Ltd.**
11 Ishaga Road Surulere
Lagos
Phone +234 803 3899107
ovoachinike@deepeeindustrials.com

### 46 New Zealand

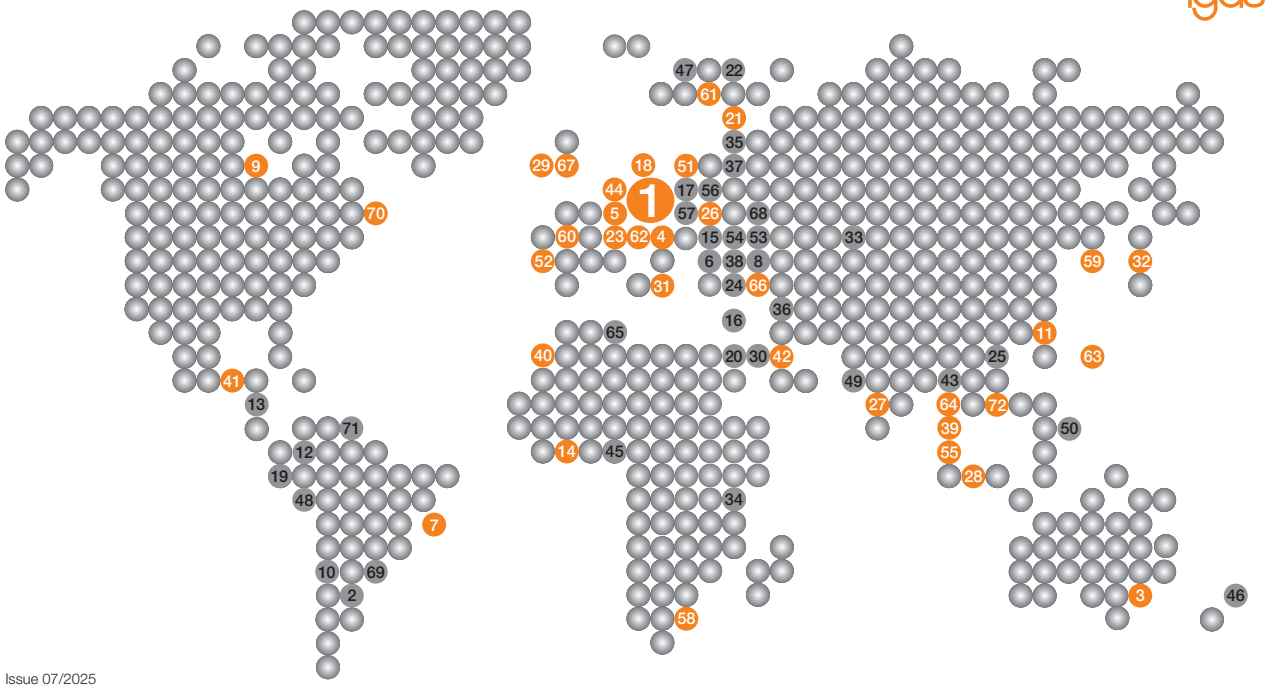
**Treotham Automation Pty Ltd.**
Level 4, 21 Putney Way
Manukau, Auckland 2104
Phone +64 9 278 6577
Fax +64 9 278 6578
info@treotham.co.nz

### 47 Norway

**ASI Automatikk AS**
Sankt Hallvards vei 3, port 8
3414 Lierstranda
Phone +47 9006 1100
info@asiflex.no

### 48 Peru

**PROIGUS SAC**
Av. Roosevelt 6021, Oficina 713
15048 Lima - Miraflores
Phone +51 998363785
profacoventas@profaco.com




Issue 07/2025

### 49 Pakistan

**GEMS International Trading**
501, Windsong Place, Block 7&8,
K.C.H.S, Off Shaheed-e-Millat Rd.
Karachi - 75350
Phone +92 21 34531505
marketing@gemsinter.com

### 50 Philippines

**Silicon Exponents Corp.**
Unit 1-B, 8414 LMN Bldg.
Dr. A. Santos Avenue Brgy.BF
Homes Sucat Parañaque City
1700 Philippines
Phone +63 2 8250 126/135
Fax +63 2 8250 141
ryemrigor@sieplus.ph

### 51 Poland

**igus® Sp. z o.o.**
ul. Działkowa 121C
02-234 Warszawa
Phone +48 22 8635770
Fax +48-22 8636169
info-pl@igus.net

### 52 Portugal

**igus® Lda.**
R Engº Ezequiel Campos, 239
4100-232 Porto
Phone +351 226109000
info@igus.pt

### 53 Romania

**Hennlich SRL**
Str. Timotei Cipariu, Nr. 5-7
310213 Arad
Phone +40 257 211119
Fax +40 257 211021
igus@hennlich.ro

### 54 Serbia + Montenegro

**Hennlich doo Beograd**
Senajska 1
11433 Belgrade, Serbia
Phone +381 11 63 098 17
Fax +381 11 63 098 20
office@hennlich.rs

### 55 Singapore – ASEAN HQ

**igus® Singapore Pte Ltd**
84 Genting Lane
#06-03 Axxel Innovation Centre
Singapore 349584
Phone +65 6487 1411
sg-info@igus.net

### 56 Slovakia

**HENNLICH s.r.o.**
Košťany nad Turcom 543
SK-038 41 Košťany nad Turcom
Phone +421 43 421 2352
lintech@hennlich.sk

### 57 Slovenia

**Hennlich d. o. o.**
Ulica Mirka Vadnova 13
SI-4000 Kranj
Slovenija
Phone +386 4 53206-10
info@hennlich.si

### 58 South Africa

**igus® Pty. Ltd.**
Unit 29
Midline Business Park
Cnr Le Roux & Richards Drive
Midrand 1682
Phone +27 11312-1848
Fax +27 11312-1594
sales.sa@igus.de

### 59 South Korea

**igus® Korea Co. Ltd.**
Venture-ro 12-42,
Yeonsu-gu
Incheon city, 22011
Phone +82 32 82129-11
Fax +82 32 82129-13
kr-info@igus.net

### 60 Spain

**igus® S.L.**
Ctra. Llobatona, 6
Polígono Noi del Sucre
08840 Viladecans – BCN
Phone +34 93 647 39 50
Fax +34 93 647 39 51
igus.es@igus.es

### 61 Sweden

**igus® AB**
Berga Allé 1
254 52 Helsingborg
Phone +46 42 329270
Fax +46 42 211585
info@igusab.se

### 61 Sweden – the-chain

**OEM Automatic AB**
Box 1011 Dalagatan 4
573 28 Tranås
Phone +46 75 2424100
Fax +46 75 2424159
info@oemautomatic.se

### 61 Sweden – dry-tech®

**Colly Components AB**
Raseborgsgatan 9
PO Box 76
164 94 Kista
Phone +46 8 7030100
Fax +46 8 7039841
info@me.colly.se

### 62 Switzerland

**igus® Schweiz GmbH**
Winkelstr. 5
4622 Egerkingen
Phone +41 62 388 97 97
Fax +41 62 388 97 99
info@igus.ch

### 63 Taiwan

**igus® Taiwan Company Ltd.**
5F, No. 35, 24th Road
Taichung Industrial Park
Taichung 40850
Phone +886 4 2358-1000
Fax +886 4 2358-1100
info@igus.com.tw

### 64 Thailand

**IGUS MOTION PLASTICS (THAILAND) CO LTD.**
1340 Soi Bangkok-Nonthaburi 30,
Bangkok-Nonthaburi Rd.,
Bangsue, Bangsue
Bangkok 10800
Phone +66 (0)2 587 4899
Fax +66 (0)2 587 4898
th-info@igus.net

### 65 Tunisia

**BOUDRANT**
53, Avenue de Carthage
1000 Tunis
Phone +216 71340244
Fax +216 71348910
info@boudrant.com.tn

### 66 Turkey

**igus® Turkey**
Güzeller Org. San. Bölg.
Galvano Teknik San. Sit.
Cumhuriyet Cad. 2/32
P.K. 41400 Gebze / Kocaeli
Phone +90 262 502 14 08
Fax +90 262 502 14 19
info@igus.com.tr

### 67 United Kingdom

**igus®**
Caswell Rd
Northampton NN4 7PW
Phone +44 1604 677240
sales@igus.co.uk

### 68 Ukraine

**Hennlich Ukraine LLC**
Winston Churchill street 59,
02094 Kyiv
Phone +38 044 500 58 73
mklt@hennlich.ua

### 69 Uruguay

**Larrique Rulemanes SA**
Galicia 1204
Montevideo
Phone +598 29021773
Fax +598-29084824
larrique@larrique.com.uy

### 70 USA

**igus® inc.**
257 Ferris Avenue
PO Box 14349
East Providence
RI 02914
Phone +1 401 4382200
Fax +1 401 4387270
webmaster@igus.com

### 71 Venezuela

**Neumatica Rotonda C.A.**
Prolong Av. Michelena
C.C. Atlas Locales B-10 y
B-11
Valencia, Edo. Carabobo
Phone +58 241 832.64.64
+58 241 832.32.50
+58 241 838.88.19
Fax +58 241 832.62.83
ventas@neumaticar.com

### 72 Vietnam

**igus® Vietnam Company Ltd**
Unit 4, 7th Floor, Standard
Factory B, Tan Thuan Export
Processing Zone
Tan Thuan Street
District 7, HCM City
Phone +84 28 3636 4189
vn-info@igus.net

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| **Control cable CF2** | |
| CF2.01.04 | 86 |
| CF2.01.08 | 86 |
| CF2.01.12 | 86 |
| CF2.01.18 | 86 |
| CF2.01.24 | 86 |
| CF2.01.36 | 86 |
| CF2.02.04 | 86 |
| CF2.02.08 | 86 |
| CF2.02.18 | 86 |
| CF2.02.48 | 86 |
| **Control cable CF5** | |
| CF5.02.36 | 58 |
| CF5.03.15 | 58 |
| CF5.03.18 | 58 |
| CF5.03.25 | 58 |
| CF5.05.02 | 58 |
| CF5.05.03 | 58 |
| CF5.05.04 | 58 |
| CF5.05.05 | 58 |
| CF5.05.07 | 58 |
| CF5.05.12 | 58 |
| CF5.05.18 | 58 |
| CF5.05.25 | 58 |
| CF5.05.30 | 58 |
| CF5.07.03 | 58 |
| CF5.07.04 | 58 |
| CF5.07.05 | 58 |
| CF5.07.07 | 58 |
| CF5.07.12 | 58 |
| CF5.07.18 | 58 |
| CF5.07.25 | 58 |
| CF5.07.36 | 58 |
| CF5.07.42 | 58 |
| CF5.10.03 | 58 |
| CF5.10.04 | 58 |
| CF5.10.05 | 58 |
| CF5.10.07 | 58 |
| CF5.10.12 | 58 |
| CF5.10.18 | 58 |
| CF5.10.25 | 58 |
| CF5.15.03 | 58 |
| CF5.15.04 | 58 |
| CF5.15.05 | 58 |
| CF5.15.07 | 58 |
| CF5.15.12 | 58 |
| CF5.15.18 | 58 |
| CF5.15.25 | 58 |
| CF5.15.36 | 58 |
| CF5.25.04 | 58 |
| CF5.25.05 | 58 |
| CF5.25.07 | 58 |
| CF5.25.12 | 58 |
| CF5.25.18 | 58 |
| CF5.25.25 | 58 |
| **Control cable CF6** | |
| CF6.02.04 | 62 |
| CF6.02.25 | 62 |
| CF6.03.05 | 62 |
| CF6.05.02 | 62 |
| CF6.05.05 | 62 |
| CF6.05.07 | 62 |
| CF6.05.09 | 62 |
| CF6.05.12 | 62 |
| CF6.05.18 | 62 |
| CF6.05.25 | 62 |
| CF6.07.03 | 62 |
| CF6.07.04 | 62 |
| CF6.07.05 | 62 |
| CF6.07.07 | 62 |
| CF6.07.12 | 62 |
| CF6.07.18 | 62 |
| CF6.07.25 | 62 |
| CF6.10.03 | 62 |
| CF6.10.04 | 62 |
| CF6.10.05 | 62 |
| CF6.10.07 | 62 |
| CF6.10.12 | 62 |
| CF6.10.18 | 62 |
| CF6.10.25 | 62 |
| CF6.15.03 | 62 |
| CF6.15.04 | 62 |
| CF6.15.05 | 62 |
| CF6.15.07 | 62 |
| CF6.15.12 | 62 |
| CF6.15.18 | 62 |
| CF6.15.25 | 62 |
| CF6.25.03 | 62 |
| CF6.25.04 | 62 |
| **Control cable CF9** | |
| CF9.02.02 | 98 |
| CF9.02.03.INI | 98 |
| CF9.02.06 | 98 |
| CF9.02.07 | 98 |
| CF9.02.08 | 98 |
| CF9.02.12 | 98 |
| CF9.02.18 | 98 |
| CF9.02.20 | 98 |
| CF9.02.25 | 98 |
| CF9.03.04.INI | 98 |
| CF9.03.05.INI | 98 |
| CF9.03.06 | 98 |
| CF9.03.08 | 98 |
| CF9.03.16.07.03.INI | 98 |
| CF9.05.02 | 98 |
| CF9.05.03 | 98 |
| CF9.05.04 | 98 |
| CF9.05.05 | 98 |
| CF9.05.07 | 98 |
| CF9.05.12 | 98 |
| CF9.05.18 | 98 |
| CF9.05.25 | 98 |
| CF9.05.36 | 98 |
| CF9.07.04 | 98 |
| CF9.07.05 | 98 |
| CF9.07.07 | 98 |
| CF9.07.12 | 98 |
| CF9.07.20 | 98 |
| CF9.07.25 | 98 |
| CF9.10.03 | 98 |
| CF9.10.04 | 98 |
| CF9.10.05 | 98 |
| CF9.10.12 | 98 |
| CF9.10.18 | 98 |
| CF9.10.25 | 98 |
| CF9.15.02 | 98 |
| CF9.15.04 | 98 |
| CF9.15.05 | 98 |
| CF9.15.07 | 98 |
| CF9.15.12 | 98 |
| CF9.15.18 | 98 |
| CF9.15.25 | 98 |
| CF9.15.36 | 98 |
| CF9.25.04 | 98 |
| CF9.25.05 | 98 |
| CF9.25.07 | 98 |
| CF9.25.12 | 98 |
| CF9.25.16 | 98 |
| CF9.25.18 | 98 |
| CF9.25.25 | 98 |
| CF9.40.04 | 98 |
| CF9.60.04 | 98 |
| CF9.60.05 | 98 |
| CF9.100.04 | 98 |
| CF9.160.04 | 98 |
| **Control cable CF9.UL** | |
| CF9.UL.02.02 | 90 |
| CF9.UL.02.03.INI | 90 |
| CF9.UL.02.04 | 90 |
| CF9.UL.02.06 | 90 |
| CF9.UL.02.08 | 90 |
| CF9.UL.02.12 | 90 |
| CF9.UL.03.04.INI | 90 |
| CF9.UL.03.05.INI | 90 |
| CF9.UL.03.06 | 90 |
| CF9.UL.03.08 | 90 |
| CF9.UL.05.02 | 90 |
| CF9.UL.05.03 | 90 |
| CF9.UL.05.04 | 90 |
| CF9.UL.05.05 | 90 |
| CF9.UL.05.07 | 90 |
| CF9.UL.05.12 | 90 |
| CF9.UL.05.18 | 90 |
| CF9.UL.07.05 | 90 |
| CF9.UL.07.07 | 90 |
| CF9.UL.07.12 | 90 |
| CF9.UL.07.25 | 90 |
| CF9.UL.10.03 | 90 |
| CF9.UL.10.04 | 90 |
| CF9.UL.10.12 | 90 |
| CF9.UL.10.18 | 90 |
| CF9.UL.10.25 | 90 |
| CF9.UL.15.04 | 90 |
| CF9.UL.15.05 | 90 |
| CF9.UL.15.07 | 90 |
| CF9.UL.15.12 | 90 |
| CF9.UL.15.18 | 90 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CF9.UL.15.25 | 90 |
| CF9.UL.25.04 | 90 |
| CF9.UL.25.05 | 90 |
| CF9.UL.25.07 | 90 |
| CF9.UL.25.12 | 90 |
| CF9.UL.25.18 | 90 |
| CF9.UL.25.25 | 90 |
| CF9.UL.40.04 | 90 |
| **Control cable CF10** | |
| CF10.01.12 | 102 |
| CF10.01.18 | 102 |
| CF10.02.04 | 102 |
| CF10.02.08 | 102 |
| CF10.02.12 | 102 |
| CF10.02.25 | 102 |
| CF10.03.05.INI | 102 |
| CF10.05.04 | 102 |
| CF10.05.05 | 102 |
| CF10.05.07 | 102 |
| CF10.05.12 | 102 |
| CF10.05.18 | 102 |
| CF10.05.25 | 102 |
| CF10.07.04 | 102 |
| CF10.07.05 | 102 |
| CF10.07.07 | 102 |
| CF10.07.12 | 102 |
| CF10.07.20 | 102 |
| CF10.07.25 | 102 |
| CF10.10.02 | 102 |
| CF10.10.03 | 102 |
| CF10.10.04 | 102 |
| CF10.10.05 | 102 |
| CF10.10.07 | 102 |
| CF10.10.12 | 102 |
| CF10.10.18 | 102 |
| CF10.10.25 | 102 |
| CF10.15.04 | 102 |
| CF10.15.05 | 102 |
| CF10.15.07 | 102 |
| CF10.15.12 | 102 |
| CF10.15.18 | 102 |
| CF10.25.04 | 102 |
| CF10.25.07 | 102 |
| CF10.25.12 | 102 |
| CF10.40.04 | 102 |
| CF10.40.05 | 102 |
| **Control cable CF10.UL** | |
| CF10.UL.02.04 | 94 |
| CF10.UL.02.08 | 94 |
| CF10.UL.02.12 | 94 |
| CF10.UL.02.25 | 94 |
| CF10.UL.05.04 | 94 |
| CF10.UL.05.05 | 94 |
| CF10.UL.05.12 | 94 |
| CF10.UL.05.25 | 94 |
| CF10.UL.07.04 | 94 |
| CF10.UL.07.05 | 94 |
| CF10.UL.07.07 | 94 |
| CF10.UL.07.12 | 94 |

| igus® Part No. | Page |
|---|---|
| CF10.UL.10.02 | 94 |
| CF10.UL.10.03 | 94 |
| CF10.UL.10.04 | 94 |
| CF10.UL.10.05 | 94 |
| CF10.UL.10.07 | 94 |
| CF10.UL.15.04 | 94 |
| CF10.UL.15.05 | 94 |
| CF10.UL.15.07 | 94 |
| CF10.UL.15.12 | 94 |
| CF10.UL.15.18 | 94 |
| CF10.UL.25.04 | 94 |
| CF10.UL.25.07 | 94 |
| CF10.UL.25.12 | 94 |
| CF10.UL.40.04 | 94 |
| **Data cable CF11** | |
| CF11.01.04.02 | 134 |
| CF11.01.18.02 | 134 |
| CF11.02.01.02 | 134 |
| CF11.02.02.02 | 134 |
| CF11.02.03.02 | 134 |
| CF11.02.04.02 | 134 |
| CF11.02.05.02 | 134 |
| CF11.02.06.02 | 134 |
| CF11.02.10.02 | 134 |
| CF11.02.14.02 | 134 |
| CF11.03.08.02 | 134 |
| CF11.05.04.02 | 134 |
| CF11.05.06.02 | 134 |
| CF11.05.08.02 | 134 |
| CF11.07.03.02 | 134 |
| CF11.10.04.02 | 134 |
| CF11.15.06.02 | 134 |
| **Measuring system cable CF11.D** | |
| CF11.001.D | 236 |
| CF11.002.D | 236 |
| CF11.003.D | 236 |
| CF11.004.D | 236 |
| CF11.005.D | 236 |
| CF11.006.D | 236 |
| CF11.007.D | 236 |
| CF11.008.D | 236 |
| CF11.009.D | 236 |
| CF11.010.D | 236 |
| CF11.011.D | 236 |
| CF11.012.D | 236 |
| CF11.013.D | 236 |
| CF11.014.D | 236 |
| CF11.015.D | 236 |
| CF11.017.D | 236 |
| CF11.018.D | 236 |
| CF11.019.D | 236 |
| CF11.021.D | 236 |
| CF11.022.D | 236 |
| CF11.025.D | 236 |
| CF11.027.D | 236 |
| CF11.028.D | 236 |
| CF11.031.D | 236 |
| CF11.032.D | 236 |
| CF11.033.D | 236 |

| igus® Part No. | Page |
|---|---|
| CF11.038.D | 236 |
| **Data cable CF12** | |
| CF12.02.04.02 | 142 |
| CF12.05.03.02 | 142 |
| CF12.05.04.02 | 142 |
| CF12.05.06.02 | 142 |
| CF12.05.08.02 | 142 |
| CF12.05.10.02 | 142 |
| CF12.05.14.02 | 142 |
| CF12.10.06.02 | 142 |
| **Bus cable CF14US** | |
| CF14US.02.04.02 | 172 |
| CF14US.02.04.02.UV | 172 |
| **Servo cable CF21.UL** | |
| CF21.07.05.02.01.UL | 256 |
| CF21.15.15.02.01.UL | 256 |
| CF21.25.15.02.01.UL | 256 |
| CF21.40.15.02.01.UL | 256 |
| CF21.60.15.02.01.UL | 256 |
| CF21.100.15.02.01.UL | 256 |
| CF21.07.03.02.02.UL | 256 |
| CF21.10.07.02.02.UL | 256 |
| CF21.15.07.02.02.UL | 256 |
| CF21.25.15.02.02.UL | 256 |
| CF21.40.15.02.02.UL | 256 |
| CF21.60.15.02.02.UL | 256 |
| CF21.100.15.02.02.UL | 256 |
| CF21.160.15.02.02.UL | 256 |
| **Motor cable CF27.D** | |
| CF27.07.04.D | 312 |
| CF27.15.04.D | 312 |
| CF27.25.04.D | 312 |
| CF27.500.04.D | 312 |
| **Servo cable CF27.D** | |
| CF27.07.05.02.01.D | 266 |
| CF27.15.15.02.01.D | 266 |
| CF27.25.15.02.01.D | 266 |
| CF27.40.15.02.01.D | 266 |
| CF27.60.15.02.01.D | 266 |
| CF27.100.15.02.01.D | 266 |
| CF27.160.15.02.01.D | 266 |
| CF27.250.15.02.01.D | 266 |
| CF27.350.15.02.01.D | 266 |
| CF27.07.03.02.02.D | 266 |
| CF27.10.07.02.02.D | 266 |
| CF27.15.07.02.02.D | 266 |
| CF27.25.15.02.02.D | 266 |
| CF27.40.15.02.02.D | 266 |
| CF27.60.15.02.02.D | 266 |
| CF27.100.15.02.02.D | 266 |
| CF27.160.15.02.02.D | 266 |
| CF27.250.15.02.02.D | 266 |
| CF27.15.05.04.D | 266 |
| CF27.25.05.04.D | 266 |
| CF27.40.05.04.D | 266 |
| CF27.07.04.D | 266 |
| CF27.15.04.D | 266 |
| CF27.25.04.D | 266 |
| CF27.500.04.D | 266 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| **Servo cable CF29.D** | |
| CF29.15.15.02.01.D | 2364 |
| CF29.25.15.02.01.D | 2364 |
| CF29.40.15.02.01.D | 2364 |
| **Motor cable CF30** | |
| CF30.15.04 | 296 |
| CF30.25.04 | 296 |
| CF30.25.05 | 296 |
| CF30.40.04 | 296 |
| CF30.40.05 | 296 |
| CF30.60.04 | 296 |
| CF30.60.05 | 296 |
| CF30.100.04 | 296 |
| CF30.100.05 | 296 |
| CF30.160.04 | 296 |
| CF30.160.05 | 296 |
| CF30.250.04 | 296 |
| CF30.350.04 | 296 |
| CF30.500.04 | 296 |
| **Motor cable CF31** | |
| CF31.15.04 | 300 |
| CF31.25.04 | 300 |
| CF31.25.05 | 300 |
| CF31.40.04 | 300 |
| CF31.40.05 | 300 |
| CF31.60.04 | 300 |
| CF31.60.05 | 300 |
| CF31.100.04 | 300 |
| CF31.100.05 | 300 |
| CF31.160.04 | 300 |
| CF31.250.04 | 300 |
| CF31.350.04 | 300 |
| CF31.500.04 | 300 |
| CF31.3640.04 | 300 |
| **Motor cable CF34.UL.D** | |
| CF34.UL.15.04.D | 316 |
| CF34.UL.25.04.D | 316 |
| CF34.UL.40.04.D | 316 |
| CF34.UL.60.04.D | 316 |
| CF34.UL.60.05.D | 316 |
| CF34.UL.100.04.D | 316 |
| CF34.UL.100.05.D | 316 |
| CF34.UL.160.04.D | 316 |
| CF34.UL.160.05.D | 316 |
| CF34.UL.250.04.D | 316 |
| **Motor cable CF35.UL** | |
| CF35.UL.05.04 | 320 |
| CF35.UL.07.04 | 320 |
| CF35.UL.15.04 | 320 |
| CF35.UL.25.04 | 320 |
| CF35.UL.40.04 | 320 |
| CF35.UL.60.04 | 320 |
| CF35.UL.100.04 | 320 |
| CF35.UL.160.04 | 320 |
| CF35.UL.250.04 | 320 |
| CF35.UL.60.03.O.PE | 320 |
| CF35.UL.250.03.O.PE | 320 |
| **Motor cable CF37.D** | |
| CF37.15.04.D | 324 |
| CF37.25.04.D | 324 |
| CF37.40.04.D | 324 |
| CF37.60.04.D | 324 |
| CF37.60.05.D | 324 |
| CF37.100.04.D | 324 |
| CF37.100.05.D | 324 |
| CF37.160.04.D | 324 |
| CF37.160.05.D | 324 |
| CF37.250.04.D | 324 |
| **Motor cable CF38** | |
| CF38.15.04 | 328 |
| CF38.25.04 | 328 |
| CF38.40.04 | 328 |
| CF38.60.04 | 328 |
| CF38.100.04 | 328 |
| CF38.160.04 | 328 |
| CF38.250.04 | 328 |
| CF38.60.03.O.PE | 328 |
| CF38.100.03.O.PE | 328 |
| CF38.160.03.O.PE | 328 |
| CF38.250.03.O.PE | 328 |
| CF38.500.03.O.PE | 328 |
| **Control cable CF77.UL.D** | |
| CF77.UL.02.03.INI | 78 |
| CF77.UL.02.04.D | 78 |
| CF77.UL.02.05.D | 78 |
| CF77.UL.02.07.D | 78 |
| CF77.UL.02.12.D | 78 |
| CF77.UL.02.18.D | 78 |
| CF77.UL.02.25.D | 78 |
| CF77.UL.03.04.INI | 78 |
| CF77.UL.03.05.INI | 78 |
| CF77.UL.03.05.INI.D | 78 |
| CF77.UL.05.04.D | 78 |
| CF77.UL.05.05.D | 78 |
| CF77.UL.05.07.D | 78 |
| CF77.UL.05.12.D | 78 |
| CF77.UL.05.18.D | 78 |
| CF77.UL.05.25.D | 78 |
| CF77.UL.05.30.D | 78 |
| CF77.UL.07.03.D | 78 |
| CF77.UL.07.04.D | 78 |
| CF77.UL.07.05.D | 78 |
| CF77.UL.07.07.D | 78 |
| CF77.UL.07.12.D | 78 |
| CF77.UL.07.18.D | 78 |
| CF77.UL.07.20.D | 78 |
| CF77.UL.07.25.D | 78 |
| CF77.UL.07.36.D | 78 |
| CF77.UL.07.42.D | 78 |
| CF77.UL.10.02.D | 78 |
| CF77.UL.10.03.D | 78 |
| CF77.UL.10.04.D | 78 |
| CF77.UL.10.05.D | 78 |
| CF77.UL.10.07.D | 78 |
| CF77.UL.10.12.D | 78 |
| CF77.UL.10.18.D | 78 |
| CF77.UL.10.25.D | 78 |
| CF77.UL.10.42.D | 78 |
| CF77.UL.15.03.D | 78 |
| CF77.UL.15.04.D | 78 |
| CF77.UL.15.05.D | 78 |
| CF77.UL.15.07.D | 78 |
| CF77.UL.15.12.D | 78 |
| CF77.UL.15.18.D | 78 |
| CF77.UL.15.25.D | 78 |
| CF77.UL.15.36.D | 78 |
| CF77.UL.25.03.D | 78 |
| CF77.UL.25.04.D | 78 |
| CF77.UL.25.05.D | 78 |
| CF77.UL.25.07.D | 78 |
| CF77.UL.25.12.D | 78 |
| CF77.UL.40.04.D | 78 |
| CF77.UL.40.05.D | 78 |
| CF77.UL.60.05.D | 78 |
| **Twistable cable CF77.UL.D** | |
| CF77.UL.02.03.INI | 364 |
| CF77.UL.02.04.D | 364 |
| CF77.UL.02.05.D | 364 |
| CF77.UL.02.07.D | 364 |
| CF77.UL.02.12.D | 364 |
| CF77.UL.02.18.D | 364 |
| CF77.UL.02.25.D | 364 |
| CF77.UL.03.04.INI | 364 |
| CF77.UL.03.05.INI | 364 |
| CF77.UL.03.05.INI.D | 364 |
| CF77.UL.05.04.D | 364 |
| CF77.UL.05.05.D | 364 |
| CF77.UL.05.07.D | 364 |
| CF77.UL.05.12.D | 364 |
| CF77.UL.05.18.D | 364 |
| CF77.UL.05.25.D | 364 |
| CF77.UL.05.30.D | 364 |
| CF77.UL.07.03.D | 364 |
| CF77.UL.07.04.D | 364 |
| CF77.UL.07.05.D | 364 |
| CF77.UL.07.07.D | 364 |
| CF77.UL.07.12.D | 364 |
| CF77.UL.07.18.D | 364 |
| CF77.UL.07.20.D | 364 |
| CF77.UL.07.25.D | 364 |
| CF77.UL.07.36.D | 364 |
| CF77.UL.07.42.D | 364 |
| CF77.UL.10.02.D | 364 |
| CF77.UL.10.03.D | 364 |
| CF77.UL.10.04.D | 364 |
| CF77.UL.10.05.D | 364 |
| CF77.UL.10.07.D | 364 |
| CF77.UL.10.12.D | 364 |
| CF77.UL.10.18.D | 364 |
| CF77.UL.10.25.D | 364 |
| CF77.UL.10.42.D | 364 |
| CF77.UL.15.03.D | 364 |
| CF77.UL.15.04.D | 364 |
| CF77.UL.15.05.D | 364 |
| CF77.UL.15.07.D | 364 |
| CF77.UL.15.12.D | 364 |
| CF77.UL.15.18.D | 364 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CF77.UL.15.25.D | 364 |
| CF77.UL.15.36.D | 364 |
| CF77.UL.25.03.D | 364 |
| CF77.UL.25.04.D | 364 |
| CF77.UL.25.05.D | 364 |
| CF77.UL.25.07.D | 364 |
| CF77.UL.25.12.D | 364 |
| CF77.UL.40.04.D | 364 |
| CF77.UL.40.05.D | 364 |
| CF77.UL.60.05.D | 364 |
| **Control cable CF78.UL** | |
| CF78.UL.05.04 | 82 |
| CF78.UL.05.05 | 82 |
| CF78.UL.05.07 | 82 |
| CF78.UL.05.09 | 82 |
| CF78.UL.05.12 | 82 |
| CF78.UL.05.18 | 82 |
| CF78.UL.05.25 | 82 |
| CF78.UL.07.03 | 82 |
| CF78.UL.07.04 | 82 |
| CF78.UL.07.05 | 82 |
| CF78.UL.07.07 | 82 |
| CF78.UL.07.12 | 82 |
| CF78.UL.07.18 | 82 |
| CF78.UL.07.36 | 82 |
| CF78.UL.10.03 | 82 |
| CF78.UL.10.04 | 82 |
| CF78.UL.10.05 | 82 |
| CF78.UL.10.07 | 82 |
| CF78.UL.10.12 | 82 |
| CF78.UL.10.18 | 82 |
| CF78.UL.10.25 | 82 |
| CF78.UL.15.03 | 82 |
| CF78.UL.15.04 | 82 |
| CF78.UL.15.05 | 82 |
| CF78.UL.15.07 | 82 |
| CF78.UL.15.12 | 82 |
| CF78.UL.15.18 | 82 |
| CF78.UL.15.25 | 82 |
| CF78.UL.15.36 | 82 |
| CF78.UL.15.42 | 82 |
| CF78.UL.25.03 | 82 |
| CF78.UL.25.04 | 82 |
| CF78.UL.25.05 | 82 |
| CF78.UL.25.07 | 82 |
| CF78.UL.25.12 | 82 |
| CF78.UL.40.04 | 82 |
| **Control cables CF98.PLUS** | |
| CF98.PLUS.01.02 | 106 |
| CF98.PLUS.01.03 | 106 |
| CF98.PLUS.01.04 | 106 |
| CF98.PLUS.01.08 | 106 |
| CF98.PLUS.02.03.INI | 106 |
| CF98.PLUS.02.04 | 106 |
| CF98.PLUS.02.08 | 106 |
| CF98.PLUS.03.04.INI | 106 |
| CF98.PLUS.05.04 | 106 |
| **Control cables CF99.PLUS** | |
| CF99.PLUS.01.02 | 110 |
| CF99.PLUS.01.04 | 110 |
| CF99.PLUS.01.08 | 110 |
| CF99.PLUS.02.04 | 110 |
| CF99.PLUS.03.08 | 110 |
| **Measuring system cable CF111.D** | |
| CF111.001.D | 224 |
| CF111.002.D | 224 |
| CF111.004.D | 224 |
| CF111.006.D | 224 |
| CF111.009.D | 224 |
| CF111.010.D | 224 |
| CF111.011.D | 224 |
| CF111.014.D | 224 |
| CF111.015.D | 224 |
| CF111.020.D | 224 |
| CF111.021.D | 224 |
| CF111.022.D | 224 |
| CF111.023.D | 224 |
| CF111.024.D | 224 |
| CF111.026.D | 224 |
| CF111.027.D | 224 |
| CF111.028.D | 224 |
| CF111.032.D | 224 |
| CF111.040.D | 224 |
| CF111.041.D | 224 |
| CF111.042.D | 224 |
| **Data cable CF112** | |
| CF112.02.02.02 | 138 |
| CF112.02.03.02 | 138 |
| CF112.02.04.02 | 138 |
| CF112.02.05.02 | 138 |
| CF112.05.02.02 | 138 |
| CF112.05.04.02 | 138 |
| CF112.05.06.02 | 138 |
| **Measuring system cable CF113.D** | |
| CF113.001.D | 230 |
| CF113.002.D | 230 |
| CF113.003.D | 230 |
| CF113.004.D | 230 |
| CF113.005.D | 230 |
| CF113.006.D | 230 |
| CF113.007.D | 230 |
| CF113.008.D | 230 |
| CF113.009.D | 230 |
| CF113.010.D | 230 |
| CF113.011.D | 230 |
| CF113.013.D | 230 |
| CF113.014.D | 230 |
| CF113.015.D | 230 |
| CF113.016.D | 230 |
| CF113.017.D | 230 |
| CF113.018.D | 230 |
| CF113.019.D | 230 |
| CF113.022.D | 230 |
| CF113.025.D | 230 |
| CF113.027.D | 230 |
| CF113.028.D | 230 |
| CF113.029.D | 230 |
| CF113.031.D | 230 |
| CF113.032.D | 230 |
| CF113.033.D | 230 |
| CF113.036.D | 230 |
| CF113.037.D | 230 |
| CF113.038.D | 230 |
| CF113.040.D | 230 |
| **Control cable CF130US** | |
| CF130US.05.02 | 34 |
| CF130US.05.03 | 34 |
| CF130US.05.04 | 34 |
| CF130US.05.05 | 34 |
| CF130US.05.07 | 34 |
| CF130US.05.12 | 34 |
| CF130US.05.18 | 34 |
| CF130US.05.25 | 34 |
| CF130US.07.04 | 34 |
| CF130US.07.05 | 34 |
| CF130US.07.07 | 34 |
| CF130US.07.12 | 34 |
| CF130US.07.18 | 34 |
| CF130US.07.25 | 34 |
| CF130US.15.03 | 34 |
| CF130US.15.04 | 34 |
| CF130US.15.05 | 34 |
| CF130US.15.07 | 34 |
| CF130US.15.10 | 34 |
| CF130US.15.12 | 34 |
| CF130US.15.18 | 34 |
| CF130US.15.22 | 34 |
| CF130US.15.25 | 34 |
| CF130US.15.33 | 34 |
| CF130US.25.04 | 34 |
| CF130US.25.07 | 34 |
| CF130US.25.10 | 34 |
| CF130US.25.12 | 34 |
| CF130US.40.04 | 34 |
| CF130US.60.04 | 34 |
| CF130US.60.05 | 34 |
| **Control cable CF130.UL** | |
| CF130.02.03.UL | 42 |
| CF130.02.04.UL | 42 |
| CF130.02.06.UL | 42 |
| CF130.02.07.UL | 42 |
| CF130.02.12.UL | 42 |
| CF130.02.18.UL | 42 |
| CF130.02.20.UL | 42 |
| CF130.02.25.UL | 42 |
| CF130.02.30.UL | 42 |
| CF130.03.02.UL | 42 |
| CF130.03.05.UL | 42 |
| CF130.05.02.UL | 42 |
| CF130.05.03.UL | 42 |
| CF130.05.04.UL | 42 |
| CF130.05.05.UL | 42 |
| CF130.05.07.UL | 42 |
| CF130.05.12.UL | 42 |
| CF130.05.18.UL | 42 |
| CF130.05.25.UL | 42 |
| CF130.07.02.UL | 42 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CF130.07.03.UL | 42 |
| CF130.07.04.UL | 42 |
| CF130.07.05.UL | 42 |
| CF130.07.07.UL | 42 |
| CF130.07.12.UL | 42 |
| CF130.07.18.UL | 42 |
| CF130.07.25.UL | 42 |
| CF130.07.36.UL | 42 |
| CF130.07.42.UL | 42 |
| CF130.10.02.UL | 42 |
| CF130.10.03.UL | 42 |
| CF130.10.04.UL | 42 |
| CF130.10.05.UL | 42 |
| CF130.10.07.UL | 42 |
| CF130.10.12.UL | 42 |
| CF130.10.18.UL | 42 |
| CF130.10.25.UL | 42 |
| CF130.15.02.UL | 42 |
| CF130.15.03.UL | 42 |
| CF130.15.04.UL | 42 |
| CF130.15.05.UL | 42 |
| CF130.15.07.UL | 42 |
| CF130.15.12.UL | 42 |
| CF130.15.18.UL | 42 |
| CF130.15.25.UL | 42 |
| CF130.15.36.UL | 42 |
| CF130.25.03.UL | 42 |
| CF130.25.04.UL | 42 |
| CF130.25.07.UL | 42 |
| CF130.25.12.UL | 42 |
| CF130.40.03.UL | 42 |
| CF130.40.04.UL | 42 |
| CF130.40.05.UL | 42 |
| CF130.60.04.UL | 42 |
| CF130.60.05.UL | 42 |
| **Control cable CF140US** | |
| CF140US.05.02 | 38 |
| CF140US.05.03 | 38 |
| CF140US.05.04 | 38 |
| CF140US.05.05 | 38 |
| CF140US.05.07 | 38 |
| CF140US.05.12 | 38 |
| CF140US.05.18 | 38 |
| CF140US.05.25 | 38 |
| CF140US.07.04 | 38 |
| CF140US.07.05 | 38 |
| CF140US.07.07 | 38 |
| CF140US.07.12 | 38 |
| CF140US.07.18 | 38 |
| CF140US.07.25 | 38 |
| CF140US.15.03 | 38 |
| CF140US.15.04 | 38 |
| CF140US.15.05 | 38 |
| CF140US.15.07 | 38 |
| CF140US.15.12 | 38 |
| CF140US.15.18 | 38 |
| CF140US.15.22 | 38 |
| CF140US.15.25 | 38 |
| CF140US.15.33 | 38 |

| igus® Part No. | Page |
|---|---|
| CF140US.25.04 | 38 |
| CF140US.25.07 | 38 |
| CF140US.25.12 | 38 |
| CF140US.25.18 | 38 |
| CF140US.40.04 | 38 |
| CF140US.60.04 | 38 |
| CF140US.60.05 | 38 |
| **Control cable CF140.UL** | |
| CF140.02.12.UL | 46 |
| CF140.03.05.UL | 46 |
| CF140.05.03.UL | 46 |
| CF140.05.04.UL | 46 |
| CF140.05.05.UL | 46 |
| CF140.05.18.UL | 46 |
| CF140.05.36.UL | 46 |
| CF140.07.03.UL | 46 |
| CF140.07.04.UL | 46 |
| CF140.07.05.UL | 46 |
| CF140.07.07.UL | 46 |
| CF140.07.12.UL | 46 |
| CF140.07.18.UL | 46 |
| CF140.07.25.UL | 46 |
| CF140.10.02.UL | 46 |
| CF140.10.03.UL | 46 |
| CF140.10.04.UL | 46 |
| CF140.10.05.UL | 46 |
| CF140.10.07.UL | 46 |
| CF140.10.12.UL | 46 |
| CF140.10.18.UL | 46 |
| CF140.10.25.UL | 46 |
| CF140.15.03.UL | 46 |
| CF140.15.04.UL | 46 |
| CF140.15.05.UL | 46 |
| CF140.15.07.UL | 46 |
| CF140.15.12.UL | 46 |
| CF140.15.18.UL | 46 |
| CF140.15.25.UL | 46 |
| CF140.15.36.UL | 46 |
| CF140.25.03.UL | 46 |
| CF140.25.04.UL | 46 |
| **Control cable CF150.UL** | |
| CF150.UL.10.03 | 50 |
| CF150.UL.10.04 | 50 |
| CF150.UL.10.05 | 50 |
| CF150.UL.10.07 | 50 |
| CF150.UL.10.12 | 50 |
| CF150.UL.10.18 | 50 |
| CF150.UL.15.03 | 50 |
| CF150.UL.15.04 | 50 |
| CF150.UL.15.05 | 50 |
| CF150.UL.15.07 | 50 |
| CF150.UL.15.12 | 50 |
| CF150.UL.15.18 | 50 |
| CF150.UL.15.25 | 50 |
| CF150.UL.25.03 | 50 |
| CF150.UL.25.04 | 50 |
| CF150.UL.25.05 | 50 |
| CF150.UL.25.07 | 50 |
| CF150.UL.25.12 | 50 |

| igus® Part No. | Page |
|---|---|
| CF150.UL.25.18 | 50 |
| **Control cable CF160.UL** | |
| CF160.UL.10.03 | 54 |
| CF160.UL.10.04 | 54 |
| CF160.UL.10.05 | 54 |
| CF160.UL.10.07 | 54 |
| CF160.UL.10.12 | 54 |
| CF160.UL.10.18 | 54 |
| CF160.UL.15.03 | 54 |
| CF160.UL.15.04 | 54 |
| CF160.UL.15.05 | 54 |
| CF160.UL.15.07 | 54 |
| CF160.UL.15.12 | 54 |
| CF160.UL.15.18 | 54 |
| CF160.UL.25.03 | 54 |
| CF160.UL.25.04 | 54 |
| CF160.UL.25.05 | 54 |
| CF160.UL.25.07 | 54 |
| CF160.UL.25.12 | 54 |
| CF160.UL.25.18 | 54 |
| **Motor cable CF210.UL** | |
| CF210.UL.05.04 | 294 |
| CF210.UL.15.04 | 294 |
| CF210.UL.25.04 | 294 |
| CF210.UL.40.04 | 294 |
| **Servo cable CF210.UL** | |
| CF210.UL.07.03.02.01 | 252 |
| CF210.UL.15.15.02.01 | 252 |
| CF210.UL.25.15.02.01 | 252 |
| CF210.UL.40.15.02.01 | 252 |
| CF210.UL.60.15.02.01 | 252 |
| CF210.UL.15.07.02.02 | 252 |
| CF210.UL.25.15.02.02 | 252 |
| CF210.UL.40.15.02.02 | 252 |
| CF210.UL.60.15.02.02 | 252 |
| CF210.UL.05.04 | 252 |
| CF210.UL.15.04 | 252 |
| CF210.UL.25.04 | 252 |
| CF210.UL.40.04 | 252 |
| **Data cable CF211** | |
| CF211.02.01.02 | 126 |
| CF211.02.02.02 | 126 |
| CF211.02.03.02 | 126 |
| CF211.02.04.02 | 126 |
| CF211.02.05.02 | 126 |
| CF211.02.06.02 | 126 |
| CF211.02.08.02 | 126 |
| CF211.02.10.02 | 126 |
| CF211.02.14.02 | 126 |
| CF211.03.03.02 | 126 |
| CF211.03.08.02 | 126 |
| CF211.05.01.02 | 126 |
| CF211.05.02.02 | 126 |
| CF211.05.03.02 | 126 |
| CF211.05.04.02 | 126 |
| CF211.05.05.02 | 126 |
| CF211.05.06.02 | 126 |
| CF211.05.08.02 | 126 |
| CF211.05.10.02 | 126 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CF211.05.14.02 | 126 |
| **Measuring system cable CF211** | |
| CF211.001 | 214 |
| CF211.002 | 214 |
| CF211.004 | 214 |
| CF211.006 | 214 |
| CF211.007 | 214 |
| CF211.009 | 214 |
| CF211.010 | 214 |
| CF211.011 | 214 |
| CF211.014 | 214 |
| CF211.015 | 214 |
| CF211.016 | 214 |
| CF211.017 | 214 |
| CF211.018 | 214 |
| CF211.019 | 214 |
| CF211.022 | 214 |
| CF211.023 | 214 |
| CF211.024 | 214 |
| CF211.027 | 214 |
| CF211.028 | 214 |
| CF211.030 | 214 |
| CF211.032 | 214 |
| CF211.033 | 214 |
| CF211.036 | 214 |
| CF211.037 | 214 |
| CF211.038 | 214 |
| CF211.039 | 214 |
| CF211.041 | 214 |
| CF211.042 | 214 |
| **Data cable CF211.PUR** | |
| CF211.PUR.02.01.02 | 130 |
| CF211.PUR.02.02.02 | 130 |
| CF211.PUR.02.03.02 | 130 |
| CF211.PUR.02.04.02 | 130 |
| CF211.PUR.02.05.02 | 130 |
| CF211.PUR.02.06.02 | 130 |
| CF211.PUR.02.08.02 | 130 |
| CF211.PUR.02.10.02 | 130 |
| CF211.PUR.02.14.02 | 130 |
| CF211.PUR.03.03.02 | 130 |
| CF211.PUR.03.06.02 | 130 |
| CF211.PUR.03.08.02 | 130 |
| CF211.PUR.05.01.02 | 130 |
| CF211.PUR.05.02.02 | 130 |
| CF211.PUR.05.03.02 | 130 |
| CF211.PUR.05.04.02 | 130 |
| CF211.PUR.05.05.02 | 130 |
| CF211.PUR.05.06.02 | 130 |
| CF211.PUR.05.08.02 | 130 |
| CF211.PUR.05.10.02 | 130 |
| CF211.PUR.05.14.02 | 130 |
| **Hybrid servo cable CF220.UL.H** | |
| CF220.UL.H100.07.04 | 272 |
| CF220.UL.H101.10.04 | 272 |
| CF220.UL.H101.15.04 | 272 |
| CF220.UL.H102.25.04 | 272 |
| CF220.UL.H203.15.04 | 272 |
| CF220.UL.H300.03.04 | 272 |
| CF220.UL.H301.07.04 | 272 |
| CF220.UL.H304.15.04 | 272 |
| CF220.UL.H501.15.04 | 272 |
| **Data cable CF240** | |
| CF240.01.03 | 118 |
| CF240.01.04 | 118 |
| CF240.01.05 | 118 |
| CF240.01.07 | 118 |
| CF240.01.14 | 118 |
| CF240.01.18 | 118 |
| CF240.01.24 | 118 |
| CF240.02.03 | 118 |
| CF240.02.04 | 118 |
| CF240.02.05 | 118 |
| CF240.02.07 | 118 |
| CF240.02.08 | 118 |
| CF240.02.14 | 118 |
| CF240.02.18 | 118 |
| CF240.02.24 | 118 |
| CF240.03.02 | 118 |
| CF240.03.03 | 118 |
| CF240.03.04 | 118 |
| CF240.03.05 | 118 |
| CF240.03.07 | 118 |
| CF240.03.10 | 118 |
| CF240.03.14 | 118 |
| CF240.03.18 | 118 |
| CF240.03.24 | 118 |
| **Data cable CF240.PUR** | |
| CF240.PUR.01.04 | 122 |
| CF240.PUR.01.07 | 122 |
| CF240.PUR.01.08 | 122 |
| CF240.PUR.01.14 | 122 |
| CF240.PUR.01.18 | 122 |
| CF240.PUR.01.25 | 122 |
| CF240.PUR.02.03 | 122 |
| CF240.PUR.02.04 | 122 |
| CF240.PUR.02.05 | 122 |
| CF240.PUR.02.07 | 122 |
| CF240.PUR.02.08 | 122 |
| CF240.PUR.02.14 | 122 |
| CF240.PUR.02.18 | 122 |
| CF240.PUR.02.25 | 122 |
| CF240.PUR.03.03 | 122 |
| CF240.PUR.03.04 | 122 |
| CF240.PUR.03.05 | 122 |
| CF240.PUR.03.07 | 122 |
| CF240.PUR.03.14 | 122 |
| CF240.PUR.03.18 | 122 |
| **Motor cable CF270.UL.D** | |
| CF270.UL.07.04.D | 308 |
| CF270.UL.10.06.D | 308 |
| CF270.UL.15.04.D | 308 |
| CF270.UL.25.04.D | 308 |
| CF270.UL.40.04.D | 308 |
| CF270.UL.60.04.D | 308 |
| CF270.UL.100.04.D | 308 |
| CF270.UL.160.04.D | 308 |
| CF270.UL.250.04.D | 308 |
| CF270.UL.350.04.D | 308 |
| **Single core CF270.UL.D** | |
| CF270.UL.60.01.D | 338 |
| CF270.UL.100.01.D | 338 |
| CF270.UL.160.01.D | 338 |
| CF270.UL.250.01.D | 338 |
| CF270.UL.350.01.D | 338 |
| CF270.UL.500.01.D | 338 |
| CF270.UL.700.01.D | 338 |
| **Servo cable CF2364.UL.D** | |
| CF270.UL.07.03.02.01.D | 262 |
| CF270.UL.15.15.02.01.D | 262 |
| CF270.UL.25.15.02.01.D | 262 |
| CF270.UL.40.15.02.01.D | 262 |
| CF270.UL.60.15.02.01.D | 262 |
| CF270.UL.100.15.02.01.D | 262 |
| CF270.UL.160.15.02.01.D | 262 |
| CF270.UL.07.03.02.02.D | 262 |
| CF270.UL.10.07.02.02.D | 262 |
| CF270.UL.15.07.02.02.D | 262 |
| CF270.UL.25.15.02.02.D | 262 |
| CF270.UL.40.15.02.02.D | 262 |
| CF270.UL.60.15.02.02.D | 262 |
| CF270.UL.100.15.02.02.D | 262 |
| CF270.UL.160.15.02.02.D | 262 |
| CF270.UL.250.15.02.02.D | 262 |
| CF270.UL.07.04.D | 262 |
| CF270.UL.10.06.D | 262 |
| CF270.UL.15.04.D | 262 |
| CF270.UL.25.04.D | 262 |
| CF270.UL.40.04.D | 262 |
| CF270.UL.60.04.D | 262 |
| CF270.UL.100.04.D | 262 |
| CF270.UL.160.04.D | 262 |
| CF270.UL.250.04.D | 262 |
| CF270.UL.350.04.D | 262 |
| CF270.UL.60.01.D | 262 |
| CF270.UL.100.01.D | 262 |
| CF270.UL.160.01.D | 262 |
| CF270.UL.250.01.D | 262 |
| CF270.UL.350.01.D | 262 |
| CF270.UL.500.01.D | 262 |
| CF270.UL.700.01.D | 262 |
| **Hybrid servo cable CF280.UL.H** | |
| CF280.UL.H100.07.04.D | 276 |
| CF280.UL.H101.10.04.D | 276 |
| CF280.UL.H101.15.04.D | 276 |
| CF280.UL.H102.25.04.D | 276 |
| CF280.UL.H102.40.04.D | 276 |
| CF280.UL.H102.60.04.D | 276 |
| CF280.UL.H200.15.07.D | 276 |
| CF280.UL.H200.25.07.D | 276 |
| CF280.UL.H201.15.04.D | 276 |
| CF280.UL.H201.25.04.D | 276 |
| CF280.UL.H203.15.04.D | 276 |
| CF280.UL.H203.25.04.D | 276 |
| CF280.UL.H204.15.04.D | 276 |
| CF280.UL.H206.40.04.D | 276 |
| CF280.UL.H206.60.04.D | 276 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CF280.UL.H207.15.04.D | 276 |
| CF280.UL.H207.25.04.D | 276 |
| CF280.UL.H300.03.04.D | 276 |
| CF280.UL.H301.07.04.D | 276 |
| CF280.UL.H304.15.04.D | 276 |
| CF280.UL.H304.25.04.D | 276 |
| CF280.UL.H400.25.05.D | 276 |
| CF280.UL.H401.07.04.D | 276 |
| CF280.UL.H402.15.04.D | 276 |
| CF280.UL.H501.15.04.D | 276 |
| CF280.UL.H502.40.04.D | 276 |
| **Single core CF300.UL.D** | |
| CF300.UL.40.01.D | 340 |
| CF300.UL.60.01.D | 340 |
| CF300.UL.100.01.D | 340 |
| CF300.UL.160.01.D | 340 |
| CF300.UL.250.01.D | 340 |
| CF300.UL.350.01.D | 340 |
| CF300.UL.500.01.D | 340 |
| CF300.UL.3640.01.D | 340 |
| CF300.UL.950.01.D | 340 |
| CF300.UL.1200.01.D | 340 |
| CF300.UL.1500.01.D | 340 |
| CF300.UL.1850.01.D | 340 |
| **Single core CF310.UL** | |
| CF310.UL.25.01 | 346 |
| CF310.UL.40.01 | 346 |
| CF310.UL.60.01 | 346 |
| CF310.UL.100.01 | 346 |
| CF310.UL.160.01 | 346 |
| CF310.UL.250.01 | 346 |
| CF310.UL.350.01 | 346 |
| CF310.UL.500.01 | 346 |
| CF310.UL.3640.01 | 346 |
| CF310.UL.950.01 | 346 |
| CF310.UL.1200.01 | 346 |
| CF310.UL.1500.01 | 346 |
| CF310.UL.1850.01 | 346 |
| **Single core CF330.D** | |
| CF330.60.01.D | 350 |
| CF330.100.01.D | 350 |
| CF330.160.01.D | 350 |
| CF330.250.01.D | 350 |
| CF330.350.01.D | 350 |
| CF330.500.01.D | 350 |
| CF330.3640.01.D | 350 |
| CF330.950.01.D | 350 |
| CF330.1200.01.D | 350 |
| CF330.1500.01.D | 350 |
| CF330.1850.01.D | 350 |
| CF330.2400.01.D | 350 |
| **Single core CF340** | |
| CF340.40.01 | 352 |
| CF340.100.01 | 352 |
| CF340.160.01 | 352 |
| CF340.250.01 | 352 |
| CF340.350.01 | 352 |
| CF340.500.01 | 352 |
| CF340.3640.01 | 352 |
| CF340.950.01 | 352 |
| CF340.1200.01 | 352 |
| CF340.1500.01 | 352 |
| CF340.1850.01 | 352 |
| CF340.2400.01 | 352 |
| **Control cable CF880** | |
| CF880.05.02 | 26 |
| CF880.05.03 | 26 |
| CF880.05.04 | 26 |
| CF880.05.05 | 26 |
| CF880.05.07 | 26 |
| CF880.05.12 | 26 |
| CF880.05.18 | 26 |
| CF880.05.25 | 26 |
| CF880.07.02 | 26 |
| CF880.07.03 | 26 |
| CF880.07.04 | 26 |
| CF880.07.05 | 26 |
| CF880.07.07 | 26 |
| CF880.07.12 | 26 |
| CF880.07.18 | 26 |
| CF880.07.25 | 26 |
| CF880.10.02 | 26 |
| CF880.10.03 | 26 |
| CF880.10.04 | 26 |
| CF880.10.05 | 26 |
| CF880.10.07 | 26 |
| CF880.10.12 | 26 |
| CF880.10.18 | 26 |
| CF880.10.25 | 26 |
| CF880.15.02 | 26 |
| CF880.15.03 | 26 |
| CF880.15.04 | 26 |
| CF880.15.05 | 26 |
| CF880.15.07 | 26 |
| CF880.15.12 | 26 |
| CF880.15.18 | 26 |
| CF880.15.25 | 26 |
| CF880.25.03 | 26 |
| CF880.25.04 | 26 |
| CF880.25.05 | 26 |
| CF880.25.07 | 26 |
| CF880.25.12 | 26 |
| **Control cable CF881** | |
| CF881.05.03 | 30 |
| CF881.05.04 | 30 |
| CF881.05.05 | 30 |
| CF881.05.07 | 30 |
| CF881.05.12 | 30 |
| CF881.05.18 | 30 |
| CF881.05.25 | 30 |
| CF881.07.02 | 30 |
| CF881.07.03 | 30 |
| CF881.07.04 | 30 |
| CF881.07.05 | 30 |
| CF881.07.07 | 30 |
| CF881.07.12 | 30 |
| CF881.07.18 | 30 |
| CF881.07.25 | 30 |
| CF881.10.02 | 30 |
| CF881.10.03 | 30 |
| CF881.10.04 | 30 |
| CF881.10.05 | 30 |
| CF881.10.07 | 30 |
| CF881.10.12 | 30 |
| CF881.10.18 | 30 |
| CF881.10.25 | 30 |
| CF881.15.02 | 30 |
| CF881.15.03 | 30 |
| CF881.15.04 | 30 |
| CF881.15.05 | 30 |
| CF881.15.07 | 30 |
| CF881.15.12 | 30 |
| CF881.15.18 | 30 |
| CF881.15.25 | 30 |
| CF881.25.04 | 30 |
| CF881.25.05 | 30 |
| CF881.25.07 | 30 |
| CF881.25.12 | 30 |
| **Measuring system cable CF884** | |
| CF884.001 | 210 |
| CF884.006 | 210 |
| CF884.009 | 210 |
| CF884.011 | 210 |
| CF884.015 | 210 |
| CF884.022 | 210 |
| CF884.028 | 210 |
| **Motor cable CF885** | |
| CF885.15.04 | 290 |
| CF885.25.04 | 290 |
| CF885.40.04 | 290 |
| CF885.60.04 | 290 |
| CF885.100.04 | 290 |
| CF885.160.04 | 290 |
| **Single core CF885** | |
| CF885.40.01 | 332 |
| CF885.60.01 | 332 |
| CF885.100.01 | 332 |
| CF885.160.01 | 332 |
| CF885.250.01 | 332 |
| CF885.350.01 | 332 |
| CF885.500.01 | 332 |
| CF885.3640.01 | 332 |
| CF885.950.01 | 332 |
| **Single core CF885.PE** | |
| CF885.PE.25.01 | 334 |
| CF885.PE.40.01 | 334 |
| CF885.PE.60.01 | 334 |
| CF885.PE.100.01 | 334 |
| CF885.PE.160.01 | 334 |
| CF885.PE.250.01 | 334 |
| **Motor cable CF886** | |
| CF886.15.04 | 292 |
| CF886.25.04 | 292 |
| CF886.40.04 | 292 |
| CF886.60.04 | 292 |
| CF886.100.04 | 292 |
| CF886.160.04 | 292 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| **Single core CF886** | |
| CF886.160.01 | 336 |
| CF886.250.01 | 336 |
| CF886.350.01 | 336 |
| **Servo cable CF887** | |
| CF887.07.05.02.01 | 250 |
| CF887.15.15.02.01 | 250 |
| CF887.25.15.02.01 | 250 |
| CF887.40.15.02.01 | 250 |
| CF887.10.07.02.02 | 250 |
| CF887.15.15.02.02 | 250 |
| CF887.25.15.02.02 | 250 |
| **Bus cable CF888** | |
| CF888.001 | 156 |
| CF888.021 | 156 |
| CF888.045 | 156 |
| CF888.060 | 156 |
| **Control cable CF890** | |
| CF890.05.02 | 70 |
| CF890.05.03 | 70 |
| CF890.05.04 | 70 |
| CF890.05.05 | 70 |
| CF890.05.07 | 70 |
| CF890.05.12 | 70 |
| CF890.05.18 | 70 |
| CF890.05.25 | 70 |
| CF890.07.02 | 70 |
| CF890.07.03 | 70 |
| CF890.07.04 | 70 |
| CF890.07.05 | 70 |
| CF890.07.07 | 70 |
| CF890.07.12 | 70 |
| CF890.07.18 | 70 |
| CF890.07.25 | 70 |
| CF890.10.02 | 70 |
| CF890.10.03 | 70 |
| CF890.10.04 | 70 |
| CF890.10.05 | 70 |
| CF890.10.07 | 70 |
| CF890.10.12 | 70 |
| CF890.10.18 | 70 |
| CF890.10.25 | 70 |
| CF890.15.02 | 70 |
| CF890.15.03 | 70 |
| CF890.15.04 | 70 |
| CF890.15.05 | 70 |
| CF890.15.07 | 70 |
| CF890.15.12 | 70 |
| CF890.15.18 | 70 |
| CF890.15.25 | 70 |
| CF890.25.03 | 70 |
| CF890.25.04 | 70 |
| CF890.25.05 | 70 |
| CF890.25.07 | 70 |
| CF890.25.12 | 70 |
| CF890.25.25 | 70 |
| **Control cable CF891** | |
| CF891.05.02 | 74 |
| CF891.05.03 | 74 |
| CF891.05.05 | 74 |
| CF891.05.12 | 74 |
| CF891.05.18 | 74 |
| CF891.05.25 | 74 |
| CF891.07.02 | 74 |
| CF891.07.03 | 74 |
| CF891.07.04 | 74 |
| CF891.07.05 | 74 |
| CF891.07.07 | 74 |
| CF891.07.12 | 74 |
| CF891.07.18 | 74 |
| CF891.07.25 | 74 |
| CF891.10.02 | 74 |
| CF891.10.03 | 74 |
| CF891.10.04 | 74 |
| CF891.10.05 | 74 |
| CF891.10.07 | 74 |
| CF891.10.12 | 74 |
| CF891.10.18 | 74 |
| CF891.10.25 | 74 |
| CF891.15.02 | 74 |
| CF891.15.03 | 74 |
| CF891.15.04 | 74 |
| CF891.15.05 | 74 |
| CF891.15.07 | 74 |
| CF891.15.12 | 74 |
| CF891.15.25 | 74 |
| CF891.25.04 | 74 |
| CF891.25.05 | 74 |
| CF891.25.07 | 74 |
| **Measuring system cable CF894** | |
| CF894.001 | 220 |
| CF894.006 | 220 |
| CF894.009 | 220 |
| CF894.011 | 220 |
| CF894.015 | 220 |
| CF894.022 | 220 |
| CF894.028 | 220 |
| **Motor cable CF895** | |
| CF895.15.04 | 304 |
| CF895.25.04 | 304 |
| CF895.40.04 | 304 |
| CF895.60.04 | 304 |
| CF895.100.04 | 304 |
| CF895.160.04 | 304 |
| **Motor cable CF896** | |
| CF896.07.04 | 306 |
| CF896.15.04 | 306 |
| CF896.25.04 | 306 |
| CF896.40.04 | 306 |
| CF896.60.04 | 306 |
| CF896.100.04 | 306 |
| CF896.160.04 | 306 |
| **Servo cable CF897** | |
| CF897.15.15.02.01 | 260 |
| CF897.25.15.02.01 | 260 |
| CF897.40.15.02.01 | 260 |
| CF897.15.15.02.02 | 260 |
| **Bus cable CF898** | |
| CF898.001 | 164 |
| CF898.021 | 164 |
| CF898.045 | 164 |
| CF898.060 | 164 |
| CF898.061.FC | 164 |
| CF898.082 | 164 |
| CF898.083 | 164 |
| **Pneumatic hose CFAIR** | |
| CAPU.A.04.0 | 438 |
| CAPU.A.06.0 | 438 |
| CAPU.A.08.0 | 438 |
| CAPU.A.10.0 | 438 |
| CAPU.A.12.0 | 438 |
| CAPU.A.16.0 | 438 |
| **Pneumatic hose CFCleanAIR** | |
| CAPE.A.04.0 | 440 |
| CAPE.A.06.0 | 440 |
| CAPE.A.08.0 | 440 |
| CAPE.A.10.0 | 440 |
| CAPE.A.12.0 | 440 |
| CAPE.A.16.0 | 440 |
| **Bus cable CFBUS** | |
| CFBUS.001 | 174 |
| CFBUS.002 | 174 |
| CFBUS.003 | 174 |
| CFBUS.010 | 174 |
| CFBUS.011 | 174 |
| CFBUS.020 | 174 |
| CFBUS.021 | 174 |
| CFBUS.022 | 174 |
| CFBUS.030 | 174 |
| CFBUS.031 | 174 |
| CFBUS.035 | 174 |
| CFBUS.040 | 174 |
| CFBUS.045 | 174 |
| CFBUS.049 | 174 |
| CFBUS.050 | 174 |
| CFBUS.052 | 174 |
| CFBUS.055 | 174 |
| CFBUS.060 | 174 |
| CFBUS.065 | 174 |
| CFBUS.066 | 174 |
| CFBUS.0364 | 174 |
| **Bus cable CFBUS.LB** | |
| CFBUS.LB.001 | 180 |
| CFBUS.LB.020 | 180 |
| CFBUS.LB.021 | 180 |
| CFBUS.LB.022 | 180 |
| CFBUS.LB.040 | 180 |
| CFBUS.LB.045 | 180 |
| CFBUS.LB.049 | 180 |
| CFBUS.LB.060 | 180 |
| **Bus cable CFBUS.PUR** | |
| CFBUS.PUR.001 | 168 |
| CFBUS.PUR.020 | 168 |
| CFBUS.PUR.021 | 168 |
| CFBUS.PUR.022 | 168 |
| CFBUS.PUR.035 | 168 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CFBUS.PUR.040 | 168 |
| CFBUS.PUR.042 | 168 |
| CFBUS.PUR.045 | 168 |
| CFBUS.PUR.049 | 168 |
| CFBUS.PUR.H01.049 | 168 |
| CFBUS.PUR.050 | 168 |
| CFBUS.PUR.052 | 168 |
| CFBUS.PUR.056 | 168 |
| CFBUS.PUR.060 | 168 |
| CFBUS.PUR.H01.060 | 168 |
| CFBUS.PUR.068 | 168 |
| **Bus cable CFBUS.PVC** | |
| CFBUS.PVC.001 | 160 |
| CFBUS.PVC.020 | 160 |
| CFBUS.PVC.021 | 160 |
| CFBUS.PVC.022 | 160 |
| CFBUS.PVC.035 | 160 |
| CFBUS.PVC.040 | 160 |
| CFBUS.PVC.045 | 160 |
| CFBUS.PVC.049 | 160 |
| CFBUS.PVC.050 | 160 |
| CFBUS.PVC.052 | 160 |
| CFBUS.PVC.060 | 160 |
| CFBUS.PVC.068 | 160 |
| **Medium voltage cable CFCRANE** | |
| CFCRANE1x25/16-6/10kV | 356 |
| CFCRANE1x35/16-6/10kV | 356 |
| CFCRANE1x50/16-6/10kV | 356 |
| CFCRANE1x364/16-6/10kV | 356 |
| CFCRANE1x95/16-6/10kV | 356 |
| CFCRANE1X120/16-6/10KV | 356 |
| CFCRANE1x185/25-6/10kV | 356 |
| **Medium voltage cable CFCRANE.PUR** | |
| CFCRANE.PUR.350.01.6/10kV | 354 |
| CFCRANE.PUR.500.01.6/10kV | 354 |
| CFCRANE.PUR.3640.01.6/10kV | 354 |
| CFCRANE.PUR.950.01.6/10kV | 354 |
| **Special cable CFFLAT** | |
| CFFLAT.40.01 | 404 |
| **Coax cable CFKoax** | |
| CFKoax1.01 | 144 |
| CFKoax1.05 | 144 |
| CFKoax2.01 | 144 |
| CFKoax3.01 | 144 |
| **Fiber Optic Cable CFLG88** | |
| CFLG88.2.62.5/125 | 190 |
| CFLG88.2.50/125 | 190 |
| **Fiber Optic Cable CFLG.G** | |
| CFLG.6G.62.5/125.TC | 200 |
| CFLG.12G.62.5/125.TC | 200 |
| CFLG.6G.50/125.TC | 200 |
| CFLG.12G.50/125.TC | 200 |
| CFLG.12E.9/125.TC | 200 |
| **Fiber Optic Cable CFLG.LB** | |
| CFLG.2LB.62.5/125 | 196 |
| CFLG.4LB.62.5/125 | 196 |
| CFLG.6LB.62.5/125 | 196 |
| CFLG.12LB.62.5/125 | 196 |
| CFLG.2LB.50/125 | 196 |

| igus® Part No. | Page |
|---|---|
| CFLG.4LB.50/125 | 196 |
| CFLG.6LB.50/125 | 196 |
| CFLG.12LB.50/125 | 196 |
| CFLG.2LB.9/125 | 196 |
| CFLG.4LB.9/125 | 196 |
| CFLG.12LB.9/125 | 196 |
| **Fiber Optic Cable CFLG.LB.PUR** | |
| CFLG.2LB.PUR.62.5/125 | 192 |
| CFLG.4LB.PUR.62.5/125 | 192 |
| CFLG.6LB.PUR.62.5/125 | 192 |
| CFLG.12LB.PUR.62.5/125 | 192 |
| CFLG.6LB.PUR.50/125 | 192 |
| CFLG.12LB.PUR.50/125 | 192 |
| CFLG.6LB.PUR.9/125 | 192 |
| **Fiber Optic Cable CFLK** | |
| CFLK.L1.01 | 188 |
| CFLK.L1.02 | 188 |
| **Single core CFPE** | |
| CFPE.15.01 | 344 |
| CFPE.25.01 | 344 |
| CFPE.40.01 | 344 |
| CFPE.60.01 | 344 |
| CFPE.100.01 | 344 |
| CFPE.160.01 | 344 |
| CFPE.250.01 | 344 |
| CFPE.350.01 | 344 |
| CFPE.500.01 | 344 |
| CFPE.3640.01 | 344 |
| CFPE.950.01 | 344 |
| **Twistable cable CFROBOT** | |
| CFROBOT.035 | 384 |
| CFROBOT.036 | 384 |
| CFROBOT.037 | 384 |
| CFROBOT.038 | 384 |
| **Twistable cable CFROBOT2** | |
| CFROBOT2.07.04.C | 368 |
| CFROBOT2.07.05.C | 368 |
| CFROBOT2.07.07.C | 368 |
| CFROBOT2.07.12.C | 368 |
| CFROBOT2.07.18.C | 368 |
| **Twistable cable CFROBOT3** | |
| CFROBOT3.02.03.02 | 370 |
| CFROBOT3.02.04.02 | 370 |
| CFROBOT3.02.06.02 | 370 |
| CFROBOT3.02.08.02 | 370 |
| CFROBOT3.05.05.02 | 370 |
| **Twistable cable CFROBOT4** | |
| CFROBOT4.001 | 372 |
| CFROBOT4.006 | 372 |
| CFROBOT4.009 | 372 |
| CFROBOT4.015 | 372 |
| CFROBOT4.028 | 372 |
| **Twistable cable CFROBOT5** | |
| CFROBOT5.500 | 376 |
| CFROBOT5.501 | 376 |
| **Twistable cable CFROBOT6** | |
| CFROBOT6.160.03 | 378 |
| CFROBOT6.250.03 | 378 |

| igus® Part No. | Page |
|---|---|
| **Twistable cable CFROBOT7** | |
| CFROBOT7.07.03.02.02.C | 380 |
| CFROBOT7.15.15.02.02.C | 380 |
| CFROBOT7.25.15.02.02.C | 380 |
| CFROBOT7.40.02.02.04.C | 380 |
| CFROBOT7.15.03.C | 380 |
| CFROBOT7.15.04.C | 380 |
| CFROBOT7.25.03.C | 380 |
| CFROBOT7.25.04.C | 380 |
| CFROBOT7.60.04.C | 380 |
| **Twistable cable CFROBOT8** | |
| CFROBOT8.001 | 386 |
| CFROBOT8.022 | 386 |
| CFROBOT8.030 | 386 |
| CFROBOT8.045 | 386 |
| CFROBOT8.049 | 386 |
| CFROBOT8.052 | 386 |
| **Twistable cable CFROBOT8.PLUS** | |
| CFROBOT8.PLUS.001 | 390 |
| CFROBOT8.PLUS.022 | 390 |
| CFROBOT8.PLUS.045 | 390 |
| CFROBOT8.PLUS.049 | 390 |
| CFROBOT8.PLUS.050 | 390 |
| CFROBOT8.PLUS.052 | 390 |
| CFROBOT8.PLUS.060 | 390 |
| **Twistable cable CFROBOT9** | |
| CFROBOT9.007 | 394 |
| CFROBOT9.010 | 394 |
| **Control cable CFSOFT1** | |
| CFSOFT1.02.03 | 66 |
| CFSOFT1.02.08 | 66 |
| CFSOFT1.03.04 | 66 |
| CFSOFT1.05.04 | 66 |
| **Control cable CFSOFT2** | |
| CFSOFT2.02.03 | 68 |
| CFSOFT2.02.08 | 68 |
| CFSOFT2.03.04 | 68 |
| CFSOFT2.05.04 | 68 |
| **Special cable CFSPECIAL.182** | |
| CFSPECIAL.182.045 | 406 |
| CFSPECIAL.182.060 | 406 |
| **Special cable CFSPECIAL.192** | |
| CFSPECIAL.192.H207.15.04.D | 408 |
| **Special cable CFSPECIAL.532** | |
| CFSPECIAL.532.15.08.02 | 410 |
| CFSPECIAL.532.15.16.02 | 410 |
| **Special cable CFSPECIAL.562.PE** | |
| CFSPECIAL.562.PE.3640.01 | 412 |
| **Special cable CFSPECIAL.572** | |
| CFSPECIAL.572.2400.01 | 414 |
| CFSPECIAL.572.3000.01 | 414 |
| CFSPECIAL.572.4000.01 | 414 |
| **Special cable CFSPECIAL.592** | |
| CFSPECIAL.592.001 | 416 |
| **Special cable CFSPECIAL.792** | |
| CFSPECIAL.792.011 | 418 |
| CFSPECIAL.792.012 | 418 |
| CFSPECIAL.792.013 | 418 |
| CFSPECIAL.792.014 | 418 |

# Table of contents according to part number


| igus® Part No. | Page |
|---|---|
| CFSPECIAL.792.015 | 418 |
| CFSPECIAL.792.016 | 418 |
| **Special cable CFTHERMO** | |
| CFTHERMO.J.001 | 402 |
| CFTHERMO.K.001 | 402 |
| CFTHERMO.K.002 | 402 |
| CFTHERMO.N.001 | 402 |
| **Control element CFCLEAN1** | |
| CFCLEAN1.02.04 | 426 |
| CFCLEAN1.03.02 | 426 |
| CFCLEAN1.03.07 | 426 |
| CFCLEAN1.05.04 | 426 |
| CFCLEAN1.07.04 | 426 |
| CFCLEAN1.07.05 | 426 |
| CFCLEAN1.10.02 | 426 |
| **Coax element CFCLEAN2** | |
| CFCLEAN2.KOAX1.03 | 428 |
| **Data element CFCLEAN3** | |
| CFCLEAN3.01.05.02 | 430 |
| CFCLEAN3.01.06.02 | 430 |
| CFCLEAN3.01.08.02 | 430 |
| CFCLEAN3.02.03.02 | 430 |
| CFCLEAN3.02.04.02 | 430 |
| CFCLEAN3.02.05.02 | 430 |
| CFCLEAN3.02.06.02 | 430 |
| **Measuring system element CFCLEAN4** | |
| CFCLEAN4.015 | 432 |
| **Motor element CFCLEAN7** | |
| CFCLEAN7.15.03.02.01 | 434 |
| CFCLEAN7.15.04 | 434 |
| CFCLEAN7.PE.25.01 | 434 |
| **Bus element CFCLEAN8** | |
| CFCLEAN8.045 | 436 |

# For your notes

# For your notes

# For your notes

# For your notes

# For your notes

# Explanations of the icons used in the catalog



Bend radius



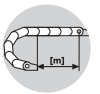
Temperature



v max. unsup-
ported/gliding



a max.



Travel distance



Torsion



UV-resistance



Nominal voltage


Testg voltage



Oil resistance


Offshore


Flame-retardant


Silicon-free



Halogen-free



PTFE-free


Outer jacket


CFRIP®


Inner jacket


Conductor
structure


Conductor
identification


Conductor


Fiber optic
cables


Conductor
insulation


Overall shield


Center element


Filler


Element shield


Element jacket


Material



Dimensions



Operating
pressure



Vacuum


UL-Listed


UL/CSA



NEC



NFPA



CLPA



DNV



REACH



Lead free



Cleanroom



Dry cleanroom



DESINA

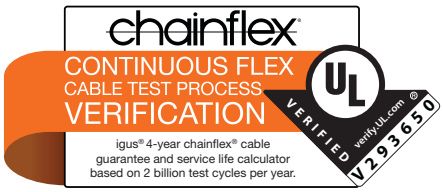

CE

igus®.com/24
Buy online – 24hrs!

# 9001:2015
# 16949:2016

igus® is certified in accordance with ISO 9001:2015 and IATF 16949:2016 in the field of energy supply systems, cables and harnessing, as well as plastic bearings.




# newsletter

Free of charge! Learn more about trends and innovations from the igus® motion plastics® world. Register here: www.igus.com/newsletter

igus®.com

igus® Inc. 257 Ferris Avenue, Rumford, RI 02916
Phone: 800-5212747 sales@igus.com
www.igus.com www.igus.com/chainflex

© igus® Inc. USA

Subject to technical alterations. CHAINFLEX-CAT Issue 07/2025

plastics