

Technical Description



Fiber Optic Solutions

R&M FO 19" 1U/2U Patch Panels

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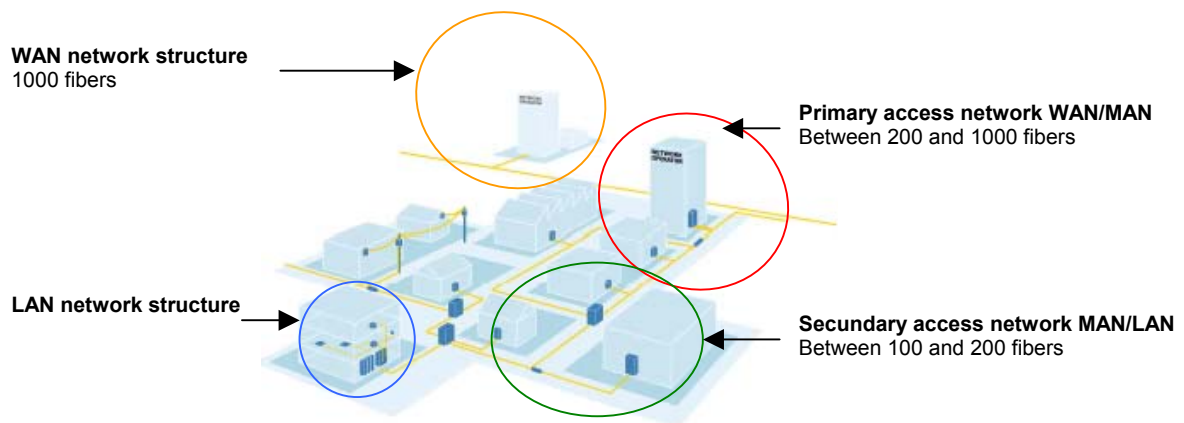
1. The concept behind the FO 19" patch panel family

Access networks wired in a **ring** or **star** topology require cables with high numbers of fibers to keep the entire network passive.

The distributing and connecting of different customers or operators is shown in the picture below.

Ring architecture (network topology): The ring topology connects devices in a closed loop. To avoid failure of the whole network in the event of damage to the ring (e.g. in construction work) two rings are installed in most cases to form a dual ring topology (→ FDDI) so that in case of an interruption on the ring, operation can continue from the last station on over the second line in the opposite direction.

Star architecture (network topology): In a star topology all workstations join in a central point and radiate outwards. The central point manages all connections between the individual network devices in the star. It is also called star coupler or → hub.



Regardless of their fields of application all **hardware components** in **LAN/MAN/WAN** networks have to fulfil similar requirements. High packing density and service reliability, modularity for future expansions and modifications of the network are some of the demands that customers place on technology.

LAN insight: the acronym stands for **Local Area Network**

LANs are local networks, which can extend over 10 m up to 10 km, connecting from two to up to several hundred network devices, often referred to as clients (→ Server). In most cases, however, a LAN only stretches over several hundred metres within buildings or organisations of in-house networks.

MAN insight: the acronym stands for **Metropolitan Area Network**

MANs are private networks spanning geographical areas of up to 20 km (town size), or even up to 100 km. They have three distinctive features: high data rate (high speed) between 34 and 655 Mbit/s, spanning geographical areas the size of a city, and access procedures from the → LAN Sector.

WAN insight: the acronym stands for **Wide Area Network**

A WAN is a private or public network for digital, packet-oriented data transmission (→ Packet Switching) spanning geographical areas of more than 10 km. In voice transmission (telephony) these large networks are usually referred to as toll networks, trunk networks long distance networks. They often connect several → LANs as → Backbone.

R&M provides a wide range of passive components for **LAN, MAN, and WAN networks**. The here described patch panel family in its modular design already covers a great many of applications.

In modern cable networks it is increasingly important to include reserve fibers for a planned network extension at a later point. By using R&M's 19" patch panels a later access to reserve fibers is made easy and convenient.

1.1. Network levels

Connecting level

On the connecting level the trunk cables are the direct connections between the local exchanges. As a rule access to passive components is not included in the planning. All fibers of a loose tube of the cable are deposited in a 12er splice tray.

The ideal components for the connecting level provided by R&M are:

All FO 19" patch panels combined with the standard splice tray R30 or the multifunction module R40.

Branching level

On the branching level 19" patch panels protect splices between main high fiber count cables and medium fiber count tap-off cables at the connection points. Here too, access to passive components is usually not included in the planning.

The ideal components for the branching level provided by R&M are:

All FO 19" patch panels combined with the standard splice tray R30 or the multifunction module R40.

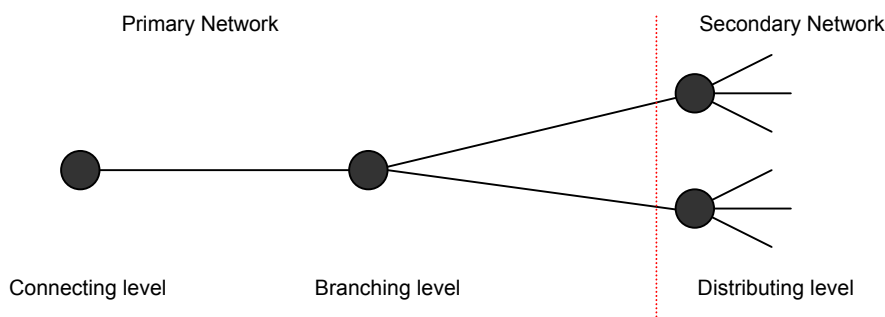
Distributing level

On this level 19" components form the connections between the medium fiber count tap-off cables and the low fiber count distribution cables. The distribution cables are led to the network endpoints or directly to the individual users. Here, a fiber optic management is absolutely crucial – R&M offers such a system philosophy.

The ideal components for the distributing level provided by R&M are:

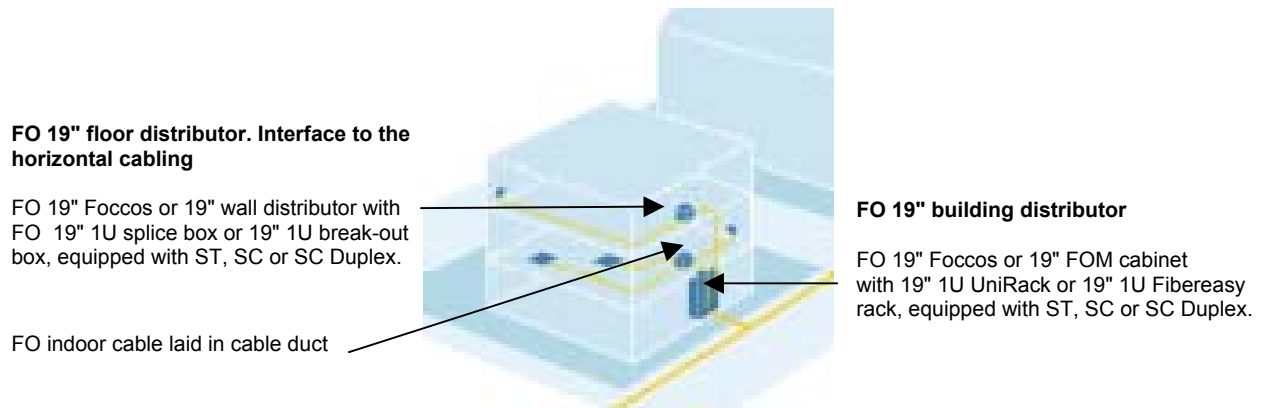
All FO 19" patch panels combined with the FOM splice tray.

1.2. Schematic view



1.3. Cabling example with R&M 19" products

The thorough planning of a structured cabling system represents a big challenge for planners, installers and users. The following example shows four floors of a building. On one of the floors the building distributor is located, in accordance with the rules of structured cabling systems. In our example it is the ground floor. In a star topology this distributor connects all the other floors over fiber optic cables, their termination being the 19" floor distributors on the individual floors.



2. Standard and high quality assortment

R&M now offers two options in the 19" technology, the **standard assortment** and the **high quality assortment**. Thanks to our international know-how in research, development and manufacturing, our well-engineered and economically sound 19" products do an excellent job, every day, everywhere in the world.

2.1. Standard solutions for the economical user

The new 19" 1U splice box/break-out box perfectly combines functionality and cost effectiveness. It is used to build up fiber optic distributors on the basis of 19" technology. The splice box is used whenever a sliding drawer is not absolutely necessary.

2.2. High quality solutions for maximum operational reliability

The basis of R&M's UniRacks, AirRacks, FibereasyRacks, FOMRacks and Racks R40 is a recessed, smoothly adjustable 19" slide-in unit. Both the loose tube tray and the splice tray plate (splice versions) slide out and can be taken off. Different types of front panels are available featuring different numbers of breakouts.

Advantages of the high quality solutions:

- Controlled fiber depositing in the R&M patch panels and splice trays for trouble-free modifications
- Large fiber reserve for repeated follow-up splicing
- Quick and safe identification in all deposits saves time and nerves
- Good accessibility for service and repair work makes the job of the installer easier

2.3. Splice versions

	Standard assortment FO 19" 1 splice box	High quality assortment		
		FO 19" 1U/2U UniRack ⁵⁾	FO 19" 1U/2U FOMRack ¹⁾	FO 19" 1U/2U Rack R40
Applications	LAN, industrial applications	Telecom, LAN, MAN, CATV, railway, industrial applications	Telecom, MAN, CATV, railway	Telecom, MAN, CATV, railway
Features	Non-sliding*	Recessed, smoothly adjustable slide-in unit	Recessed, smoothly adjustable slide-in unit	Recessed, smoothly adjustable slide-in unit
Dimensions (w x d x h)	482.6 x 44 x 230 (1U)	482.6 x 44 x 230 (1U) 482.6 x 88 x 230 (2U)	482.6 x 44 x 230 (1U) 482.6 x 88 x 230 (2U)	482.6 x 44 x 230 (1U) 482.6 x 88 x 230 (2U)
Material, colour	Sheet steel, powder-coated, median grey, NCS 2502-B			
<u>Terminations</u>				
Connector type E-2000™ si	-	1U = 24 ²⁾ , 2U = 72 ³⁾	1U = 24, 2U = 24 ²⁾	1U = 24, 2U = 24 ²⁾
Connector type SC si	24 ²⁾ , 36 ³⁾	1U = 24 ²⁾ , 2U = 72 ³⁾	1U = 24, 2U = 24 ²⁾	1U = 24, 2U = 24 ²⁾
Connector type FC	-	1U = 24 ²⁾ , 2U = 48 ³⁾	-	-
Connector type ST	24 ²⁾	1U = 24 ²⁾ , 2U = 48 ³⁾	-	-
Connector type SC duz	24 ²⁾ , 36 ³⁾	1U = 12 ²⁾ , 2U = 24 ³⁾	-	-
Connector type E-2000™ Compact	-	1U = 12 ²⁾ , 2U = -	-	-
Connector type SC-RJ	-	1U = 12 ²⁾ , 2U = -	-	-
Radius splice trays	>30 mm	>30 mm	>32mm	>40 mm
Splice trays per cable termination	up to 4	1U = 2 2U = 6	1U = 1 2U = 2	1U = 1 2U = 2
Sufficient fiber reserve for repeated follow-up splicing	Yes	Yes	Yes	Yes
Cable exits at patch cable side	Left and right	Left and right	Left	Left
Controlled fiber depositing in splice tray	Good	Good	Very good	Good
Easy identification of fibers in splice tray	Good	Good	Very good	Good
Good accessibility for service and repair work	Average	Very good	Very good	Very good
Application in high speed distribution networks	Average	Good	Very good	Very good
FO cable guide 75mm ⁴⁾	Yes	Yes	Yes	Yes
FO cable guide 110mm ⁴⁾	Yes	Yes	Yes	Yes
FO FOM cable guide 110mm ⁴⁾	Yes	Yes	Yes	Yes
FO 21" 1U adapter ⁴⁾	Yes	Yes	Yes	Yes
FO patching rings 35 and 75 mm ⁴⁾	Yes	Yes	Yes	Yes
FO rear cable entry II ⁴⁾	Yes	Yes	Yes	Yes
FO rear cable entry with PG16 screwing ⁴⁾	Yes	Yes	Yes	Yes
FO radius guard ⁴⁾	No	No	No	No
FO splice set for 19" 1U splice box ⁴⁾	Yes	No	No	No
FO cover for 19" 1U splice box / break-out box ⁴⁾	Yes	No	No	No

2.4. Break-out versions

	Standard assortment FO 19" 1U Break-out box	High quality assortment FO 19" 1U FibereasyRack
Applications	LAN, industrial applications	Telecom, LAN, MAN, CATV, railway, industrial applications
Features	Non-sliding	Recessed, smoothly adjustable slide-in unit
Dimensions (w x d x h)	482.6 x 44 x 230 (1U)	482.6 x 44 x 230 (1U)
Material, colour	Sheet steel, powder-coated, median grey, NCS 2502-B	
Terminations		
Connector type E-2000™ si	-	24 ²⁾
Connector type SC si	24 ²⁾ , 36 ³⁾	24 ²⁾
Connector type FC	-	24 ²⁾
Connector type ST	24 ²⁾	24 ²⁾
Connector type SC duz	24 ²⁾ , 36 ³⁾	12 ²⁾
Connector type E-2000™ Compact	-	12 ²⁾
Connector type SC-RJ	-	12 ²⁾
Cabling systems (terminated installation cables)	Possible	Possible
FO cable guide 75mm ⁴⁾	Yes	Yes
FO cable guide 110mm ⁴⁾	Yes	Yes
FO FOM cable guide 110mm ⁴⁾	Yes	Yes
FO patching rings 35 and 75 mm ⁴⁾	Yes	Yes
FO 21" 1U adapter ⁴⁾	Yes	Yes
FO rear cable entry II ⁴⁾	Yes	No
FO rear cable entry with PG16 screwing ⁴⁾	Yes	No
FO radius guard ⁴⁾	Yes	Yes
FO cover for 19" 1U splice box / break-out box ⁴⁾	Yes	No

¹⁾ Only possible with crimp splice protection

²⁾ Included in the standard assortment

³⁾ Available for an additional charge

⁴⁾ Option

⁵⁾ FO 19" 1U AirRack is similar to the 19" 1U UniRack. The only difference is the perforated plate.

3. Standard assortment 19" 1U splice box

3.1. System description 19" 1U splice box

The basis of the 19" 1U splice box is a fixed 19" 1U assembly unit. The installation cable can enter either at the side or at the back of the 1U rack.

The installation cables and pigtail fiber reserves can be deposited in the generously designed drawer.

3.2. Accessories (options)

Product name	R&M ordering number	Description
FO cable guide (75 mm or 110 mm)	R30315 (75mm), R302003 (110mm)	Both the cable guide and the patching rings plus Velcro fastener serve as cable track for the patch cables led to the front panel from left or right.
FO patching rings (35 mm and 75 mm) left and right	R302004 (35mm), R302005 (75mm)	
FO FOM cable guide 110 mm	R304439	Both the FOM cable guide and the FOM patching rings with strain relief elastics serve as cable track for patch cables led to the front panel from left or right.
FO FOM patching rings 75 mm left and right	R304440	
FO cover for splice box / break-out box	R306775	For protection from mechanical damage. The cover can be opened and locked without tools.
FO 21" 1U adapter set for 19" 1U and 2U patch panels	R305148	With this adapter the 19" patch panels can be fastened in metrical profile rails (535 mm).
FO rear cable guide II for 19" 1U and 2U patch panels	R302058	The rear cable guide is an additional guide for the FO cable and flex hoses.
FO rear cable entry with PG 16 screwing	R302006	This cable entry provides additional strain relief for the FO cable.
FO splice set for 19" 1U splice box	R306774	Splice set for empty splice boxes

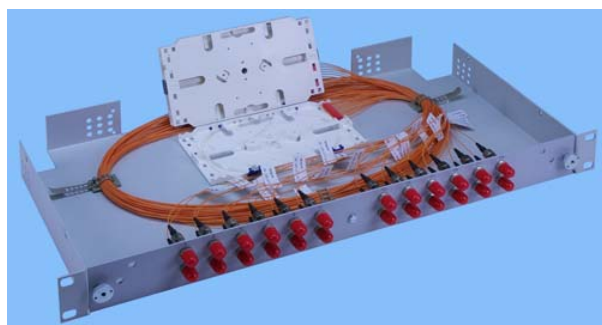
3.3. R&M's FO 19" 1U splice boxes feature:

- 19" 1U FO assembly unit for fixed installation
- Reserve drawer for the incoming installation cable and pigtails
- Removable front panel for easy mounting of adapters
- Twist-safe holder for up to 4 splice trays
- Optional cable entry (straight/angled)
- Clear and professional front panel labelling with silk-screen printing
- Labelling strips

3.4. The following splice trays can be used:

	Standard splice tray with radius 30 mm	Multifunction module with radius 40 mm	FOM (Fiber Optic Management) splice tray with radius 32 mm
FO 19" 1U splice box	Yes	Not available	Not available

3.5. FO 19" 1U splice box



3.6. Advantages and points in favour in comparison with competitors

	R&M Switzerland	BTR Telecom Germany	Corning USA/Canada
Labelled front panel in silk-screen print	Yes	No	Yes
Labelling strips	Yes	Yes	Yes
Removable front panel to clean the connectors	Yes	Yes	No
Twist-safe, swivelling splice trays	Yes	No	No
19" cover	Yes	Yes	Yes
Variable cable entry straight/angled	Yes	Yes	?
Cable entry with cable tie	Yes	Yes	?
Cable entry with PG 16 screwing	Yes	Yes	?
Accommodates 24 connectors	Yes	Yes	No
Cable guide for patch cables on the same height unit	Yes	No	No
Mounting depth	230 mm	255 mm	302 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

	Brugg Switzerland	Moeller Austria	Draka Comteq Norway
Labelled front panel in silk-screen print	Yes	Yes	Yes
Labelling strips	No	No	No
Removable front panel to clean the connectors	No	No	No
Twist-safe, swivelling splice trays	Yes	No	No
19" cover	Yes	No	Yes
Variable cable entry straight/angled	Yes	No	No
Cable entry with cable tie	Yes	No	Yes
Cable entry with PG 16 screwing	No	Yes	No
Accommodates 24 connectors	Yes	No	Yes
Cable guide for patch cables on the same height unit	No	No	No
Mounting depth	230 mm	255 mm	302 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

	OPTOMER Poland	Huber & Suhner Switzerland	Krone Germany
Labelled front panel in silk-screen print	Yes	Yes	Yes
Labelling strips	No	No	No
Removable front panel to clean the connectors	No	No	No
Twist-safe, swivelling splice trays	Yes	No	Yes
19" cover	No	Yes	Yes
Variable cable entry straight/angled	Yes	Yes	Yes
Cable entry with cable tie	Yes	Yes	Yes
Cable entry with PG 16 screwing	No	Yes, PG 11, 16, 21	No
Accommodates 24 connectors	No	Yes	Yes
Cable guide for patch cables on the same height unit	No	No	No
Mounting depth	230 mm	255 mm	302 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

4. Standard assortment 19" 1U break-out box

4.1. System description 19" 1U break-out box

The basis of the 19" 1U break-out box is a fixed 19" 1U assembly unit. The break-out cable can enter either at the side or at the back of the 1U rack.

The break-out cables and pigtail reserves can be deposited in the generously designed drawer.

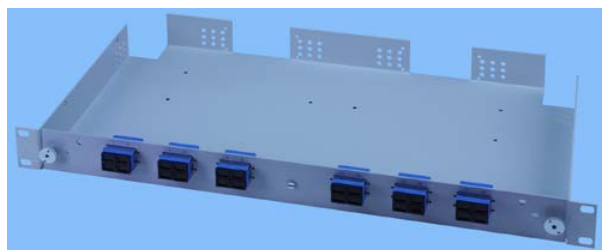
4.2. Accessories (options)

Product name	R&M ordering number	Description
FO cable guide (75 mm or 110 mm)	R30315 (75mm), R302003 (110mm)	Both the cable guide and the patching rings plus Velcro fastener serve as cable track for the patch cables led to the front panel from left or right.
FO patching rings (35 mm and 75 mm) left and right	R302004 (35mm), R302005 (75mm)	
FO FOM cable guide 110mm	R304439	Both the FOM cable guide and the FOM patching rings with strain relief elastics serve as cable track for patch cables led to the front panel from left or right.
FO FOM patching rings 75 mm left and right	R304440	
FO cover for splice box / break-out box	R306775	For protection from mechanical damage. The cover can be opened and locked without tools.
FO 21" 1U adapter set for 19" 1U and 2U patch panels	R305148	With this adapter the 19" patch panels can be fastened in metrical profile rails (535 mm).
FO rear cable guide II for 19" 1U and 2U patch panels	R302058	The rear cable guide is an additional guide for the FO cable and flex hoses.
FO rear cable entry with PG 16 screwing	R302006	This cable entry provides additional strain relief for the FO cable.
FO radius guard 2x15mm	R302007	Additional patch cable guide. The break-out box accommodates max. two times 2x15mm radius guards.

4.3. R&M's FO 19" 1U break-out boxes feature:

- 19" 1U FO assembly unit for fixed installation
- Reserve drawer for the incoming break-out cable
- Removable front panel for easy mounting of adapters
- Variable cable entry (straight/angled)
- Clear and professional front panel labelling with silk-screen printing
- Labelling strips

4.4. FO 19" 1U break-out box



4.5. Advantages and points in favour in comparison with competitors

	R&M Switzerland	BTR Telecom Germany	Corning USA/Canada
Labelled front panel in silk-screen print	Yes	No	Yes
Labelling strips	Yes	Yes	Yes
Removable front panel to clean the connectors	Yes	Yes	No
19" cover	Yes	Yes	Yes
Variable cable entry straight/angled	Yes	Yes	?
Cable entry with cable tie	Yes	Yes	?
Cable entry with PG 16 screwing	Yes	Yes	?
Accommodates 24 connectors	Yes	Yes	No
Mounting of pre-terminated cables	Yes	Yes	Yes
Cable guide for patch cables on the same height unit	Yes	No	No
Mounting depth	230 mm	255 mm	302 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

	Brugg Switzerland	Moeller Austria	Draka Comteq Norway
Labelled front panel in silk-screen print	Yes	Yes	Yes
Labelling strips	No	No	No
Removable front panel to clean the connectors	No	No	No
19" cover	Yes	No	Yes
Variable cable entry straight/angled	Yes	No	No
Cable entry with cable tie	Yes	No	Yes
Cable entry with PG 16 screwing	No	Yes	No
Accommodates 24 connectors	Yes	No	Yes
Mounting of pre-terminated cables	Yes	Yes	Yes
Cable guide for patch cables on the same height unit	No	No	No
Mounting depth	230 mm	255 mm	302 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

	OPTOMER Poland	Huber & Suhner Switzerland	Krone Germany
Labelled front panel in silk-screen print	Yes	Yes	Yes
Labelling strips	No	No	No
Removable front panel to clean the connectors	No	No	No
19" cover	No	Yes	Yes
Variable cable entry straight/angled	Yes	Yes	Yes
Cable entry with cable tie	Yes	Yes	Yes
Cable entry with PG 16 screwing	No	Yes, PG 11, 16, 21	No
Accommodates 24 connectors	No	Yes	Yes
Mounting of pre-terminated cables	Yes	Yes	Yes
Cable guide for patch cables on the same height unit	No	No	No
Mounting depth	230 mm	255 mm	302 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

5. High quality assortment 19" 1U UniRack, FOMRack, Rack R40

5.1. System description 19" 1U UniRack, FOMRack, Rack R40

The basis of the 19" 1U high quality assortment consists of a smoothly retractable 19" 1U slide-in unit (retractable 0 to 55 mm). The installation cable may enter the 1U rack at the side or at the rear. The cable guide for the rear cable entry, however, is optional. Up to 2 x 2.0 meter of spare loose tubes can be stored in the generously designed drawer.

There are two rectangular openings on the left and right in the splice tray plate to lead the loose tubes from the drawer to the splice tray. The pigtail fiber reserve of approx. 3m can be stored in the splice tray plate, i.e. in the splice tray.

The observance of the bending radius in the splice tray, i.e. in the R&M 1U Rack is ensured.

R&M today offers three types of splice trays, cf. table on page 25, chapter 9.

In an extension, the splice tray and the loose tube reserve drawer can be pulled out far enough for the splice tray to be opened with a screwdriver. (Not possible with the patch cable guide of 110mm.) If no vertically retractable splice table is available, the 2 meters of loose tubes reserve can be removed. This allows a handling of the splice unit within a radius of 1 meter.

5.2. Accessories (options)

Product name	R&M ordering number	Description
FO cable guide (75 mm or 110 mm)	R30315 (75mm), R302003 (110mm)	The cable guide plus Velcro fastener serves as cable track for the patch cables led to the front panel from left or right.
FO patching rings (35 mm and 75 mm) left and right	R302004 (35mm), R302005 (75mm)	The patching rings plus Velcro fastener serve as cable track for the patch cables led to the front panel from left or right. This is the case when the 1U UniRack is moved back (smoothly adjustable in depth to 55 mm).
FO FOM cable guide 110mm	R304439	The FOM cable guide with strain relief elastics serve as cable track/ for patch cables led to the front panel from left or right.
FO FOM patching rings 75 mm left and right	R304440	The FOM patching rings with strain relief elastics serve as cable track for patch cables led to the front panel from left or right. This is the case when the 1U UniRack is moved back (smoothly adjustable in depth to 55 mm).
FO 21" 1U adapter set for 19" 1U and 2U patch panels	R305148	With this adapter the 19" patch panels can be fastened in metrical profile rails (535 mm).
FO rear cable guide II for 19" 1U and 2U patch panels	R302058	The rear cable guide is an additional guide for the FO cable and flex hoses.
FO rear cable entry with PG 16 screwing	R302006	This cable entry provides additional relief for the FO cable.

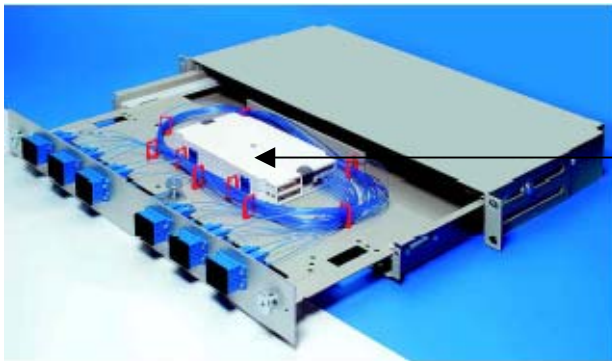
5.3. R&M's FO 19" 1U UniRacks, 1U FOMRacks and Racks R40 feature:

- Recessed, smoothly adjustable 1U slide-in unit (range of 55mm)
- Reserve drawer for the incoming installation cable
- Splice tray plate as splice unit
- Removable front panel for easy mounting of adaptors
- Twist-safe holder of max. 2 splice trays
- Variable cable entry (straight/angled)
- Pigtail guide
- Clear and professional labelling of the front panel in silks-screen printing
- Labelling strips

5.4. The following splice trays can be used:

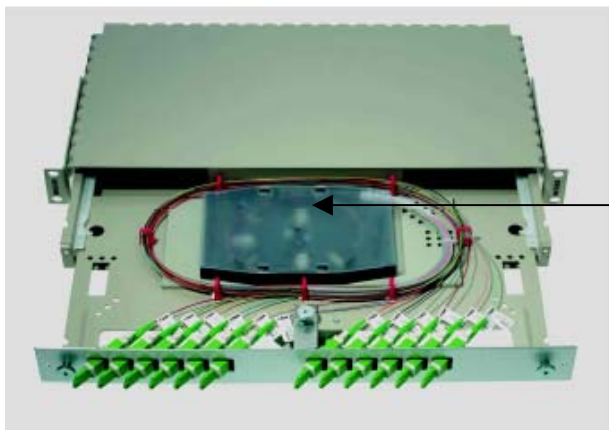
	Standard splice tray with radius 30 mm	Multifunction module with radius 40 mm	FOM (Fiber Optic Management) splice tray with radius 32 mm
FO 19" 1U UniRack	Yes	Not available	Not available
FO 19" 1U FOMRack	Not available	Not available	Yes
FO 19" 1U Rack R40	Not available	Yes	Not available

5.5. FO 19" 1U UniRack



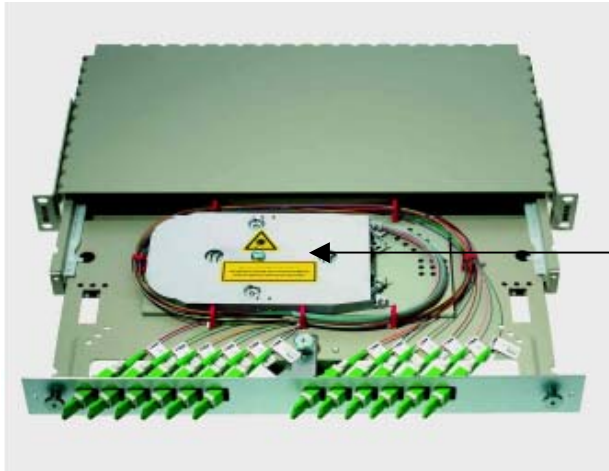
Standard splice tray with radius 30 mm

5.6. FO 19" 1U Rack R40



Multifunction module with radius 40 mm

5.7. FO 19" 1U FOMRack



FOM (Fiber Optic Management) splice tray with radius 32 mm

5.8. Advantages and points in favour in comparison with competitors

	R&M Switzerland	BTR Telecom Germany	Corning USA/Canada
Labelled front panel in silk-screen print	Yes	No	Yes
Labelling strips	Yes	Yes	Yes
Removable front panel to clean the connectors	Yes	Yes	No
1U recessed slide-in unit, smoothly adjustably	Yes	Yes	No
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	Yes	Yes	No
Double draw-out part	Yes	No	No
Twist-safe holder of max. 2 splice trays	Yes	Yes	Yes
Standard splice tray	Yes	Yes	Yes
Multifunction module with radius 40 mm	Yes	No	?
Single fiber management in splice tray	Yes	No	?
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	Yes	No	No
3 meters pigtail reserves (1.7 meters of it inside the splice tray)	Yes	Yes	Yes
Cable guide, strain relief and splice unit are on the same height unit	Yes	No	No
Variable cable entry straight/angled	Yes	Yes	?
Cable entry with cable tie	Yes	Yes	?
Cable entry with PG 16 screwing	Yes	Yes	?
Accommodates up to 24 connectors	Yes	Yes	Yes
Locking device (lock)	No	No	Yes
Front panel can be sealed	Yes	No	No
Mounting depth	230 mm	255 mm	363 mm
Material powder-coated sheet steel	Yes	Yes	Yes
Material aluminium	No	No	No

	Brugg Switzerland	Moeller Austria	Huber & Suhner Switzerland
Labelled front panel in silk-screen print	Yes	No	No
Labelling strips	No	Yes	Yes
Removable front panel to clean the connectors	No	No	No
1U recessed slide-in unit, smoothly adjustably	Yes	Yes	Yes
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	Yes	No	No
Double draw-out part	No	Yes	No
Twist-safe holder of max. 2 splice trays	Yes	Yes	Yes
Standard splice tray	Yes	Yes	Yes, R&M
Multifunction module with radius 40 mm	No	Yes	No
Single fiber management in splice tray	No	No	No
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	No	No	No
3 meters pigtail reserves (1.7 meters of it inside the splice tray)	Yes	No	No
Cable guide, strain relief and splice unit are on the same height unit	No	Yes	No
Variable cable entry straight/angled	Yes	No (angled)	Yes
Cable entry with cable tie	Yes	No	Yes
Cable entry with PG 16 screwing	?	Yes	Yes, PG 11, 16, 21
Accommodates up to 24 connectors	Yes	Yes	Yes
Locking device (lock)	No	No	No
Front panel can be sealed	No	No	No
Mounting depth	230 mm	278 mm	235 mm
Material powder-coated sheet steel	No	Yes	No
Material aluminium	Yes	No	Yes

	OPTOMER Poland	FCA Poland
Labelled front panel in silk-screen print	Yes	Yes
Labelling strips	No	No
Removable front panel to clean the connectors	Yes	No
1U recessed slide-in unit, smoothly adjustably	No	Yes
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	No	No
Double draw-out part	No	No
Twist-safe holder of max. 2 splice trays	Yes	Yes
Standard splice tray	Yes, R&M	Yes
Multifunction module with radius 40 mm	No	?
Single fiber management in splice tray	Yes	No
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	No	No
3 meters pigtail reserves (1.7 meters of it inside the splice tray)	No	No
Cable guide, strain relief and splice unit are on the same height unit	No	Yes
Variable cable entry straight/angled	Yes	No
Cable entry with cable tie	?	Yes
Cable entry with PG 16 screwing	?	No
Accommodates up to 24 connectors	Yes	Yes
Locking device (lock)	No	Yes
Front panel can be sealed	No	No
Mounting depth	200 mm	200 mm
Material powder-coated sheet steel	Yes	Yes
Material aluminium	No	No

6. High quality assortment 19" 1U AirRack

6.1. System description 19" 1U AirRack

The basis of R&M's AirRacks consists of a smoothly retractable 19" 1U slide-in unit (retractable 0 to 55 mm). The slide-in unit, the cable guide and the splice tray plate are made of perforated plate. The installation cable may enter the AirRack at the side or at the rear. The cable guide for the rear cable entry, however, is optional. Up to 2 x 2.0 meter of spare loose tubes can be stored in the generously designed drawer.

There are two rectangular openings on the left and right in the splice tray plate to lead the loose tubes from the drawer to the splice tray. The pigtailed reserve of approx. 3m can be stored in the splice tray table, i.e. in the splice tray.

The observance of the bending radius in the splice tray, i.e. in the R&M AirRack is ensured.

In an extension, the splice tray and the loose tube reserve drawer can be pulled out far enough for the splice tray to be opened with a screwdriver. (Not possible with the patch cable guide of 110mm.) If no vertically retractable splice table is available, the 2 meters of loose tubes reserve can be removed. This allows a handling of the splice unit within a radius of 1 meter.

6.2. Accessories (options)

Product name	R&M ordering number	Description
FO cable guide (75 mm or 110 mm)	R30315 (75mm), R302003 (110mm)	The cable guide plus Velcro fastener serves as cable track for the patch cables led to the front panel from left or right.
FO patching rings (35 mm and 75 mm) left and right	R 302004 (35mm), R 302005 (75mm)	The patching rings plus Velcro fastener serve as cable track for the patch cables led to the front panel from left or right. This is the case when the 1U AirRack is moved back (smoothly adjustable in depth to 55 mm).
FO FOM cable guide 110mm	R304439	The FOM cable guide with strain relief elastics serve as cable track for patch cables led to the front panel from left or right.
FO FOM patching rings 75 mm left and right	R304440	The FOM patching rings with strain relief elastics serve as cable track for patch cables led to the front panel from left or right. This is the case when the 1U AirRack is moved back (smoothly adjustable in depth to 55 mm).
FO rear cable guide II for 19" 1U and 2U patch panels	R302058	The rear cable guide is an additional guide for the FO cable and flex hoses.
FO rear cable entry with PG 16 screwing	R302006	This cable entry provides additional relief for the FO cable.
FO 21" 1U adapter set for 19" 1U and 2U patch panels	R305148	With this adapter the 19" patch panels can be fastened in metrical profile rails (535 mm).

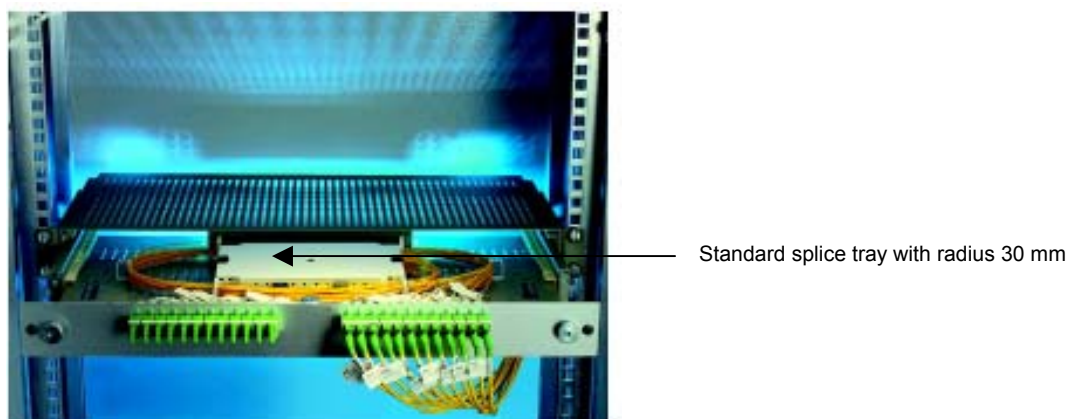
6.3. R&M's FO 19" 1U AirRacks feature:

- Recessed, smoothly adjustable 1U AirRack unit (range of 55mm)
- AirReserve drawer for the incoming installation cable
- AirSplice tray plate as splice unit
- Removable front panel for easy mounting of adaptors
- Twist-safe holder of max. 2 splice trays
- Variable cable entry (straight/angled)
- Pigtail guide
- Clear and professional labelling of the front panel in silks-screen printing
- Labelling strips

6.4. The following splice trays can be used:

	Standard splice tray with radius 30 mm	Multifunction module with radius 40 mm	FOM (Fiber Optic Management) splice tray with radius 32 mm
FO 19" 1U AirRack	Yes	Not available	Not available

6.5. FO 19" 1U AirRack



6.6. Advantages and points in favour in comparison with competitors

	R&M Switzerland	Sedlbauer AG Germany
Labelled front panel in silk-screen print	Yes	No
Labelling strips	Yes	Yes
Removable front panel to clean the connectors	Yes	No
1U recessed slide-in unit, smoothly adjustably	Yes	Yes, (2U)
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	Yes	Yes
Double draw-out part	Yes	No, swivelling
Twist-safe holder of max. 2 splice trays	Yes	Yes
Standard splice tray	Yes	Yes, R&M
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	Yes	No
3 meter pigtail reserves (1.7 meters of it inside the splice tray)	Yes	No

	R&M Switzerland	Sedlbauer AG Germany
Variable cable entry straight/angled	Yes	Yes
Cable entry with cable tie	Yes	?
Cable guide, strain relief and splice unit on the same height unit	Yes	Yes
Cable entry with PG 16 screwing	Yes	?
Accommodates 24 connectors	Yes	Yes, (2U)
Locking device (lock)	No	No
Front panel can be sealed	Yes	No
Mounting depth	210 mm	265 mm
Perforated plate	Yes	Yes
Material powder-coated sheet steel	Yes	Yes
Material aluminium	No	No

7. High quality assortment 19" 2U UniRack, FOMRack, Rack R40

7.1. System description 19" 2U UniRack, FOMRack, Rack R40

The basis of the 19" 2U high quality assortment consists of a smoothly retractable 19" 2U slide-in unit (retractable 0 to 55 mm). The installation cable may enter the 2U rack at the side or at the rear. The cable guide for the rear cable entry, however, is optional. Up to 6 x 2.0 meter of spare loose tubes can be stored in the generously designed drawer.

There are two rectangular openings on the left and right in the splice tray plate to lead the loose tubes from the drawer to the splice tray. The pigtailed reserve of approx. 3m can be stored in the splice tray table, i.e. in the splice tray.

The observance of the bending radius in the splice tray, i.e. in the R&M 2U Rack is ensured.

R&M today offers three types of splice trays, cf. table on page 25, chapter 9.

In an extension, the splice tray and the loose tube reserve drawer can be pulled out far enough for the splice tray to be opened with a screwdriver. (Not possible with the patch cable guide of 110mm.) If no vertically retractable splice table is available, the 2 meters of loose tubes reserve can be removed. This allows a handling of the splice unit within a radius of 1 meter.

7.2. Accessories (options)

Product name	R&M ordering number	Description
FO cable guide 110 mm	R302003	The cable guide plus Velcro fastener serves as cable track for the patch cables led to the front panel from left or right.
FO patching rings 75 mm, left and right	R302005	The patching rings plus Velcro fastener serve as cable track for the patch cables led to the front panel from left or right. This is the case when the 2U UniRack is moved back (smoothly adjustable in depth to 55 mm).
FO FOM cable guide 110 mm	R304439	The FOM cable guide with strain relief elastics serve as cable track for patch cables led to the front panel from left or right.

Product name	R&M ordering number	Description
FO 21" 1U adapter set for 19" 1U and 2U patch panels	R305148	With this adapter the 19" patch panels can be fastened in metrical profile rails (535 mm).
FO FOM patching rings 75 mm left and right	R304440	The FOM patching rings with strain relief elastics serve as cable track for patch cables led to the front panel from left or right. This is the case when the 1U AirRack is moved back (smoothly adjustable in depth to 55 mm).
FO rear cable guide II for 19" 1U and 2U patch panels	R302058	The rear cable guide is an additional guide for the FO cable and flex hoses.
FO rear cable entry with PG 16 screwing	R302006	This cable entry provides additional relief for the FO cable.

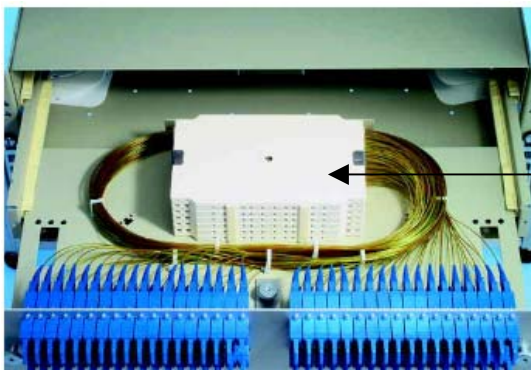
7.3. R&M's FO 19" 2U UniRacks feature:

- Recessed, smoothly adjustable 2U slide-in unit (range of 55mm)
- Reserve drawer for the incoming installation cable
- Splice tray plate as splice unit
- Removable front panel for easy mounting of adaptors
- Twist-safe holder of max. 6 splice trays
- Variable cable entry (straight/angled)
- Pigtail guide
- Clear and professional labelling of the front panel in silks-screen printing
- Labelling strips

7.4. The following splice trays can be used:

	Standard splice tray with radius 30 mm	Multifunction module with radius 40 mm	FOM (Fiber Optic Management) splice tray with radius 32 mm
FO 19" 2U UniRack	Yes	Not available	Not available
FO 19" 2U FOMRack	Not available	Not available	Yes
FO 19" 2U Rack R40	Not available	Yes	Not available

7.5. FO 19" 2U UniRack



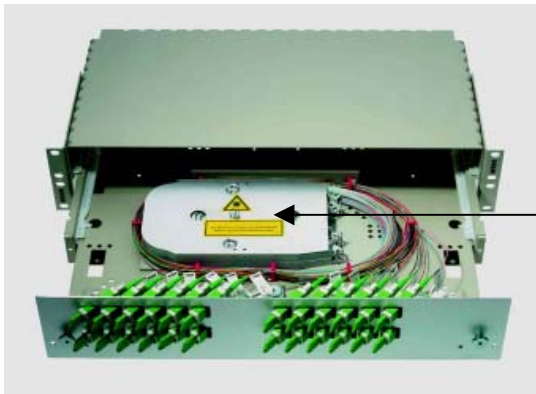
Standard splice tray with radius 30 mm

7.6. FO 19" 2U Rack R40



Multifunction module with radius 40 mm

7.7. FO 19" 2U FOMRack



FOM (Fiber Optic Management) Splice tray with radius 32 mm

7.8. Advantages and points in favour in comparison with competitors

	R&M Switzerland	BTR Telecom Germany	Corning USA/Canada
Labelled front panel in silk-screen print	Yes	Not available	Yes
Labelling strips	Yes		Yes
Removable front panel to clean the connectors	Yes		No
2U recessed slide-in unit, smoothly adjustably	Yes		No
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	Yes		No
Double draw-out part	Yes		No
Twist-safe holder of max. 6 splice trays	Yes		No, 4
Standard splice tray	Yes		Yes
Multifunction module with radius 40 mm	Yes		?
Single fiber management in splice tray	Yes		No
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	Yes		No
3 meters pigtail reserves (1.7 meters of it inside the splice tray)	Yes		Yes
Cable guide, strain relief and splice unit on the same height unit	Yes		No

	R&M Switzerland	BTR Telecom Germany	Corning USA/Canada
Variable cable entry straight/angled	Yes	Not available	?
Cable entry with cable tie	Yes		?
Cable entry with PG 16 screwing	Yes		?
Accommodates up to 72 connectors	Yes		No
Locking device (lock)	No		Yes
Front panel can be sealed	Yes		No
Mounting depth	230 mm		363 mm
Material powder-coated sheet steel	Yes		Yes
Material aluminium	No		No

	Brugg Switzerland	Moeller Austria	Sedlbauer AG Germany
Labelled front panel in silk-screen print	Yes	No	No
Labelling strips	No	Yes	Yes
Removable front panel to clean the connectors	No	No	No
2U recessed slide-in unit, smoothly adjustably	Yes	Yes	Yes
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	Yes	No	Yes
Double draw-out part	No	Yes	No, swivelling
Twist-safe holder of max. 6 splice trays	No	No	Yes
Standard splice tray	Yes	Yes	Yes, R&M
Multifunction module with radius 40 mm	No	Yes	No
Single fiber management in splice tray	No	No	Yes, Krone
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	No	No	No
3 meters pigtail reserves (1.7 meters of it inside the splice tray)	Yes	No	No
Cable guide, strain relief and splice unit on the same height unit	No	Yes	Yes
Variable cable entry straight/angled	Yes	No (angled)	Yes
Cable entry with cable tie	Yes	No	?
Cable entry with PG 16 screwing	?	Yes	?
Accommodates up to 72 connectors	No	No	No
Locking device (lock)	No	No	No
Front panel can be sealed	No	No	No
Mounting depth	274 mm	278 mm	275 mm
Material powder-coated sheet steel	No	Yes	Yes
Material aluminium	Yes	No	No

	OPTOMER Poland	FCA Poland	Huber & Suhner Switzerland
Labelled front panel in silk-screen print	Yes	Yes	No
Labelling strips	No	No	Yes
Removable front panel to clean the connectors	Yes	No	No
2U recessed slide-in unit, smoothly adjustably	No	Yes	Yes
Pigtail reserves and the incoming installation cables are separate (two separate deposits)	No	No	No
Double draw-out part	No	No	No
Twist-safe holder of max. 6 splice trays	No, 4	No	Yes
Standard splice tray	Yes, R&M	Yes	Yes, R&M
Multifunction module with radius 40 mm	No	?	No
Single fiber management in splice tray	Yes	No	No
Coloured pigtails acc. to code DIN VDE 0888 with the connector types LSH and SC SM	No	No	No

	OPTOMER Poland	FCA Poland	Huber & Suhner Switzerland
3 meters pigtail reserves (1.7 meters of it inside the splice tray)	No	No	No
Cable guide, strain relief and splice unit on the same height unit	No	Yes	No
Variable cable entry straight/angled	Yes	No	Yes
Cable entry with cable tie	?	Yes	Yes
Cable entry with PG 16 screwing	?	No	Yes, PG 11, 16, 21
Accommodates up to 72 connectors	No	No	No
Locking device (lock)	No	Yes	No
Front panel can be sealed	No	No	No
Mounting depth	200 mm	200 mm	235 mm
Material powder-coated sheet steel	Yes	Yes	No
Material aluminium	No	No	Yes

8. High quality assortment

8.1. System description 19" 1U FibereasyRack

The basis of the R&M 19" 1U FibereasyRack consists of a continuously adjustable 19" 1U assembly (retractable 0 to 55 mm). The break-out cable may enter the 1U rack at the side or at the rear.

The break-out cables can be stored in the generously dimensioned drawer.

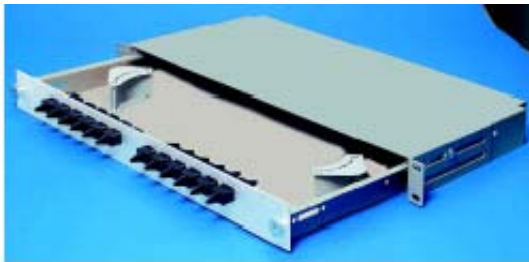
8.2. Accessories (options)

Product name	R&M ordering number	Description
FO cable guide (75 mm or 110 mm)	R30315 (75mm), R302003 (110mm)	Both the cable guide and the patching rings plus Velcro fastener serve as cable track for the patch cables led to the front panel from left or right.
FO patching rings (35 mm and 75 mm) left and right	R302004 (35mm), R302005 (75mm)	
FO FOM cable guide 110 mm	R304439	Both the FOM cable guide and the FOM patching rings with strain relief elastics serve as cable track for patch cables led to the front panel from left or right.
FO FOM patching rings 75 mm left and right	R304440	
FO 21" 1U adapter set for 19" 1U and 2U patch panels	R305148	With this adapter the 19" patch panels can be fastened in metrical profile rails (535 mm).
FO rear cable guide II for 19" 1U and 2U patch panels	R302058	The rear cable guide is an additional guide for the FO cable and flex hoses.
FO rear cable entry with PG 16 screwing	R302006	This cable entry provides additional relief for the FO cable.
FO radius guard 2x15mm	R302007	Additional patch cable guide. The break-out box accommodates max. two times 2x15mm radius guards.

8.3. R&M's FO 19" 1U FibereasyRack feature:

- Recessed, smoothly adjustable 1U slide-in unit
- Reserve drawer for the incoming installation cable
- Removable front panel for easy mounting of adaptors
- Twist-safe holder of max. 2 splice trays
- Variable cable entry (straight/angled)
- Clear and professional labelling of the front panel in silks-screen printing
- Labelling strips

8.4. FO 19" 1U FibereasyRack



8.5. Advantages and points in favour in comparison with competitors

	R&M Switzerland	BTR Telecom Germany	Corning USA/Canada
Labelled front panel in silk-screen print	Yes	Not available	Yes
Labelling strips	Yes		Yes
Removable front panel to clean the connectors	Yes		No
1U recessed slide-in unit, smoothly adjustably	Yes		No
Single draw-out part	Yes		Yes
Twist-safe holder of max. 2 splice trays	Yes		Yes
Can be mounted with standard splice tray	Yes, break-out version as of now		Yes, main applications
Cable guide, strain relief and splice unit on the same height unit	Yes		No
Variable cable entry straight/angled	Yes		?
Cable entry with cable tie	Yes		?
Cable entry with PG 16 screwing	Yes		?
Accommodates 24 connectors	Yes		Yes
Locking device (lock)	No		Yes
Front panel can be sealed	Yes		No
Mounting depth	230 mm		363 mm
Material powder-coated sheet steel	Yes		Yes
Material aluminium	No	No	

	Brugg Switzerland	Moeller Austria	Huber & Suhner Switzerland
Labelled front panel in silk-screen print	Not available	Yes	Not available
Labelling strips		No	
Removable front panel to clean the connectors		No	
1U recessed slide-in unit, smoothly adjustably		Yes	
Single draw-out part		Double draw-out part	
Twist-safe holder of max. 2 splice trays		Yes	
Can be mounted with standard splice tray		Yes, main application	
Cable guide, strain relief and splice unit on the same height unit		Yes	
Variable cable entry straight/angled		No (angled)	
Cable entry with cable tie		No	
Cable entry with PG 16 screwing		Yes	
Accommodates 24 connectors		No	
Locking device (lock)		No	
Front panel can be sealed		No	
Mounting depth		278 mm	
Material powder-coated sheet steel		Yes	
Material aluminium		No	

	OPTOMER Poland	FCA Poland
Labelled front panel in silk-screen print	Yes	Yes
Labelling strips	No	No
Removable front panel to clean the connectors	Yes	No
1U recessed slide-in unit, smoothly adjustably	No	Yes
Single draw-out part	Yes	Yes
Twist-safe holder of max. 2 splice trays	Yes	Yes
Can be mounted with standard splice tray	Yes, R&M, main application	Yes, main application
Cable guide, strain relief and splice unit on the same height unit	No	Yes
Variable cable entry straight/angled	Yes	No
Cable entry with cable tie	?	Yes
Cable entry with PG 16 screwing	?	No
Accommodates 24 connectors	Yes	Yes
Locking device (lock)	No	Yes
Front panel can be sealed	No	No
Mounting depth	200 mm	200 mm
Material powder-coated sheet steel	Yes	Yes
Material aluminium	No	No

9. R&M splice trays

	Standard splice tray with radius 30 mm	Multifunction module with radius 40 mm	FOM (Fiber Optic Management) splice tray with radius 32 mm
Fiber reserve sufficient for repeated follow-up splicing	Yes	Yes	Yes
Controlled fiber deposit inside the splice tray	Good	Goode	Very good
Fibers in splice tray can be easily identified	Good	Good	Very good
Easy access for service and repair work	Yes	Yes	Yes
Application in high-speed distribution networks	Good	Very good	Very good
Little mounting time	Yes	Yes	No (time-consuming)
Splice tray cover	Yes, plastic	Yes, plastic transparent	Yes, aluminium

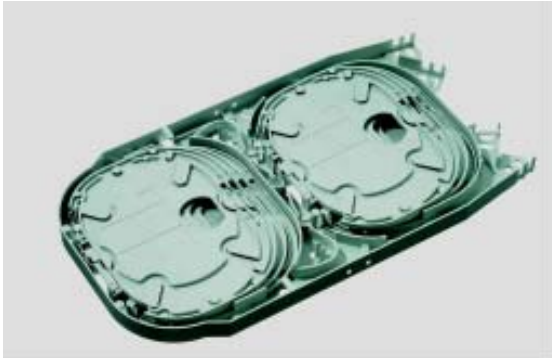
9.1. Standard splice tray radius 30 mm



9.2. Multifunction module radius 40 mm



9.3. FOM (Fiber Optic Management), splice tray radius 32 mm



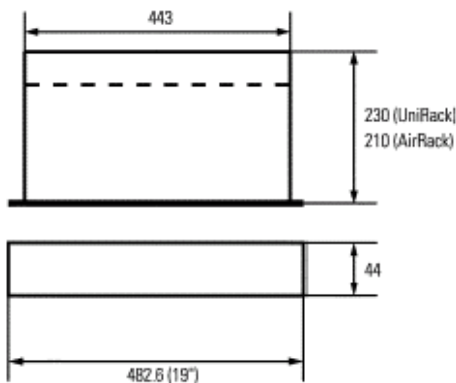
10. Material specifications

10.1. FO 19" 1U/2U patch panels

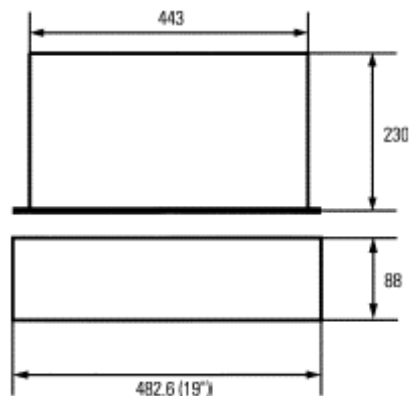
- | | | |
|----------------------------|--------------------|---------------------------------------|
| • 1U assembly unit | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 2U assembly unit | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 1U AirSlide-in unit | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 19" 1U mounting brackets | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 19" 2U mounting brackets | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • Loose tube drawer | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • AirLoose tube drawer | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 1U splice tray plate | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 1U AirSplice tray plate | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • Front panel | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • Cable guide | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • 75 and 110 mm | | |
| • Patching rings 35 mm | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • Patching rings 75 mm | Sheet steel 1.5 mm | powder-coated median grey, NCS 2502-B |
| • Rear cable guides | Rough aluminium | |

10.2. Dimensions in mm

FO 19" 1U patch panels



FO 19" 2U patch panels



12. Technical descriptions and documentation

• Catalogue FO Products English <i>Katalog FO Products Englisch</i>	R305470
• Catalogue FO Products German <i>Katalog FO Produkte Deutsch</i>	R305469
• PowerPoint presentation Patch Panels <i>Powerpoint Präsentation Rangierfelder</i>	German/English
• PowerPoint presentation 3U 8HP Fiberliner <i>Powerpoint Präsentation 3HE 8TE Fiberliner</i>	German/English
• PowerPoint presentation 3HE 7HP Connector Module <i>Powerpoint Präsentation 3HE 7TE Steckermodul</i>	German/English
• PowerPoint presentation FOMsystem <i>Powerpoint Präsentation FOMsystem</i>	German/English
• PowerPoint presentation SM Coupler <i>Powerpoint Präsentation SM Koppler</i>	German/English
• Installation Instructions 19" 1U/2U Patch Panels Splice Version <i>Bedienungsanleitungen 19" 1HE /2HE Rangierfelder Spleiss Version</i>	301982
• Installation Instructions 19" 1U/2U Patch Panels Break-out Version <i>Bedienungsanleitungen 19" 1HE /2HE Rangierfelder Break-Out-Version</i>	3939
• Installation Instructions 19" 1U Splice, Break-out Box <i>Bedienungsanleitungen 19" 1HE Spleiss-, Break-Out-Box</i>	306627
• Installation Instructions Krone FiberPlus® <i>Bedienungsanleitung Krone FiberPlus®</i>	304364
• Installation Instructions 3U 8 HP Fiberliner Splice Version <i>Bedienungsanleitung 3HE 8HP Fiberliner Spleiss Version</i>	3974
• Installation Instructions 3U 8 HP Fiberliner Break-out Version <i>Bedienungsanleitung 3HE 8HP Fiberliner Break-Out-Version</i>	3975
• Installation Instructions 19" 3U Patch Panels <i>Bedienungsanleitung 19" 3HE Rangierfelder</i>	4291
• Installation Instructions 3U 7 HP Connector Module <i>Bedienungsanleitung 3HE 7HP Steckermodul</i>	305371
• Installation Instructions SM Coupler <i>Bedienungsanleitung SM Koppler</i>	306405
• Installation Instructions FOMsystem <i>Bedienungsanleitung FOM Schrank</i>	305278
• <i>Test Report R&M Patch Panels</i> Prüfbericht R&M Rangierfelder	German/English
• Technical Description Foccos <i>Technische Beschreibung Foccos</i>	German/English
• Technical Description Patch Panels <i>Technische Beschreibung Rangierfelder</i>	German/English
• Technical Description 3 U 8 HP Fiberliner <i>Technische Beschreibung 3HE 8TE Fiberliner</i>	German/English
• Technical Description 3U 7 HP Connector Module <i>Technische Beschreibung 3HE 7TE Steckermodul</i>	German/English
• Technical Description FOMsystem <i>Technische Beschreibung FOMsystem</i>	German/English
• Technical Description SM Coupler <i>Technische Beschreibung SM Koppler</i>	German/English
• Technical Description SM Attenuators, Terminators, Coupling Adapters <i>Technische Beschreibung SM Dämpfungsglieder, Abschluss, Übergangskupplung</i>	German/English
• Technical Specifications 19" Optical Distribution Frame and 19" Modules <i>Ausschreibungstext für den optischen 19" Verteiler und den 19" Module</i>	German/English

E-2000™ (LSH): Manufactured under licence of Diamond SA, CH-6616 Losone

LSH = E-2000™

LSHRJ = E-2000™ Compact

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