

7 cable management mistakes you don't know you're making

Planning out your cable management system correctly is key to avoiding unnecessary downtime. Simple considerations in the beginning of that process can prevent issues like loss of continuity, insulation damage, mechanical deformation or electromagnetic interference (EMI). However, certain rules of thumb, such as filling only as much as 80 percent of a cable carrier's cross section, have become outdated. So how do you know you're specifying, designing and installing an efficient system? Read on for a list of seven common cable management mistakes that you may not know you're making and for suggestions on how to avoid them.

1. Lack of interior separation

Interior separators and shelves are crucial for keeping similar cables and hoses compartmentalized. When they're not separated, cables can cross over one another and become tangled.

Cables with significant differences in diameter or incompatible jackets should be placed in separate compartments. Typically, vertical separators are primarily used as they are the simplest to install and offer easy access to cables. For more complex cable packages, horizontal shelves can be used to provide additional separation.

The maximum cable or hose diameter corresponds to the inner height of your selected cable carrier, with additional minimum clearance. We recommend leaving a 10 percent clearance around electrical cables and 20 percent around hydraulic hoses.



Visible interior separation between cables and hoses in an Energy Chain® cable carrier

The faster and more frequently a cable carrier operates, the more important it is for cables and hoses to be positioned precisely inside that carrier.

2. Uneven distribution of weight

Cables and hoses need to be able to move freely inside a cable carrier without exerting an uneven load on the carrier. Unevenly distributed weight can result in a carrier that is too heavy on one side, which can disrupt movement, cause the carrier to tilt and potentially interfere with the work area.

Cable weight should be evenly distributed across a carrier's cross section. We recommend placing heavy cables towards the edges of the carrier and lighter cables towards the center, so that the majority of the cable weight is supported close to the side links. This is especially important for gliding applications.

3. Overfilled cable carrier

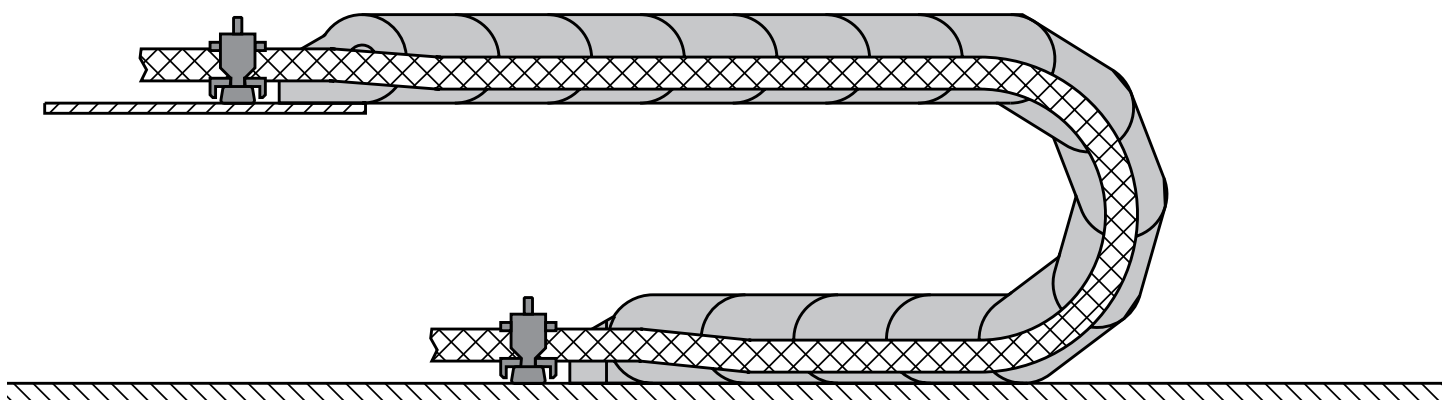
It may be hard to leave some space inside your cable carrier, but it's important to resist the temptation to overfill it since that can obstruct free movement.

Your chances of jacket abrasion significantly increase if cables become caught on one another and bind. There is also a greater chance of EMI when power and data cables are positioned too close together. We recommend you space all power and data cables as far apart as possible to prevent EMI.

4. Lack of proper strain relief

There is no way to control the length of the cable inside your carrier without proper strain relief. The cable will pull into the carrier and bunch as the carrier moves back and forth, causing premature system failure. Points outside the carrier, such as connectors or end termination points, will also absorb all mechanical forces.

For horizontal and vertical applications, round electrical cables should be secured with strain relief at both ends of the cable carrier. In certain situations, such as rotary applications or with high pressure or pulsing hydraulic hoses, it is recommended to secure your cables just at the moving end. A service loop should be left at one end of the chain to allow for proper strain relief adjustment.



Strain relief on both ends of a cable carrier, resulting in the cable resting in the neutral axis.

5. Not installing cables along the neutral axis

Cables with proper strain relief should be positioned in the neutral axis of your cable carrier. The cables should not be pulled tight against the inner radius or pushed against the outer radius.

Once strain relief is properly installed, test the carrier in both the extended and home position to ensure that cables remain properly positioned in the neutral axis.

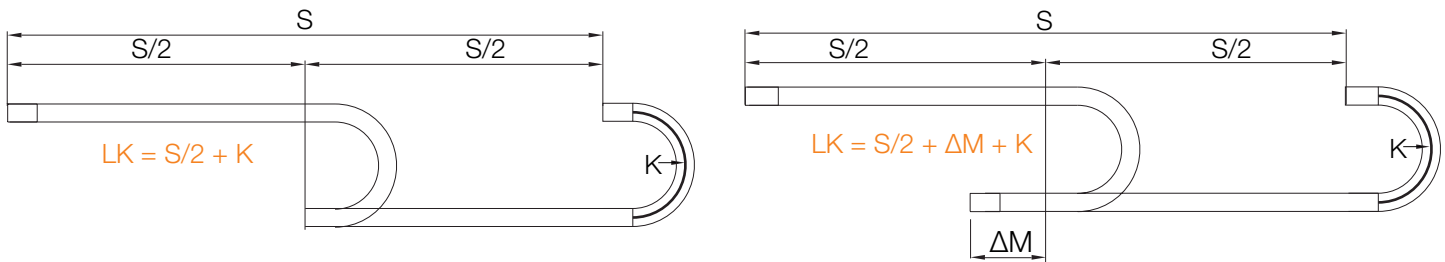
6. Dissimilar jacket types placed next to each other

If the outer jackets of cables and hoses have different coefficients of friction and rub against one another, the harder, more resilient material will gradually wear down the softer jacket and cause the system to fail. PUR and TPE jackets have similar wear characteristics, so laying these types of cables together is not a problem; however, mixing PVC and PUR jackets is not recommended. If jacket materials need to be mixed inside the same carrier, ensure the jacket materials are rated for use inside of one. Rubber or thermoset jacket materials tend to have tackier surfaces and will bind inside cable carriers.

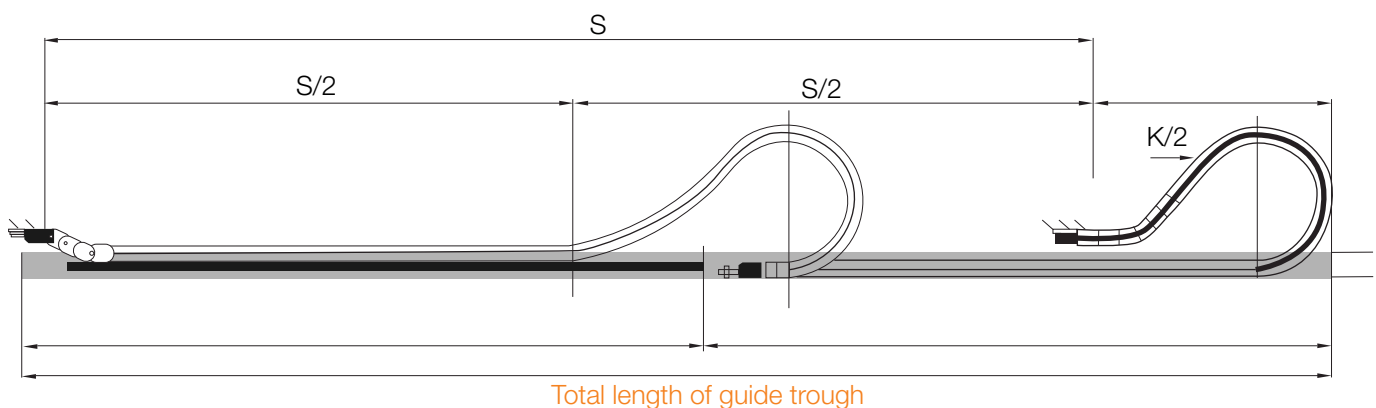
7. Improper cable carrier length

A cable carrier's full range of movement could be compromised if its length is miscalculated and pulled or stretched cables can result in conductor breakage. To properly calculate the length of your carrier, use the following equations:

For unsupported, vertical or side-mounted applications, use **LK = S/2 + K** (if the fixed point is at the center of travel) or **LK = S/2 + ΔM + K** (if the fixed end is located offset from the center of travel).



For gliding applications, use **LK = S/2 + K2** (if the fixed point is at the center of travel) or **LK = S/2 + ΔM + K2** (if the fixed end is located offset from the center of travel).



In both cases, **S** = maximum travel distance, **K** = unsupported curve length, **K2** = gliding curve length, **LK** = carrier length and **ΔM** = deviation from the center point. The curve length values **K** and **K2** vary by carrier size and are typically available from the manufacturer spec sheet for the given cable carrier.

We offer free consultation services for our current and potential customers. Provide us with your application's cable requirements and receive our recommendations with no strings attached. Contact us directly at sales@igus.com or call us at 800-521-2747 Monday – Friday, 8 a.m. – 8 p.m. EST.