

The background of the slide is a photograph of a data centre aisle. It shows rows of dark, perforated server racks with vertical silver handles. The perspective is from the end of the aisle, looking down its length, with a soft focus effect. A white rectangular box is overlaid on the bottom right of the image.

# Data Centre Solutions

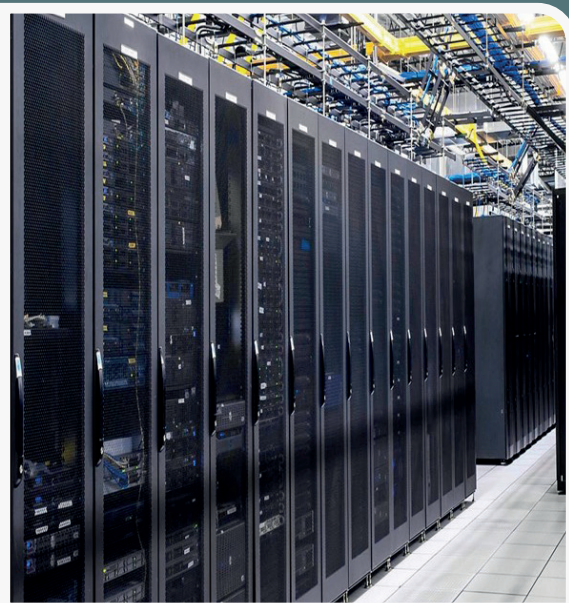
Developing tomorrow's networks, today

# DISCOVER YOUR DATA CENTRE CATALOGUE

Data Centres are a specialised facility to house, manage and process systems and servers.

Telenco UK's Data Centre solutions include:

- Racks and Containment
- Connectivity
- Transmission
- Tooling and testing

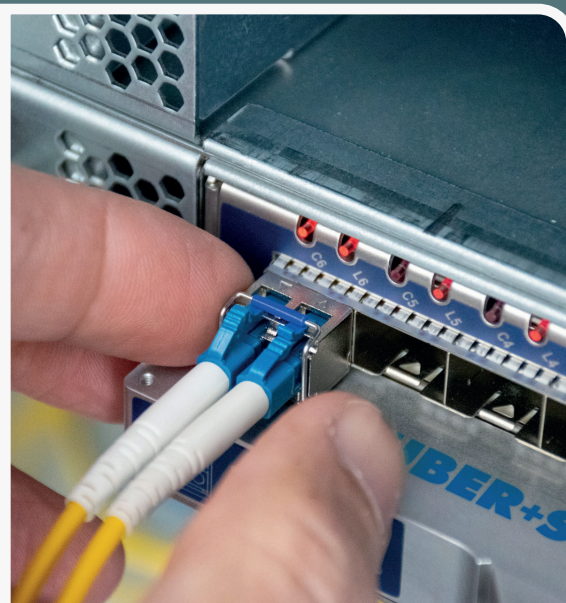


**Racks and  
Containment**



**Connectivity**





Transmission



Tooling and Testing



# FIBRE AND CONNECTOR REMINDER

## General information

Here are the decisive criteria for the choice of connectors, fibre type, cable and optical connectivity specifications:

- Application
- Environmental constraints
- The network's specificities
- Trade standards
- Local specifications
- Terms of reference

## The various types of fibre

### Singlemode fibres



#### G.652.D

- Yellow colour
- Ø 9/125µm
- Standard singlemode fibre
- Non-delayed dispersion



#### G.657.A

- Yellow colour
- Ø 9/125µm
- Small bending radius:
  - A1 = 10mm
  - A2 = 7.5mm



#### G.657.B

- Yellow colour
- Ø 9/125µm
- Small bending radius:
  - A1 = 7.5mm
  - A2 = 5mm

### Multimode fibres



#### OM3

- Aqua colour
- Ø 50/125µm
- From 800m to 1Gbit/s
- From 300m to 10Gbit/s
- From 100m to 40Gbit/s
- From 100m to 100Gbit/s



#### OM4

- Magenta colour
- Ø 50/125µm
- From 1100m to 1Gbit/s
- From 400m to 10Gbit/s
- From 150m to 40Gbit/s
- From 150m to 100Gbit/s

## Fibre optic colour code

### XP C 93-850-3-25

Fibre position	Colour
1	Red
2	Blue
3	Green
4	Yellow
5	Purple
6	White
7	Orange
8	Grey
9	Brown
10	Black
11	Cyan
12	Pink

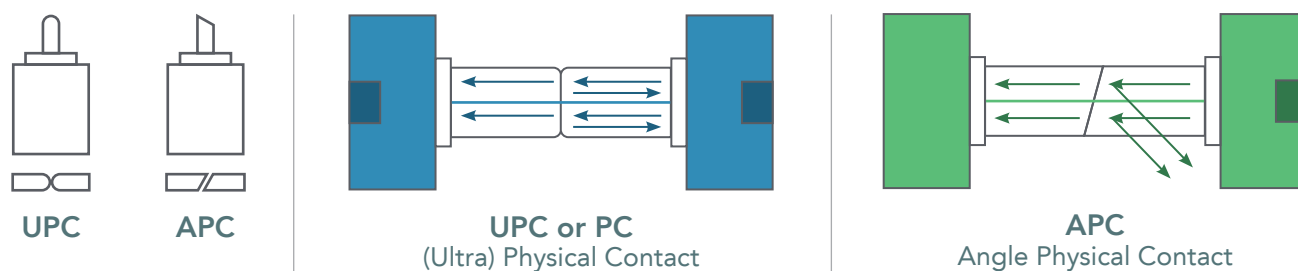
### EIA598-A (FOTAG)

Fibre position	Colour
1	Blue
2	Orange
3	Green
4	Brown
5	Grey
6	White
7	Red
8	Black
9	Yellow
10	Purple
11	Pink
12	Cyan

Fibre position	Colour
13	Blue
14	Orange
15	Green
16	Brown
17	Grey
18	White
19	Red
20	Black
21	Yellow
22	Purple
23	Pink
24	Cyan

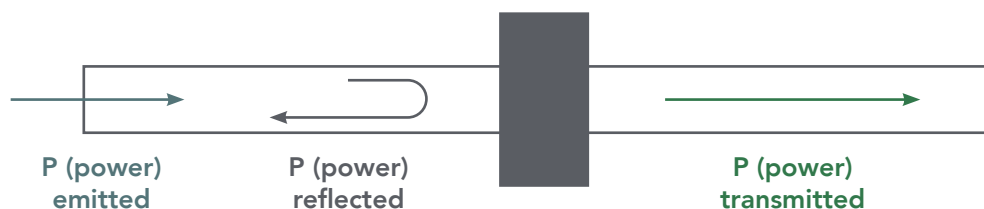


## The different polishing types

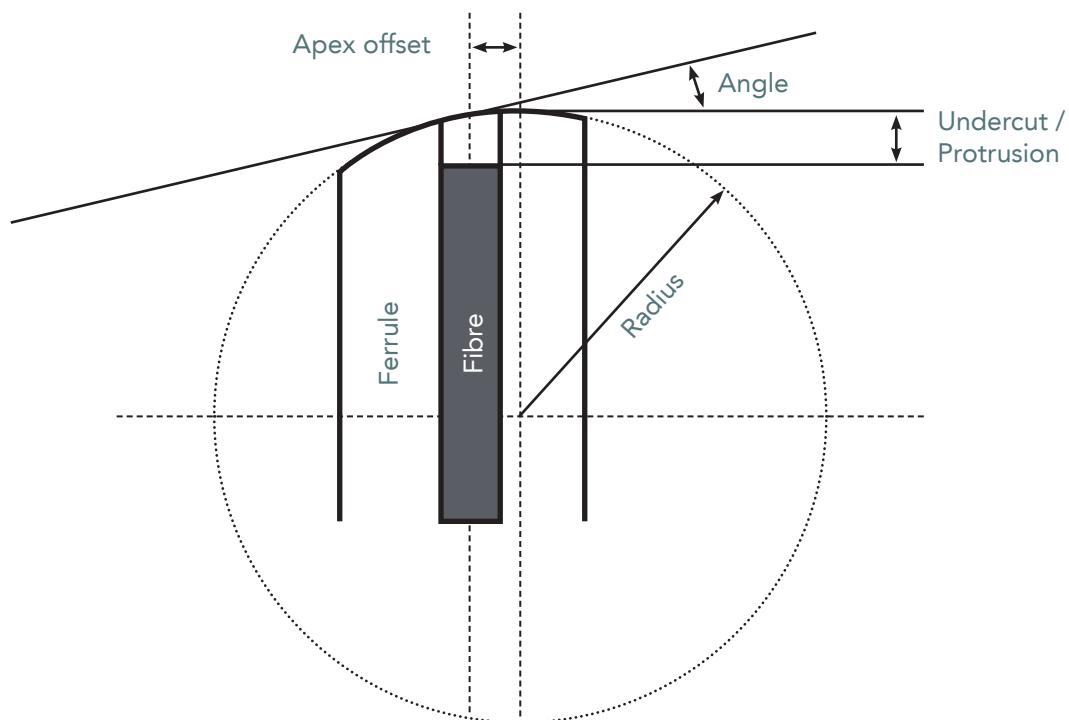


The APC polishing, only available with singlemode fibre, improves the RL value (Return Loss in dB), which has a double effect:

- Reduces the risks of signal interference
- Preserves optical transmitters



## Geometrical criteria of the optical face



## The connectors

### The IL/RL Telenco performances

The Telenco® singlemode connectors are Grade B1 in APC version and Grade B2 in UPC version.

Attenuation (Insertion Loss: IL)	Attenuation value for random connection according to IEC 61300-3-34
Grade B	$\leq 0.12\text{dB}$ on average and $\leq 0.25\text{dB}$ max for 97% of connections

Reflectance (Return Loss: RL)	Reflectance value for random connection according to IEC 61300-3-6	
Grade 1	$\geq 60\text{dB}$	APC polishing
Grade 2	$\geq 50\text{dB}$	UPC polishing

### The MTP® connectors

MTP® is a registered trademark of US Conec Ltd.

The MTP® US Conec connectors offer enhanced features over traditional MPO connectors. They are equipped with a floating ferrule in order to reduce insertion loss values. They also have guide pins that improve the alignment of male and female connectors, allowing thus for multiple insertions.

Telenco networks exclusively uses MTP® Elite connectors for the manufacture of its MTP® trunks.

MTP® polarity type A - Right		Fibres											
A connector	Key up	1	2	3	4	5	6	7	8	9	10	11	12
B connector	Key down	1	2	3	4	5	6	7	8	9	10	11	12

MTP® polarity type B - Reversed		Fibres											
A connector	Key up	1	2	3	4	5	6	7	8	9	10	11	12
B connector	Key down	12	11	10	9	8	7	6	5	4	3	2	1

MTP® polarity type C - Pair to pair crossover		Fibres											
A connector	Key up	1	2	3	4	5	6	7	8	9	10	11	12
B connector	Key down	2	1	4	3	6	5	8	7	10	9	12	11



## The singlemode (SM) connectors



SC/APC



LC/APC



LC/APC Duplex



E2000/APC



FC/APC



MTP®/APC



SC/UPC



LC/UPC



LC/UPC Duplex



E2000/UPC



ST/UPC



FC/UPC



MTP®/UPC

## The multimode (MM) connectors



SC/PC



LC/PC



LC/PC Duplex



E2000/PC



FC/PC



ST/PC



MTP®/PC

## The most commonly used connectors

### Telecom networks

#### Singlemode



SC/APC  
= SCA



SC/UPC  
= SCU



LC/APC  
= LCA



LC/UPC  
= LCU



FC/UPC  
= FCU

### Date centres networks / Private networks

#### Singlemode



LC/UPC  
= LCU



SC/UPC  
= SCU



MTP®/APC -  
MPO/APC  
= MTA

#### Multimode



LC = LCU



SC = SCU



MTP®/PC -  
MPO/PC  
= MTP®



### Special connectors

To provide its customers with ever more innovative solutions, Telenco networks develops and assembles special connectors allowing greater security and durability for fibre optic networks.

#### The secured version of SC connectors

**Telenco**

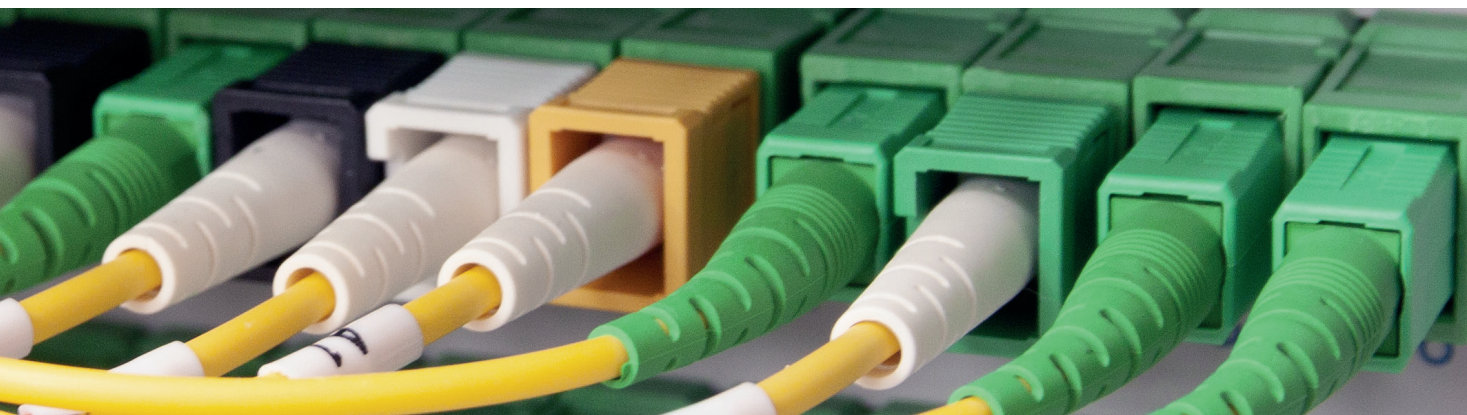


The Telenco SC Secure connectors are high-end self-locking fibre optic cabling systems. They enable the protection of critical networks against disconnection errors or malicious acts.

#### SC connectors with permanent protection

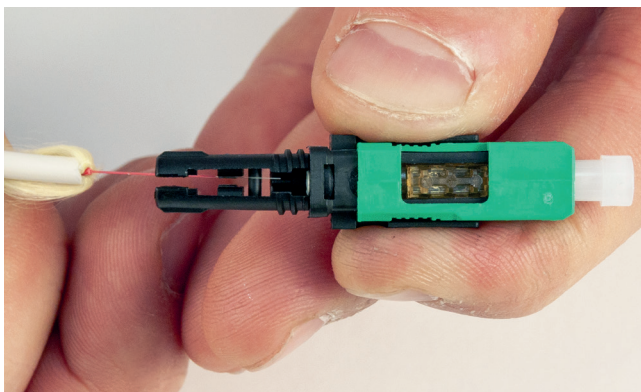


The SC connectors with permanent protection allow to keep connectors on hold. The multiplication of connections/disconnections can be carried out without risk for the optical faces and by saving time for users, all while also bringing a real ecological gain to the installations requiring an intensive patching.



#### Telenco® field mountable connectors

Droptic® cables are compatible with field mountable connectors. Field mountable connectors offer a similar optical performance to that provided by standard connectors. They are quick and easy to install on jobsite, while also ensuring a high level of reliability. These connectors can be installed on 250µm, 900µm or 3mm fibre optic cables.



#### The OptiTap® Corning® hardened connectors

Telenco networks has the licence to install the OptiTap® hardened connectors by Corning.

The OptiTap® hardened connectors by Corning peuvent can be mounted on Droptic® LM4, LX030PU and LX030PUR drop cables, when packaged in cable coils.

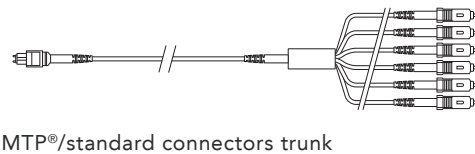
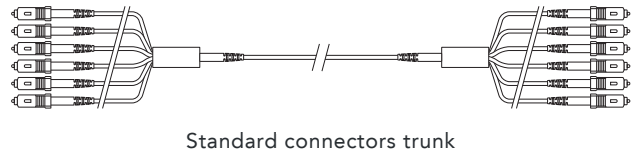
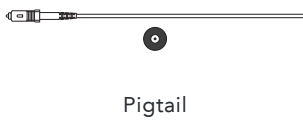
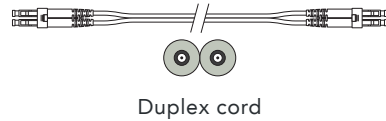
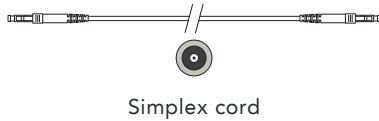
**CORNING**





## Pre-terminated fibre optic links

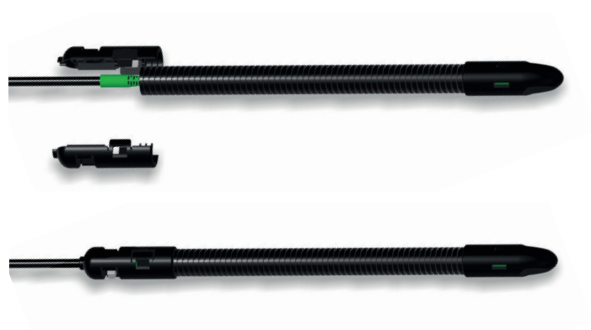
### The various structures

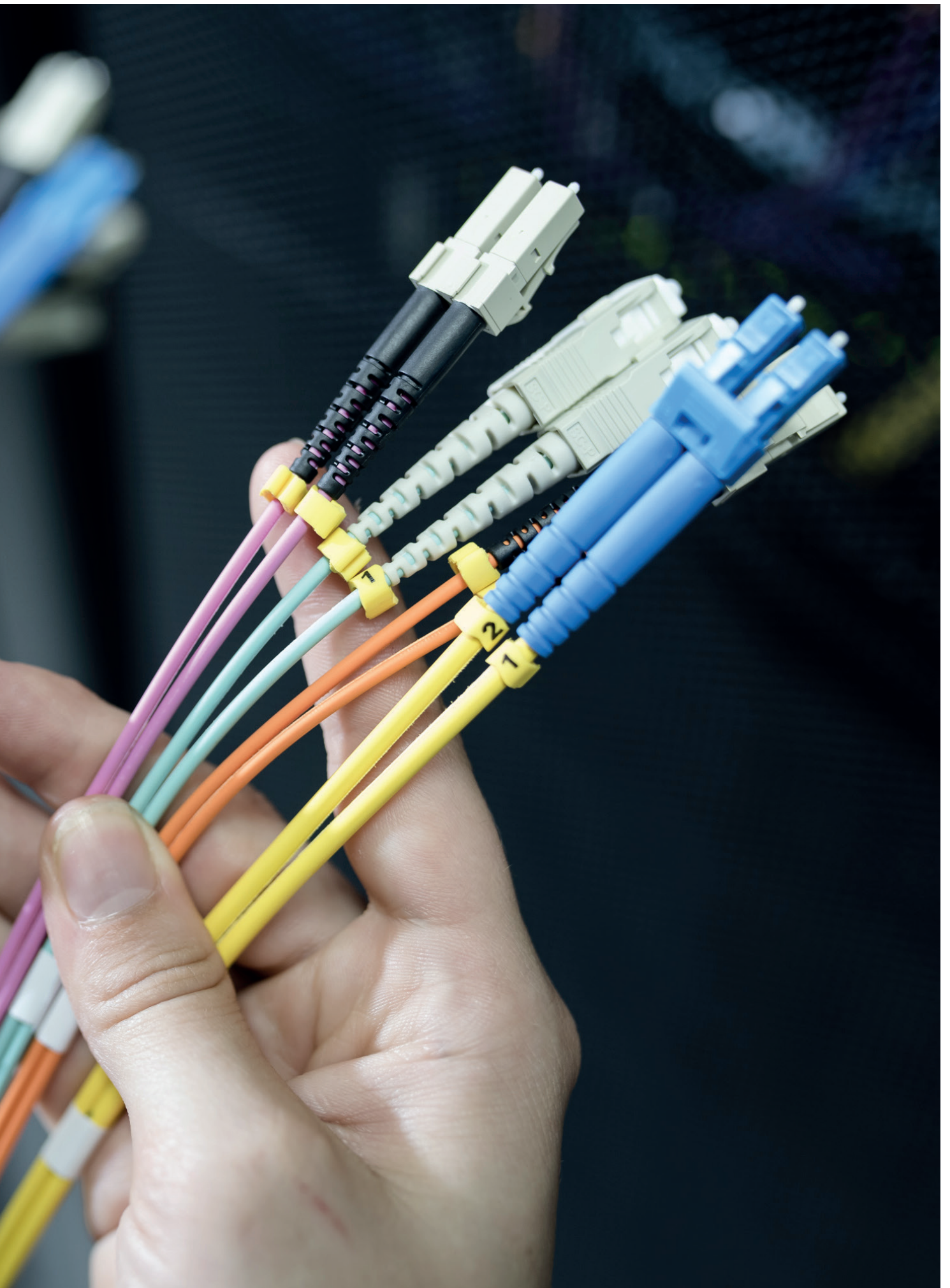


### Telenco® cable protective end caps

Telenco networks offers specific cable protective end caps, equipped with a pulling eye, used for protecting the ends of pre-terminated cables during the installation phase.

The length of the protective end cap is adjustable on request, from 30cm to 1m.







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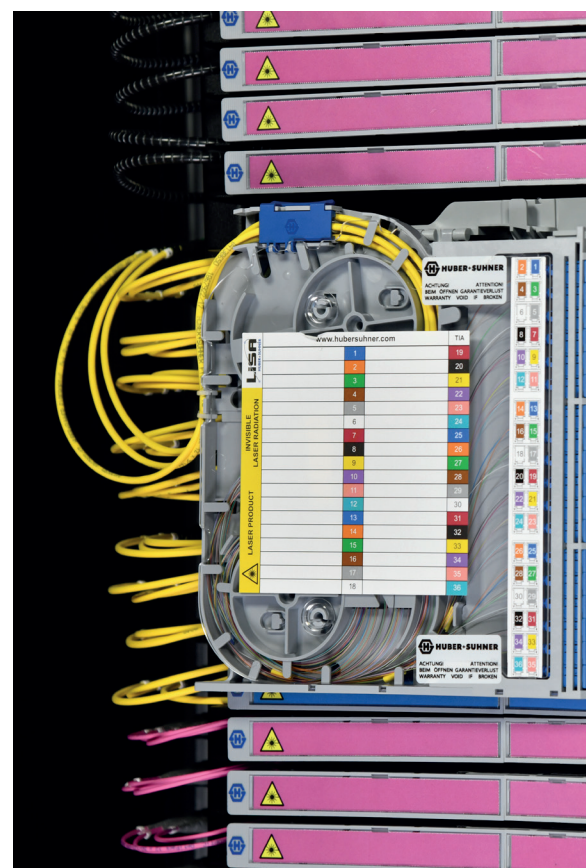
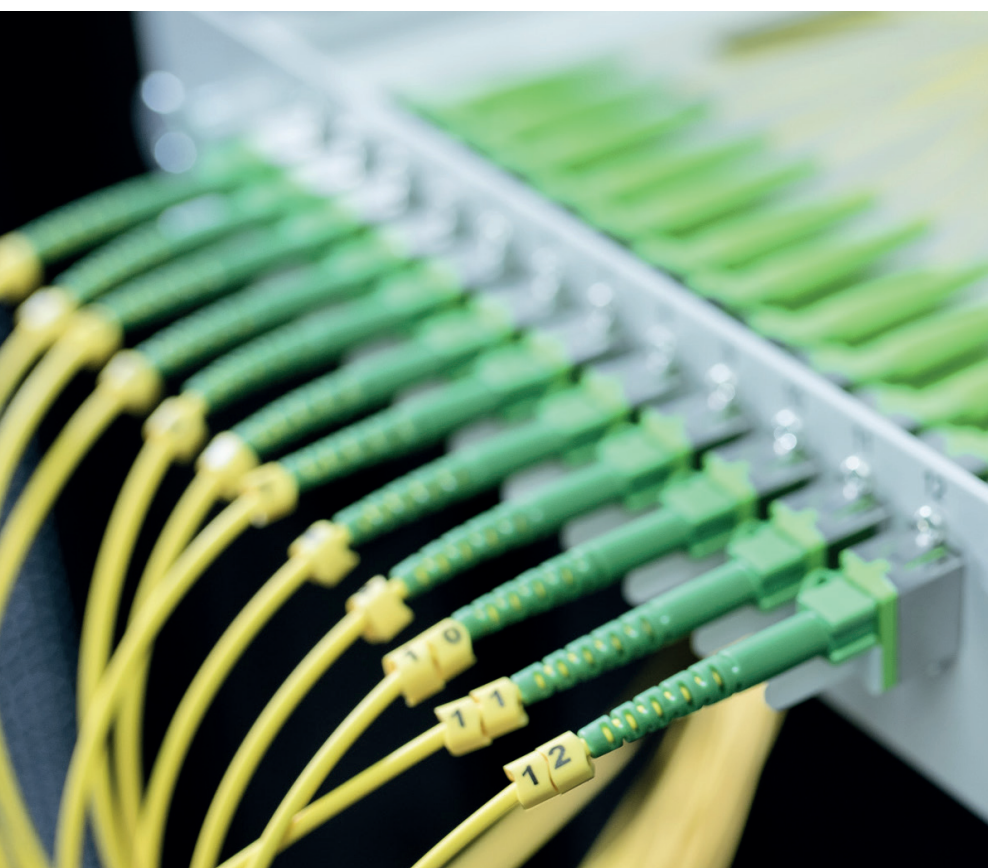






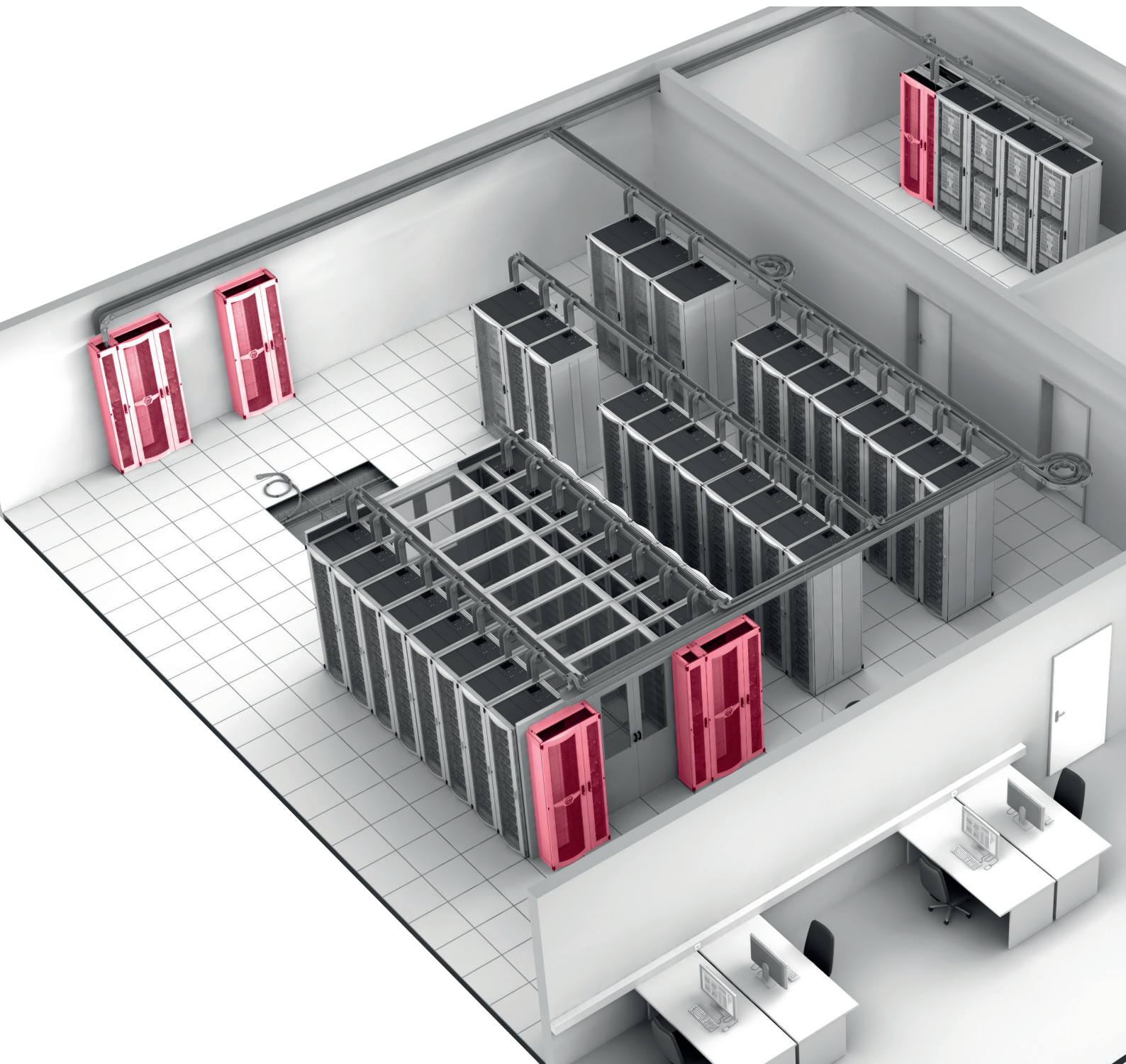
# Racks and Containment

ODF, MMR Solution	14
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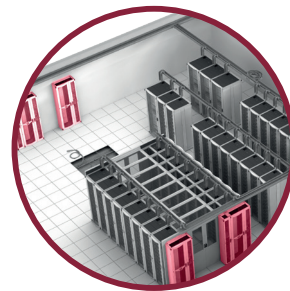
# ODF, MMR SOLUTION





## 19" LISA solution

### 47U LISA racks



**MMR (Meet-Me-Room)**  
**MDA (Main Distribution Area)**

Main distribution  
area of data centres  
optical networks

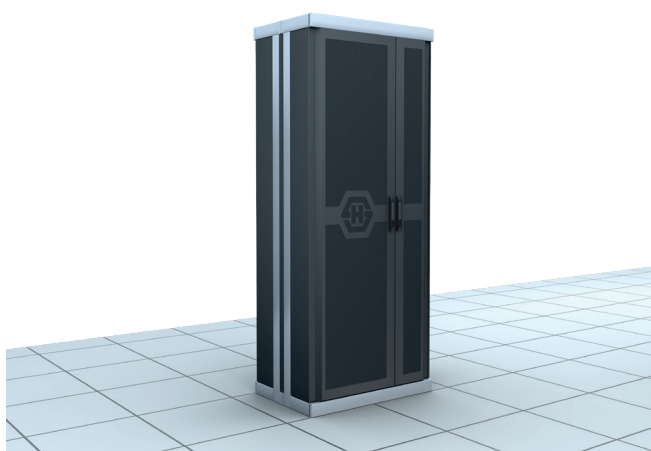
The HUBER+SUHNER® LISA racks are high density fibre optic management systems.

They have been specifically designed to meet all the requirements of Meet-Me-Room (MMR) or Main Distribution Area (MDA) of data centres requiring high density patching and a significant need for scalability.

With a depth of only 300mm and offering a full access from the front side, the HUBER+SUHNER® LISA racks can be placed at the head of a row, back-to-back (on a single floor slab) or against a wall for a minimum power consumption. They can also be assembled side by side to easily increase the patching capacity. Thanks to this space optimisation, they can be easily positioned within the data centres and allow the management of a maximum fibre count in the smallest possible space.

#### The product's benefits:

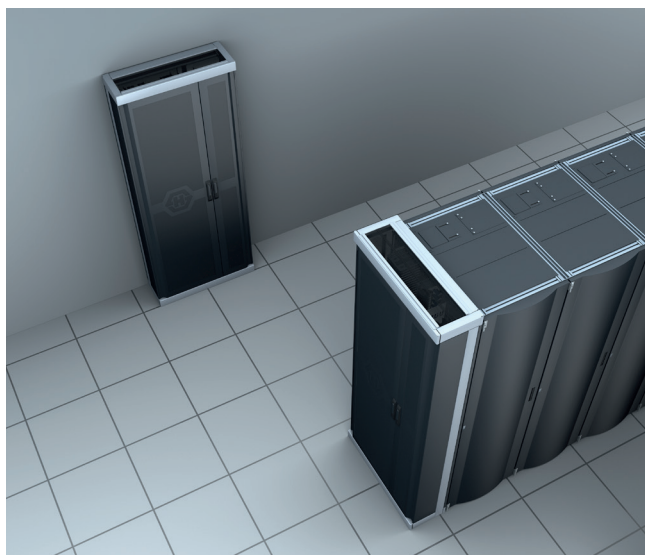
- + Multi-network modular high density
- + 100% dedicated solution tommR and MDA optical networks
- + Congestion optimisation: 300mm depth, front side full fibre access
- + Easy and quick installation
- + Scalability: easy capacity increase and connectivity change
- + Integrated management of cable slack thanks to largely dimensioned coiling areas
- + Excellent fibre routing with bending radii protection
- + Easy assembly and disassembly of doors and side panels



The HUBER+SUHNER® LISA racks are available in 900mm and 1200mm wide versions. Indeed, for a better cable management, an add-on stand-alone rack of 300mm wide can be provided to offer an additional fibre management and coiling space. It can be used in combination with a 900mm rack to create a 1200mm wide rack, or separately for cable storage applications.

The HUBER+SUHNER® LISA racks are the most flexible and scalable fibre management system available on the market. They present large openings for all types, sizes and quantities of cables and a lightweight 2-post design for a better access to these latter ones. Their doors and side panels can be quickly assembled and disassembled, without tools.

Users benefit of large coiling areas. All internal components can be installed and are accessible from the front side. The racks can be thus installed easily and quickly.



The HUBER+SUHNER® LISA racks are equipped with an integrated cable slack management system for routing and managing extra cable lengths. Moreover, this management method reduces the number of cable lengths required to enable connections. Only two lengths of cable are needed to connect any port of a LISA rack.

To meet the needs, cassettes can be added or modified. They present two opening versions (horizontal and vertical), which makes the access to fibres, patchcords and splice cassettes' trunks very simple and without risk for the fibres of other cassettes. Likewise, adding or removing cassettes is extremely simple and presents no risk for the active links.

Cassettes are identified by a triple labelling, with a double identification: colours and text. This clear and quickly visible labelling system helps reducing installation and service

times and have a significant impact on the operational costs of the data centres. Different types of connectors, fibres and applications can be mixed within the same rack. The HUBER+SUHNER® LISA racks can accommodate up to 1620 Duplex LC ports (3240 fibres) and up to 1080 MTP®/MPO ports (25,920 fibres).

Depending on the requirements, the HUBER+SUHNER® LISA solution can be easily configured by selecting the following elements:

- Distribution racks 900 or 1200mm wide
- Tray units in 2U, 3U, 6U and 7U versions
- Cassettes in Patching, Splicing or Transition versions

These innovations make the HUBER+SUHNER® LISA solution perfectly suitable to the modularity and scalability needed to support the growth and evolution of data centres.

LISA 47U Distribution rack

HUBER+SUHNER



PN	Size	Height	Dimensions	Colour	Weight
91452	19"	47U	900x300mm	Noir	123.40kg

LISA 47U Extension distribution rack

HUBER+SUHNER



PN	Size	Height	Dimensions	Colour	Weight
91453	19"	47U	300x300mm	Noir	56.30kg

## Technical specifications:

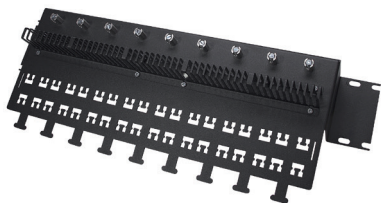
Parameter		Specifications
Rack type	Distribution rack 900x300mm	Extension distribution rack 300x300mm
RoHS directive 2002/95/EC	100% compliant	
REACH standard		
Ingress Protection	IP30	
Flammability rating	UL 94 V-0	
UV resistance		
Chemical resistance	Yes	
Halogen free		
Structure	Material	Aluminum
	Colour	Silver
Panels	Material	Metal sheet
	Colour	Black
Dimensions (D x W x H)	300mm x 900mm x 2200mm	300mm x 300mm x 2200mm
Weight	123.40kg	56.30kg
Optical capacities	LC: 1620 ports, 3240 fibres MTP®: 1080 ports, 25,920 fibres	-
Temperature	Operation, transport and storage: -46° C / +81° C	

Telenco reserves the right to modify specifications without prior notice

## LISA Accessories

## 19" Cable mounting bracket

**HUBER+SUHNER**



PN	Description	Weight
91454	19" Cable mounting bracket 10x Black cables	1.35kg

## Cover for 19" cable mounting bracket

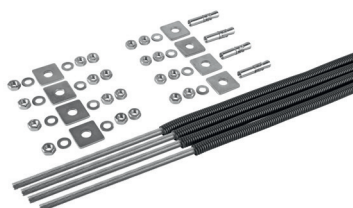
**HUBER+SUHNER**



PN	Description	Weight
91447	Cover for 19" cable mounting bracket 10x Black cables	0.40kg

## Mounting kit for false floor

**HUBER+SUHNER**



PN	Description	Weight
92202	LISA mounting kit for false floor	2.70kg

## FO Protective tube Ø 5mm

**HUBER+SUHNER**



PN	Description	Weight
92042	FO tube protection Ø 5mm Black 100m	1.80kg





### LISA Tray unit

The HUBER+SUHNER® LISA tray units are high-density fibre optic management sub-assemblies. Located inside the HUBER+SUHNER® LISA racks, they can accommodate Splicing, Patching or Transition cassettes and, on request, Splitter or WDM cassettes.

The HUBER+SUHNER® LISA tray units are compatible with LC, SC and MTP® cassettes. This enables the upgrade of the equipment. This allows the equipment to be upgraded, as for instance switching to a network based on MTP® connectors all while preserving the same installation.

Likewise, singlemode and multimode cassettes can be mixed, providing for flexibility and scalability.

#### The product's benefits:

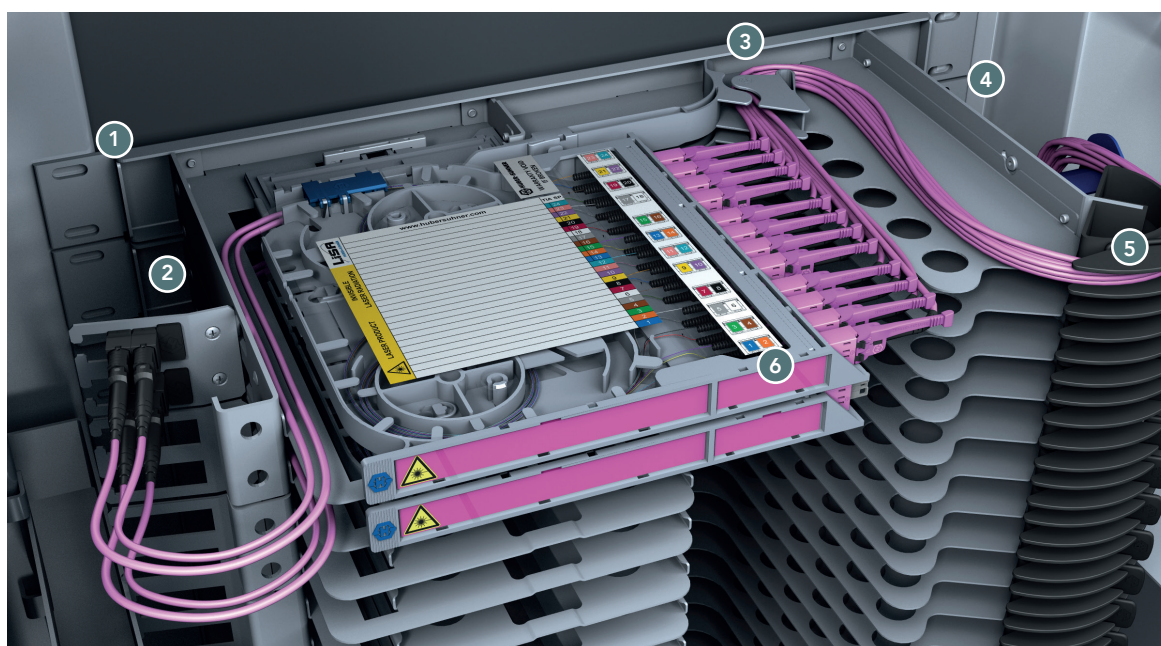
- + Secure: Independent fibre flow using splice cassettes
- + Scalability: 4 tray units heights (2U, 3U, 6U, 7U)
- + Quick and easy tray unit installation on the rear post
- + Secure patchcord routing and bending radius compliance

Thanks to their full front accessibility, the HUBER+SUHNER® LISA tray units allow for easy installation, space saving, secure fibre management and optimised working space. Installation and maintenance are carried out from the front side, so there is no need to access the rear side of the LISA rack, nor have to be equipped with special tools.

To adapt to all possible configurations, the HUBER+SUHNER® LISA tray units are available in LC versions:

- 2U: 4 LISA cassettes and up to 144 fibres
- 3U: 5 LISA cassettes and up to 216 fibres
- 6U: 12 LISA cassettes and up to 432 fibres
- 7U: 15 LISA cassettes and up to 540 fibres

#### The interconnection system of a tray unit



1 Mounting on the rear post allows to free up space for the management of the rack from its front side

2 Mounting plate for retubing sheaths or MTP® connectors for pre-terminated links

3 Secure routing of optical patchcords for an easy handling of cassettes

4 Securing bending radii

5 Clip for the retention of optical patchcords

6 Up to 36 fibres per cassette, i.e. 72 fibres/U



## 19" LISA Patching tray unit

**HUBER+SUHNER**



PN 92345

PN	Height	Slot number	Colour	Weight
91974	2U	4	Black	2.50kg
92937	3U	6		3.80kg
92938	6U	12		7.60kg
92345	7U	15		9.10kg

## 19" LISA Splicing/Transition left tray unit

**HUBER+SUHNER**



PN 92043

PN	Height	Slot number	Colour	Weight
92939	2U	4	Black	2.30kg
92438	3U	6		3.50kg
92940	6U	12		7.00kg
92043	7U	15		8.60kg

### Technical specifications:

Parameter		Specifications			
Height		2U	3U	6U	7U
RoHS directive 2002/95/EC		100% compliant			
REACH standard					
Halogen free		Yes			
Tray unit material	Patching version	Aluminum			
	Splicing/ Transition versions	Steel and aluminum			
Tray unit colour		Black			
Mandrels' material	Front side	ABS			
	Sideways	HDPE			
Mandrels' colour	Front side	Black			
	Sideways	Blue			
Tray unit dimensions (D x W x H)	Patching version	264 x 498 x 88mm	264 x 498 x 132mm	264 x 498 x 266mm	264 x 498 x 310mm
	Splicing/ Transition versions	264 x 501 x 88mm	264 x 501 x 132mm	264 x 501 x 266mm	264 x 501 x 310mm
Tray unit weight (kg)	Patching version	2.5kg	3.8kg	7.6kg	9.1kg
	Splicing/ Transition versions	2.4kg	3.5kg	7kg	8.6kg
Maximum number of cassettes		4	6	12	15
Temperature		Operation, transport and storage: -25° C / +70° C			

Telenco reserves the right to modify specifications without prior notice



## LISA Cassette

The HUBER+SUHNER® LISA cassettes can be integrated into LISA tray units placed inside HUBER+SUHNER® LISA racks.

They are engineered for a quick installation: can be installed and removed in less than 10 seconds without interfering with the pre-installed fibres. LISA cassettes also offer an optimised accessibility and ensure that connections are secured sideways, presenting no risk to the front side, thanks to their lateral configuration.

The HUBER+SUHNER® LISA cassettes present 3 labels and a double identification system using colours and text. This clear and quickly visible labelling system helps reducing installation and service times and have a significant impact on the operational costs of the data centres.

The HUBER+SUHNER® LISA cassettes are easy to identify and to access from the front side. Indeed, installation and maintenance can be carried out from the front side, so there is no need to access the rear side of the LISA rack, nor have to be equipped with special tools. Connections are performed sideways, which provides for a greater laser safety protection to users. This architecture also allows for the extraction and drawdown of cassettes with active fibres, without any risks for maintenance operations or for optical links add-on jobs. The integrated sliding system (horizontal and vertical), as well as the self-locking one make the installation simple, fast and repeatable.

The HUBER+SUHNER® LISA cassettes are available to cover a wide range of applications: Patching (for connecting pre-terminated cables), Splicing (for connecting optical fibres by using splicing applications), Transition (for converting MTP® cables into Duplex LC and SC connectivity solutions).

The HUBER+SUHNER® LISA cassettes are available with various types of fibre optics (Singlemode and Multimode) and different connectors (LC, SC, MTP®). They exist in the following versions: 12FO (SC), 18FO (SC), 24FO (LC, MTP®) and 36FO (LC, MTP®).

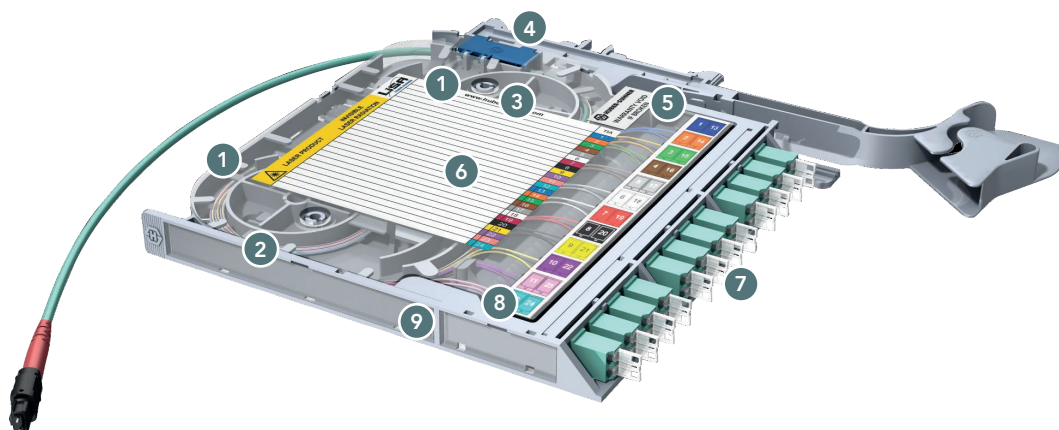
Regardless of the connection and application, HUBER+SUHNER® LISA cassettes can be installed and mixed within the same LISA rack. This makes it easy to change the cabling structure of the data centres in the course of its growth, providing thus for a great flexibility and scalability.

The HUBER+SUHNER® LISA cassettes are designed for managing fibres in a secured and orderly manner, making no compromise for the user handling or optical performances. The guiding elements inside the cassette ensure the respect of the minimum bending radius of the fibres, as well as enough space between the incoming and outgoing fibre optics.

### The product's benefits:

- + Modularity: Patching, Splicing, Transition
- + Flexibility: cassettes available in LC/SC/MTP®, singlemode or multimode versions
- + Scalability: possibility to add-on cassettes if needed
- + Easy access: 2 ways of opening cassettes
- + Optimised work space: full access to cassettes from the front side
- + Easy identification by colour and label system
- + Quick installation and easy handling without tools
- + Secured fibre routing respecting the bending radius

### The interconnection system of a cassette



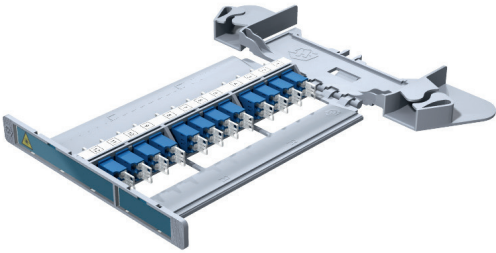
- 1 Storage area for fibre overlengths
- 2 Tabs for maintaining fibres (various lengths)
- 3 Storage of fibres pending connection

- 4 Cable attachment / Retubing sheath
- 5 Pigtail connection
- 6 Central area for splicing/ Fibre identification label with numbers and colours

- 7 Connector positioning (up to 36 optical paths)
- 8 Already stripped fibres
- 9 2 areas for identification labels

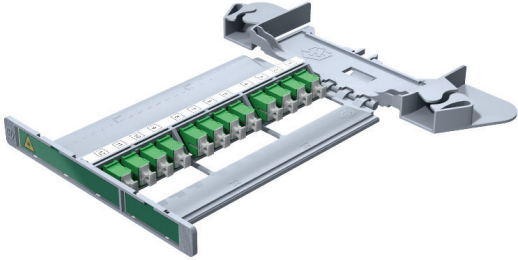
LISA Patching cassette

**HUBER+SUHNER**



PN 50091

**HUBER+SUHNER**



PN 91973

PN	Connector type	Connector number	Fibre count	Weight
50091	Duplex LC/UPC	12	24	0.29kg
92941		18	36	0.31kg
91973	SC/APC	12	12	0.29kg
91972		18	18	0.31kg

Available configurations:



Duplex  
LC/UPC



Simplex  
SC/APC

Fibre type: Singlemode

Technical specifications:

Parameter		Specifications	
Type of cassette		LISA Transition cassette	
Compatible connectors		LC/UPC	SC/APC
Connectors colour		Blue	Green
Fibre optic count	12 adaptors	24	12
	18 adaptors	36	18
Weight	12 adaptors	0.29kg	
	18 adaptors	0.32kg	
Cassette dimensions (D x W X H)		241mm x 259mm x 19mm	
Cassette material		ABS/PC	
Cassette colour		Grey	
RoHS directive 2002/95/EC		100% compliant	
REACH standard			
Flammability rating		UL 94V-0	
UV resistance		Yes	
Chemical resistance			
Halogen free			
Temperature		Operation: -40° C/ +70° C	
Other versions available on request	Singlemode	LC/APC, SC/UPC, MTP®/APC	
	Multimode	LC/PC, SC/PC, MTP®/PC	

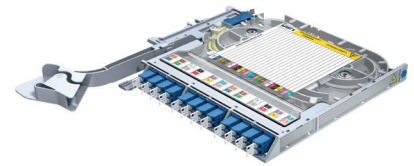
Telenco reserves the right to modify specifications without prior notice



## LISA Splicing cassette

PN	Fibre type	Fibre optic count	Pigtail colour code	Number of adaptors	Connector type	Weight
91450	G.652D	24	TIA	12	Duplex LC/UPC	0.61kg
92044		24	Monochrome		Duplex LC/UPC	0.61kg
91449		12	TIA		SC/APC	0.55kg

HUBER+SUHNER



PN 91450

## Available configurations:



LC/UPC



SC/APC

Fibre type: Singlemode

## Technical specifications:

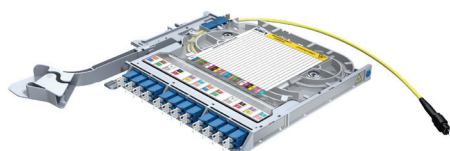
Parameter	Specifications	
Type of cassette	LISA Splicing cassette	
Compatible connectors	LC/UPC	SC/APC
Connectors' colour	Blue	Green
Number of adaptors	12	
Fibre optic count	24	12
Pigtail colour code	TIA/ Monochrome	TIA
Weight	0.61kg	0.55kg
Cassette dimensions (D x W X H)	293mm x 262mm x 18mm	
Cassette material	ABS/PC	
Cassette colour	Grey	
RoHS directive 2002/95/EC	100% compliant	
REACH standard		
Flammability rating	UL 94V-0	
UV resistance		
Chemical resistance	Yes	
Halogen free		
Temperature	Operation: -40° C/ +70° C	
Other versions available on request	Singlemode	LC/APC, SC/UPC
	Multimode	LC/PC, SC/PC

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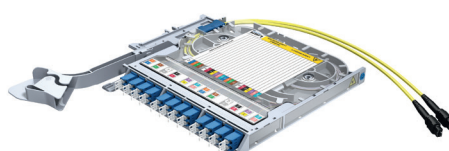
## LISA Transition cassette

**HUBER+SUHNER**



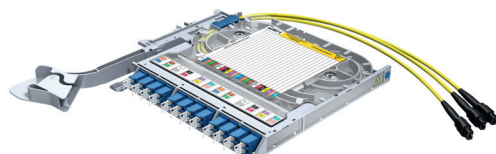
PN 50090

**HUBER+SUHNER**



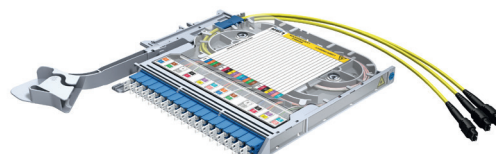
PN 92193

**HUBER+SUHNER**



PN 50089

**HUBER+SUHNER**



PN 92194

PN	Fibre type	Fibre optic count	Version	Number of adaptors	Connector type	Weight
50090	G.652D	24	MTA F24R1	12	Duplex LC/UPC	0.54kg
92193		24	2MTA M 12AS	12		
50089		24	3MTA F 8NS	12		
92194		36	3MTA M 12AS	18		

### Available configurations:



MTP®/APC



LC/UPC

**Fibre type:** Singlemode

### Technical specifications:

Parameter		Specifications		
Type of cassette		LISA Transition cassette		
Compatible connectors		MTP®/APC-LC/UPC		
Version	1MTA F 24R1	2MTA M 12AS	3MTA F 8NS	3MTA M 12AS
Number of adaptors		12		18
Fibre optic count		24		36
Number of MTP® outputs		1	2	3
MTP® connector type		MTP®/APC	MTP®/APC	MTP®/APC
Weight		0.50kg	0.54kg	
Cassette dimensions (D x W X H)		293mm x 262mm x 18mm		
Cassette material		ABS/PC		
Cassette colour		Grey		
RoHS directive 2002/95/EC		100% compliant		
REACH standard				
Flammability rating		UL 94V-0		
UV resistance		Yes		
Chemical resistance				
Halogen free				
Temperature		Operation: -40° C/ +70° C		
Other versions available on request	Multimode	MTP®/PC		

Telenco reserves the right to modify specifications without prior notice



## 19" High density IANOS solution

### IANOS Chassis

The HUBER+SUHNER® IANOS chassis are high density fibre optic modular management systems allowing for quick and flexible fibre optic operations in data centres. They fit into all standard 19" racks so to accommodate Patching modules (for connecting pre-terminated cables), Splicing modules (for connecting optical fibres by using splicing applications), Transition (to convert MTP® cables into Duplex LC and SC connectivity solutions).

Data centres are constantly adapting to the demands placed on them and current fibre optic management systems have to meet these changes with a minimum of cost, time and network disruption. IANOS anticipates these evolutions by offering the most wide range of connectivity scenarios in a single generic platform.

The HUBER+SUHNER® IANOS chassis are available in 1U and 4U versions for high density applications.

In 1U and LC version, they can accommodate up to 12 modules and 144 fibres (72 ports) per rack unit.

In 4U and LC version, they can accommodate up to 48 modules and 576 fibres (288 ports) per rack unit.

Thanks to their modularity, the HUBER+SUHNER® IANOS chassis can also be used for networks based on MTP®/MPO connectors for 10G or 100G links.

The HUBER+SUHNER® IANOS chassis present 6 plates per rack unit, which can slide independently, and 2 front covers offering a full fibre protection, as well as wide identification areas. As needs may change, other modules can be added from the front or the back side. The HUBER+SUHNER® IANOS chassis are thus, evolving at the same pace with the data centres.

It is possible to mix different modules within the same chassis depending on:

- Connectivity solutions (SC, LC or MTP®)
- Height (1U or 4U)
- Fibre optic types (Singlemode or Multimode)
- Applications (Patching, Splicing, Transition)

The position of the modules, as well as the position of the existing ports are clearly marked on the HUBER+SUHNER® IANOS chassis. A sliding label positioned at the center of the chassis offers additional information. This clear and quickly visible labelling system helps reducing installation and service times and have a significant impact on the operational costs of the data centres.

The fibre routing in the front part of the chassis is clearly defined and independent, which allows for safe interventions on active fibres. This makes access to the patch cables quick and easy. At the rear, cable trays can be supplied together with the HUBER+SUHNER® IANOS chassis so to ease the securing and management of fibre and to enhance cabling.

#### The product's benefits:

- + High density (144FO/U)
- + Modularity (Patching, Splicing, Transition)
- + Scalability: 2 chassis heights (1U, 4U)
- + Flexibility: possibility to add modules from the chassis' front or rear side
- + Security: independent fibre flow per module

#### Technical specifications:

Parameter		Specifications	
Chassis type		IANOS chassis	
Size		19"	
Height	1U	4U	
RoHS requirement 2002/95/EC		100% compliant	
REACH standard			
Halogen free		Yes	
Chassis	Material	Stainless steel	
	Colour	Grey	
	Dimensions (L x W x H)	328mm x 483mm x 44mm	328mm x 483mm x 177mm
Weight		3.6kg	12.4kg
Maximum number of modules		12	48
Maximum capacity in LC version		72 ports / 144 fibres	288 ports / 576 fibres

Telenco reserves the right to modify specifications without prior notice

## 1U IANOS Chassis

**HUBER+SUHNER**



PN	Size	Height	Slot number	Weight
91445	19"	1U	12	3.60kg

## 4U IANOS Chassis

**HUBER+SUHNER**



PN	Size	Height	Slot number	Weight
92618	19"	4U	48	12.40kg

## 1U IANOS Accessories

### Cable tray

**HUBER+SUHNER**



PN	Size	Height	Slot number	Weight
91448	19"	1U	12	0.60kg

#### Characteristics:

**Length:** 279mm

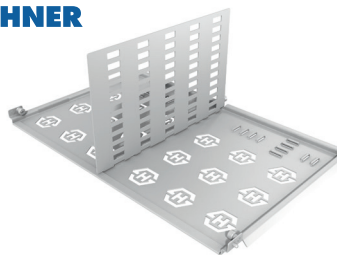
**Width:** 449mm

**Height:** 41mm

## 4U IANOS Accessories

### Cable tray

**HUBER+SUHNER**



PN	Size	Height	Slot number	Weight
92619	19"	4U	48	0.70kg

#### Characteristics:

**Length:** 279mm

**Width:** 449mm

**Height:** 171mm

## Lateral patchcord guide

**HUBER+SUHNER**



PN	Size	Height	Slot number	Weight
92942	19"	1U	12	0.45kg

#### Characteristics:

**Length:** 133mm

**Width:** 89mm

**Height:** 44mm

## Lateral patchcord guide

**HUBER+SUHNER**



PN	Size	Height	Slot number	Weight
92943	19"	4U	48	0.95kg

#### Characteristics:

**Length:** 130mm

**Width:** 89mm

**Height:** 177mm

### IANOS Modules

The HUBER+SUHNER® IANOS modules can be installed into HUBER+SUHNER® 19" IANOS chassis. Engineered for a quick installation and an easy access, they are extremely compact and lightweight. They can be easily integrated into and removed from IANOS chassis as soon as the data centres evolves, without interfering with pre-installed fibres.

The HUBER+SUHNER® IANOS modules cover a wide range of applications: Patching (for the connection of pre-terminated cables), Splicing (for connecting optical fibres by using splicing applications), Transition (to convert MTP® cables into Duplex LC and SC connectivity solutions).

These applications are configurable with various:

- Connectivity solutions (SC, LC or MTP®)
- Sizes (simple or double)
- Fibre optic types (Singlemode or Multimode)

All these combinations can be integrated and exchanged in the same HUBER+SUHNER® 1U or 4U IANOS chassis. The installation and maintenance of HUBER+SUHNER® IANOS modules is fast as they can be operated either at the rear side or at the front of the chassis, without tools. This allows a great flexibility when installing modules, even in confined or dense environments.

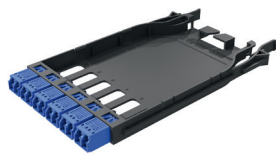
The HUBER+SUHNER® IANOS modules feature a clear and quickly visible labelling system that helps reducing installation and service times and have a significant impact on the operational costs of the data centres.

#### The product's benefits:

- + Quick and toolless installation from front or rear side
- + Scalability: possibility of adding modules if necessary
- + Flexibility: available in SC/LC/ MTP® and singlemode/ multimode versions
- + Modularity: simple or double version
- + Easy identification by colour code or label system
- + Quick and secure access to fibres

#### IANOS Patching module

**HUBER+SUHNER**



PN	Connector type	Connector number	Fibre count	Weight
92620	Duplex LC/UPC	6	12	0.05kg

#### IANOS Double Splicing module

**HUBER+SUHNER**



PN 92621



PN 91451

PN	Connector type	Connector number	Fibre count	Weight
92621	SC/APC	12	12	0.24kg
91451	Duplex LC/UPC	24		

#### Available configurations:



LC/UPC

**Fibre type:** Singlemode

#### Available configurations:



SC/APC



LC/UPC

**Fibre type:** Singlemode (G.652D)



## Technical specifications:

Parameter		Specifications	
Module type		IANOS Patching module	
		IANOS Double splicing module	
Compatible connectors		LC/UPC	LC/UPC
Colours of the connectors		Blue	Blue
			Green
Number of connectors		6	12
Fibre optic count		12FO	24FO
			12FO
Weight		0.05kg	0.24kg
Module dimensions (L x W x H)		172mm x 97mm x 12mm	177mm x 199mm x 12mm
Pigtail code colour		-	TIA
Module material		PC	PC
Module colour		Black	Black
RoHS directive 2002/95/EC		100% compliant	100% compliant
REACH standard			
Halogen free		Yes	Yes
Other versions available on request	Singlemode	MTP®/APC, LC/APC, SC/APC	Simple and double module: LC/APC, SC/UPC
	Multimode	SC/PC, LC/PC, MTP®/PC	Simple and double module: LC/PC, SC/PC

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## ODF, MMR SOLUTION

### IANOS Double transition module

**HUBER+SUHNER**



PN 92622

**HUBER+SUHNER**



PN 92280

PN	Version	Connector type	Number of connectors	Fibre count	Weight
92622	MTA F 12AP	SC/APC	1	12	0.30kg
92280	2MTA F 12AP	Duplex LC/UPC	2	24	
92623	3MTA F 8NS		3		
92944	MTA F 24R1		1		

#### Available configurations:

##### 1<sup>st</sup> configuration:



MTP®/APC



SC/APC

##### 2<sup>nd</sup> configuration:



MTP®/APC



LC/UPC

**Fibre type:** Singlemode

#### Technical specifications:

Parameter		Specifications			
Module type		IANOS Double Transition module			
Compatible connectors		MTP®/APC-LC/UPC			MTP®/APC-SC/APC
Version		3MTA F 8NS	2MTA M 12AP	1MTA F 24R1	1MTA M 12AP
Number of adaptors		12			
Fibre optic count		24FO			12FO
Number of MTP® outputs		3	2	1	1
Type of MTP® connectors		MTP®/APC	MTP®/APC	MTP®/APC	MTP®/APC
Weight		0.30kg			
Module dimensions (L x W x H)		172mm x 196mm x 12mm			
Module material		PC			
Module colour		Black			
RoHS directive 2002/95/EC		100% compliant			
REACH standard					
Halogen free		Yes			
Other versions available on request	Singlemode	Double module: MTP®/APC-LC/APC, MTP®/APC-SC/UPC			
	Multimode	Double module: MTP®/PC-LC/PC, MTP®/PC-SC/PC			

Telenco reserves the right to modify specifications without prior notice





We design and manufacture enclosures for critical infrastructure operators, systems integrators and global OEMs spanning markets including rail, fixed and mobile networks, road, data centres, defence, water and energy utilities.

Our outdoor enclosures and indoor racks and cabinets in 19", ETSI and ANSI formats for compute, data storage and networking hardware are designed and manufactured in the UK by our experienced team of engineers.

We are specialists in developing enclosure solutions to challenges with heat and cold, electro-magnetic fields (RF/EMC), seismic activity in earthquake zones, shock and vibration, ingress protection (IP), and vandals, which can be certified to global civilian and military standards.

Our Consult, Design, Make and Protect process serves our customers with individual solutions to their challenges quickly and cost effectively. Our modern factory can produce in volume to support national scale infrastructure projects. We also offer factory pre-wiring saving you valuable time on site.

The "Rainford Way" means your equipment will perform at its best, achieving the highest levels of reliability and minimum in-life maintenance cost.

Rainford solutions

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# SERVER, NETWORK AND COLLOCATION

## Data centre server cabinets

Our range of flexible and modular 19" free-standing server cabinets have been designed for mission critical operations such as data storage, server housing and infrastructural cabling. They can also offer solutions for hot/cold corridor data centre architecture.



### Technical Specifications:

- + Height options: 27U, 36U, 42U, 52U, 54U, 60U
- + Depth options: 1000mm, 1100mm, 1200mm
- + Width options: 600mm, 800mm
- + Load capacity up to 2000 kg
- + Standard finishes:
  - Jet Black RAL 9005
  - Light Grey RAL 7035
- + 2 pairs of fully adjustable 19", ETSI or ANSI mounting profiles
- + Front & rear mesh doors – 80% open area
- + 3-point door locking for security
- + Removable doors, hinged left or right
- + 2 pairs of horizontally divided side panels with locks
- + Large cable aperture in base
- + 2 vertical cable trays fitted at rear (1 per side)
- + Brushed cable entry in roof
- + 10 way x 80 A earth bar fitted in base at the rear
- + Fully earth bonded
- + Conforms to IEC 60297-3, EIA 310-D and BS 3192
- + Cabinet supplied fully assembled

### Optional Features:

- + Wide range of accessories
- + Double (wardrobe style) rear doors for easy handling
- + Active airflow management multiple fan tray options and features



### Technical specifications:

Parameter	Specifications
Material	Steel
Colour	RAL 7035 light grey or RAL 9005 black
Compliance	RoHS, UL Certified
Packaging	Assembled with option of flat packed (unassembled)
Maximum static load	Up to 1500kg
Finish	Frame, doors, side panels, top and bottom panels powder coated
19" mounting rails	Zinc-plated

### Standard Configuration Include:

- + Perforated front and rear doors.
- + Front & rear doors with swing handle Multi point locking
- + Solid Side Panels with cylinder locks and latches
- + Roof with 3 cable entries for 800 width, 1 cable entry for 600 width racks and additional multi-purpose cut-outs
- + 2 Pairs of depth adjustable heavy duty 19" Mounting Rails
- + 2 Pairs of Adjustable Feet
- + Bottom cover with 3 cable entries for 800 width, 1 cable entry for 600 width racks

Parameter	Specifications	
Width	600	800
Height	42U	47U
Depth	1000	1200
Colour	RAL 7035 Grey RAL 9005 Black	

**Options:** A wide range of options for locking, door styles and accessories are available upon request.





## Hyperscale & colocation server and network cabinet

Available up to 60U

Our range of free-standing server and network cabinets have been designed to be used in Hyperscale and colocation applications for mission critical operations such as data storage, server housing and infrastructure cabling. There are also options available for hot/cold aisle containment.

We understand that not all off-the-shelf products suit everyone. We will work with you to create a solution that meets all your requirements. Our team of experts can design a solution to fit any cabinet configuration including height, width, depth, alignment, aisle layout and floor space.

### Product's benefits:

- + Maximise footprint: up to 60U
- + Customer density: flexible divisions from 1 to 5 compartments
- + Low CO2 footprint
- + UK Manufactured

### Technical Specifications:

Dimensions, construction

- + Height options: 42U, 47U, 54U, 60U
- + Width options: 600mm, 800mm
- + Depth options: 1000mm, 1100mm, 1200mm
- + 19" or ETSI format front and rear verticals, fully depth adjustable on notched depth members
- + Static load capacity up to 2000 kg
- + Material: mild steel
- + Removable side panels
- + Finish: polyester powder coat
- + Colour options:
  - Jet Black (RAL 9005)
  - Light Grey (RAL 7035)

### Airflow Management:

- + Brushed cable entry in roof
- + 80% SAFA hexagonal mesh doors
- + Brush strip air blocking



# AISLE CONTAINMENT



## Aisle containment systems

Aisle containment systems in data centres is a technology that aims to improve cooling efficiency and energy utilisation by segregating hot and cold air streams within the facility. These systems consist of physical barriers like doors, curtains, or adjustable panels that create separate aisles for hot and cold air circulation. By implementing aisle containment systems, data centres can achieve better control over airflow, optimise cooling performance, and reduce energy consumption.

### Advantages of Aisle Containment Systems:

- + **Improved Cooling Efficiency:** Aisle containment systems effectively manage the airflow and eliminate the mixing of hot and cold air. This ensures that only the necessary amount of cold air is delivered to the IT equipment, improving cooling efficiency and reducing energy waste.
- + **Energy Savings:** By optimising airflow and reducing the need for excessive cooling, aisle containment systems contribute to significant energy savings. These systems help minimise the power consumption of cooling equipment, resulting in lower energy costs for data centre operations.
- + **Enhanced Equipment Performance:** By providing a controlled cooling environment, aisle containment systems help maintain consistent temperatures around the server racks. This promotes better performance and reliability of the IT equipment, leading to reduced downtime and improved overall data centre efficiency.
- + **Power Usage Effectiveness (PUE) Improvement:** Implementing aisle containment systems typically leads to a decrease in a data centre's PUE. PUE is a measure of how efficiently a data centre utilises its power for IT equipment versus non-IT infrastructure. By improving cooling efficiency and reducing energy consumption, aisle containment systems can help lower PUE values, indicating increased energy efficiency.
- + **Environmental Impact:** Aisle containment systems have a positive impact on the environment. By reducing energy consumption, they contribute to lower carbon emissions and support sustainability efforts. The efficient cooling achieved through these systems also reduces the strain on power grids and decreases the overall environmental footprint of the data centre.

### Benefits:

- + Improved cooling efficiency and better cooling performance
- + Reduced power consumption and energy savings
- + Lower PUE values
- + Enhanced equipment performance
- + Positive environmental impact
- + Overall, these systems help in creating a more sustainable and efficient operation in data centres and on businesses



Single sliding doors

PN	Aisle Width	Door Width	Opening
RAC-SD-R-1800-900	1800	900	RIGHT
RAC-SD-L-1800-900	1800	900	LEFT
RAC-SD-R-1200-900	1800	900	RIGHT
RAC-SD-L-1200-900	1200	900	LEFT

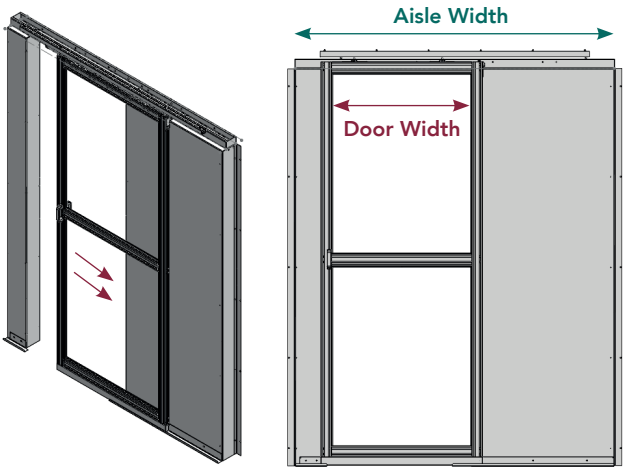
Additional sizes are available upon request

Key: RAC-SD-R-1200-900

R- Right Side  
L- Left Side

Aisle Width

Door Width



Double sliding doors

PN	Aisle Width	Door Width	Opening
RAC-SD-D-1200-1400	1200	1400	FROM CENTRE
RAC-SD-D-1800-2000	1800	2000	FROM CENTRE

Doors are self-closing  
Additional sizes are available upon request

Key: RAC-SD-D-1200-1400

D- Double Doors

Aisle Width

Door Width

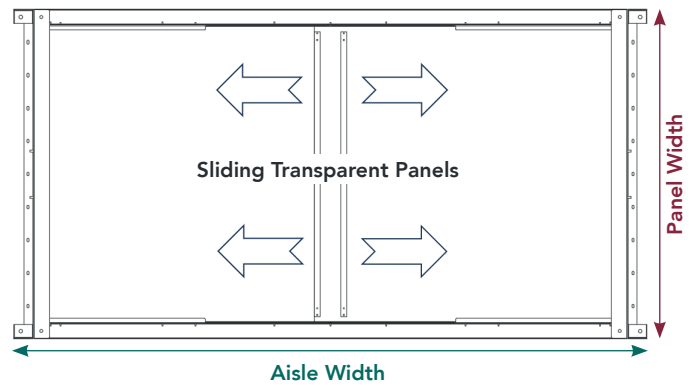


## AISLE CONTAINMENT

### Sliding roof panel

PN	Aisle Width	Panel Width
RAC-SR-0900-600	900	600
RAC-SR-0900-700		700
RAC-SR-0900-800		800
RAC-SR-0900-1000		1000
RAC-SR-0900-1200		1200
RAC-SR-1000-600	1000	600
RAC-SR-1000-700		700
RAC-SR-1000-800		800
RAC-SR-1000-1000		1000
RAC-SR-1000-1200		1200
RAC-SR-1200-600	1200	600
RAC-SR-1200-700		700
RAC-SR-1200-800		800
RAC-SR-1200-1000		1000
RAC-SR-1200-1200		1200
RAC-SR-1800-600	1800	600
RAC-SR-1800-700		700
RAC-SR-1800-800		800
RAC-SR-1800-1000		1000
RAC-SR-1800-1200		1200

Additional sizes are available upon request



#### Material:

+ Transparent Lumex Panels



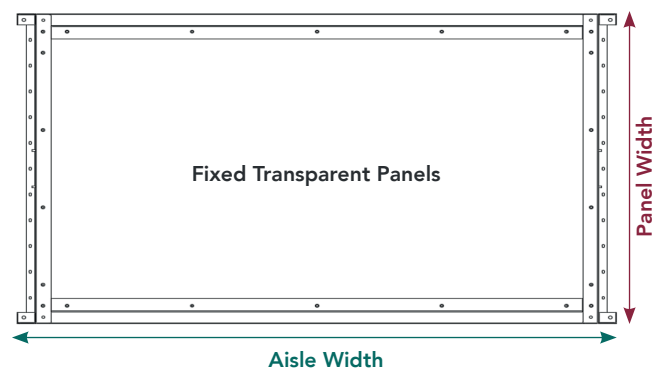
Key: RAC-SR-1200-900

Aisle Width  
Panel Width

### Fixed roof panel

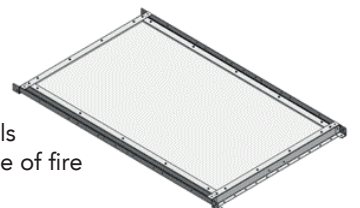
PN	Aisle Width	Panel Width
RAC-FR-0900-600	900	600
RAC-FR-0900-700		700
RAC-FR-0900-800		800
RAC-FR-0900-1000		1000
RAC-FR-0900-1200		1200
RAC-FR-1000-600	1000	600
RAC-FR-1000-700		700
RAC-FR-1000-800		800
RAC-FR-1000-1000		1000
RAC-FR-1000-1200		1200
RAC-FR-1200-600	1200	600
RAC-FR-1200-700		700
RAC-FR-1200-800		800
RAC-FR-1200-1000		1000
RAC-FR-1200-1200		1200
RAC-FR-1800-600	1800	600
RAC-FR-1800-700		700
RAC-FR-1800-800		800
RAC-FR-1800-1000		1000
RAC-FR-1800-1200		1200

Additional sizes are available upon request



#### Materials:

+ Transparent Lumex Panels  
+ Drop-Away panels in case of fire



Key: RAC-SR-1200-900

Aisle Width  
Panel Width





## Wall infill panel

PN	Panel Width
RAC-IPW-200	200
RAC-IPW-300	300
RAC-IPW-400	400
RAC-IPW-500	500
RAC-IPW-600	600
RAC-IPW-700	700
RAC-IPW-800	800
RAC-IPW-900	900
RAC-IPW-180	180
RAC-IPW-195	195
RAC-IPW-240	240
RAC-IPW-295	295

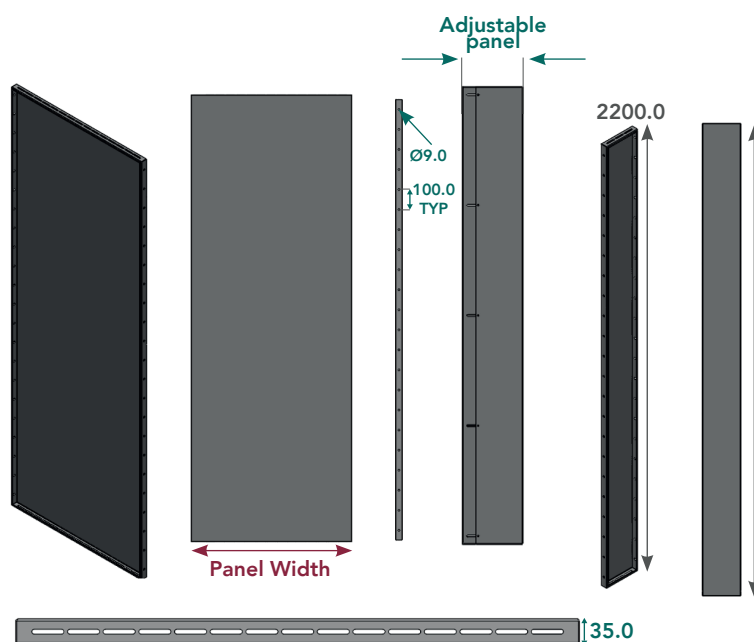
Uniform and specialty sizes available

### Specifications:

- + Adjustable panels
- + RAC-IPW-ADJ: 210-425

Key: RAC-IPW-**200**

Panel Width



## Height correction panels

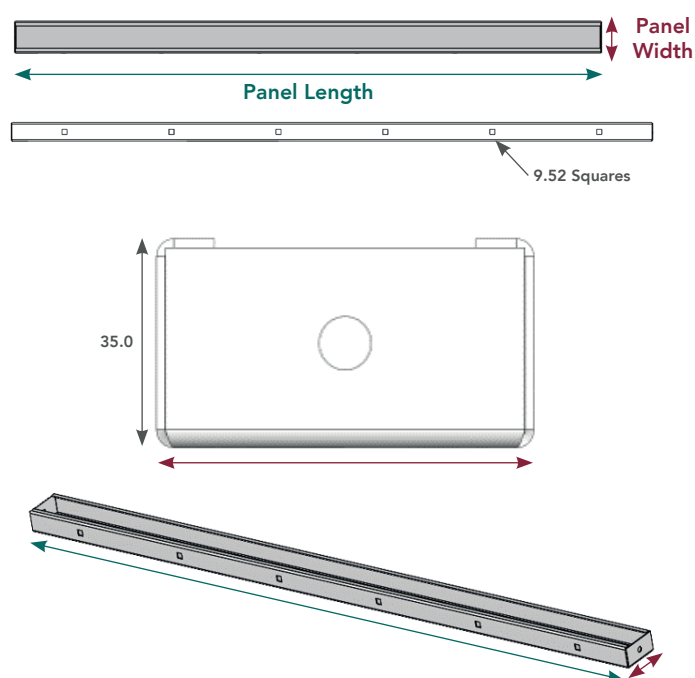
PN	Panel Length	Panel Width
RAC-IPT-1200-65	1200	65
RAC-IPT-1200-55	1200	55
RAC-IPT-1200-50	1200	50
RAC-IPT-800-50	800	50
RAC-IPT-600-65	600	65
RAC-IPT-600-55	600	55
RAC-IPT-600-50	600	50

Additional sizes are available upon request

Key: RAC-IPT-**1200**-**65**

Panel Length

Panel Width



# SECURITY PARTITIONING

## Modular caging and partitioning solutions

Rainford manufactures a range of high-quality and modular security cages and partitioning systems to secure your server storage environments, computer equipment, and other valuable assets within your data centre and critical systems and multitenant environment.



### Key Advantages:

- + Modular type for easy assembly and scalability
- + Various door types
- + Doors can include most locks
- + Airflow best practices
- + A tamper-proof and highly security system
- + Cages can include a roof if required

### Cage Specifications:

- + Cage door types: Sliding or hinged with a self-closing option
- + Cage door locking options: Key operated, electronic, electromechanical, variety of emergency exit hardware
- + Cage door sizes: from 0.6m up to 2.8m wide



### Features:

- + Stronger than welded mesh
- + Allows air to circulate freely – up to 70% free airspace
- + Option for the cage panels to be installed raised off the floor to allow easy access to the raised floor void
- + Roof can be added for additional security
- + Under floor above-ceiling barriers for extra security
- + Variety of cage pattern designs – 12.7mm square, 19mm square, 33mm square,
- + 45mm square, solid panels. Other hole types and sizes are available
- + Cage panels steel thickness: 1.5mm – 4mm
- + Cage height: up to 9m
- + Cage and door panels can be customised with the client logo
- + Extensive choice of colours and finishes available

### Partitioning Specifications:

- + Solid steel bolted construction, all bolts
- + Modular construction to allow for easy assembly and future expansion
- + Available in vented or solid steel panel
- + Various door type available including hinged and sliding
- + Fabricated from solid steel
- + Support airflow solid steel
- + Tamper proof high security locking systems

### Options:

- + Integrated with Hot/Cold Aisle
- + Multiple colour options
- + Corporate logo is available
- + Electronic locks integrated with building security systems
- + Auto closing door

### Applications:

- + Colocation
- + Hyperscale data centre
- + Multitenant data centre



# SUSPENDED SYSTEM

## Fibre optic ducting raceway system

Rainford YellowDuct raceway systems have been uniquely designed to protect fibre optic cables from being damaged and ensures that the bend radius of the cable is not compromised.

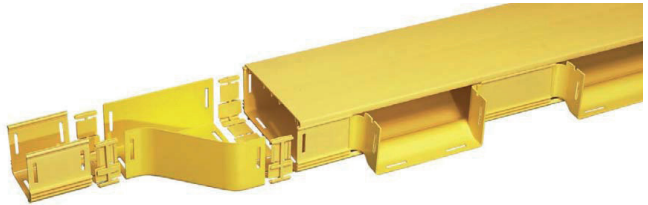
All components in the system are manufactured from Noryl, a very strong engineering plastic, which is self-extinguishing and halogen free (certified to UL94V-0 specifications for 100, 220 and 300mm ducting, and to UL94V-1 specifications for 30 and 50mm ducting).

This means in the case of a fire, the gases emitted will not cause harm to personnel, buildings or transmission equipment.

Our YellowDuct raceway system is available in 7 sizes and all components simply snap together or can be joined with "spotless" joiners. Vertical drops can be positioned or added easily with the addition of a cutout in the horizontal duct raceway using a hand tool or by using the express «over the top» drop option which requires no tools.

These fibre optic ducting raceway products are manufactured to the highest quality standards (ISO 9001), complying with the stringent requirements of UL2024A & ROHS and carry a 10 year warranty.

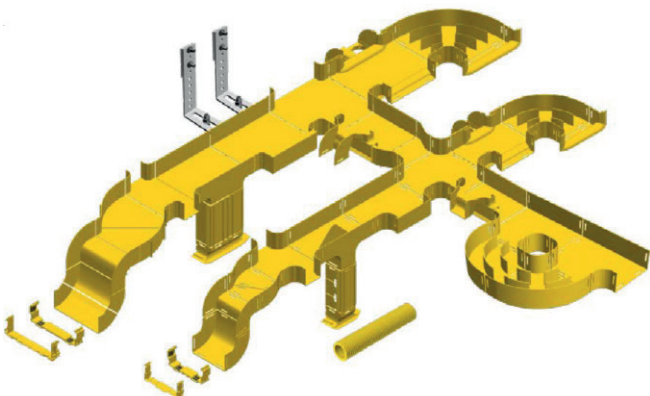
The YellowDuct raceway system can be mounted from walls, ladder racks, on raised floor support brackets, on floors, or to the top of equipment racks or frames. There are over 350 individual components available in 7 different sizes.



## YellowDuct raceway products

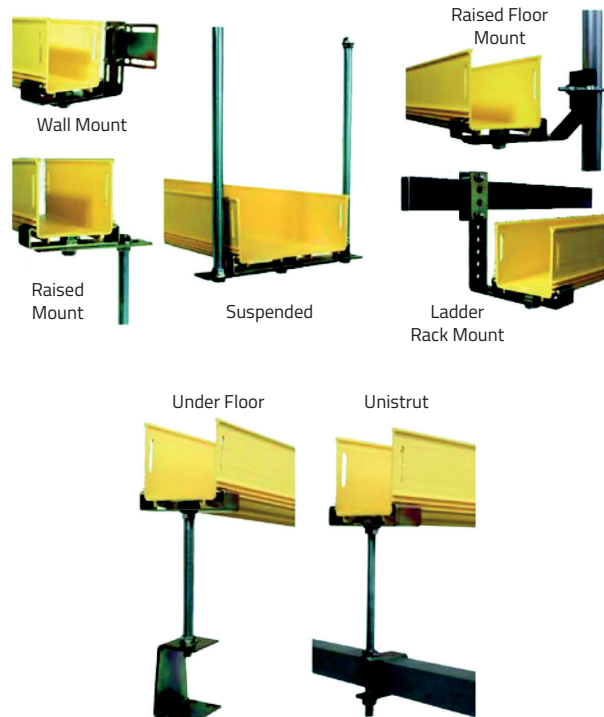
### Technical Specifications:

- + 600mm x 100mm system
- + Straight duct lengths
- + Joiners
- + Vertical elbows
- + Horizontal elbows
- + Horizontal tees
- + Vertical tees
- + Horizontal crosses
- + Fibre storage loops
- + Adaptors
- + End caps
- + Tubing
- + Reducers
- + Low profile ducting solution
- + Data rack ducting & accessories
- + Drop-off solutions
- + Mounting solutions
- + Tooling components



## YellowDuct Mounting

The YellowDuct raceway systems can be mounted in various locations. Just a few examples are shown below, however if you are looking for a custom solution or additional mounting options, contact our sales team [sales.uk@telenco.com](mailto:sales.uk@telenco.com).



### Cable entry and exits

Select the appropriate drop-off or outlet method from the following examples:

Round convoluted tube



Solid duct



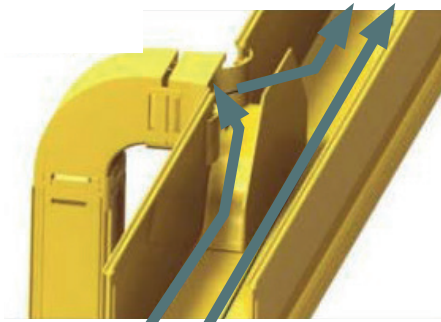
Trumpet



Square convoluted tube



Fibre cords can be simply routed via ramp off into or out of the ducting.



Cords can easily pass through the ducting to the next drop point or exit.



Single or dual high-density convoluted tube outlets.

#### Standard and Conforms:

- + ISO 9001 Certified Quality Management System by BSI
- + Fire retardant plastic, Halogen Free, for 100, 220 and 300mm ducting the rating is UL94V-0, for 30 and 50mm ducting the rating is UL94V-1
- + UL2024A standard
- + EEU - ROHS requirements
- + GR-63 Core Earthquake test compliance



# ACCESSORIES

## Cable management tray

Our cable management tray system is a high-quality modular cable containment system for use in both overhead and underfloor applications.

Available in standard two finishes or a colour to suit your project/ corporate colour scheme, the cable trays and associated brackets, wall supports, and other installation components are available from our UK manufacturing plant on short lead-times.

We can configure, pack and deliver our cable management trays and associated components as complete kits for a specific site or room or we offer a complete turnkey design, manufacture and installation service.

### Available finishes:

- + BLK Gloss Black (polyester powder paint)
- + CHR Chrome (electroplated)
- + SPL Customer-specific colour



Typical installation of overhead copper and fibre management system with customised brackets to the top of the cabinets



Typical installation of an overhead tray with brackets and support angles



Typical installation of an overhead tray with ceiling mounted supports

Our cable trays are available in the following standard sizes:

### 50mm Series

available in the following sizes:

- + 100mm
- + 150mm
- + 200mm
- + 250mm
- + 300mm
- + 400mm
- + 450mm
- + 500mm
- + 600mm

### 100mm Series

available in the following sizes:

- + 100mm
- + 150mm
- + 200mm
- + 250mm
- + 300mm
- + 400mm
- + 450mm
- + 500mm
- + 600mm

### 150mm Series

available in the following sizes:

- + 100mm
- + 150mm
- + 200mm
- + 250mm
- + 300mm
- + 400mm
- + 450mm
- + 500mm
- + 600mm



## ACCESSORIES

The following support brackets, wall brackets and other accessories are available:

Description	Width	Qty per kit
Ceiling Mounted Cable Tray Support Brackets - Centre Support	100mm	50
	150mm	50
	200mm	50
	300mm	50
	400mm	50
	450mm	40
	500mm	40
	600mm	40
Ceiling Mounted Cable Tray Support Brackets - 'Trapeze' Support	100mm	50
	150mm	50
	200mm	50
	300mm	50
	400mm	50
	450mm	40
	500mm	40
	600mm	40
Wall Mounted Angle Support	200mm	30
	300mm	30
	400mm	30
	500mm	20
	600mm	20
Cable Tray Splice Brackets	N/A	50
Cable Tray Joint Clips	N/A	50
Fastener Kit	N/A	50
Threaded Rod (M12x3m)	N/A	10

In addition, project-specific accessories can be designed and manufactured to suit a particular site requirement.





# Connectivity

Optical trunks  
Optical patchcords  
Optical patchpanels

42  
43  
49

Connectivity





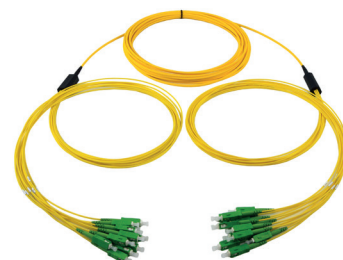
# OPTICAL TRUNKS

## Micro break out trunk Ø 3.0/3.6mm

The Telenco® singlemode micro break out trunks are used for facilitating the cabling deployment in telecom networks, data centres and high density patching environments. Thanks to their significantly reduced diameter, micro break out trunks ease and reduce installation times, offering thus a small footprint. They are used for indoor applications and are available for capacities from 1 to 24FO. The Telenco® singlemode micro break out trunks are pre-terminated in our production units and allow a quick connection between different equipment. They are 100% configurable and pre-terminated at one or both ends.

The Telenco® singlemode micro break out trunks have, as an option, a connector protection system, a pull ring and are supplied with a measurement sheet. They can be equipped with standard SC and LC connectors, Secure SC connectors, as well as with LC HD Push-Pull connectors.

The Telenco® singlemode micro break out trunks are fully compliant with the IEC-61300 standard.



### The product's benefits:

- + Space saving
- + Great flexibility
- + Premium optical quality
- + 100% configurable
- + Reduced installation time
- + 100% dielectric
- + Gel free

### Available configurations:



SC/APC



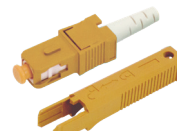
SC/UPC



LC/APC



LC/UPC



Secure SC



LC HD Push-Pull

### Colour:



**Fibre type:** G.657A2, G.652D

**Total length:** from 2m to 300m

**Fan-out length:** from 0.3m to 2.5m

**Diameters:** Ø 3mm, Ø 3.6mm

Parameter	Specifications
Fibre optic count	From 1 to 24FO
Flame retardant IEC 60332-1	100% compliant
Zero Halogen IEC 60754-2-1/-2	
Low Smoke IEC 61034-2-1/-2	
Cable material	LSZH (Low Smoke Zero Halogen)
Cable reinforcement material	Aramid yarns
Connector material	Body: thermoplastic / Ferrule: Zirconia
Minimum bending radius	Static: 5 x Ø / Dynamic: 15 x Ø
Cable diameter	From 1 to 12FO: Ø 3mm / From 13 to 24FO: Ø 3.6mm
Insertion Loss (IL)	Grade B ≤ 0.12dB on average and ≤ 0.25dB max for 97% of connections
Return Loss (RL)	≥ 60dB (APC) and ≥ 50dB (UPC)
Mechanical tests	Δ IL ≤ 0.20dB
Environmental tests	
Temperature	Operation, transport and storage: -40° C / +60° C

Telenco reserves the right to modify specifications without prior notice



# OPTICAL PATCHCORDS

## LC push-pull and uniboot LC push-pull patchcords

The HUBER+SUHNER® Simplex LC Push-Pull and Duplex Uniboot LC Push-Pull optical patchcords are used to interconnect the various equipment in data centres requiring high density patching and a significant need for scalability.

The Push-Pull system features a push/pull mechanism as well as an extended tab that allows the locking and the removal of the connectors even in a high density network configuration with limited accessibility. This makes connections/disconnections simple and fast.

The HUBER+SUHNER® Uniboot LC Push-Pull version has, in addition, a common boot for the 2 connectors. This Uniboot design allows to significantly reduce the occupied space by using one single cable with reduced diameter for both fibres. It also allows the polarity of the cable to be changed on site, without using special tools, and presents a polarity indicator on each connector.

The HUBER+SUHNER® LC Push-Pull and Uniboot LC Push-Pull patchcords can be equipped, as an option, with a label holder on the extended tab. This labeling improves network identification, traceability and structuring. Labels can be created with standard label printers and can be easily removed if necessary.



### Uniboot LC Push-Pull- Duplex version



- 1 Polarity indicator - can be reversed without special tools
- 2 Tab for easy connections/disconnections
- 3 Label positioning
- 4 Cable diameter: Ø 2.1mm
- 5 One single boot for the 2 LC ferrules: «Uniboot» system
- 6 HD bracelet for Duplex Uniboot LC patchcord «Push-Pull» locking mechanism

The HUBER+SUHNER® LC Push-Pull and Uniboot LC Push-Pull optical patchcords are multi-network solutions, available in LC/UPC, LC/APC and multimode LC/PC versions. They provide for a high degree of flexibility and are available in a wide range of lengths.

The HUBER+SUHNER® LC Push-Pull and Uniboot LC Push-Pull patchcords are fully compliant with IEC-61300, IEC 61753-1, IEC-61754-20 and TIA 604-10-A standards.

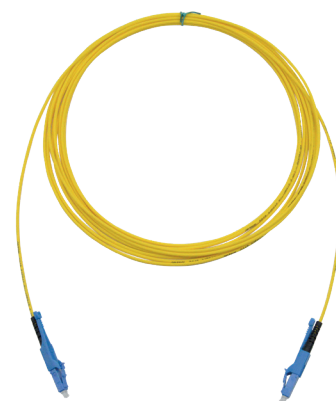


## Simplex push-pull LC/UPC optical patchcord Ø 1.8mm

PN	Fibre type	Length	Weight
92951	G.657A2	2.0m	0.02kg
92464		3.5m	
92952		5.0m	

## The product's benefits:

- + Easy to connect/disconnect thank to its Push-Pull system
- + Extended tab ideal for high density patching environments
- + Innovative design for great accessibility
- + Label holder on the connector for improved network identification, traceability and structuring



PN 92464

## Available configurations:



LC/UPC Push-Pull



LC/APC Push-Pull



LC/PC OM3 Push-Pull



LC/PC OM4 Push-Pull

## Colours:



**Fibre type:** Singlemode (G.657A2), Multimode (OM3, OM4)

**Length:** 0.5m to 40m

**Diameter:** Ø 1.8mm

## Technical specifications:

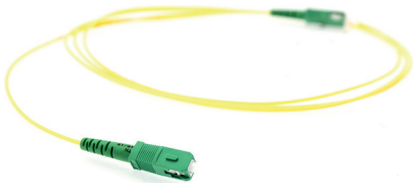
Parameter	Specifications		
Fibre type	G.657A2	OM3	OM4
Fibre optic count	1FO		
Connector type	LC/UPC Push-Pull	LC/APC Push-Pull	LC/PC Push-Pull
IEC-61300	100% compliant		
Connector material	Body: thermoplastic Ferrule: Zirconia		
Cable material	LSZH (Low Smoke Zero Halogen)		
Cable diameter	Ø 1.8mm		
Insertion Loss (IL)	≤ 0.30dB		
Return Loss (RL)	≥ 50dB	≥ 60dB	≥ 35dB
Temperature	Operation, transport and storage: -25° C / +70° C		
Tensile strength	70N		

Telenco reserves the right to modify specifications without prior notice



Simplex LC/UPC-LC/UPC patchcord Ø 1.6/2.0mm

PN	Fibre type	Diameter	Colour	Length	Weight
91403	G.657A2	Ø 2.0mm	Yellow	2.0m	0.02kg
91404				3.0m	0.02kg
91405				5.0m	0.03kg
09489				2.0m	0.02kg
13227				3.0m	0.03kg
11387				5.0m	0.03kg



PN 91403

Available configurations:



SC/APC



SC/UPC



LC/APC



LC/UPC



FC/UPC



Secure SC

Colour:



**Fibre type:** Singlemode (G.657A2)

**Length:** 0.5m to 40m

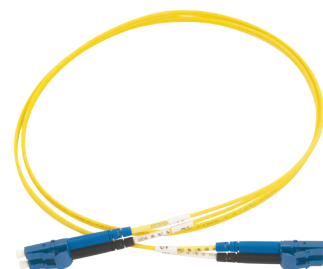
**Diameter:** Ø 1.6mm, Ø 2.0mm



## OPTICAL PATCHCORDS

### Duplex LC/UPC-LC/UPC patchcord Ø 2.0mm

PN	Fibre type	Diameter	Colour	Length	Weight
90984	G.657A2	Ø 2.0mm	Yellow	2.0m	0.04kg
91463				3.0m	0.04kg
91464				5.0m	0.06kg
91460	2.0m		0.04kg		
91068	OM3		Aqua	3.0m	0.04kg
92953				5.0m	0.06kg
91461				2.0m	0.04kg
91074	OM4		Magenta	3.0m	0.04kg
91157				5.0m	0.06kg



PN 90984

#### Available configurations:

##### Singlemode (G.657A2):



##### Multimode (OM3, OM4):

#### Colours:



**Length:** 0.5m to 40m

**Diameter:** Ø 2.0mm

#### Technical specifications for Simplex and Duplex patchcords:

Parameter		Specifications		
Fibre type		G.657A2	OM3	OM4
Cable colour		Yellow	Aqua	Magenta
Fibre count	Simplex	1FO		
	Duplex	2FO		
IEC-61300		100% compliant		
Connector material		Body: Thermoplastic Ferrule: Zirconia		
Cable material		LSZH (Low Smoke Zero Halogen)		
Outer diameter of the cable	Simplex	Ø 1.6mm / 2.0mm		
	Duplex	Ø 2.0mm		
Insertion Loss (IL)		Grade B ≤ 0.12dB on average and ≤ 0.25dB max for 97% of connections	≤ 0.30dB	
Return Loss (RL)		≥ 60dB (APC) and ≥ 50dB (UPC)	≥ 30dB	
Mechanical tests		Δ IL ≤ 0.20dB		
Environmental tests				
Temperature		Operation, transport and storage: -40° C / +75° C		
Tensile strength		70N		

Telenco reserves the right to modify specifications without prior notice



## Duplex uniboot LC/UPC push-pull patchcord Ø 2.1mm

**HUBER+SUHNER**

PN	Fibre type	Length	Weight
92085	G.657A2	2.0m	0.02kg
92115		3.5m	
92116		5.0m	



PN 92085

### The product's benefits:

- + Easy to connect/disconnect thank to its Push-Pull system
- + Extended tab ideal for high density patching environments
- + Innovative design for great accessibility
- + Uniboot system for a maximum space saving
- + Polarity can be changed on site, without tools
- + Label holder on the connector for improved network identification, traceability and structuring

### Available configurations:



LC/UPC Push-Pull  
Uniboot



LC/APC Push-Pull  
Uniboot



LC/PC OM3 Push-Pull  
Uniboot



LC/PC OM4 Push-Pull  
Uniboot

### Colours:



**Fibre type:** Singlemode (G.657A2), Multimode (OM3, OM4)

**Length:** 0.5m to 40m

**Diameter:** Ø 2.1mm

### Technical specifications:

Parameter	Specifications		
Fibre type	G.657A2	OM3	OM4
Fibre optic count	2FO		
Connector type	LC/UPC Push-Pull Uniboot	LC/APC Push-Pull Uniboot	LC/PC Push-Pull Uniboot
IEC-61300 / IEC-61754-20 / TIA 604-10-A	100% compliant		
Flammability rating	UL 94 V-0		
Connector material	Body: Thermoplastic Ferrule: Zirconia		
Cable material	LSZH (Low Smoke Zero Halogen)		
Cable diameter	Ø 2.1mm		
Insertion Loss (IL)	≤ 0.30dB	≤ 0.50dB	≤ 0.30dB
Return Loss (RL)	≥ 50dB	≥ 65dB	≥ 35dB
Mechanical tests	100% compliant with IEC 61753-1		
Environmental tests	100% compliant with IEC 61753-1		
Durability	≤ 1000 connection cycles		
Temperature	Operation, transport and storage: -25° C / +70° C		
Tensile strength	70N		

Telenco reserves the right to modify specifications without prior notice





## Simplex and duplex patchcords

The Telenco® singlemode and multimode optical patchcords offer high-end optical performances providing for reliable networks. They are used to interconnect the various equipment in data centres.

Available in Simplex and Duplex versions, they can be equipped with standard LC and SC connectors, as well as with Secure SC connectors.

### The product's benefits:

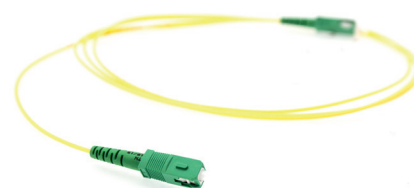
- + High precision ceramic
- + Great interoperability
- + Easy to install
- + Excellent mechanical and temperature stability
- + 100% configurable

The Telenco® singlemode and multimode optical patchcords comply with IEC-61300 standards.

### Simplex optical patchcord Ø 1.6/2.0mm

PN	Connector type	Diameter	Length	Weight	
91403	LC/UPC	Ø 2.0mm	2.0m	0.02kg	
91404			3.0m	0.02kg	
91405			5.0m	0.03kg	
09489	SC/APC		2.0m	0.02kg	
13227			3.0m	0.03kg	
11387			5.0m	0.03kg	

 **Telenco**



PN 91403

### Available configurations:



SC/APC



SC/UPC



LC/APC



LC/UPC



FC/UPC



Secure SC

### Colours:



**Fibre type:** Singlemode (G.657A2)

**Length:** 0.5m to 40m

**Diameter:** Ø 1.6mm, Ø 2.0mm

### Technical specifications:

Parameter	Specifications
Fibre type	G.657A2
Cable colour	Yellow
Fibre count	1FO
IEC-61300	100% compliant
Connector material	Body: Thermoplastic Ferrule: Zirconia
Cable material	LSZH (Low Smoke Zero Halogen)
Cable diameter	Ø 1.6mm/ 2.0mm
Insertion Loss (IL)	Grade B ≤ 0.12dB on average and ≤ 0.25dB max for 97% of connections
Return Loss (RL)	≥ 60dB (APC) and ≥ 50dB (UPC)
Mechanical tests	Δ IL ≤ 0.20dB
Environmental tests	
Temperature	Operation, transport and storage: -40° C / +75° C
Tensile strength	70N

Telenco reserves the right to modify specifications without prior notice

# OPTICAL PATCH PANELS

## Suspended connectivity solution

### 19" suspended rack

The 19" suspended rack is specifically designed to meet the needs of data centres requiring distribution of the connectivity equipment above the racks. They are compatible with most of the 19" rack mountable equipment. With a rugged design, it presents a front panel enabling a full link protection.

PN	Format	Height	Weight
93054	19"	4U	7,7kg

#### Characteristics:

**Length:** 217mm

**Width:** 522mm

**Height:** 348mm

**HUBER+SUHNER**



## 19" IANOS High density solution

The 19" IANOS solution has been specifically developed to meet high density patching and modularity needs in data centres. This solution offers a capacity of up to 144FO per rack unit.

### 1U IANOS Chassis

#### IANOS Chassis

**HUBER+SUHNER**



PN	Size	Slot number	Weight
91445	19"	12	3.60kg

#### Characteristics:

**Length:** 328mm

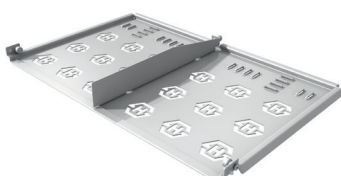
**Width:** 483mm

**Height:** 44mm

### 1U IANOS Accessories

#### Rear cable track

**HUBER+SUHNER**



PN	Size	Slot number	Weight
91448	19"	12	0.60kg

#### Characteristics:

**Length:** 279mm

**Width:** 449mm

**Height:** 41mm

#### Lateral patchcord guide

**HUBER+SUHNER**



PN	Size	Slot number	Weight
92942	19"	12	0.45kg

#### Characteristics:

**Length:** 133mm

**Width:** 89mm

**Height:** 44mm

### IANOS Modules

#### IANOS Patching module

PN	Connector type	Connector number	Fibre type	Fibre count	Weight
92620	Duplex LC/UPC	6	Singlemode	12	0.05kg
92954			Multimode (OM4)		

#### Available configurations:



**Colour:**



**Fibre type:** Singlemode (G.652D), Multimode (OM3, OM4)

**Length:** 172mm

**Width:** 97mm

**Height:** 12mm

**HUBER+SUHNER**



PN 92620



## OPTICAL PATCH PANELS

### IANOS Splicing module

PN	Connector type	Connector number	Fibre type	Fibre count	Weight
92955	Duplex LC/UPC	6	G.652D	12	0.24kg
91451	Duplex LC/UPC	12		24	
92621	SC/APC	12	OM4	12	
92956	Duplex LC/PC	6		12	
92957	Duplex LC/PC	12		24	
92958	SC/PC	12		12	

**HUBER+SUHNER**



PN 91451

#### Available configurations:

##### Singlemode (G.652D):



LC/UPC



SC/APC

##### Multimode (OM3,OM4):



LC/PC



SC/PC

#### Simple module:

**Length:** 190mm

**Width:** 97mm

**Height:** 12mm

#### Double module:

**Length:** 177mm

**Width:** 199mm

**Height:** 12mm

**Colour:**



### IANOS transition module

PN	Connector type	Adaptor type	Connector number	Fibre type	Fibre count	Weight
92280	MTA M12AP	Duplex LC/UPC	2	Singlemode	24	0.30kg
92944	MTA F24R1	Duplex LC/UPC	1		24	
92622	MTA M12AP	SC/APC	1		12	
92959	MTP® M12AP	Duplex LC/PC	2	Multimode (OM4)	24	
92960	MTP® F24R1	Duplex LC/PC	1		24	
92961	MTP® M12AP	SC/PC	1		12	

**HUBER+SUHNER**



PN 92280

#### Available configurations:

##### Singlemode (G.652D)

##### 1<sup>st</sup> configuration:



MTP®/APC



LC/UPC

##### 2<sup>nd</sup> configuration:



MTP®/APC



SC/APC

**Colour:**



**Length:** 172mm

**Width:** 196mm

**Height:** 12mm

##### Multimode (OM3,OM4)

##### 3<sup>rd</sup> configuration:



MTP®/PC



LC/PC

##### 4<sup>th</sup> configuration:



MTP®/PC



SC/PC



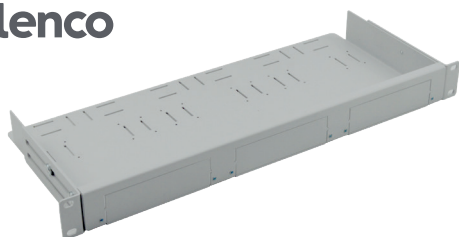


## 19" Medium density solutions

The 19" Medium density modules and chassis are specifically developed to meet the needs of data centres requiring medium density optical patching and high modularity. The 19" Medium density solutions provide for capacities of up to 72 FO per rack unit for Patching versions, respectively 96FO per rack unit for MTP® Transition versions.

### 7HP Chassis

#### 1U 7HP Chassis



PN	Size	Height	Number of modules	Weight
50033	19"	1U	3	2.00kg

#### Characteristics:

**Length:** 221mm

**Width:** 427mm

**Height:** 44mm

#### 3U 7HP Chassis



PN	Size	Height	Number of modules	Weight
50034	19"	3U	12	2.00kg

#### Characteristics:

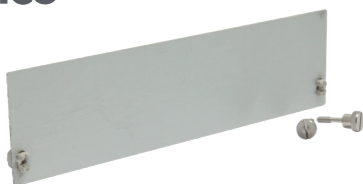
**Length:** 221mm

**Width:** 427mm

**Height:** 132mm

### 3U 7HP Chassis accessories

#### 1-Unit cache



PN	Description	Weight
50032	1-unit cache for 1U or 3U 7HP chassis	0.05kg

#### Characteristics:

**Thickness:** 1.5mm

**Width:** 35mm

**Height:** 129mm

#### Rear cable tray



PN	Description	Weight
91288	Rear cable tray for 3U 7HP chassis	3.00kg

#### Characteristics:

**Length:** 35mm

**Width:** 427mm

**Height:** 132mm



## OPTICAL PATCH PANELS

### 7HP Modules

#### 7HP patching module

PN	Connector type	Connector number	Fibre type	Fibre count	Weight
92962	LC/UPC	4	Singlemode	8	0.40kg
92963	Duplex LC/UPC	6		12	
92964	Duplex LC/UPC	12		24	
92965	SC/APC	8		8	
91511	SC/APC	12	Multimode (OM3)	12	
92966	LC/UPC	4		8	
92967	Duplex LC/UPC	6		12	
50038	Duplex LC/UPC	12	Multimode (OM4)	24	
92968	LC/UPC	4		8	
92969	Duplex LC/UPC	6		12	
92900	Duplex LC/UPC	12		24	

#### Characteristics:

**Fibre type:** Singlemode, Multimode (OM3, OM4)

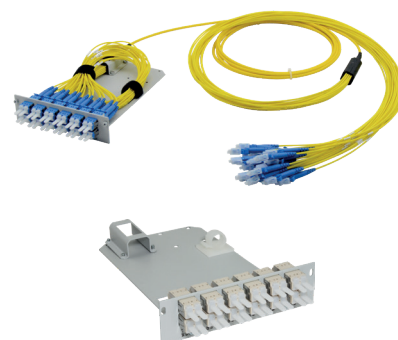
**Length:** 175mm

**Width:** 35mm

**Height:** 129mm



**Telenco**



PN 50038

### MD Chassis

#### 1U MD MTP® transition chassis

PN	Size	Height	Number of modules	Weight
92970	19"	1U	4	2.00kg

#### Characteristics:

**Length:** 202mm

**Width:** 427mm

**Height:** 44mm

**Telenco**

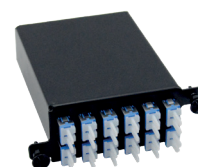


### MD Modules

#### MD MTP® transition module

PN	Connector type	Adaptor type	Connector number	Fibre type	Fibre count	Weight
92971	MTA F8NS	LC/UPC	1	Singlemode	8	0.45kg
92972	MTA M12AP	LC/UPC	1		12	
92973	MTA F8NS	LC/UPC	2		16	
92974	MTA F24R1	LC/UPC	1		24	
92975	MTA M12AP	LC/UPC	2	Multimode (OM3)	24	
92976	MTA M12AP	SC/APC	1		12	
92977	MTP® M12AP	LC/UPC	1		12	
92978	MTP® F24R1	LC/UPC	1	Multimode (OM4)	24	
92979	MTP® M12AP	LC/UPC	2		24	
92980	MTP® M12AP	LC/UPC	1		12	
92981	MTP® F24R1	LC/UPC	1		24	
92982	MTP® M12AP	LC/UPC	2		24	

**Telenco**



PN 92975

#### Characteristics:

**Fibre type:** Singlemode, Multimode (OM3, OM4)

**Length:** 115mm

**Width:** 88mm

**Height:** 42mm



## 19" Standard solution

The 19" Sliding patch panels are specifically designed to meet the needs of fibre optic high density patching applications. The 19" standard solution provides for a capacity of up to 48FO per rack unit.

### 19" 1U LC/UPC sliding patch panel - trunk version

PN	Fibre type	Fibre count	Weight
92341	Singlemode	6	2.00kg
92030		12	
50064		24	
92033		36	
50076		48	
92983	Multimode	6	
50078		12	
92984		24	
92985		36	
92986		48	

 **Telenco**



PN 50064

#### Characteristics:

**Fibre type:** Singlemode, Multimode

**Length:** 201mm

**Width:** 482mm

**Height:** 44mm





# Explore our full portfolio of fiber-optic solutions.

Connect your data  
center to growth.



## Structured cabling

Efficient and scalable fiber  
management systems



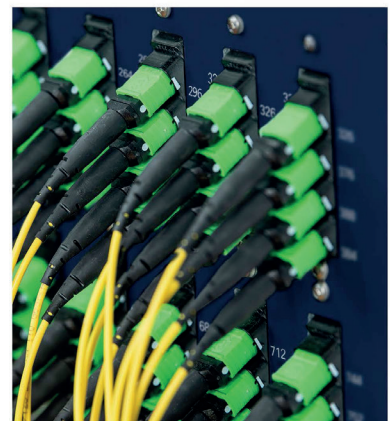
## Bandwidth expansion

Increased transmission reach  
and higher path redundancy



## All-optical switching

Full software control as well as  
automated, remote and secure  
cross connections



**HUBER+SUHNER**

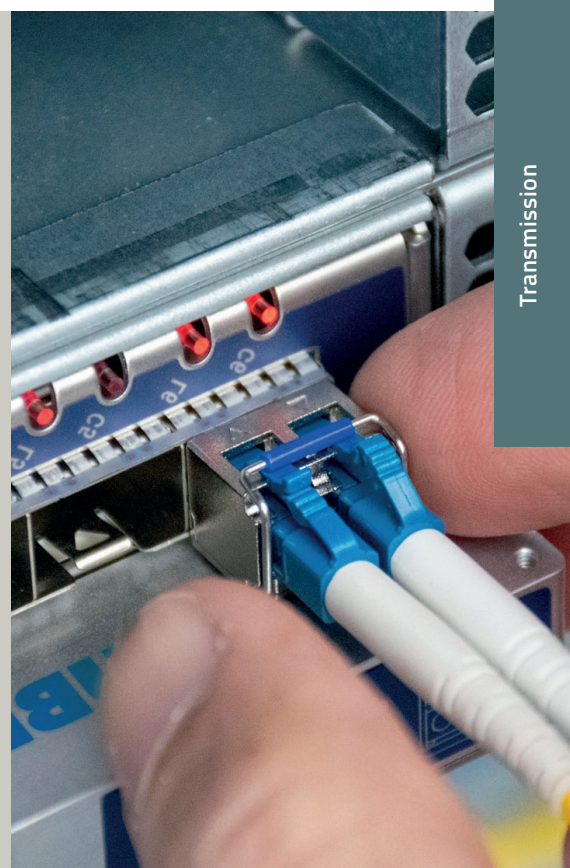
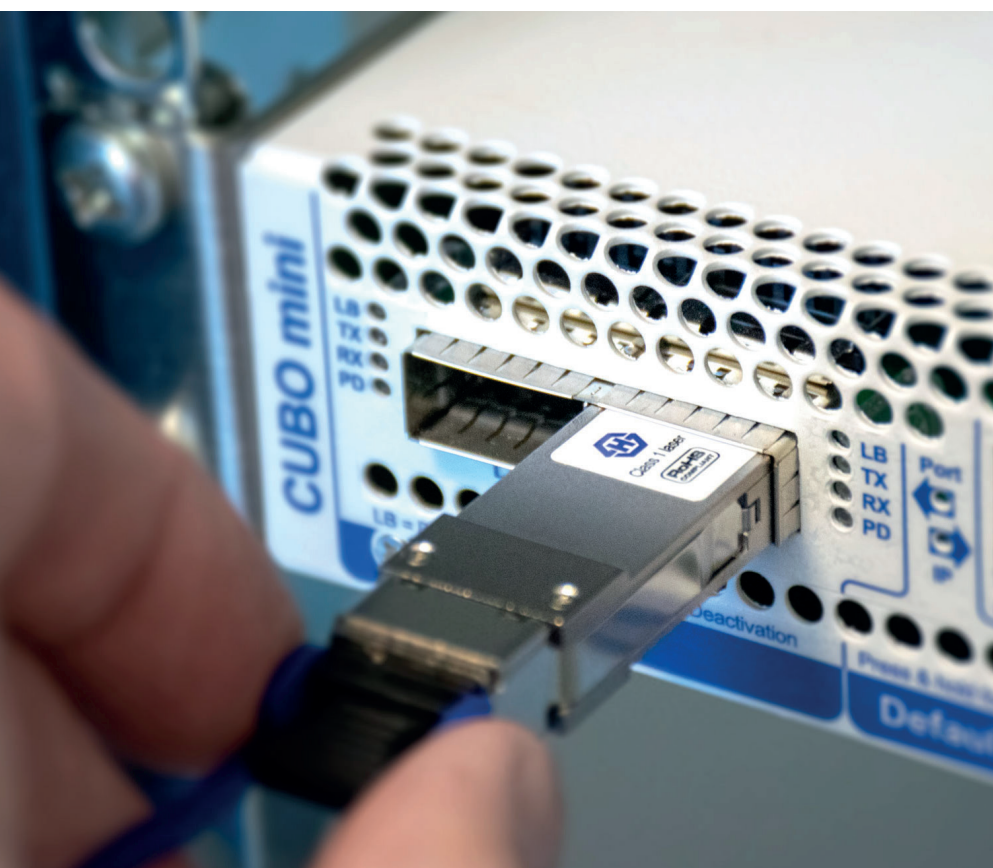




# Transmission

Transceivers  
WDM solutions

56  
60



# TRANSCEIVERS

## How to choose a transceiver (optical module)?

The key issue is, of course, to identify the service to be transported.

Is it:

- Ethernet?
- Fibre Channel?
- Or other services such as SDH (STM-n) or CPRI (for cellular network radio heads)?



We will then specify the data rate, from 1 to 400Gbit/s.

These two elements determine the mechanical format of the optical module:

- SFP for 1Gbit/s Ethernet or 1/2/4G Fibre Channel
- SFP+ for 10Gbit/s Ethernet or 16G/32G Fibre Channel
- QSFP+ for 40Gbit/s Ethernet
- QSFP28 (more rarely CFP, CFP2) for 100Gbit/s Ethernet

Of course, this mechanical format must match with the «cage» offered by the service equipment.

The brand and model of this latter must be known in order to ensure perfect compatibility.

For instance, an optical module with a «Huawei» compatibility coding may not work when integrated into a Cisco equipment.



Then, the transmission characteristics must be specified.

How far, using which type of optical fibre and according to which modality the optical signal will be transmitted?



For optical patchcords connecting two pieces of equipment of the same rack or room, the multimode «SR» short range and very economical transceiver may be a fine solution, even though data centres operators are now favouring singlemode fibre.

For a campus-wide pair of optical link of a few kilometers, the singlemode «LR» (Long range) will be appropriate.

For a “metropolitan” transmission, we can use the “ER” (Extended Range) optical modules covering distances of up to 40km or “ZR” for up to 80km.

There are also the so-called “bidirectional optical modules” (and purchased by pair, the transmitters and receivers are being swapped) enabling the transmission on a single-strand fibre.

The distances mentioned here are indicative only, and it will be useful at a later stage to think in terms of optical budget required, taking into consideration the expected attenuation of the used fibre.

The Telenco and HUBER+SUHNER Cube Optics® pre-sales experts are available to help with this calculation.

Finally, as the long-distance fibre is often scarce and expensive, this one can be shared and more than one circuit can be transmitted over a single pair. That's the advantage of the Wavelength Division Multiplexing (WDM).

Its dense variant, the DWDM, will enable up to 40 or even 128 channels to be carried over a single fibre pair, with the use of a passive multiplexer. In this case, the optical modules will be “coloured”, as they emit their signal at a very precise wavelength. Permissible wavelength are standardised by ITU-T G.694.1 (DWDM) and G.694.2 (CWDM). In this case, the required wavelength (sometimes called “channel” in DWDM) must be clearly specified for each optical module.



## Transceivers

Optical transceivers are used to transform the outgoing electrical information, from a service equipment (switch, router, DSLAM, OLT, etc.), into an optical information that can be transmitted via an optical fibre over a short, medium or long distance.

Transceivers are available in many mechanical versions ( SFP, SFP+, QSFP+, QSFP28 being the most common) standardised by industry agreements called Multi-Source Agreements (MSAs). The significant advantage of these optical modules is that they make the optical transmission independent of the service equipment.

In this way, the Ethernet port of a router does not need to know if the packets it transmits are intended to an equipment in the same rack or to another at 100km away. It simply has a standard "SFP cage" , in which we can integrate:

- Short-range multimode SFP (a couple of dozen of metres)
- Inter-building «LR» singlemode SFP (up to 10 km span)
- Long distance «grey» «ZR» SFP (up to 80 km span, one single circuit over a fibre pair)
- DWDM ZR «coloured» SFP (up to 80 km span, and potentially several dozen of multiplexed circuits over a single fibre pair)

### The product's benefits:

- + Very large range of mechanical formats, spans, speeds and services
  - + Compatibility coding for almost all the equipment available on the market
  - + Targeted quality by the major operators with a return rate inferior to 0.01% in 2020
  - + Reliability, optical and electrical performance, environmental robustness rigorously qualified and verified by one of a kind test laboratory, used in parallel for the development of advanced optical components.
- HUBER+SUHNER Cube Optics® also supplies optical components to the largest manufacturers in the market.

## HUBER+SUHNER



### Available formats:



SFP



SFP+



QSFP+



QSFP 28





See Tables 1 and 2 below for related information.

## Technical specifications:

Service		Format	Standard			
			SR (850nmmm)	LR (1310nm SM)	ER (1550nm SM)	ZR DWDM
			Fibre type			
			Multimode	Singlemode	Singlemode	Singlemode
			Theoretical span			
			< 300m	< 10km	< 40km	< 80km
Ethernet	1GE	SFP	CSM-300A08Dx-85	CSS-303A11Dx-13	CSS-329A19Dx-15	CSS-326A26Dx-cc
	10GE	SFP+	CSM-900A06Dx-85	CSS-900B09Dx-13	CSS-907A15Dx-15	CSS-851A23Dx-cc
	40GE	QSFP+	CQM-800A04Dx-85	CQS-800A08Dx-13	-	-
	100GE	QSFP28	CQM-900A04Dx-85	CQS-900A08Dx-13	-	-
Fibre Channel	1/2/4/8G FC	SFP+	CSM-850A06DB-85	CSS-801A05DB-13	CSS-802A14DB-34	CSS-851B23Dx-cc
	16G FC	SFP+	-	FTLX1471D3BCL-B	-	-

1

Compatibility	Code Dx-
Alcatel	DAL-
Cisco	DC-
Dell	DL-
Ericsson	DR-
Huawei	DU-
Juniper	DJ-
Nokia	DK-
Uncoded	D0-

## Please contact us for:

Arista, Brocade, Calix, Ciena, Extreme, Force10, Foundry, HPE, IBM, Intel, Nortel, Coriant, Transmode, others.

## Example of a configuration:

2

DWDM channels	Code -cc
	18 to 61

Parameter	Specifications
Service	1GE Ethernet
Format	SFP
Standard	ZR DWDM
Fibre type	Singlemode
Theoretical span	< 80km
Compatibility	Ericsson
Dx code	DR-
DWDM channels	26
Reference	CSS-326A26DR-26

## Other versions available on request:

Service	Format	Span
25GE, 50GE, 400GE (new)	Xenpak, X2, XFP	SR10, DWDM ER,
STM-n, CPRI, others (old or specific)	QSFP-DD, others	ER4, eLR4, others



## XG- BASE transceivers

The product line of XG-BASE-compatible transceivers is available in a wide range of form factors: SFP, SFP+, QSFP+, QSFP28, etc., standardised by industry agreements known as Multi-Source Agreements (MSA). Telenco draws on its experience and expertise to offer transceivers that are compatible with all equipment on the market, reducing network costs and the number of references to be stocked.

### Specifications:

Available Compatibility	Cisco ; Juniper ; Huawei ; Nokia ...		
Form Factor	SFP	SFP+	QSFP28
Data rate	1G	10G	100G
Dimensions (mm)	13 X 8,5 X 57	13 X 8,5 X 57	13 X 8,5 X 78 + 44
Transmission distance	300m up to 80km		
Wavelengths	850 to 1610nm		
Connector	LC simplex ; LC duplex ; MTP/MPO		
Fibre type	Singlemode or Multimode		
Norm	Bidirectional or Monodirectional		
Certification	RoHS compliant		
Temperature	0°C to 70 °C (-40 °C to 85 °C possible upon request)		
Humidity	0% to 85%		



### The product's benefits:

- + Wide range of form factor and data rates
- + Compatibility with all market equipment
- + Dedicated technical team

Network	Form factor	Data rate	Wavelengths	Transmission distance	Connector	Compatibility
Backbone	SFP	1G	1310nm	10km	LC Duplex	Nokia, Ericsson, Huawei, Cisco....etc
			1210nm	40km	LC Duplex	
			1550nm	40km	LC Duplex	
			1550nm	80km	LC Duplex	
			1310nm	10km	LC Duplex	
	SFP+	10G	1310nm	40km	LC Duplex	
			1550nm	40km	LC Duplex	
			1550nm	80km	LC Duplex	
			TX1270/RX1330nm	20km	LC Simplex	
			TX1330/RX1270nm	20km	LC Simplex	
4G	SFP+	10G	1310nm	2km	LC Duplex	
			CWDM	10km/40km/80km	LC Duplex	
			DWDM	80km	LC Duplex	
			Bidi	10km/20km, 40km / 60km/80km	LC Duplex	
5G	SFP28	25G	1310nm	2km	LC Duplex	
			1xxxnm	10km	LC Duplex	
			1xxxnm	15km	LC Duplex	
			TX1xx0/RX1xx0	10km	LC Simplex	

## i-CODE box

The i-CODE box is a device for switching transceiver compatibility. The i-CODE box enables the transceiver to adapt to all types of manufacturer's devices (Cisco, Nokia, Huawei ...). It is compact, portable and supports a wide range of form factors (SFP, SFP+, QSFP+, QSFP28...).

### Specifications:

Available Compatibility	Cisco ; Juniper ; Huawei ; ZTE ; Nokia ...
Accepted form factor	SFP ; 5FP+ ; XFP ; SFP28 ; SFP56 ; QSFP+ ; QSFP28 ; QSFP
Dimensions	30 x 100 x 160mm
Power	5V
Softwear	Windows 10
Connector	USB
Temperature	10 °C to 60 °C



### The product's benefits:

- + Wide range of form factor and data rates
- + Compatibility with all equipment in the market
- + Dedicated technical team



# WDM TRANSMISSION

## Bandwidth expansion | CUBO Network Cube X Network Cube X - overview

### NCX - A range that redefines passive multiplexing

The Network Cube X (NCX) range redefines the passive optical multiplexer by introducing an innovative approach to the upgrade port. Based on expertise gained from collaborating with customers in countless projects for more than twenty years, the versatile range enables Wavelength-Division Multiplexing (WDM) setups that could previously only be solved by using custom designs.

**HUBER+SUHNER**



#### Flexible plug and play

The range is equipped with a convenient push and-pull mechanism that makes installation, moving and removing simple and fast..



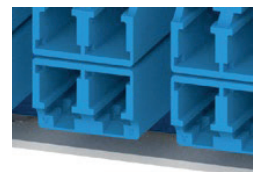
#### Modular design

With three standard module sizes, you can choose the most suitable dimensions to minimise the footprint of your setup while meeting your current needs and plans for expansion.



#### Innovative upgrade ports

Three types of application-specific upgrade ports enable you to maximise data transport capacity in line with your system design. And expand it over time.



# Bandwidth expansion | CUBO Network Cube X | The NCX Range

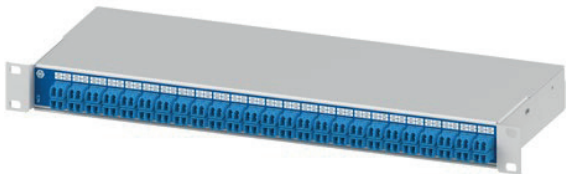
## Network Cube X - Module types

### Mix and match to suit your setup today – and tomorrow

With three standard module sizes, you can choose the most suitable dimensions to minimise the footprint of your setup while meeting your current needs and plans for expansion.

### NCX - A range that redefines passive multiplexing

**Characteristics:**  
W 482.6mm, D 161mm, H 39mm



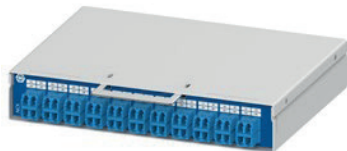
### Modules



**S module**  
W 71.8mm, D 161mm, H 39.25mm



**M module**  
W 144.3mm, D 161mm, H 39.25mm



**L module**  
W 216.8mm, D 161mm, H 39.25mm

### 19" NCX shell

The simple auto latching mechanism locks the S, M and L modules in as soon as they have been pushed far enough into the shell. To remove the modules the lever at the top of the individual modules simply has to be pushed down.



### Mix and match

The L, M and S modules can be mixed and matched in various combinations, within the 19" NCX shell.







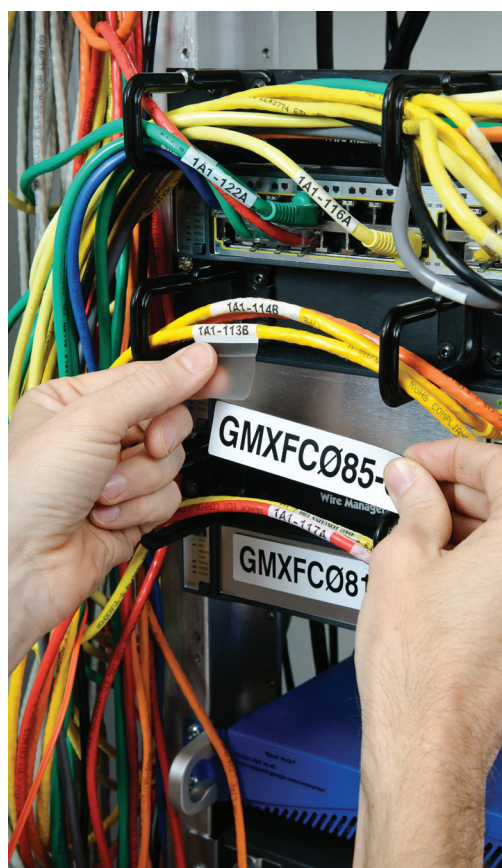




# Tooling and testing

Test & measurement  
Labelling equipment & accessories

64  
68





# TEST & MEASUREMENT

## Essential fibre testing

Contaminated connectors are the #1 cause for troubleshooting in optical networks. While standards bodies have established acceptance criteria for the quality and cleanliness of fibre connector end faces, engineers still face challenges with implementing these practices. Without the right tools, maintaining these standards or specifications is difficult and time consuming. VIAVI's essential fibre tools lead the industry in helping engineers deploy these best practices. Through technology innovation and extensive experience in fibre testing, our solutions equip engineers to ensure fibre network performance with workflow efficiency and that is unmatched by anyone.

### FiberChek Probe

VIAVI



The FiberChek probe is an “all-in-one” handheld solution with built-in capabilities for image viewing, auto-focus, PASS/FAIL analysis, and storing.

PN	Description
Q6311	Fiberchek probe

### SmartPocket OMK-36V2 SM+MM Test Kit

VIAVI



The OMK-36V2 is a quad SM/MM kit with an OLS-36V2 and an OLP-35V2 for Enterprise LAN/WAN applications is used for measuring optical power levels and link insertion loss for both SM and MM networks.

PN	Description
Q6232	SmartPocket OMK-36V2 SM+MM Test Kit

### FiberChek Sidewinder

The Sidewinder provides the same benefits as the FiberChek, but also adds fully automated inspection and analysis for every fibre of an MPO or other multifibre connectors.

#### Specifications:

Application	Handheld inspection and analysis solution for multi-fibre connectors such as MPO
Key Features	Fully Autonomous multi-fibre inspection Built-in fibre end-face analysis Live fibre viewing Audible sounds for Pass/Fail Stores results on device Built in acceptance criteria to industry standards
Market	Test and Certification Solutions for enterprise, data centre & mobile contractors
Approved by	BT Core Networks, Microsoft, AWS

VIAVI



PN	Description
Q6312	FiberChek Sidewinder

# Fibre certification

Deployment of fibre continues to grow in data centre and enterprise networks. Whether used for backbone cabling or to connect servers to switches, fibre supports higher data rates at greater distances than copper cabling. Testing and certification of installed fibre confirms the system—as installed—will support the applications that will ultimately be carried on the fibre. The certification reports from this testing can be used to obtain warranties from the supplier of the infrastructure. VIAVI's fibre certification solutions help engineers optimise their workflow while performing all the required tests for certification in half the time as legacy tools.

- + Comprehensive fibre testing to TIA/ISO/IEC standards
- + Fibre end-face inspection with automated pass/fail analysis integrated into all solutions
- + Integrated saving of both local and remote results on the local device
- + Encircled flux compliant
- + Easily-generated fibre certification reports

**Tier 1 Certification:** Consists of fibre-optic insertion loss (IL), length, and polarity measurements

## SmartClass Fibre MPOLx

SmartClass Fibre MPOLx is the industry's first dedicated Tier 1 MPO certification solution that can perform all the test requirements for Basic/Tier 1 certification using MPO fibre connectivity.



### Specifications:

Application	First Dedicated Tier 1 (Basic) MPO Certification Solution
Key Features	With the MPOLx, field engineers can perform all the necessary test requirements for Tier 1 (Basic) certification in a single solution: Measure MPO length Measure optical loss Check polarity Inspect fibre end faces Generate certification reports
Market	Test and Certification Solutions for enterprise & data centre contractors
Approved by	BT Core Networks, Microsoft, AWS



PN	Description
Q6251	SmartClass Fibre MPOLx

**Tier 2 Certification:** Consists of performing an OTDR trace of each fibre link

## Smart OTDR

The SmartOTDR essential handheld fibre tester is an affordable, easy-to-use device for techs at any level, with robust wireless connectivity options that increase productivity anywhere. It integrates all the essential fibre test requirements into a single device with OTDR measurement, fibre end face analysis, optical loss testing and visual fault locator.



PN	Description
Q6001	Smart OTDR





### T-BERD/MTS-4000 V2

The T-BERD/MTS-4000 V2 platform delivers a fully integrated and automated solution for Tier 2 fibre certification of ribbon fibre MPO cables in single-mode fibre networks. When used with the Enterprise Smart Link Mapper (SLM) users get the OTDR trace and a graphical link view which greatly simplifies trace event identification, plus a project view to track which cables/fibres have been tested with clear pass/fail indications for visualisation of testing progress and reporting.

**Specifications:**

Application	Modular test platform designed for all phases of the network lifecycle, from the installation to maintenance.
Key Features	Installation & maintenance of FTTH, Wireless, 5G, enterprise and data centre networks. Modular design OTDR & selective power meters Automated bi-directional (IL/ORL & OTDR) Multi-Fibre MPO cable tier-2 certification
Market	Fibre qualification - GPON & XGS-PON FTTP - Activation, Troubleshooting. Enterprise & data centre - Tier 2 Tests Metro Core - Longhaul - 10G,40G,100G Fibre qualification
Approved by	Microsoft, AWS



PN	Description
Q6501	T-BERD/MTS-4000 V2

### Big error rate teasting

Once the physical infrastructure is verified, data centre operators have applications where there is a need to test the transmission quality of circuits above the physical layer. A common example is testing the bit error rate on high-performance connections between data centres. VIAVI has a powerful line of handheld network testers well-suited for a data centre environment for their simple test scripts, accuracy, and small size.

### T-BERD/MTS 5800-100G



To maintain the integrity of critical data centre interconnections and to verify customer SLAs, a data centre tech may need to perform tests on Ethernet line rates up to 100G, as well as OTN, CWDM, or DWDM circuits. The T-BERD/MTS 5800-100G is also capable of testing AOC/DAC cables up to 10G.

## TED® Optical light source QUAD kit

### A complete kit that includes:

- + A pocket-sized, high-precision broadband TED® photometer (850/1300/1310/1490/1550/1625nm) with integrated visual fault locator (VFL 10mW).
- + A TED® QUAD optical source, which includes two wavelengths of 850/1300 nm for multimode fibre and two wavelengths of 1310/1550 nm for single mode fibre. It combines robustness, reliability, lightness, and ergonomics.

TED®



PN	Description
33013	TED® Optical light source QUAD Kit

## TED® Optical fibre identifier

The TED® optical fibre identifier is an essential tool for the fibre optic intervention engineers. It makes it possible to detect the presence of a signal in the optical fibre without needing to disconnect it. By lightly pinching the fibre, a small part of the signal is diverted towards 2 photodetectors then measured in order to reveal the direction of traffic flow and the relative optical power level. This operation can be carried out on fibres in service.

### The product's benefits:

- + Identify an active fibre
- + Isolate a problematic fibre
- + Evaluate the relative power level of the signal
- + Detect the direction of traffic
- + Detect a signal modulated at 270Hz, 1kHz and 2kHz

TED®



PN	Description
33002	TED® Optical Fibre identifier

## TED® Visual fault locator

The TED® Visual Fault Locator is an essential tool for engineers to carry out on-site interventions. The visible light of the optical pen makes it possible to identify one fibre among others at the time of installation or maintenance. This light also highlights defects on the visible part of a fibre such as stresses (macro-curvatures) and continuity breaks.

TED®



PN	Description
1000946	TED® Visual fault locator 1mW
15289	TED® Visual fault locator 10mW

## TED® Ferrule cleaning pens

The TED® ferrule cleaning pens the cleaning of optical connectors, whether directly or through a fitting.

### The product's benefits:

- + Extendable end cap
- + Effective against dust and oil

### Characteristics:

- + Fits 2.5mm ferrules: SC/FC/ST
- + Up to 600 cleans



PN	Description
19456	TED® Cleaning pen 1.25mm (LC, MU)
34004	TED® Cleaning pen 2.5mm (SC, ST, FC)



# LABELLING EQUIPMENT & ACCESSORIES



M610 Printer



M210 Printer



M211 Printer



BMP51 Printer



	Multiple and linked	Simple and individual	Simple and individual	Simple and simultaneous, individual and multiple advanced
Keyboard	QWERTY	ABC	No keyboard	QWERTY
Batteries	Rechargeable battery Mains adapter	6 AA batteries (not included) or rechargeable battery (not included)	lithium-ion battery, internal, non-removable	8 AA batteries - Rechargeable battery - AC adapter
Print speed	33.80(mm/s)	10(mm/s)	15.24(mm/s)	25.40(mm/s)
Impression in stand-alone mode (Without PC connection)	Peripheral	Autonomous	Bluetooth smartphone	Autonomous & peripheral
Connectivity options	2.0  Flashdrive  Optional	-		Optional
Cutter	Manual cutting	Manual cutting Straight cut With label retention	Automatic cutter With label retention	Manual cutting Between labels or at the end of the job Printing with label retention
Flash memory	512MB - Up to 250000 labels 512MB - Up to 250,000 labels	-	-	48MB - Up to 25,000 labels
Bar code	Code 39 and 128, others via software	Code 39 and 128, Datamatrix and Code QR	Code 39 and 128, others via application	Code 39 and 128, others via software
Dimensions (WxHxD)	107 x 328 x 106mm	114 x 241 x 63mm	137 x 101 x 66mm	155 x 3261 x 91mm
Composition	Rigid case - Battery - Mains adapter - USB Cable - Wrist Strap - Brady Suite Workstation - Roll of labels PTL-19-423 Ink ribbon M61-R6010	PN W5010: M210 only PN W5010-UK: - Rigid case - Battery in lithium-ion - Power cable	PN W5011: M211 only PN W5011-UK: - hard case - external battery - power cable - belt clip	Hard case - Lithium-ion battery  USB cable - Mains adapter - Continued by Brady Workstation Cartridge MC1-1000-422
Max width (label)	50.80mm	19.00mm	19.00mm	38.10mm
Max width (impression)	48.76mm	16.00mm	15.75mm	36.00mm
Min width (label)	6.40mm	6.40mm	6.40mm	6.40mm
Supported materials	More than 8000 standard references: strips continuous, die-cut label rolls and wholesale packaging, labels and bands personalised	More than 60 standard references: continuous strips	More than 60 standard references: continuous strips	More than 200 standard references: webs and labels pre-cut
Label colours				
Screen	Colour touch screen	Monochrome LCD screen	-	Monochrome LCD screen
Print resolution	300 dpi	203 dpi	203 dpi	300 dpi
Text	4-174 pt	6-40 pt	6-40 pt	4-102 pt
Embedded symbols	450 symbols included	215 symbols included	Depending on the software used	405 symbols included
Guarantee	2 years	2 years	2 years	2 years





# Printer Consumables

## Ribbons

Product	PN	Printer compatibility
Ribbon R4310 Black for BMP61	C5043	BMP61
Ribbon R6010 Black for BMP61	C5060	BMP61
BMP61 M611 R6600 Series	C5066	BMP61



## PIA tag – PIANOI

Product	PN	Printer compatibility
White PIA Tag	C5606-WT	BMP61
Yellow PIA Tag	C5606-YL	BMP61



## Cable tags roll of 250

Product	PN	Printer compatibility
Cable Tags PE (Yellow) 15x75mm	C5652-YL	BMP61
Cable Tags PE (White) 15x75mm	C5652-WT	BMP61
Cable Tags PE (Yellow) 25x75mm	C5654-YL	BMP61
Cable Tags PE (White) 25x75mm	C5654-WT	BMP61
Cable Tags OHPU (Yellow) 15x75mm	C5662-YL	BMP61
Cable Tags OHPU (White) 15x75mm	C5662-WT	BMP61
Cable Tags OHPU (Yellow) 25x75mm	C5664-YL	BMP61
Cable Tags OHPU (White) 25x75mm	C5664-WT	BMP61



## Tape nylon cloth (BK on WT)

Product	PN	Printer compatibility
Tape Nylon Cloth (Yellow) 19.05mm x 4.88m	C5286	M210/M211
Tape Nylon Cloth 9.53mm x 4.88m	C5284	M210/M211



## Tape Vinyl (BK on WT)

Product	PN	Printer compatibility
Tape Vinyl 19.05mm x 6.4m	C5296-WT	M210/M211
Tape Vinyl 19.05mm x 7.62m	C5596-WB	M210/M211
Tape Vinyl 25.40mm x 7.62m	C5597-WB	M210/M211
Tape Vinyl 9.53mm x 6.4m	W5101	M210/M211
Tape Vinyl 19.05mm x 7.62m	W5101	M210/M211



## Tape cart VinylSL (BK on WT)

Product	PN	Printer compatibility
Tape Cart. VinylSL 19.05mm x 6.4m	C5246	M210/M211
Tape Cart. VinylSL 25.4mm x 4.3m	C5247	M210/M211
Tape Cart. VinylSL 30.48mm x 4.3m	C5248	M210/M211
Tape Cart. VinylSL 38.1mm x 4.3m	C5249	M210/M211





# NOTES

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