

ENVIRONMENTS FOR ELECTRONICS

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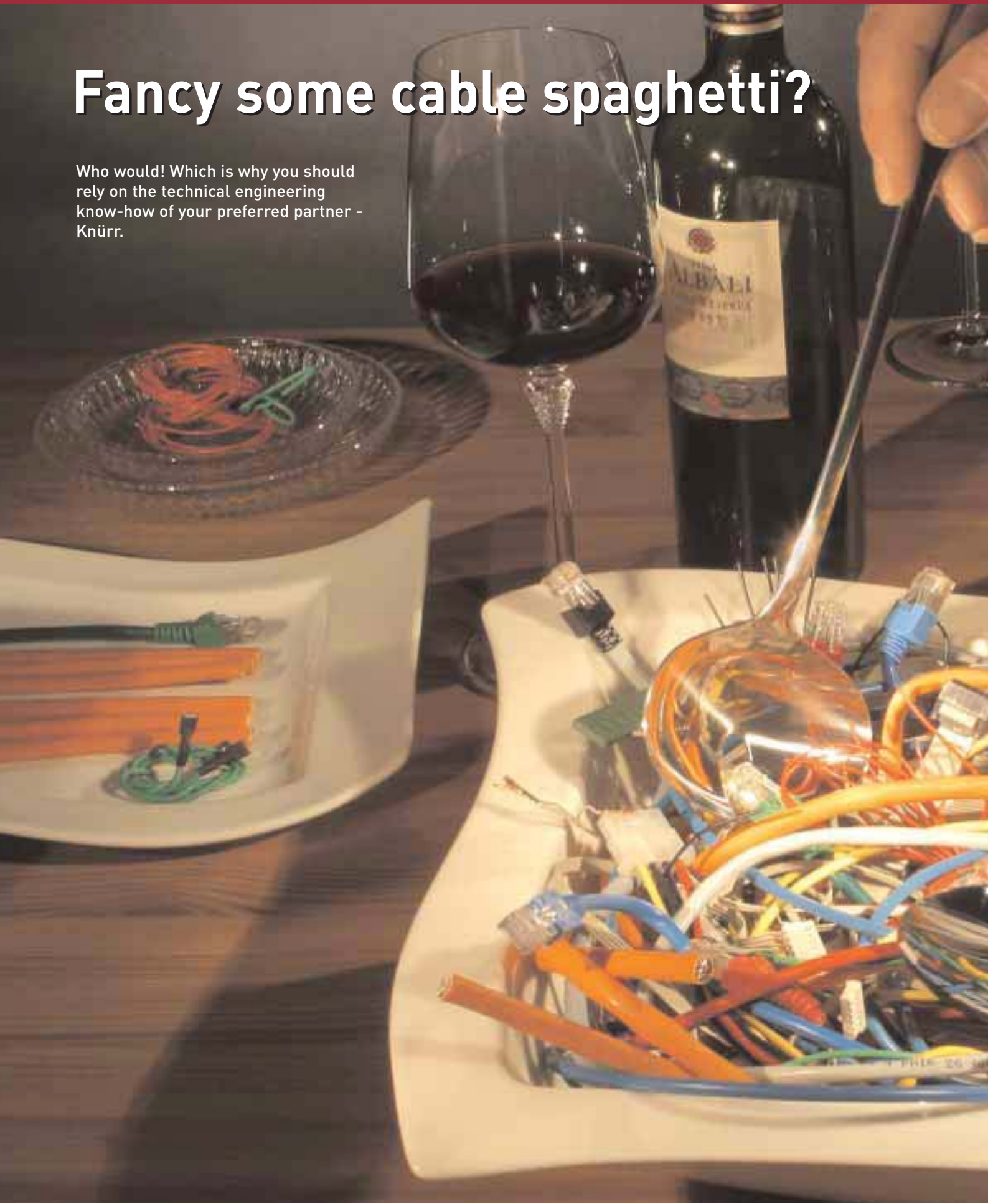
Cable Management of the Extra Class



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Fancy some cable spaghetti?

Who would! Which is why you should rely on the technical engineering know-how of your preferred partner - Knürr.



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Global networking continues to grow at an unstoppable pace and constantly demands higher performance, innovative and technically ingenious networks and intelligent rack system platforms. These platforms represent the nodal points of these networks and create the interfaces between Internet, LAN and WAN.

A well structured cable management also plays a pivotal financial role in this networking, especially in the rack systems of the networks, servers and telecommunication.

Data cables are high grade components in a cabling system and are an integral component in the overall system. Only when these »cables« are treated and laid properly, can their technical properties be used to their full potential.

Data cables can be made of copper or fibre optics. Traditional copper cables usually have a small external diameter and consist of a "loose" structure of four wire pairs stranded with one another with small copper cross-sections. And it's for this very reason that it is extremely important to reduce the mechanical stresses of these cables to the absolute required minimum. Fibre optic cables on the other hand consist of an inner conductor made of glass or plastic (core), a glass or plastic coat (cladding) and several more coats that provide protection against mechanical stresses. These millimetre thick fibre glass cables are far more sensitive to mechanical strain.

So if we're talking about cable management, then we also have to talk about feeding electrical energy, that is, the power cables must be protected from mechanical strains and stresses. Power cables in networks are usually laid separate from the data cables.

Perfected Cable Management From Knürr

The new Knürr cable management system guarantees a material-protecting cabling system for all communication requirements (voice, data and video), while also taking future transmission technologies into account.

Special consideration during the development was given to ...

Ease of installation: In the complete product range, it is always ensured that the individual cable manage-

ment components are easy to install. The convenient “one-man-installation” is therefore just as important as the “later-stage” installation of components.

Application options: The individual cable management components have been designed for flexible use in numerous applications (e.g. radial limit in conjunction with the C-extrusion rail with the cable entry and for the cable rerouting in the rack).

Multifunctionality: A closer look at the individual products reveals that some possess an inherent “multitalent”. The cable routing brace, for example, not only has the option of routing cables horizontally and vertically using Velcro ties or cable ties, but rather also allows numerous components to be mounted using screws and caged nuts. These caged nuts can also be shifted with room for play in a slot, so that every mounting dimension can be accommodated.





MEC20083



MEC20084

Investment security: Knürr cable management corresponds in the objectives it sets out to achieve with the requirements of future transmission technologies, and it therefore promises high investment security in the cabling of networks in Knürr rack systems.

Transparency: Different components for fibre glass and copper cables, especially the fixing options using Velcro strips and cable bundling with different coloured Velcro strip cable ties, guarantee a transparent cable management, which is the optimum starting situation for an intelligent expansion of the network and for the highest standard of servicing convenience.

Safety: During selection of the production technology, the materials and the surfaces, constant attention was paid in ensuring that these products would not cause any damage to the cables.

Flexibility: The components demonstrate a particularly high degree of flexibility with relocations or with expansions of the communications structure.

Costs: In addition to cost-effective production, particularly close attention was also paid to a costs-conscious application.



MEC20085



MEC20068



MEC20086



MEC20066



MEC20058



MEC20084



LIG00021

It must be ensured when laying cables that every type of mechanical stress is avoided:

- **Bending loads**

The bending radii may never be less than the values provided by the cable manufacturer in the respective data sheets. At points that bend too much, the electrical properties of the »cable« change and reduce the transmission bandwidths and ranges. If no manufacturer specifications are available, then the following rule of thumb applies: With loose cabling, at least 15 times the external cable diameter and with fixed cabling, at least 10 times the external cable diameter.

- **Kink stress**

The most extreme bending loads can cause the cable to break.

- **Tensile stress**

This is only determined by the copper cross-section of the conductor, as all other materials are too soft. The »cable« may not be stressed more than 50N/(mm² Cu cross-section) as otherwise the conductors are stretched and the cross-section is reduced. If higher pulling forces are unavoidably required, then »cables« with additional strain relief elements must be used.

- **Compressive stress**

These are caused by loads bearing down from above, fixed clamping or sharp kinking of the »cable« and must always be avoided, as otherwise the "loose" cable structure changes and the electrical transmission properties are impaired.

- **Torque stresses (twisting)**

These must never have an effect on the »cable«, as they drive the cable elements into one another and therefore impair the transmission properties.

Cabling made easy!

Velcro cable tie With all cable management components, special attention has been paid in ensuring that mounting can be made using Velcro strip cable ties. Velcro cable ties not only guarantee a stress-free fixing of the cable, but rather can also be re-released at any time and reused again and again. Velcro cable ties are also extremely helpful for the installation engineer both in providing a pinch-free cable bundling and because they are so quick to apply.

Excess cable storage The storage of excess cable lengths is made on the one hand separated from the patch fields, however in a position that is always easily accessible. Copper cable excess can be stored separate from fibre glass excess lengths within the Knürr rack systems: the copper cables stored hanging on a side and the more sensitive fibre glass cables stored flat in a front-accessible excess length drawer.

Cable clamping and strain relief Both an easy to access cable clamping and a technically fault-free strain relief are also guaranteed with the Knürr range of products.



MEC20077



MEC20076



MEC20071



MEC20059



MEC20061



MEC20074



MEC20079



MEC20072



MIR20198

Roof Superstructure for Cable Trays

- Mounting cable trays using C-extrusion rails
- Freely selectable positioning

Material / Finish
 C-Extrusion rail: Sheet steel, zinc passivated
 Mounting bracket: Sheet steel, powered RAL 7035, textured

Supply schedule
 2 C-extrusion rails
 4 Mounting brackets
 Mounting material

How supplied
 Flat packed kit

Note
 Please also order U-clamps, cable clamping bars or threaded plates.

W	H	D	Order no.	UP
		600	05.040.070.9	1 set
		800	05.040.072.9	1 set
		900	05.040.073.9	1 set
		1000	05.040.074.9	1 set



MEC20045

Cascading

- For orderly cable management and for cable clamping
- Can be expanded

Material / Finish
 Base plate: Sheet steel, powder-coated RAL 7035, textured
 Foam: Polyethylene, anthracite

Supply schedule
 2 End plates with foam
 3 Plates with foam on both sides
 Mounting material

How supplied
 Flat packed kit

W	H	D	Order no.	UP
			05.040.088.9	1 set



MIR00096

C-Extrusion Rail

- For cable clamping using U-clamps
- Cable clamping closer to access
- Suitable for use in conjunction with split cover and fan cover

Material / Finish
 - Sheet steel, 1.5 mm, zinc passivated

Supply schedule
 1 C-extrusion rail
 Mounting material

How supplied
 Flat packed kit

Note
 Please order U-clamps, cable clamping bars or threaded plates.

W	H	D	L	Model	Order no.	UP
			460		05.040.080.0	1 set
			660		05.040.082.0	1 set



MEC20051

Threaded Plate, M5

- For use in conjunction with C-extrusion rails

Material / Finish
Flat rolled steel, 4.0 mm, zinc-passivated

Supply schedule
20 Threaded plates

How supplied
Flat packed kit

W	H	D	L	Order no.	UP
				05.040.077.9	1 set



MEC20090

Radial Limit

- Various installation options available:
- on the basic rack for cable clamping
- on the 19" extrusion for cable rerouting and cable management
- For use in conjunction with C-extrusion rails

Material / Finish
Sheet steel, 1.5 mm, zinc passivated

Supply schedule
1 Radial limit
Mounting material

How supplied
Flat packed kit

W	H	D	L	Order no.	UP
290		87		05.040.090.0	1 set



MEC20091

Cable Routing Brace

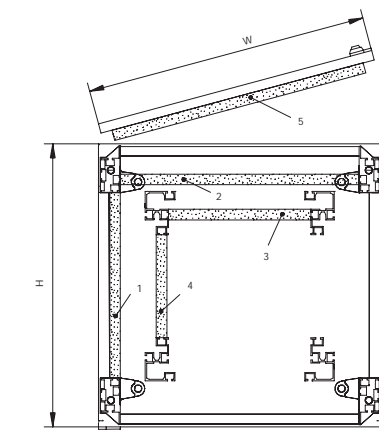
- For mounting on the miracel/smaract basic rack and on the 19" extrusion
- For cable clamping using Velcro strips, cable ties
- For orderly cable management in the rack
- For universal mounting option using caged nuts (all dimensions can be accommodated as caged nuts are flexible)

Material / Finish
Sheet steel, 1.5 mm, zinc passivated

Supply schedule
1 Cable routing brace
Mounting material

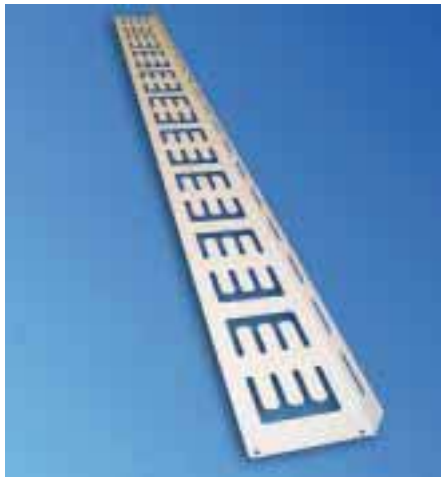
How supplied
In units

Note
If required, please also order Velcro strip



MIR00090

W	H	D	L	Model	For rack type	Order no.	UP
		600	455	Item 1	miracel	05.040.001.0	1 unit
		800	655	Item 1	miracel	05.040.003.0	1 unit
		900	755	Item 1	miracel	05.040.004.0	1 unit
		1000	855	Item 1	miracel	05.040.005.0	1 unit
		600	534	Item 2	miracel/smaract	05.040.008.0	1 unit
		800	734	Item 2	miracel/smaract	05.040.010.0	1 unit
		19"	468	Item 3	miracel/smaract/dpr	05.040.011.0	1 unit



MEC20088

Cable Trough

- For orderly cable management in the miracel rack
- Mounting of the cable using Velcro strips or cable ties
- Combination as L, U or T unit possible

Material / Finish
Sheet steel, 1.5 mm, zinc passivated, powder-coated, RAL 7035, light grey

Supply schedule
1 Cable trough
Mounting material

How supplied
Flat packed kit

Note
If required, please also order Velcro strip.

W	H	D	HU/U	Model	Order no.	UP
			41	for rack type - miracel	05.040.021.1	1 set
			46	for rack type - miracel	05.040.022.1	1 set



MEC20038

Jumper Bracket, Universal


- Can be used for extrusion distance (from front) 123 mm and 73 mm
- For tidy and orderly cable management
- Open version, no threading
- Mounting on the external side of the 19" extrusion
- Installation position freely selectable

Material / Finish
Round steel, d = 5 mm, zinc passivated

Supply schedule
1 Jumper bracket

How supplied
In units

Note
Please also order the appropriate mounting material.

W	HU/U	Model	Order no.	UP
from 800		for rack type - miracel	05.040.025.0	1 unit 



MEC20039

Jumper Bracket, Rectangular


- For tidy and orderly cable management
- Open version, no threading
- Mounting on the external side of the 19" extrusion
- Installation position freely selectable
- For large cable volumes

Material / Finish
Round steel, d = 5 mm, zinc passivated

Supply schedule
1 Jumper bracket, rectangular

How supplied
In units

Note
Please also order the appropriate mounting material.

W	Model	Order no.	UP
from 800	58x288 mm, for rack type - miracel	05.040.028.0	1 unit 



MEC20092

Jumper Bracket, Flexible

- For flexible and orderly cable management
- Any installation place and position possible
- Open version, no threading

Material / Finish




Round steel, d = 5 mm, zinc passivated

Supply schedule

1 Jumper bracket
Mounting material

How supplied

Flat packed kit

W	H	D	Model	Order no.	UP
			33x72 mm	05.040.031.0	 1 set
			33x212 mm	05.040.032.0	 1 set
			72x92 mm	05.040.033.0	 1 set



ELM00028

Jumper Crossbar

- Ideal for vertical routing and cable strain relief
- Open version, no threading
- Mounting on the external side T-slot of the 19" extrusion
- Installation position freely selectable
- From rack depth 600 mm

Material / Finish

Round steel, d = 5 mm, zinc passivated

Supply schedule

2 Jumper crossbars

How supplied

Flat packed kit

W	H	D	Model	Order no.	UP
				01.117.033.7	 1 set



MEC20044

Excess Fibre Optic Cable Storage

- For orderly cable management of fibre optic cables in the miracel rack (from W 800 mm)
- For excess cable storage

Material / Finish

Base plate: Powder-coated
RAL 7035, textured
Cable holder: polyamide, black

Supply schedule

1 Base plate
1 Cable holder
Mounting material

How supplied

Flat packed kit

W	H	D	HU/U	Model	Order no.	UP
			2		05.040.041.1	1 set



MEC20052

Cu (Copper) Excess Cable Storage

- For storing excess copper cables (or fibre optic cables)
- For orderly cable management in the miracel rack

Material / Finish
Sheet steel, 1.5 mm, zinc passivated

Supply schedule
1 Excess cable holder
Mounting material

How supplied
Flat packed kit

W	H	D	HU/U	Model	Order no.	UP
				for rack type – miracel	05.040.044.0	1 set



MEC20047

19" Excess Fibre Optic Cable Drawer, 1HU

- For excess fibre optic cable storage
- Pull-out
- Cable fixing possible using Velcro strip cable ties

Material / Finish
Sheet steel, 1.5 mm
Powder-coated, RAL 7035, textured

Supply schedule
1 Main unit
1 Drawer

How supplied
Flat packed kit

Note
Please also order suitable front panel mounting material and Velcro strip.

W	H	D	Model	Order no.	UP
19"	43.6	350		05.040.047.1	1 set



MEC00110

Type 1

19" Cable Routing Board, 1 HU

- For safe and secure cable routing of copper and fibre optic cables

Material / Finish
Front panel: sheet steel, 1.5 mm
Powder-coated, RAL 7035, textured

Supply schedule
1 Front panel
5 Cable routing brackets

How supplied
Flat packed kit, preassembled

Dimensions for cable routing:
Type 1: 55x22 mm, plastic
Type 2: 95x32 mm, steel

Note
Please also order suitable front panel mounting material.



MEC20014

Type 2

W	H	D	HU/U	Model	Order no.	UP
			1		01.117.044.1	1 set
			2		01.117.144.1	1 set



MEC20041

19" Cable Routing Board, Flexible, 1 HU

- For orderly cable management in the rack
- For safe and secure cable routing of copper and fibre optic cables

Material / Finish

Front panel: sheet steel, 1.5 mm,
Powder-coated, RAL 7035, textured
Jumper bracket: round steel, d = 5 mm,
zinc passivated

Supply schedule

1 Front panel
5 Cable routing brackets
Mounting material

How supplied

Flat packed kit

Note

Please also order suitable front panel mounting material.

W	H	D	HU/U	Model	Order no.	UP
			1		05.040.100.1	 1 set
			2		05.040.101.1	 1 set



MEC20081

Fibre Optic Cable Routing Board, 1 HU

- For orderly cable management in the miracel rack
- For safe and secure cable routing of fibre optic cables
- Optional with cover panels to protect the cables and as labelling option

Material / Finish

Sheet steel, 1.5 mm
Powder-coated, RAL 7035, textured

Supply schedule



1 19" Cable routing board

How supplied

In units

Note

Please also order suitable front panel mounting material and cover.

W	H	D	HU/U	Model	Order no.	UP
			1	Cable routing board	05.040.050.1	 1 unit
				Accessories: Cover	05.040.051.1	 1 unit



CUD00021

Cable Routing Board, 1HU

- For orderly cable management in the rack internal space
- With edge protector

Material / Finish

Sheet steel, 1.5 mm
Powder-coated, RAL 7035, textured

Supply schedule

1 19" Cable routing board

How supplied

In units

Note

Please also order front panel mounting material.

W	H	D	HU/U	Model	Order no.	UP
19"	44.5		1		01.117.020.1	 1 unit
19"	88.1		2		01.117.021.1	 1 unit



MEC20049

19" Cable Trough

- For orderly cable management in front of the 19" front panel
- Mounting possible on front panels
- Cable fixing possible using Velcro strip cable ties

Material / Finish
Sheet steel, 1.5 mm
Powder-coated, RAL 7035, textured

Supply schedule
1 Cable trough

How supplied
units

Note
Please also order suitable front panel mounting material and Velcro strip.

W	H	D	HU/U	Model	Order no.	UP
19"		100	1		05.040.055.1	1 unit



MEC20042

Cable Trough Between Racks

- For orderly cable management between linked racks
- Mounting possible using Velcro strips

Material / Finish
Sheet steel, 1.5mm
Powder-coated, RAL 7035, textured

Supply schedule
1 Cable trough
Mounting material

How supplied
Flat packed kit

Note
Please also order Velcro strip

W	H	D	HU/U	Model	Order no.	UP
265		60			05.040.058.1	1 set



ELM00025

Cable Routing Ring

- For tidy and orderly cable management
- Open version, no threading
- Mounting on the T-slots of the vertical extrusions
- Installation position freely selectable

Supply schedule
5 Cable routing rings
Mounting material

How supplied
Flat packed kit

W	H	D	HU/U	Model	Order no.	UP
					01.312.207.9	5 units



LIG00068

Fibre Optic Cable Router

- For safe and orderly cable management of fibre optic cables
- With step extrusion of the slots to implement the strain relief of the fibre optic cables
- Mounting on the side of the 19" extrusion

Material
Polyamide, UL 94 V0

Supply schedule
1 Pair of fibre optic cable routers
Mounting material

W	H	D	HU/U	Model	Order no.	UP
					01.117.099.1	 1 pair



MEC20026

Velcro cable tie with plastic eyelet

- For mounting non-standard components
- For bundling cables

Material / Colour
Polypropylene/polyamide, black

Supply schedule
20 Velcro strip cable ties

How supplied
Flat packed kit

W	H	D	L	Model	Order no.	UP
16			300		01.240.550.9	1 set



MEC20048

Velcro Strip (in meters)

- For stress-free mounting of copper and fibre optic cables
- Velcro strip can be cut to any length required

Material / Colour
Black: One Wrap Fastener
F.R.T., UL 94-V2
Blue: One Wrap Fastener

Supply schedule
1 Meter Velcro strip

How supplied
Meter strips

W	H	D	L	Model	Order no.	UP
16			1000	Black	05.040.060.9	 1 meter
16			1000	Blue	05.040.061.9	 1 meter


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to the
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