**EFB ELEKTRONIK**

# FTTH
## FIBER TO THE HOME
## WITH FIBER TO THE FASTEST CONNECTION

WIR SORGEN FÜR VERBINDUNG
WE CARE FOR CONNECTION

# PROFILE OF
## EFB-ELEKTRONIK

EFB-Elektronik GmbH is a leading manufacturer and system provider of networking technology and industrial system solutions. Our expertise ranges from structured cabling using certified high-end products for data centres to custom developments for industrial clients.

Our team services customers worldwide from our headquarters in Bielefeld, Germany. Our customer base includes renowned household names from the IT and security industry, as well as medium sized companies and large corporations.

Our membership in the international TKH Group based in the Netherlands, with more than 6,500 employees and production facilities around the globe, gives us additional leverage for the benefit of our customers. The EFB group of companies has 265 employees across eight locations in Europe, five of them in Germany and three subsidiary companies located in Istanbul, Copenhagen and Vienna.

## CONTENT

EFB
ELEKTRONIK

FTTH (Fiber to the Home) is the cabling of optical fiber into the building where the installation of the optical fiber at the subscriber's extension ends. EN 50700, for example, serves as the basis for network expansion. EFB-Elektronik's FTTH range offers a coordinated selection of cables, connection closures, small distributors, installation accessories and CPE for the successful implementation of local FTTH projects. Our comprehensive service includes support for the entire course of the project. In the FTTH network the focus is particularly on the connections from road distributors to the building.

## FTTH-NETWORKS:
### WITH FIBER TO
# THE FASTEST CONNECTION
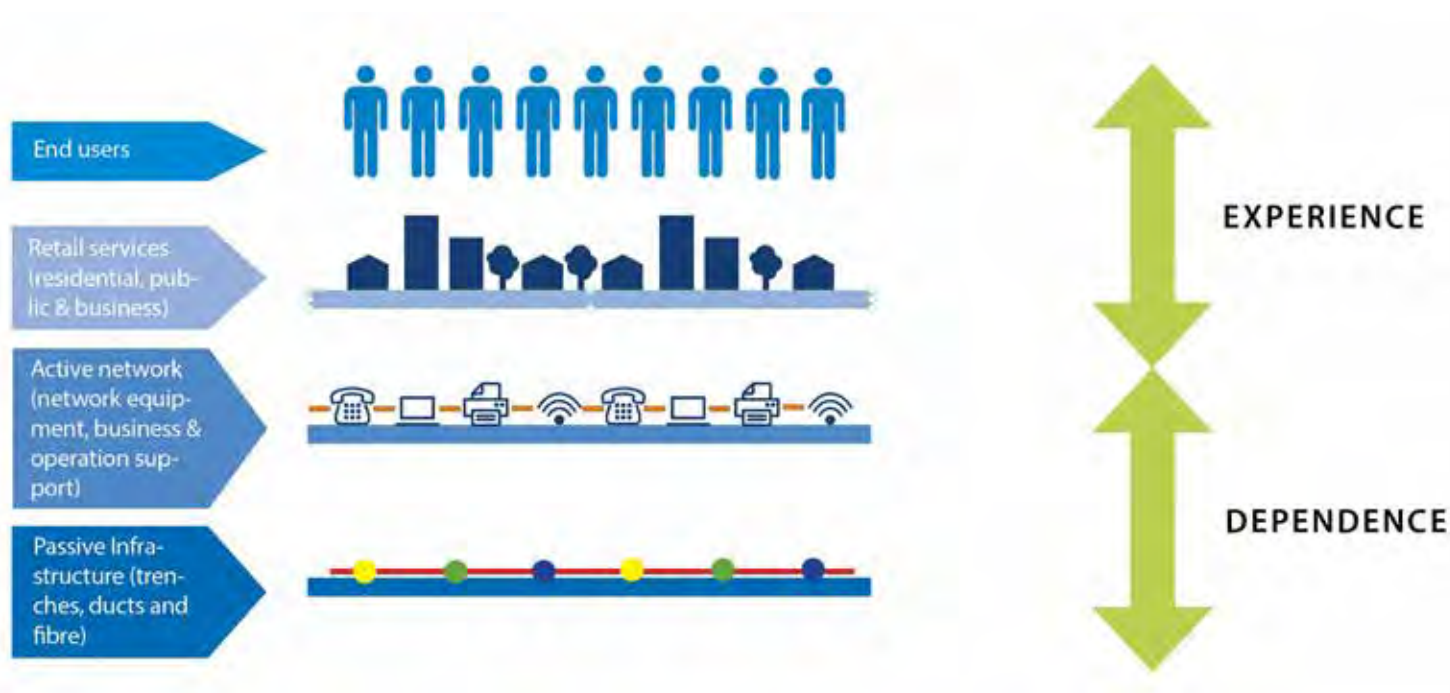


(Fibre-to-the-home refers to cable installation in which the optical fibre extends to the apartment, and the cable ends at the subscriber connection. In single-family houses, there is essentially no difference between FTTB and FTTH, since the optical fibre ends at the house anyway).

# THE FTTH BUILDING TOPOLOGY

## POINT TO MULTIPOINT

At present, the connection type used is either point to multipoint or point to point. Point to multipoint technology is a connection from one point to several end points. This is also known as a multipoint connection, which is a passive optical network (PON). This is used to transfer information for several participants from the exchange to the distribution point in the residential area. The transmission method used is either time division multiplexing (TDM-PON) or wavelength division multiplexing (WDM-PON). Many passive optical splitters distribute the information to multiple optical fibers and transport it to end user. Multiple use of optical fibers makes it possible to connect many new participants to an existing optical fibre network.
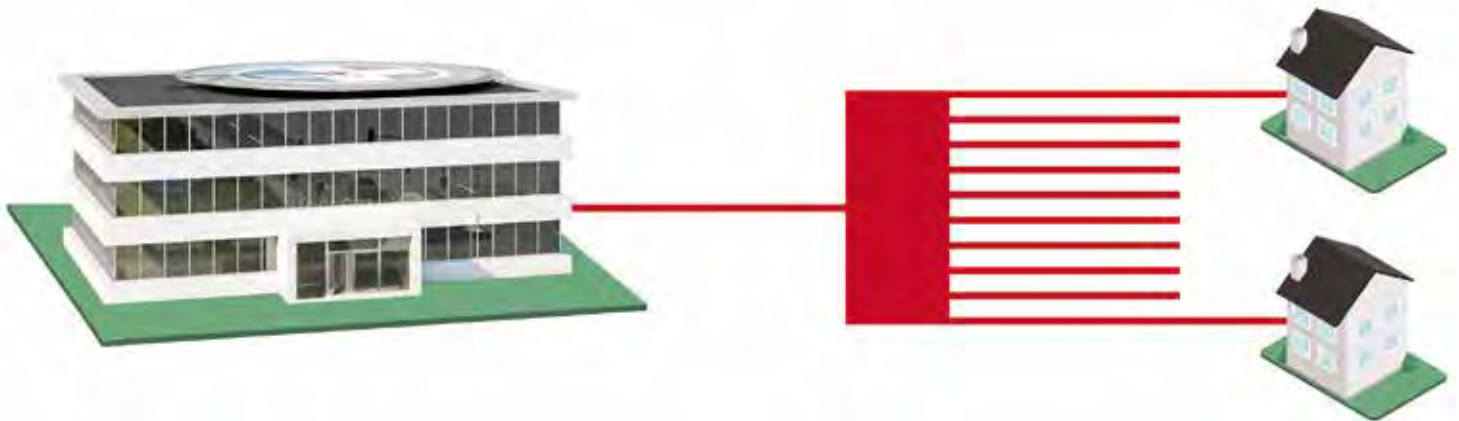


## POINT TO POINT

With a point to point connection, information is transported from the exchange without an intermediate station, using a direct connection to the end user. This is also known as point to point technology. The information is transported using a direct Ethernet connection via separate fibers. This connection type offers better conditions for a future increase in bandwidth and flexible upgrades.
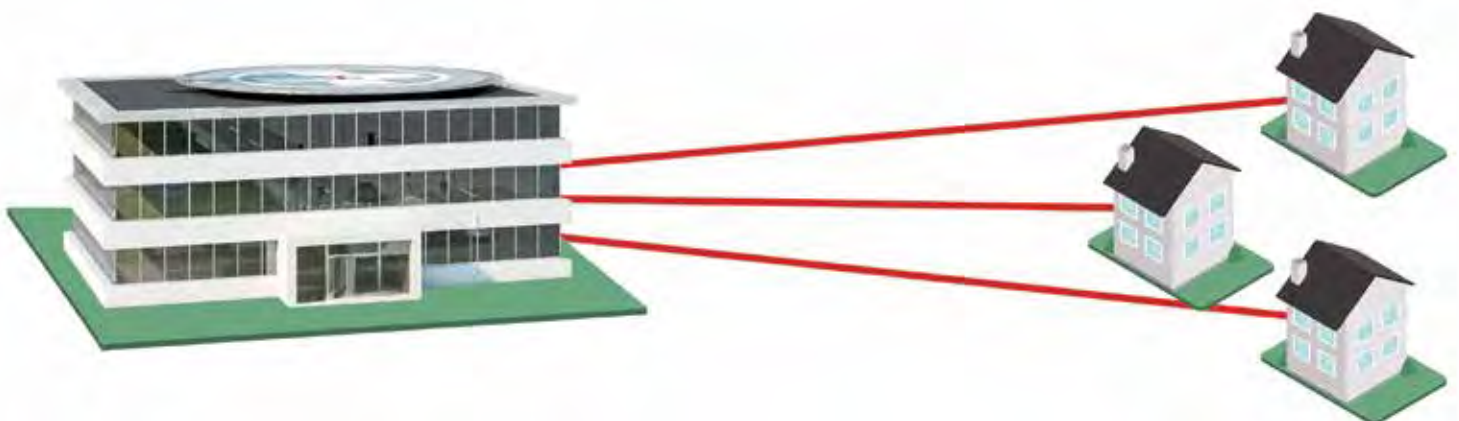
# FTTH SYSTEM SOLUTIONS:
# FROM THE ROAD DISTRIBUTOR TO THE BUILDING

We offer complete system solutions for FTTH networks from the road distributors, drawing on our many years of experience as cabling specialists. This means that a wide range of components for the house connection (outside) in protection class IP65 is available in various sizes and port numbers. For installation in buildings, we offer suitable products with IP20 protection and for network termination. Components for the extension of existing buildings were integrated into the portfolio using DIN-rail systems. Furthermore, the pre-assembled boxes and adapters are fitted with ITU-T G657A2 grade fibers. The installation cables offered especially for the FTTH sector all comply with the ITU-T G657A2 standard and are classified in the Euro fire classes in accordance with the Construction Products Regulation.
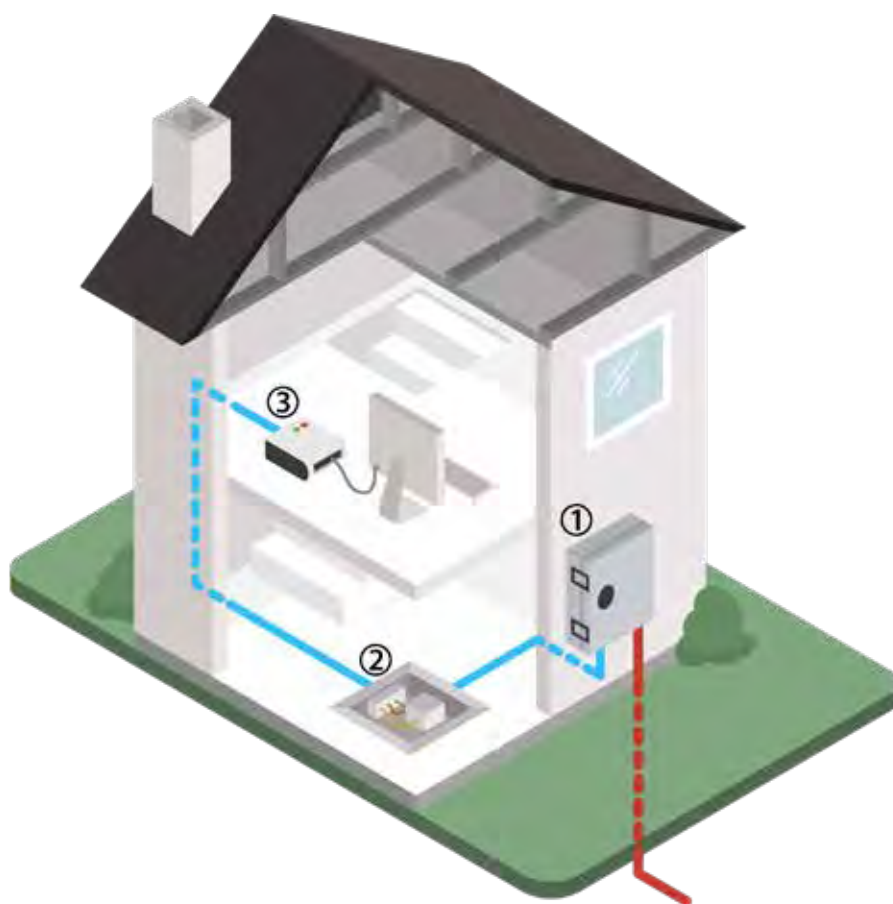


| Outdoor | Indoor | Equipment |

# FTTH Connection Boxes
## FOR EVERY PURPOSE

An important component of any FTTH network is the correct connection box. The FTTH junction box from EFB-Elektronik is ideally protected against climatic conditions with IP65 protection and is therefore perfectly suited for outdoor use. Depending on the application, the outdoor connection box is available in various sizes and port numbers for the different fitting of adapters and splitters. The following number of port connections are available: 16, 8, 4, 2.

## ALL ADVANTAGES AT A GLANCE

- Optimum use for outdoor applications due to protection class IP65
- Different sizes (16,8,4,2 port) for various applications
- Integrated fiber overlength cassette
- Access protection by key or special screw as well as sealing possible
- Integrated swivelling splice cassette for more flexibility
- 16 port and 8 port chassis suitable for PLC splitter

# FTTH IP65 Connection Boxes

FTTH-BOX-OUT-1 closed

FTTH-BOX-OUT-2 closed

FTTH-BOX-OUT-3 closed

FTTH-BOX-OUT-4 closed

| | |
|---|---|
| Foreign body and contact protection: | Protection against ingrees of dust |
| Water protection: | Protection against jet water |
| Type of Splice protection: | Thermo |
| Suitable for adapter: | SC Simplex/LC Duplex/E2000® |
| Scope of application: | Outdoor |
| Mounting: | Wall mounting |
| Possibility of mast mounting: | No |
| Material: | Plastic |
| Colour: | White |

FTTH-BOX-OUT-1 open
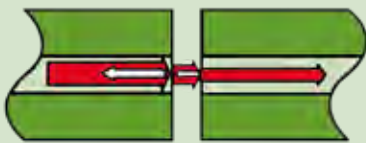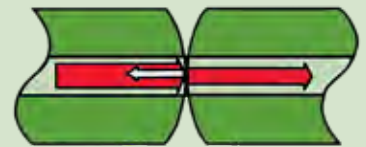
FTTH-BOX-OUT-2 open

FTTH-BOX-OUT-3 open

FTTH-BOX-OUT-4 open

| Art.-No. | Cable entry without cable gland | Cable entry with cable gland | Number of Fibers | Dimensions | Temperature Range | Access Control |
|---|---|---|---|---|---|---|
| FTTH-BOX-OUT-1 | 16x 3-5mm | 2x PG13,5 | 16 | 295x220x85 mm | -25 – 70 °C | Lock |
| FTTH-BOX-OUT-2 | 8x max. 3mm / 1x max. 9mm | 2x PG13,5 | 8 | 213x163x47 mm | -25 – 70 °C | Special screw |
| FTTH-BOX-OUT-3 | 1x max. 10mm / 4x max. 4mm | | 4 | 172x136x40 mm | -25 – 70 °C | Special screw |
| FTTH-BOX-OUT-4 | 1x max. 10mm / 2x max. 4mm | | 2 | 165x100x30 mm | -25 – 70 °C | Special screw |

# THE CORRECT SELECTION
# OF CONNECTORS FOR YOUR
# CONNECTION

The optical cable connectors are decisive for the performance of the optical transmission link, as they act as a direct connection between the different optical fibre links and have a significant influence on transmission values. Subscriber connectors, also called SC connectors, have the advantage of a low IL and are very robust. The disadvantage is that this connector does not have a high packing density in comparison to others such as the LC connector. The lucent connector, also called LC connector, has a high packing density due to its small dimensions. In addition, the LC connector has a low RL. Caution is required when cleaning the connectors, as even small amounts of contamination can have an extremely negative impact on insertion loss and return loss values. This can lead to total transmission failure. The LC and SC connector faces are used in optical cable transmissions and switch systems, optical MDF, LAN, CATV, SONET/SDH, ATM, WDM communication systems as well as measuring and test devices. The ferrule diameter is 2.5 mm for the SC connector face and 1.25 mm for the LC connector face. An angled polish is possible with both connector types. The typical insertion loss is 0.2 - 0.3 dB for SC connectors and 0.2 dB for LC connectors. The SC connectors are standardised in accordance with IEC 61754-4 and the LC connectors in accordance with IEC 61754-20. The SC connector can be securely connected to network components using the push-pull principle. A clip is used as the locking mechanism for LC connectors. These connector types can be equipped with couplings with laser protection caps. This substantially reduces the risk of connectors becoming contaminated and significantly increases the level of eye protection provided.

| Polishing type | return loss | principle |
|---|---|---|
| surface-polished end surfaces with air gap (no longer in use) | 14 dB |  |
| convex-polished end surfaces PC (physical contact) UPC (ultra physical contact) | > 40 dB > 50 dB |  |
| APC (angled physical contact) angled polish with convex end surfaces | > 60 dB |  |

# FTTH Indoor Connection Boxes


FTTH-BOX-IN-1 closed


FTTH-BOX-IN-2 closed


FTTH-BOX-IN-3 closed


FTTH-BOX-IN-4 closed

| | |
|---|---|
| Foreign body and contact protection: | Protection against medium-sized foreign bodies |
| Water protection: | Without protection |
| Type of Splice protection: | Thermo |
| Suitable for adapter: | SC Simplex/LC Duplex/E2000® |
| Scope of application: | Indoor |
| Mounting: | Wall mounting |
| Possibility of mast mounting: | False |
| Material: | Plastic |
| Colour: | White |


FTTH-BOX-IN-1 open


FTTH-BOX-IN-2 open


FTTH-BOX-IN-3 open
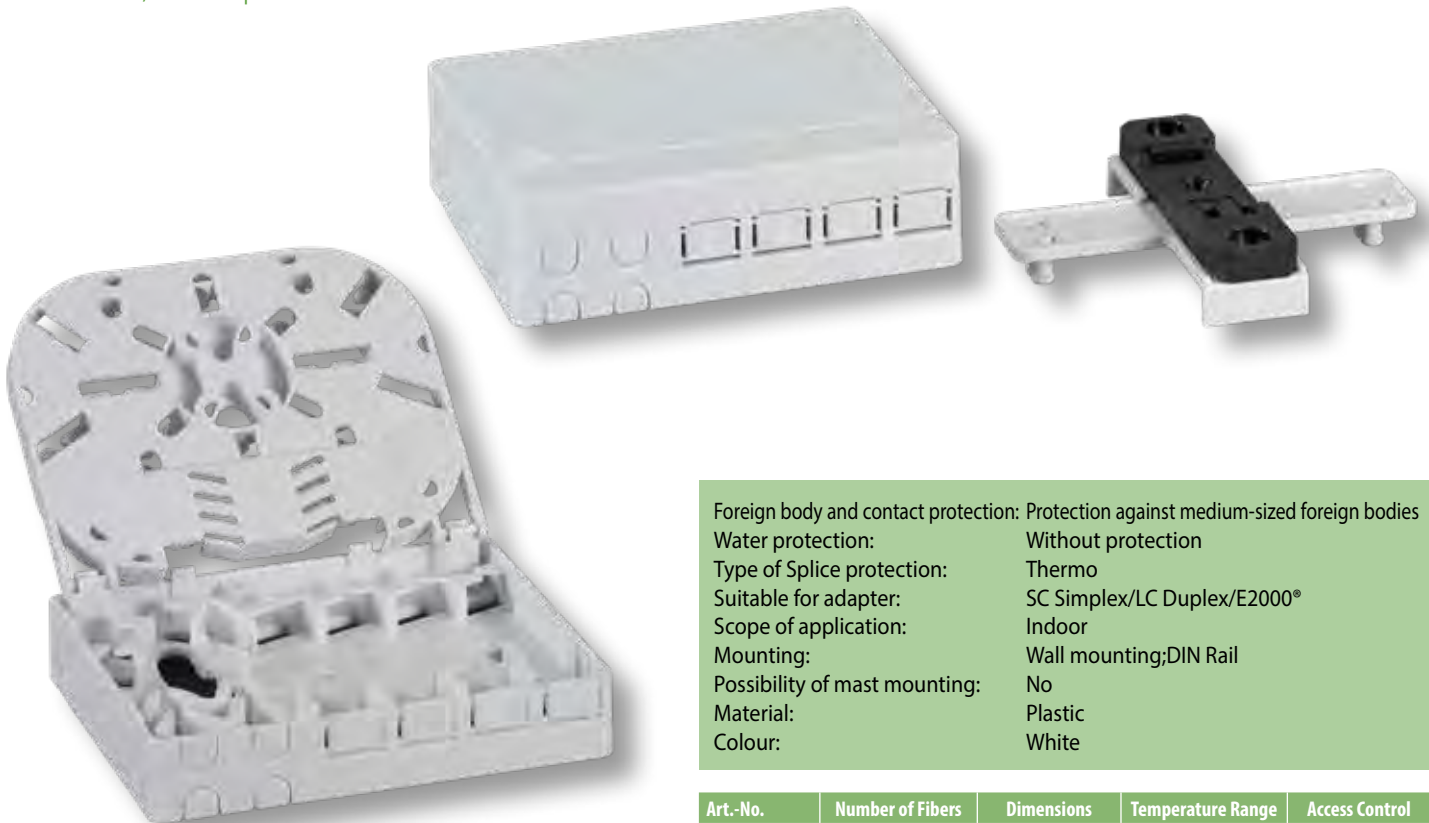

FTTH-BOX-IN-4 open

| Art.-No. | Number of Fibers | Dimensions | Temperature Range | Access Control |
|---|---|---|---|---|
| FTTH-BOX-IN-1 | 4 | 150 x 110 x 34 mm | 0 – 50 °C | Without |
| FTTH-BOX-IN-2 | 2 | 84x130x24 mm | 0 – 50 °C | Without |
| FTTH-BOX-IN-3 | 2 | 115x86x23 mm | 0 – 50 °C | Without |
| FTTH-BOX-IN-4 | 2 | 148x90x16 mm | 0 – 50 °C | Without |

# FTTH Indoor DIN RAIL Box
## for 4 Fiber, 4 Adapter

| Foreign body and contact protection: | Protection against medium-sized foreign bodies |
|---|---|
| Water protection: | Without protection |
| Type of Splice protection: | Thermo |
| Suitable for adapter: | SC Simplex/LC Duplex/E2000® |
| Scope of application: | Indoor |
| Mounting: | Wall mounting;DIN Rail |
| Possibility of mast mounting: | No |
| Material: | Plastic |
| Colour: | White |

| Art.-No. | Number of Fibers | Dimensions | Temperature Range | Access Control |
|---|---|---|---|---|
| FTTH-BOX-IN-5 | 4 | 101x81x29 mm | 0 – 50 °C | Ohne |

# DIN RAIL adapter assembeled
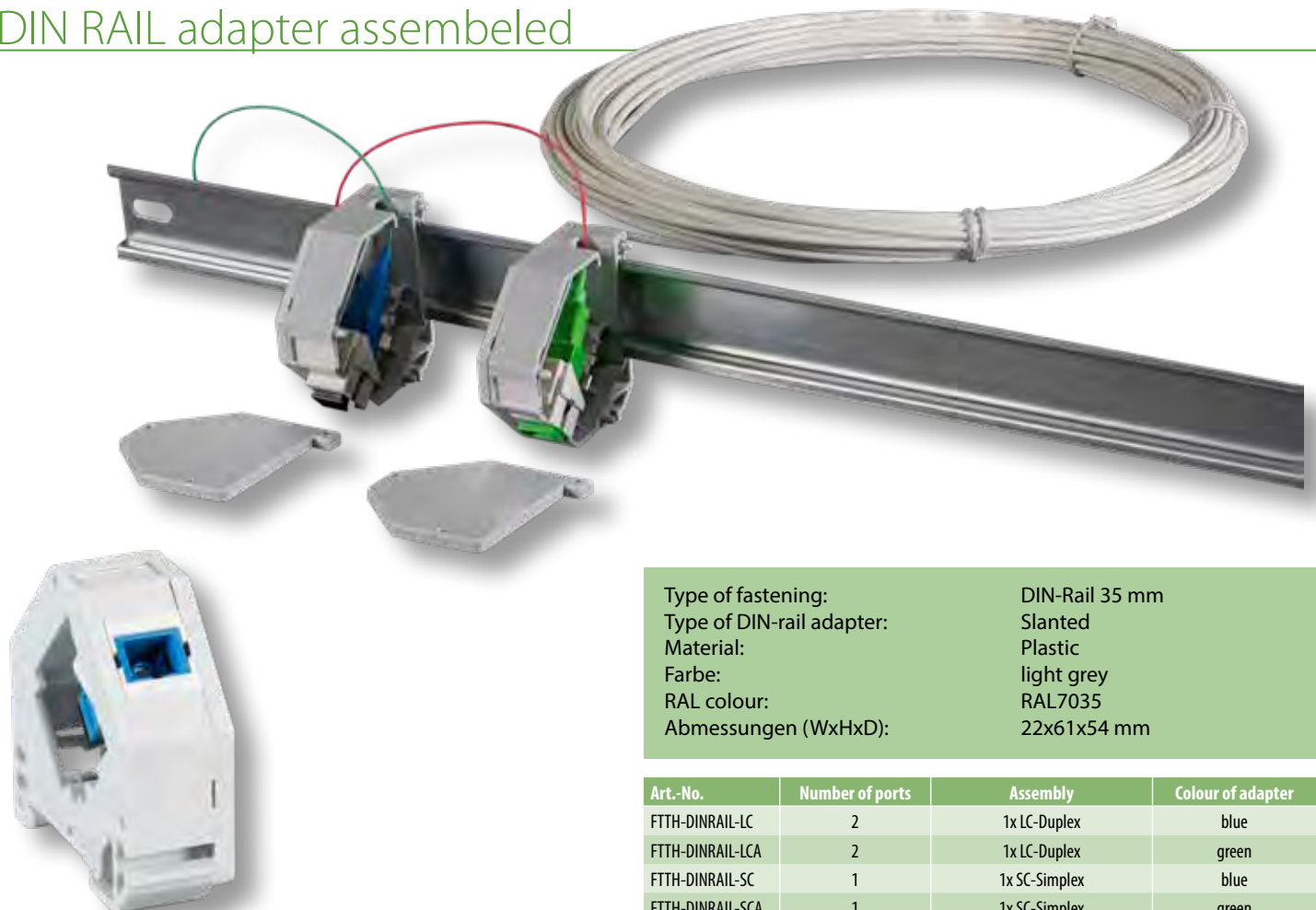
| Type of fastening: | DIN-Rail 35 mm |
|---|---|
| Type of DIN-rail adapter: | Slanted |
| Material: | Plastic |
| Farbe: | light grey |
| RAL colour: | RAL7035 |
| Abmessungen (WxHxD): | 22x61x54 mm |

| Art.-No. | Number of ports | Assembly | Colour of adapter |
|---|---|---|---|
| FTTH-DINRAIL-LC | 2 | 1x LC-Duplex | blue |
| FTTH-DINRAIL-LCA | 2 | 1x LC-Duplex | green |
| FTTH-DINRAIL-SC | 1 | 1x SC-Simplex | blue |
| FTTH-DINRAIL-SCA | 1 | 1x SC-Simplex | green |

# FTTx Compact-Connection box

| | |
|---|---|
| Foreign body and contact protection: | Protection against medium-sized foreign bodies |
| Water protection: | Without protection |
| Type of Splice protection: | Thermo |
| Suitable for adapter: | SC Simplex/LC Duplex/E2000® |
| Scope of application: | Indoor |
| Mounting: | Wall mounting |
| Possibility of mast mounting: | No |
| Material: | plastic |
| Colour: | white |

| Art.-No. | Number of Fibers | Dimensions | Temperature Range | Access Control |
|---|---|---|---|---|
| 53700.2 | 4 | 100x80x22 mm | -20 – 60 °C | without |

# FTTH In Wall Distributor

| | |
|---|---|
| Foreign body and contact protection: | Protection against medium-sized foreign bodies |
| Water protection: | Without protection |
| Type of Splice protection: | crimp/thermo |
| Suitable for adapter: | SC Simplex/LC Duplex/E2000® |
| Scope of application: | Innen |
| Mounting: | In Wall |
| Possibility of mast mounting: | False |
| Material: | Metall |
| Colour: | Grey |

| Art.-No. | Cable entry without cable gland | Number of Fibers | Dimensions | Temperature Range | Access Control |
|---|---|---|---|---|---|
| FTTH-BOX-IN-UP | 4x variable size | 24 | 380x380x83 mm | 0 – 50 °C | without |

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# FTTH flush mount outlet

Fiber Optical flush-mounted data outlet to accommodate 2 SC-Simplex adapter or 2 LC-Duplex adapter. The data outlet is equipped with couplings in the classes OM3, OM4 or OS2 including shutter.

**The highlight of this flush-mounted data outlet is that it not only has an integrated receptacle for excess fiber lengths, but also has a receptacle for splice protection (4x crimp or 4x shrink).**

Depending on the application, the holder can also be dismantled so that it does not get in the way when pre-assembled cables are installed.
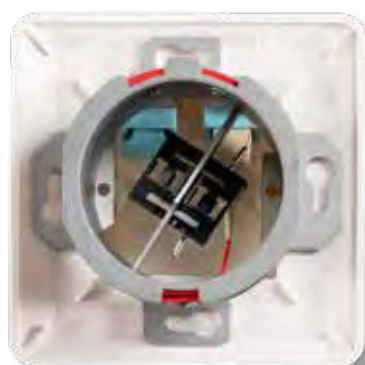
**Performance features:**
Horizontal and vertical installation in the cable duct or flush mounting
Recording of fiber overlengths
Integrated splice protection for 4 splices
Cover 80mm x 80mm
Data outlet depth of 40mm for installation in flush-mounted boxes or cavity wall boxes

| | |
|---|---|
| Outlet direction: | down |
| Dust protection cap: | shutter |
| Material bearing ring: | Zinc alloy |
| Material central plate: | ABS plastic |
| Material adapter plates: | ABS plastic |
| Max. Assembly (Adapter): | 2 |
| With bus/coupling: | yes |
| Surface mounted: | No |
| Flush mounted (plaster): | yes |
| Duct installation: | yes |

| Art.-No. | Colour | Suitable for adapter | Central plate according to | Dimensions |
|---|---|---|---|---|
| FTTH-OUTLET-LC-OS2 | white | SC Simplex/LC Duplex | DIN 49075 | 80 x 80 x 40 mm |
| FTTH-OUTLET-SC-OS2 | white | SC Simplex/LC Duplex | DIN 49075 | 80 x 80 x 40 mm |
| FTTH-OUTLET-LC-OM4 | white | SC Simplex/LC Duplex | DIN 49075 | 80 x 80 x 40 mm |
| FTTH-OUTLET-SC-OM4 | white | SC Simplex/LC Duplex | DIN 49075 | 80 x 80 x 40 mm |
| FTTH-OUTLET-LC-OM3 | white | SC Simplex/LC Duplex | DIN 49075 | 80 x 80 x 40 mm |
| FTTH-OUTLET-SC-OM3 | white | SC Simplex/LC Duplex | DIN 49075 | 80 x 80 x 40 mm |

# FTTH subrack for system cassettes

19" subrack for FTTH-MODUL-XX
Up to 204 LC ports to 3 units
with front-sided cable tray
delivery without modules

| Material: | Steel sheet |
|---|---|
| Type of surface: | With powder coating |
| Type of enclosure: | open |
| With ventilation slots: | yes |
| Degree of protection (IP): | IP20 |

| Art.-No. | max. Modules | max. Ports | Colour | Dimensions |
|---|---|---|---|---|
| FTTH-BGT-1HE | 8 | 96 LC / 48 SC | grau | 483 x 135 x 190 mm |
| FTTH-BGT-3HE | 17 | 204 LC / 102 SC | grau | 483 x 44,5 x 190 mm |

# FTTH system modules
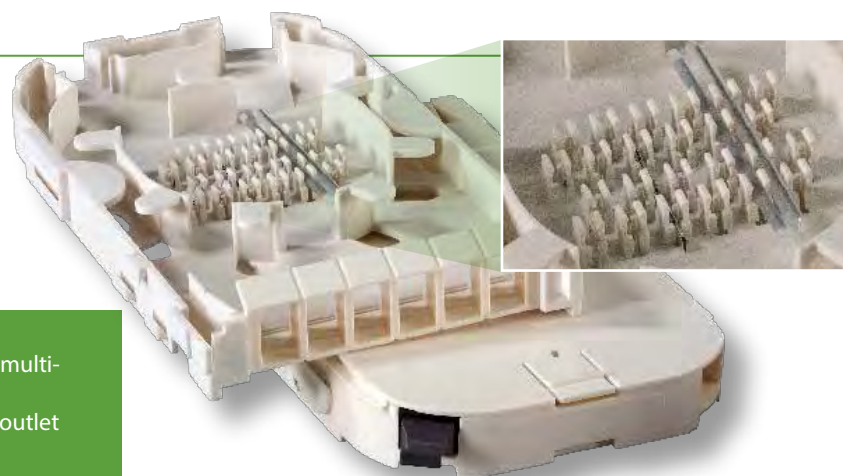
Suitable for 1HE and 3HE subrack FTTH-BGT-xHE
Pre-equipped with 6 SC-Simplex adapter in single mode, multi-
mode OM4 or multimode OM3 with ceramic ferrule
Inclined outlet left/right for the 1HE version, top/bottom outlet
for the 3HE version
Cable entry via MTP®/MPO coupling
Splice cassette (Shrink -and Crimpprotection) holder included in
cassette for MTP®/ MPO free installation

| Number of height units: | 0,5 |
|---|---|
| With Pigtail: | No |

| Art.-No. | Modules | Quantity adapter | Adapter | APC | Adapter Colour |
|---|---|---|---|---|---|
| FTTH-MODUL-LCOS2 | Singlemode | 6 | LC duplex | No | blue |
| FTTH-MODUL-SCOS2 | Singlemode | 6 | SC | No | blue |
| FTTH-MODUL-LCOM4 | Multimode OM4 | 6 | LC duplex | No | erica-violet |
| FTTH-MODUL-SCOM4 | Multimode OM4 | 6 | SC | No | erica-violet |
| FTTH-MODUL-LCOM3 | Multimode OM3 | 6 | LC duplex | No | aqua |
| FTTH-MODUL-SCOM3 | Multimode OM3 | 6 | SC | No | aqua |

# Wall mounting for XON1300 & APL



## Modularity Saves Investment and Service Costs

No matter if it concerns the housing industry, a city carrier or a utility company, easy planning and scaling of the FTTH network is a key point in the deployment process. Terminating the network with the XON1300 provides the ideal solution.

## Versatile for greater success

### Flexibility:
The XON30.W wallmount unit acts as a passive network termination and can be installed independently from the active XON1300 unit.

### Reduction of Operational Costs:
Simple insertion of the XON1300 into the wallmount unit and placing into operation is carried out by the end user. Modification in services requires only an exchange of the active equipment.

### Durable & Robust Technology:
Excellent quality and robustness guarantee a long life time and a high reliability of the device preparing the network for future bandwidth requirements.

### Designed for the Living Room:
A timeless housing design in the smallest form factor suitable for the living area. Winner of the RedDot Award 2014 for the effective housing concept.

Thanks to its modularity, the XON1300 can be used in various point-to-point FTTH applications. The module is available in different versions for 1- and 2-fiber

Topologies:
XON1300.S Gigabit Ethernet Switch
XON1300.P / IP passive module for maintaining router freedom

| | |
|---|---|
| Scope of application: | Inside |
| Mounting: | Wall mounting |
| Possibility of mast mounting: | No |
| Material: | Plastic |
| Colour: | white |



| Art.-No. | Cable entry without cable gland | Number of Fibers | Dimensions | Temperature Range | Access Control |
|---|---|---|---|---|---|
| XON30 | 4 | 2 | 48x150x150 mm | | without |

## Passive Network termination,
optical CATV, without XON30 housing



| Art.-No. | Mounting method |
|---|---|
| XON1300.P | empty housing |

## Gigabit Ethernet Switch,
4xLAN, without XON30 housing



| Art.-No. | Number of ports 10/100/1000 Mbps RJ45 | Mounting method |
|---|---|---|
| XON1300.S | 4 | empty housing |

# FTTX Compact Box pre assembled, 2xLC/APC Duplex, G.657.A2

Scope of application:   Inside
Mounting:               Wall mounting
Material:               Plastic halogen free
Colour:                 white
Number of adapters:     2
IP Protection:          IP20
Dimensions:             100x80x22 mm

10m - 20m - 30m - 40m - 50m - 60m - 70m - 80m

| Art.-No. | Fiber type | Fiber category | Cable diameter | Material outer sheath | Colour outer sheath | Adapter |
|---|---|---|---|---|---|---|
| 53670.x | Singlemode | G657.A2 | 2,2 mm | LSZH | white | LC Duplex |
| 53680.x | Singlemode | G657.A2 | 2,2 mm | LSZH | white | SC Simplex |

# FTTH DIN RAIL Adapter, Laserprotection integrated

Scope of application:   Inside
Mounting:               DIN Rail
Material:               Plastic halogen free
Colour:                 white
RAL colour:             RAL9010
Number of adapters:     4
IP Protection:          IP30
Dimensions:             89.5x35x51.5 mm

15m - 30m - 50m - 100m

| Art.-No. | Fiber type | Fiber category | Cable diameter | Material outer sheath | Colour outer sheath | Adapter | Dimensions |
|---|---|---|---|---|---|---|---|
| 53681.x | Singlemode | G657.A2 | 4,1 mm | LSZH | ivory | 1x SC Simplex | 89,5x17,5x51,5 mm |
| 53682.x | Singlemode | G657.A2 | 4,1 mm | LSZH | ivory | 2x SC Simplex | 89,5x17,5x51,5 mm |
| 53683.x | Singlemode | G657.A2 | 4,1 mm | LSZH | ivory | 4x SC Simplex | 89,5x35x51,5 mm |

# Customised solutions in our own manufacturing facility

In our own manufacturing facilities in Germany, we offer the option to create customised cable assemblies for you: From jumpers to pigtails to breakout and loose tube fibre cables and E-2000 connectors.

To ensure top quality, we rely on the many years of experience and high level of knowledge of our employees. In addition, we use state-of-the-art testing techniques, a manufacturing process system and carry out regular quality checks. We
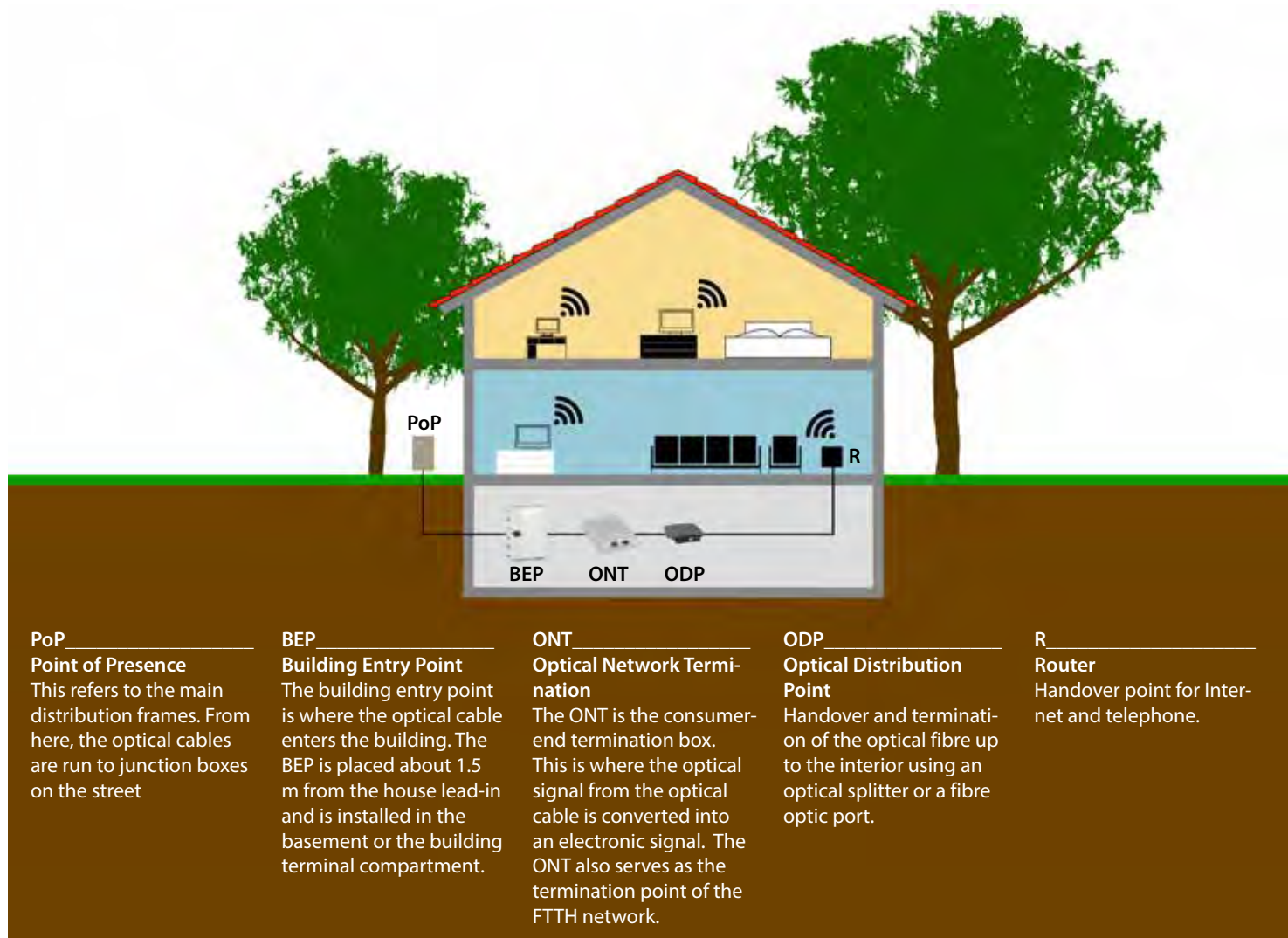
can also guarantee high stock availability of individual components and short manufacturing times.
In the manufacture of E-2000 connectors, we use R&M certified production processes to achieve the best possible quality of the cable assemblies.

# DOMESTIC CONNECTION WITH OPTICAL FIBRE CABLING

Certain basic conditions have to be created for the successful installation of an FTTH network. The building should have an accessible installation location for a building interconnection point. This location should not be more than 1.5 m from the building infeed. The building connection requires an area of approx. 0.8 m x 0.8 m. The building should already be cabled with optical fibre from the building interconnection point to the interior area. The optical fibre box can be placed in any location. The ONT is installed beside it. Two Schuko sockets are required for the ONT and a router. The distance between the socket and the ONT may not be more than 1 m.



| PoP_____ | BEP_____ | ONT_____ | ODP_____ | R_____ |
|---|---|---|---|---|
| **Point of Presence** | **Building Entry Point** | **Optical Network Termination** | **Optical Distribution Point** | **Router** |
| This refers to the main distribution frames. From here, the optical cables are run to junction boxes on the street | The building entry point is where the optical cable enters the building. The BEP is placed about 1.5 m from the house lead-in and is installed in the basement or the building terminal compartment. | The ONT is the consumer-end termination box. This is where the optical signal from the optical cable is converted into an electronic signal. The ONT also serves as the termination point of the FTTH network. | Handover and termination of the optical fibre up to the interior using an optical splitter or a fibre optic port. | Handover point for Internet and telephone. |

# ACCESSORIES COMPLETING YOUR FTTH NETWORK

For the optimal completed FTTH network, EFB-Elektronik offers the entire range of numerous accessories in the field of fiber optics. From MDIC (Micro Drop Cable) over pigtails up to junction boxes we have all articles available with a high delivery capacity.
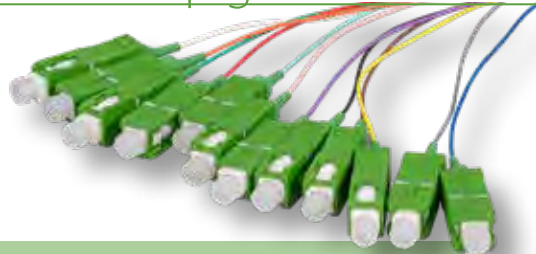
## FTTH Fiber pigtail LC
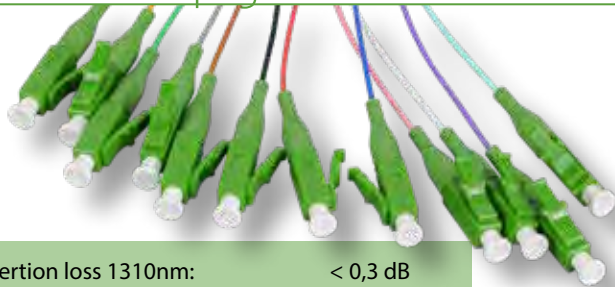
| Insertion loss 1310nm: | < 0,3 dB |
| Max. Tension: | 3 N |
| Mion. Bending Radius Static: | 10xOD |
| Minimaler Bending Dynamic: | 20xOD |
| Outer Diameter: | 0,9 mm |
| Jacket Material: | LSZH |
| Length: | 2.0 m |
| Operating Temperature: | -20 – 70 °C |
| Connector Conform to Standard: | IEC61754-20 |
| Cable Conform to Standard: | IEC60793-2 |

| Art.-No. | Category | Colour | APC-version | Connector Colour |
|---|---|---|---|---|
| FTTH-PIGTAIL-LCA1 | G657A2 | yellow | True | green |
| FTTH-PIGTAIL-LC1 | G657A2 | yellow | False | blue |
| FTTH-PIGTAIL-LCA12 | G657A2 | 12 colours | True | green |
| FTTH-PIGTAIL-LC12 | G657A2 | 12 colours | False | blue |

## FTTH Fiber pigtail SC

| Insertion loss 1310nm: | < 0,3 dB |
| Max. Tension: | 3 N |
| Mion. Bending Radius Static: | 10xOD |
| Minimaler Bending Dynamic: | 20xOD |
| Outer Diameter: | 0,9 mm |
| Jacket Material: | LSZH |
| Length: | 2.0 m |
| Operating Temperature: | -20 – 70 °C |
| Connector Conform to Standard: | IEC61754-4 |
| Cable Conform to Standard: | IEC60793-2 |

| Art.-No. | Category | Colour | APC-version | Connector Colour |
|---|---|---|---|---|
| FTTH-PIGTAIL-SCA1 | G657A2 | yellow | True | green |
| FTTH-PIGTAIL-SC1 | G657A2 | yellow | False | blue |
| FTTH-PIGTAIL-SCA12 | G657A2 | 12 colours | True | green |
| FTTH-PIGTAIL-SC12 | G657A2 | 12 colours | False | blue |

## PLC Splitter

| Type of accessory: | PLC Splitter |
| Number of connectors front side: | 1 |
| Colour: | Aluminium |
| Application: | CATV |

| Art.-No. | Connection type front side | Connection type backside | Split | length | width | heigths | Insertion loss (inc. connector) |
|---|---|---|---|---|---|---|---|
| FTTH-PLC4-SCA | open | SC/APC | 1 to 4 | 55 mm | 7 mm | 4 mm | <7,4 dB |
| FTTH-PLC8-SCA | open | SC/APC | 1 to 8 | 55 mm | 7 mm | 4 mm | <10,5 dB |
| FTTH-PLC16-SCA | open | SC/APC | 1 to 16 | 60 mm | 12 mm | 4 mm | <13,8 dB |
| FTTH-PLC4-LCA | open | LC/APC | 1 to 4 | 55 mm | 7 mm | 4 mm | <7,4 dB |
| FTTH-PLC8-LCA | open | LC/APC | 1 to 8 | 55 mm | 7 mm | 4 mm | <10,5 dB |
| FTTH-PLC16-LCA | open | LC/APC | 1 to 16 | 60 mm | 12 mm | 4 mm | <13,8 dB |

# LC Duplex Adapter
## with Plastic housing

Type of connector connection 1: LC-Duplex
Type of connector connection 2: LC-Duplex
Type of fastening:                    screw/lock
Design:                               SC-Simplex
Accessories:                          Self-Tapping Screw
Insertion loss 1310nm:                < 0,3dB

| Art.-No. | Suitable for type of fibre | Material sleeve | Colour | Type |
|----------|---------------------------|-----------------|--------|------|
| 53350.2  | Singlemode                | ceramic         | blue   | LC / PC |
| 53343.31 | Singlemode                | ceramic         | green  | LC/APC |

# LC Duplex Adapter
## with Metal housing

Type of connector connection 1: LC-Duplex
Type of connector connection 2: LC-Duplex
Type of fastening:                    screw/lock
Design:                               SC-Simplex
Accessories:                          Metric Screw
Insertion loss 1310nm:                < 0,25dB

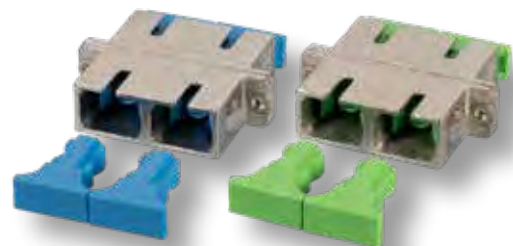| Art.-No. | Suitable for type of fibre | Material sleeve | Colour | Type |
|----------|---------------------------|-----------------|--------|------|
| 53343.1  | Singlemode                | ceramic         | metal  | LC / PC |

# SC Duplex Adapter
## with Plastic housing

Type of connector connection 1:  SC-duplex
Type of connector connection 2:  SC-duplex
Type of fastening:                    screw/lock
Design:                               SC-duplex
Accessories:                          Self-Tapping Screw
Insertion loss 1310nm:                < 0,2dB

| Art.-No. | Suitable for type of fibre | Material sleeve | Colour | Type |
|----------|---------------------------|-----------------|--------|------|
| 53316.3  | Singlemode                | ceramic         | blau   | SC / PC |
| 53316.35 | Singlemode                | ceramic         | grün   | SC / APC |

# SC Duplex Adapter
## with Metal housing

Type of connector connection 1: SC-duplex
Type of connector connection 2: SC-duplex
Type of fastening:                    screw/lock
Design:                               SC-duplex
Accessories:                          Metric Screw
Insertion loss 1310nm:                < 0,2dB

| Art.-No. | Suitable for type of fibre | Material sleeve | Colour | Type |
|----------|---------------------------|-----------------|--------|------|
| 53316.34 | Singlemode                | ceramic         | metal  | SC / PC |
| 53319.3  | Singlemode                | ceramic         | metal  | SC / APC |

# Broadband Outdoor Cable MDIC - Micro Drop Installations Cable

| Material outer sheath: | LSZH |
|---|---|
| Euro Class: | Fca |
| Colour outer sheath: | white |
| Temperature Range (Operation): | -30..70 – °C |
| Temperature Range (Storage): | -30..70 – °C |
| Temperature Range (Installation): | -10..50 – °C |
| IL max. (dB/km) 1310nm: | 0,35 |
| IL max. (dB/km) 1550nm: | 0,22 |
| Cabling standards: | EN 50173-1;ISO/IEC 11801 |

| Art.-No. | Construct | Cable Ø | Weight | Bending radius | Tensile Force |
|---|---|---|---|---|---|
| 56204.1 | 2 x Singlemode G.657.A1 | 2,0 x 3,1 mm | 10 kg/km | 30 mm | 150 N |
| 56204.2 | 4 x Singlemode G.657.A1 | 3,7 mm | 16 kg/km | 37 mm | 150 N |

# FTTH Indoor Drop Cable LSOH

① - Optical fiber : Optical fiber 250µm
② - Thermoplastic sheath: Microbundle 800µm  LSOH
③ - Strength members : Aramid yarns
④ - Outer sheath : LSOH NF EN 50290-2-27 Compliant
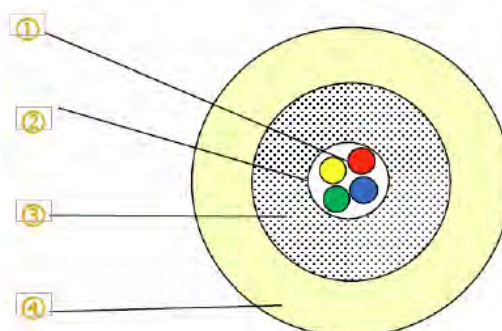
| Material outer sheath: | LSZH |
|---|---|
| Euro Class: | Dca |
| Colour outer sheath: | Elfenbein |
| Temperature Range (Operation): | -5..60 – °C |
| Temperature Range (Storage): | -40..70 – °C |
| Temperature Range (Installation): | -5..50 – °C |
| Rayleigh Backscatter Coefficient 1310nm: | 1,467 |
| Rayleigh Backscatter Coefficient 1550nm: | 1,468 |
| Rayleigh Backscatter Coefficient 1625nm: | 1,468 |
| IL max. (dB/km) 1310nm: | 0,36 |

| Art.-No. | Construct | Cable Ø | Weight | Bending radius | Tensile Force |
|---|---|---|---|---|---|
| FTTH-DROP-2 | 2 x Singlemode G.657.A2 | 3,0 mm | 11 kg/km | 20 mm | 15da N |
| FTTH-DROP-4 | 4 x Singlemode G.657.A2 | 2,65 mm | 6,5 kg/km | 15 mm | 15da N |

# Connector Field Installable with fiberholder

| Material of ferrule: | ceramic |
|---|---|
| Connection type: | clamp |
| Cable Ø: | 0.9 mm |

| Art.-No. | Suitable for type of fibre | Type of connector | Colour | Insertion Loss | Return Loss |
|---|---|---|---|---|---|
| 53196.1 | Singlemode | LC | blue | 0,5 dB | >55 dB |
| 53197.1 | Multimode | LC | turquoise | 0,3 dB | >35 dB |
| 53198.1 | Multimode | LC | black | 0,3 dB | >35 dB |
| 53199.1 | Singlemode | SC | blue | 0,5 dB | >55 dB |
| 53200.1 | Multimode | SC | turquoise | 0,3 dB | >35 dB |
| 53201.1 | Multimode | SC | black | 0,3 dB | >35 dB |

# Fiber Optic Frame Set for E2000®, SC simplex or LC duplex

| Outlet direction: | angled |
|---|---|
| Dust protection cap: | without |
| Material bearing ring: | Zinc alloy |
| Material central plate: | ABS plastic |
| Max. Assembly (Adapter): | 2 |
| With bus/coupling: | False |
| Surface mounted: | yes |
| Flush mounted (plaster): | yes |
| Duct installation: | yes |

| Art.-No. | Colour | Suitable for adapter | Central plate according to | Dimensions |
|---|---|---|---|---|
| ET-25085F0 | white | SC Simplex/LC Duplex/E2000® | DIN 49075 | 80x80 mm |

# Professional Fiber Optic Tool Case

Scope of delivery / Contents:
1 x Aluminium case for fiber optic tools, (W x H x D) approx. 345 x 100 x 260 mm (Art.-No. 39840.1)
1 x Fiber Checker Single- and Multimode for 1.25mm and 2.5 mm ferrules (Art.-No. 399900.2),
Power 2xAAA, Batteries not included
1 x QUICKLOADER Mini 6 in 1 multi-bit screwdriver (Art.-No. 39935.4)
1 x Chrome-plated side cutter Knipex 7005 180 (Art.-No. 39982.2)
1 x Pliers Knipex 3815 200 (Art.-No. 39984.1)
1 x Stripping tool Miller® RCS-114 for round cable 4.5 - 29 mm longitudinal-cross-spiral cut (Art.-No. 39900.1)
1 x Kevlar® cutter KS-1 140 mm (Art.-No. 39903.1)
1 x loose tube tool blue 3.2 - 6.3 mm (Art.-No. 39958.1)
1 x Stripping tool 180 µm - 300 µm, for stripping the primary coating (Art. No. 39923.1)
1 x Miller® Fiber Stripper FO 103-T-250-J „Tri-Hole" (Art.-No. 39901.1)
1 x Alcohol dispenser - container PE with swab humidifier, without contents (Art.-No. 39920.2)
1 x Cleaner „FCT-C410" for fiber optic connectors (Art.-No. 39961.1)
1 x Ferrule cleaner for ST, SC and FC for PC&APC 2.5 mm ferrules (Art.-No. 39988.2)
1 x Ferrule cleaner for LC and MU for PC&APC 1.25 mm ferrules (Art.-No. 39989.2)
10 x Stick Cleaner for 2.50 mm sleeves (Art.-No. 39976.1)
10 x Stick Cleaner for 1.25 mm sleeves (Art.-No. 39975.1)
25 x Miller® fiber cleaning tapes, alcohol-soaked (Art.-No. 39926.1)

| Art.-No. | Description |
|---|---|
| 39843.2 | Professional Fiber Optic Tool Case |

This solid tool case made of aluminium contains everything that is neccessary for the daily work with optical fibers. Equal if cleaning, stripping or testing - a suitable tool is provided in professional quality.

# Outdoor Pipe Closure
## for Connecting and Junction

# INFRALAN® Cleaver

| | |
|---|---|
| Suitable for number of fibers: | 24 |
| Cable glands: | M16 |
| Degree of protection (IP): | IP68 |
| Cable Diameter: | 3,5 – 10,7 mm |
| Material: | plastic |
| Splice Cassette: | integrated |
| Direct Burial: | True |
| Tensile stress / compression: | 55 N |
| Operating Temperature: | -40 – 70 °C |

| Art.-No. | Splice Holder | Dimension (LxBxH) | In-/Output | Colour |
|---|---|---|---|---|
| 83187.1 | crimp | 307 x 69 mm | 2 | Green |
| 83189.1 | shrink | 307 x 69 mm | 3 | Black |

| Art.-No. | Description |
|---|---|
| HS18-CLEAVER | INFRALAN® Cleaver |

# 19" Subrack



19"/3U subrack with 84DU
Additional integrated 1U cable overlength box
Total hight: 4U
4U aluminium side walls for installation in 19" rack
84DU depth adjustable subrack with 1DU splitting (1DU=5,08mm)
Cable overlength box to the back/front sliding unit
Front mounted cable routing panel with 5 cable brackets
Delivery unequipped
Scope of delivery: 1 x subrack mounted
1 x PG16 cable gland incl. locknut
 5 x cable brackets

Dimensions: 483x178x295mm

| | |
|---|---|
| Material: | Thermoplastic |
| Type of surface: | With powder coating |
| Type of enclosure: | Open |
| With ventilation slots: | True |
| Degree of protection (IP): | IP20 |
| Width: | 483 mm |
| Height: | 177.8 mm |
| Depth: | 295 mm |

| Art.-No. | max. Modules | Colour |
|---|---|---|
| 53711.1 | 12 | alu/metall |

# Plug-In Module 3U/7DU



Fully equipped plug-in module with adapters and pigtails
For installation in 19„subracks 53711.1 and 53733.1
3U/7DU
1x splice cassette including cover
12 pigtails with 1x splice holder (12 x crimp)
24 pigtails with 2x splice holder (12 x crimp)
Overlength cassette
Labelling strip

Number of height units:    3
With Pigtail:    yes

| Art.-No. | Quantity adapter | Adapter | APC | Adapter Colour |
|---|---|---|---|---|
| B88206.12 | 6 | LC duplex | Yes | metal |
| B88921.12 | 6 | LC duplex | No | blue |
| B88922.12 | 6 | LC duplex | No | metal |
| B88206.24 | 6 | LC quad | Yes | green |
| B88925.12 | 3 | LC quad | No | blue |
| B88925.24 | 6 | LC quad | No | blue |
| B88223.12 | 6 | SC duplex | No | blue |
| B88226.12 | 6 | SC duplex | Yes | metal |
| B88228.12 | 6 | SC duplex | Yes | green |
| B88224.12 | 12 | SC simplex | No | blue |

**EFB ELEKTRONIK**

# Compact Media Converter

**CTS**

| Height: | 20.0 mm |
| Width: | 51.3 mm |
| Depth: | 74.0 mm |

| Art.-No. | RJ45-Port | LWL-Port | Mode | Distance |
|---|---|---|---|---|
| MCT-100BTFC-SM30 | 10/100 | SC 100 FX | SM | 30000 m |
| MCT-3002BTFC-SM10 | 10/100/1000 | SC 1000 LX | SM | 10000 m |
| MCT-3002SFP-DR | 10/100/1000 | 1 x MGBIC 100/1000Mbit/s | MM oder SM | - |

# Compact Media Converter
(Single Fiber)

**CTS**

| Height: | 20.0 mm |
| Width: | 51.0 mm |
| Depth: | 74.0 mm |

| Art.-No. | RJ45-Port | LWL-Port | Mode | Distance |
|---|---|---|---|---|
| MCT-3002W2A-SM10 | 10/100/1000 | SC 1000 LX | SM | 10000 m |
| MCT-3002W2B-SM10 | 10/100/1000 | SC 1000 LX | SM | 10000 m |

# 10 Port Gigabit L2 Management Switch
## 8 x 100/1000 SFP, 2 x Combo RJ45/SFP

**CTS**

8x 100/1000Mbps SFP Slots
2x 100/1000Mbps RJ45/SFP
SFP Slots support for MiniGBICs 100FX, 1000BaseX
Management: SNMP, WEB, RMON, Telnet and TFTP management
Features: IPv6, IGMPv3, Multicast, VLAN, QOS, Autonegotiation, Auto MDI/MDIX and more.
1x RS232 RJ45 Port, 1 x Digital input (Terminal block), Diagnostic led
19" Bracket included
Metal housing Fanless (L x B x H): 210 x 235 x 44 mm

| Art.-No. | Description |
|---|---|
| FOS-3110 | 10 Port Gigabit L2 Management Switch, 8 x 100/1000 SFP, 2 x Combo RJ45/SFP |

# 28-Port L3 Lite Managed Gigabit Ethernet Fiber Switch

20x Gigabit-Ethernet SFP Slots with 4x 1G RJ45-SFP Combo Slots
and 4x 10Gigabit SFP+ slots, additionally there is 1x RJ45 MGMT Port
and 1x RJ45 Console Port
The SFP slot supports 1G MGBICs, the SFP+ slot supports MGBIC for
10Gigabit 10GBaseX
Management: SNMP, WEB, RMON, Telnet und TFTP administration
IPv6, Multicast, VLAN, Virtual Stacking, Autonegotiation and Auto
MDI/MDIX and much more.
L3 Features: Multi-netting (CIDR), IPv4 Static Routes, RIP v1/v2,. ARP/
Proxy ARP
19" Mounting brackets included
Metal housing with fan (L x W x H): 440 x 220 x 44 mm

**level one**

| Art.-No. | Description |
|---|---|
| GTL-2872 | 28-Port L3 Lite Managed Gigabit Fiber Switch, 4x 10 GE SFP+, 4x Gigabit SFP/RJ45 |

Copenhagen

Hamburg

Bielefeld

Frankfurt

Sonneberg

Munich

Vienna

Istanbul
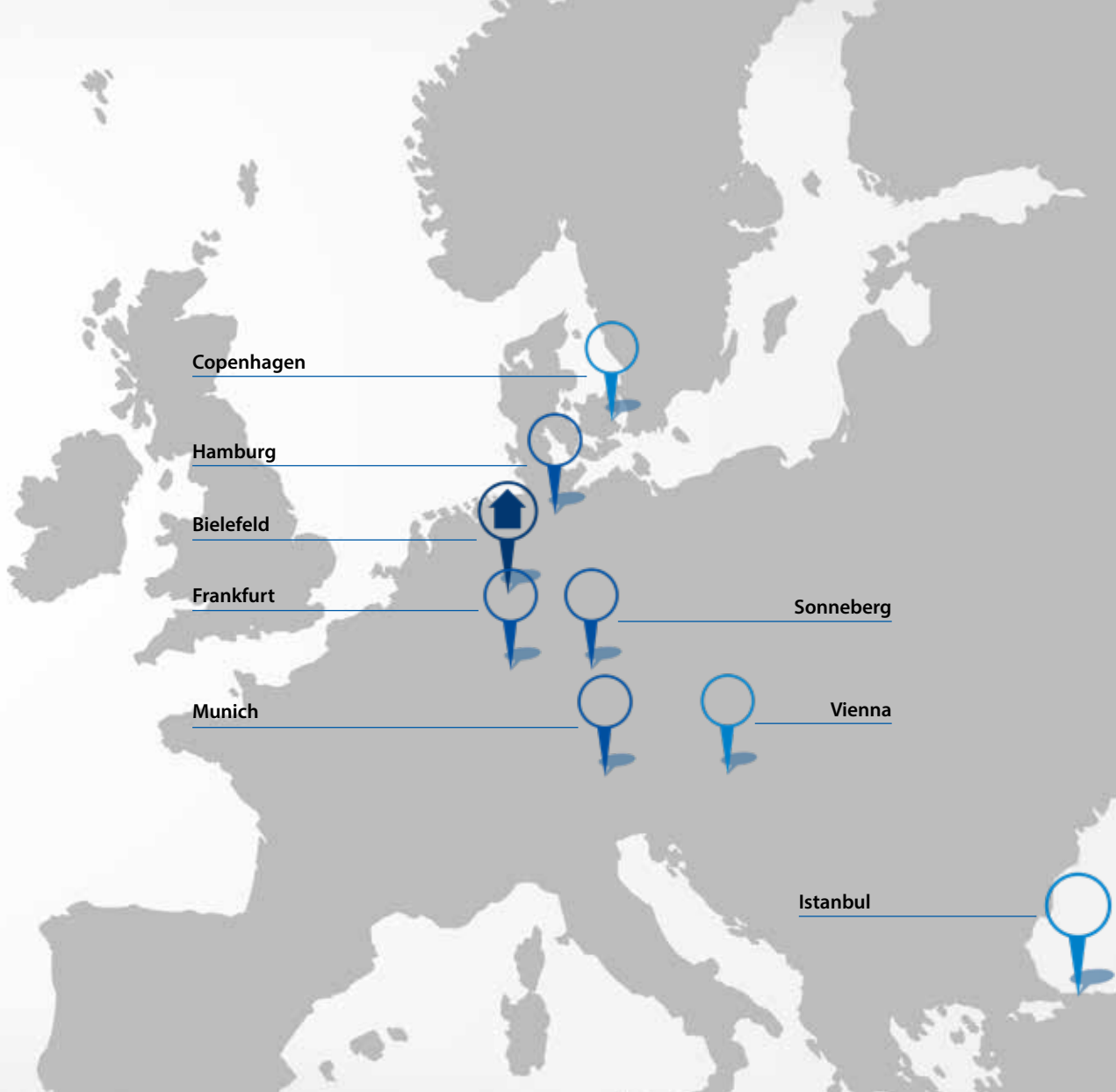
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