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

To prevent unnecessary downtime, your cable management system must be correctly specified, designed, and installed. Simple considerations in the beginning can prevent large problems, such as loss of continuity, insulation damage, mechanical deformation, or EMI problems, later on.

Modern cable carriers can withstand longer travels, faster speeds, and higher loads than ever before. Such advances in automation technology mean that certain rules of thumb, such as filling only as much as 80% of a cable carrier's cross section, have become outdated. For this reason, we've put together this list of seven common cable management mistakes that you may not know you're making, as well as how to avoid them.

1. Lack of interior separation

Interior separators and shelves are crucial for keeping similar cables and hoses compartmentalized. When separation is not used, cables can cross over one another and become tangled.

The clearance height of a compartment with several cables and hoses shouldn't amount to more than 1.5 times the diameter of the largest cable or hose. Cables with wide differences in diameter should be laid in separate compartments. Cables and hoses with incompatible jackets should also be separated (see point #6 for more on this).

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

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

The faster and more frequently a cable carrier operates, the more important the exact positioning of the cables and hoses inside. For high-speed applications over 1.64 feet per second, or for high cycle applications with over 10,000 cycles per year, cables or hoses must not be laid on top of one another without horizontal separation.

2. Uneven distribution of weight

Cables and hoses need to be laid inside a cable carrier so that they are able to move freely without exerting tensile forces along the radius. Unevenly distributed weight can result in a cable carrier that is too heavy on one side, which can disrupt movement and cause the carrier to tilt, potentially interfering with the work area.

3. Overfilled cable carrier

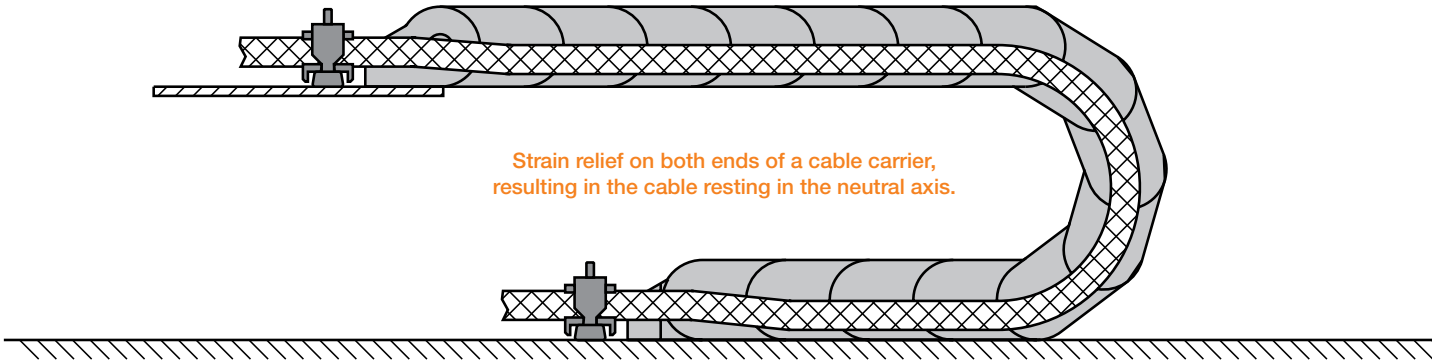
While it may be hard to leave seemingly available cable carrier space unfilled, overfilling a cable carrier can obstruct free movement. Cables that do not have room to move properly will interfere with the movement of the cable carrier.

Additionally, if cables become caught on one another and bind, jacket abrasion can be significantly increased. There is also a greater chance of electromagnetic interference, or EMI, when power and data cables are positioned close together. As a rule, we recommend you space all power and data cables as far apart as possible in order to best prevent EMI.

4. Lack of proper strain relief

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

Typically, round electrical cables should be secured with strain relief at both ends. In exceptional cases, the cables may be fixed with strain relief at the moving end only. A gap of 10-30 times the cable diameter between the end of the bend radius and the fixed point is recommended.



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

Correctly strain relieved cables will position in the neutral axis of a cable carrier. The cables should not be pulled tight against the inner radius or pushed against the outer radius.

Strain relief should be properly installed, and then tested in both the extended and the home position.

6. Dissimilar jacket types placed next to each other

If the outer jacket of cables/hoses have different coefficients of friction and rub against one another, the harder, more resilient material will gradually wear down the softer jacket, leading to failure.

While PUR and TPE jackets have similar wear characteristics and laying these types of cables together is not a problem, mixing PVC and PUR jackets is not recommended. If jacket materials need to be mixed in the same carrier, then ensure that jacket materials are rated for cable carrier use. Rubber or thermoset jacket materials tend to have tackier surfaces and will bind inside cable carriers, and are therefore not recommended as outer jacket materials when using a cable carrier system.

7. Improper cable carrier length

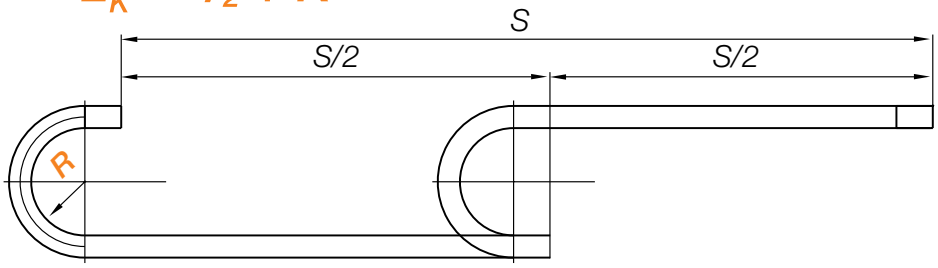
If the cable carrier's length is miscalculated, then the full range of movement could be compromised. Pulled or stretched cables can result in conductor breakage.

To properly calculate the length of an Energy Chain® cable carrier, use the following equations:

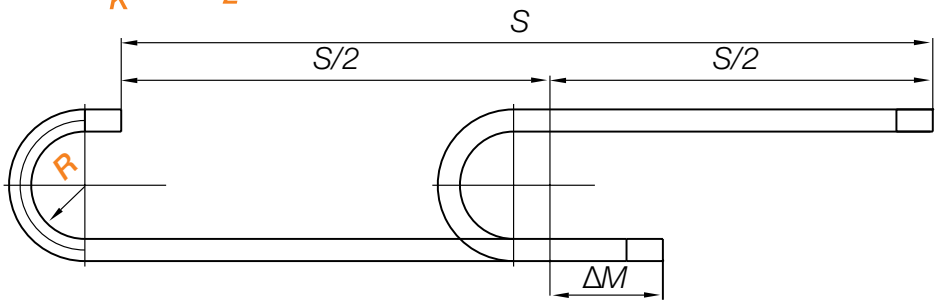
$$L_K = {}^{S}/_{2} + K \qquad or \qquad L_K = {}^{S}/_{2} + \Delta M + K$$

If the fixed end is located in the center of travel, the cable carrier's length, "L_K," is calculated by using half the length of travel, and adding the value "K" for the bend radius. Placing the fixed end in the center of travel is the most cost-effective solution, as it requires the shortest possible cable carrier and cable/hose lengths. When the fixed end is not located in the center, the offset mounting value (ΔM) must be added.

$$L_K = {}^{S}/_{2} + K$$



$$L_K = {}^{S}/_{2} + \Delta M + K$$



Due to the wide variety of applications, we offer free consultation services for our customers and potential customers. Provide us with your application's cable requirements, and receive our recommendations quickly, with no strings attached. Contact us directly at sales@igus.com, or by calling us at 800.521.2747 Monday-Friday, 8 AM - 8PM EST

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