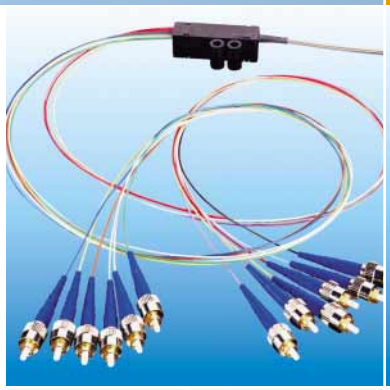
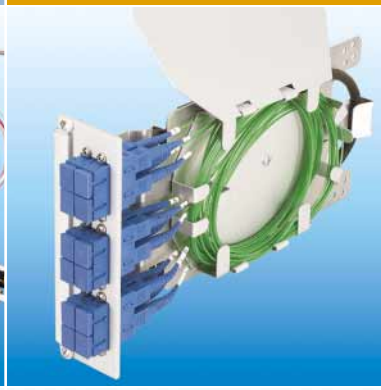
Accessories for Fiber Optic Networks

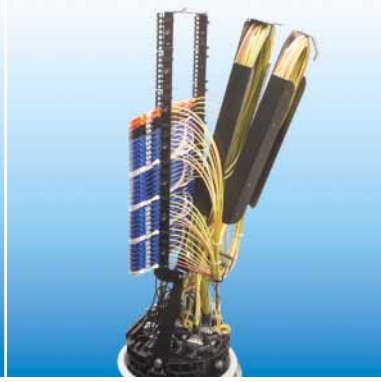
Edition 2

CORNING
Discovering Beyond Imagination

Corning
Cable Systems





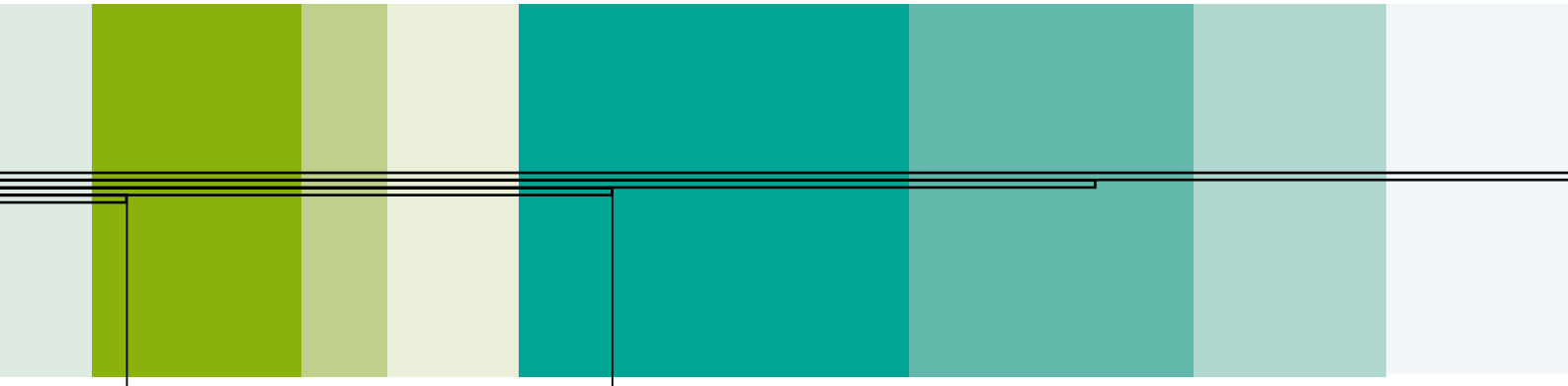


Carrier Networks | Private Networks | OEM | Data Centers | Project Services

Introduction

Fusion Splicers

FO Measuring & Testing Equipment



Fiber Optic Connection Systems, Field-installable Connectors, Mechanical Splices, Fan-out Kits

Fiber Optic Cable Assemblies

Closures for Fiber Optic Cables

Fiber Optic Hardware

Fiber Optic Tools

Additional Information

CORNING CABLE SYSTEMS

> Corning:
An Experienced and Reliable Partner for You

In 2000, Corning consolidated its entire cable, hardware, equipment and services business into Corning Cable Systems. Corning Cable Systems comprises the former Siecor Corporation, BICC's communication cables business (Corning Cables), Siemens' former Communication Cables division and RXS Kabelgarnituren.

With over 150 years of experience in the world of telecommunications, we are an experienced partner you can trust to bring cost-effective solutions to your communication requirements. In the field of fiber optic cable technology, Corning was one of the original pioneers with expertise second to none.

The first milestone was set by Corning in 1970 with the invention of the low loss glass fiber as an optical transmission medium. As early as 1974, when fiber optic technology was still in its infancy, Corning Cable Systems was working with Europe's leading Public Telecommunications companies in developing trial fiber optic cable routes. In the late '70s came the initial projects in the USA which marked the start of a global business embracing a large number of demanding customer projects.

As a leading cable system provider, we can supply our customers not only with individual products but also complete cabling solutions from a single source. To complement our cable developments and the increasing complexity of optical and high performance copper cable networks, we have built up an extensive range of interconnection and distribution hardware.

> The Customer is our Focal Point

Certificate of Registration

Quality Management System

This is to certify that:
Corning Incorporated
Corning Cable Systems GmbH & Co.KG
Zweigniederlassung Hagen
Profilstrasse 4
D-58093 Hagen
Germany

Hold Certificate No: FM 10549

and operate a Quality Management System which complies with the requirements of BS EN ISO 9001:1994 for the scope detailed on the following page:

For and on behalf of BSI:

Certification Manager, Systems Assessment

Originally registered: 1 Aug 1990 Latest issue: 22 Mar 2001 Page: 1 of 3

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CERTIFICATION AFAQ

N° QUAL/1995/3952d

CORNING CABLE SYSTEMS SA

CONCEPTION, FABRICATION ET COMMERCIALISATION DE : PROTECTIONS D'EPISSURES DE CABLES EN CUIVRE A MOYENNE TENSION ET DE FIBRES OPTIQUES, ACCESSOIRES POUR L'INSTALLATION DE CANALISATIONS SOUTERRAINES ET EQUIPEMENTS POUR L'AIGUILLAGE ET LE TIRAGE DE CABLES DANS LES CONDUITES. TRANSFORMATION DE MATIERES PLASTIQUES. ASSEMBLAGE SUR PIECES EN PLASTIQUE. TRAVAUX DE DECOR SUR PIECES EN PLASTIQUE.

DESIGN, MANUFACTURING AND MARKETING AND SALES OF : SPLICE PROTECTIONS FOR MEDIUM VOLTAGE COPPER CABLES AND OPTICAL FIBERS, ACCESSORIES FOR THE INSTALLATION OF UNDERGROUND PIPES AND EQUIPMENT FOR SWITCHING AND PULLING CABLES IN DUCTS. PROCESSING OF PLASTICS. ASSEMBLY ON PLASTIC PARTS. DECORATION WORKS ON PLASTIC PARTS.

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Le Président du Comité de Certification / *The President of the Certification Committee* — A. PIGEONNIER

Le Directeur Général d'AFAQ / *The Managing Director of AFAQ* — O. PEYRAT

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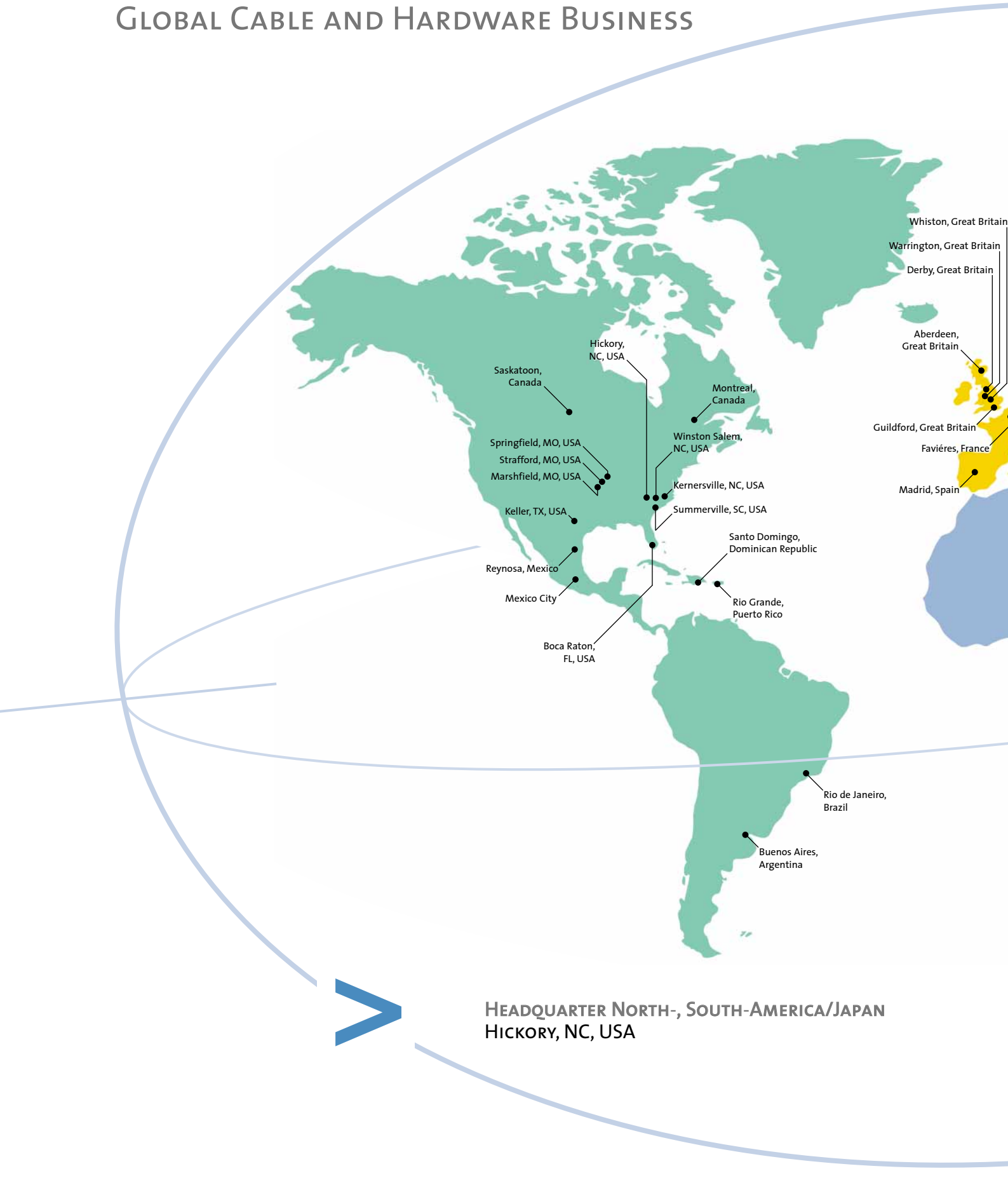
Corning Cable Systems is committed to providing superior product quality and customer support services.

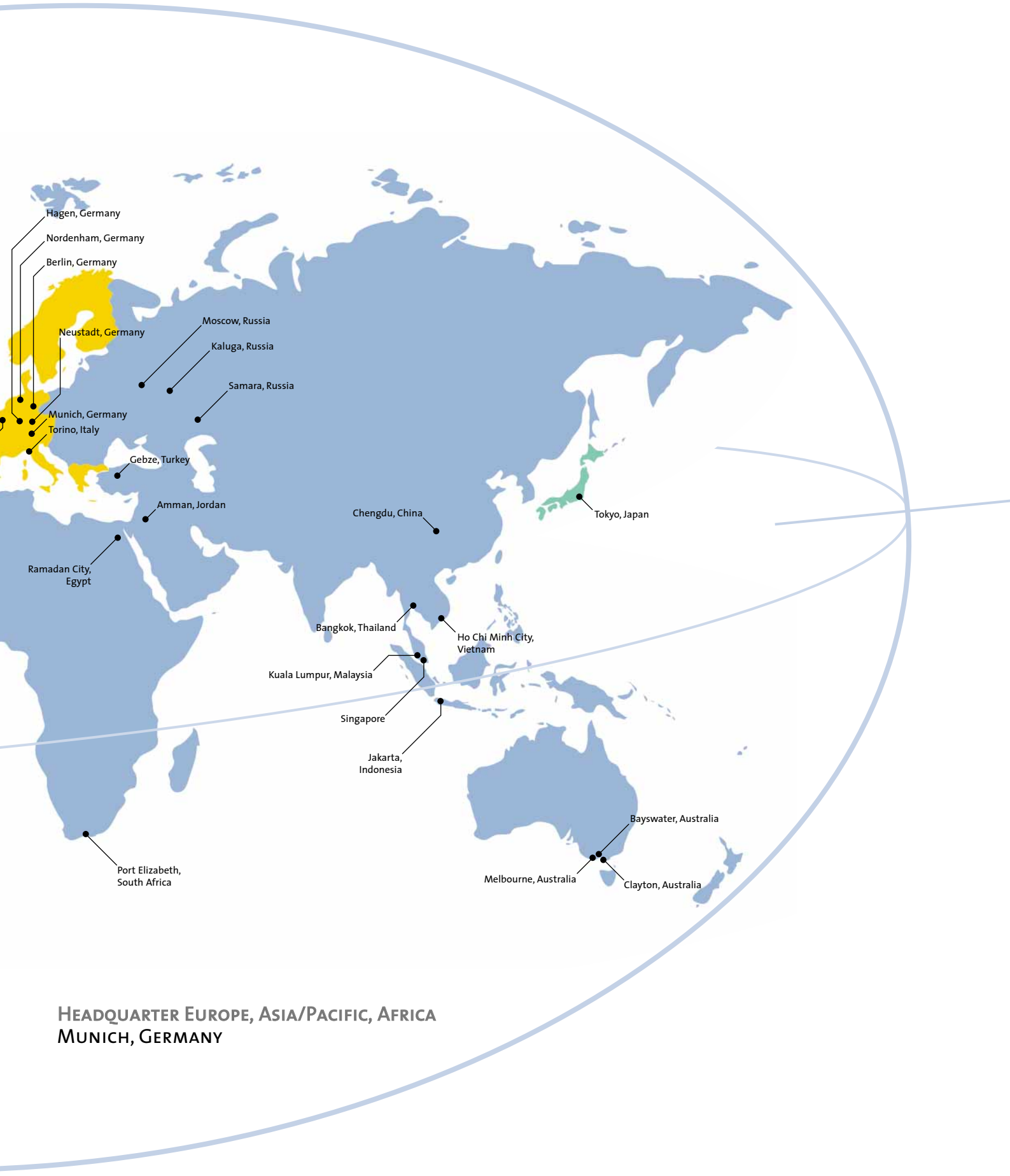
Our global presence is your gain.
Because, wherever you are, Corning is close at hand.

Our quality and environmental management systems are certified of course to DIN EN ISO 9001 and ISO 14001.

Corning Cable Systems:
Global Cable and Hardware Business



Headquarter North-, South-America/Japan
Hickory, NC, USA

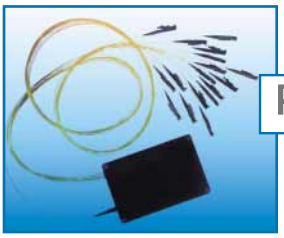


Headquarter Europe, Asia/Pacific, Africa
Munich, Germany

> Corning Cable Systems: Everything from a Single Source

StarWay

Aerial Cables



PhotonWay

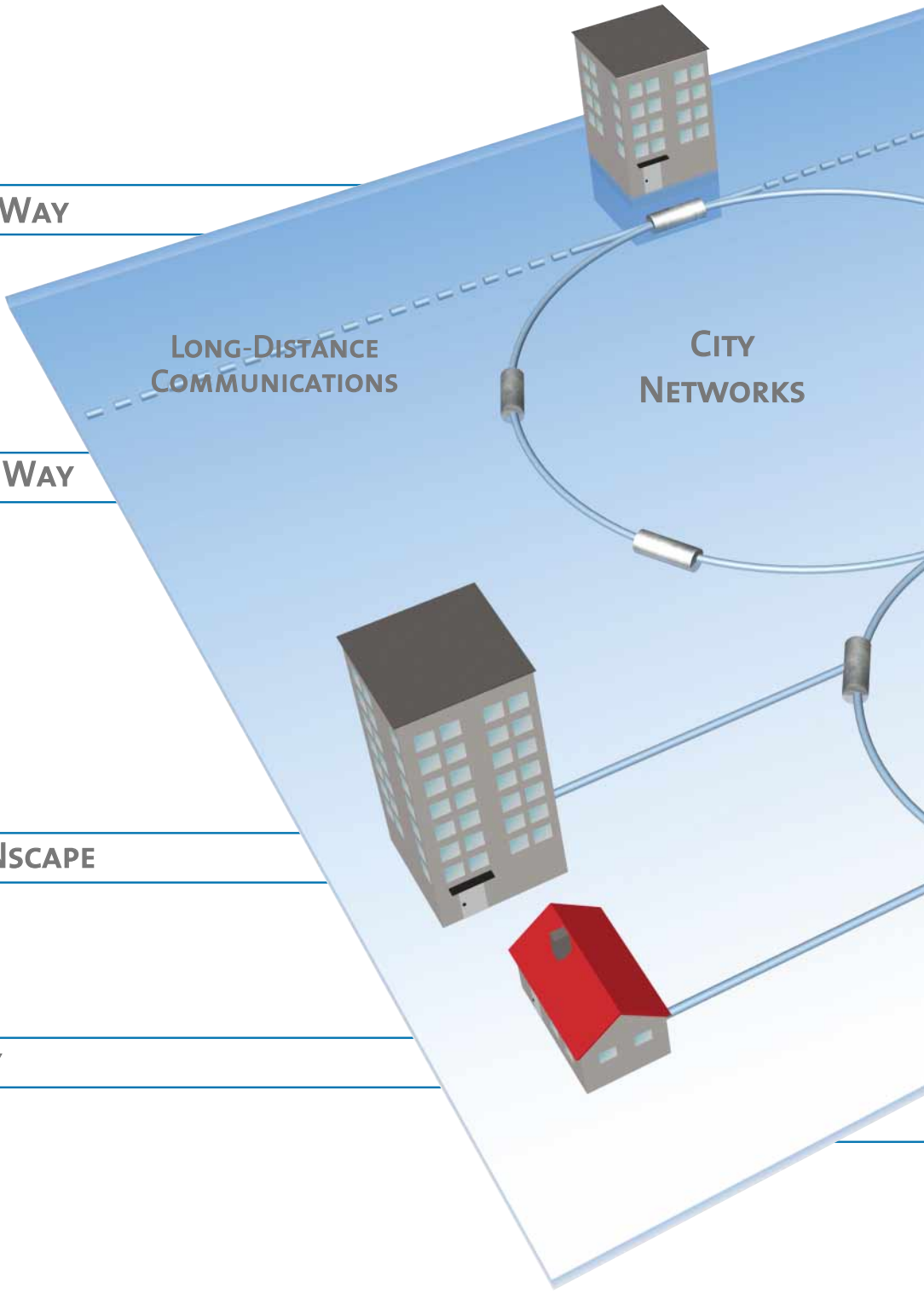
Photonic Components

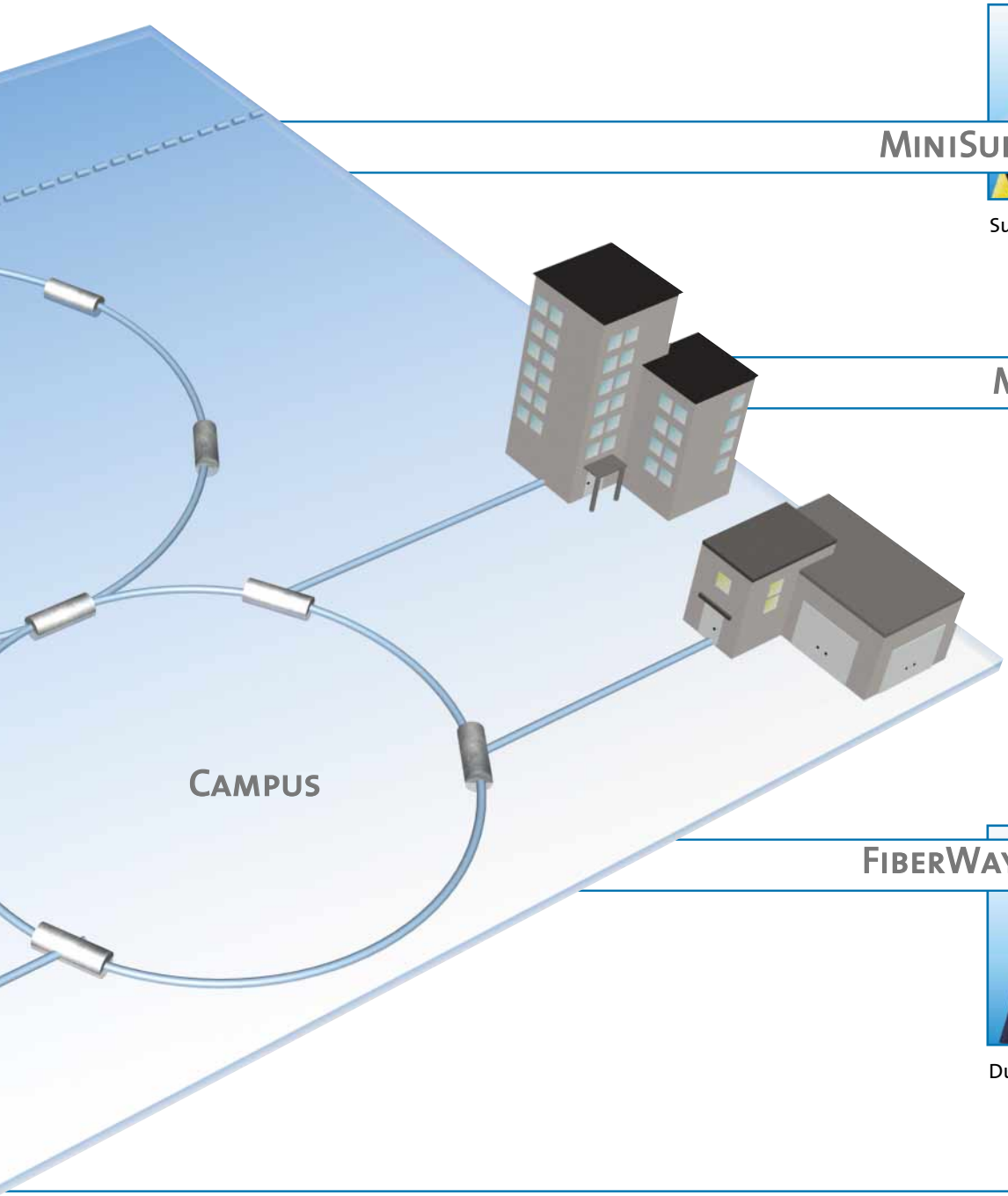
LANscape

Premises Cabling System

HomeWay

Multimedia Home Cabling





MiniSub

Submarine Cables

MCS

Micro Cabling Systems

FiberWay

Duct and Buried Cables

Accessories

Services

> Fiber Optics: The Communication Media of the Future

Optical Fibers in the Network

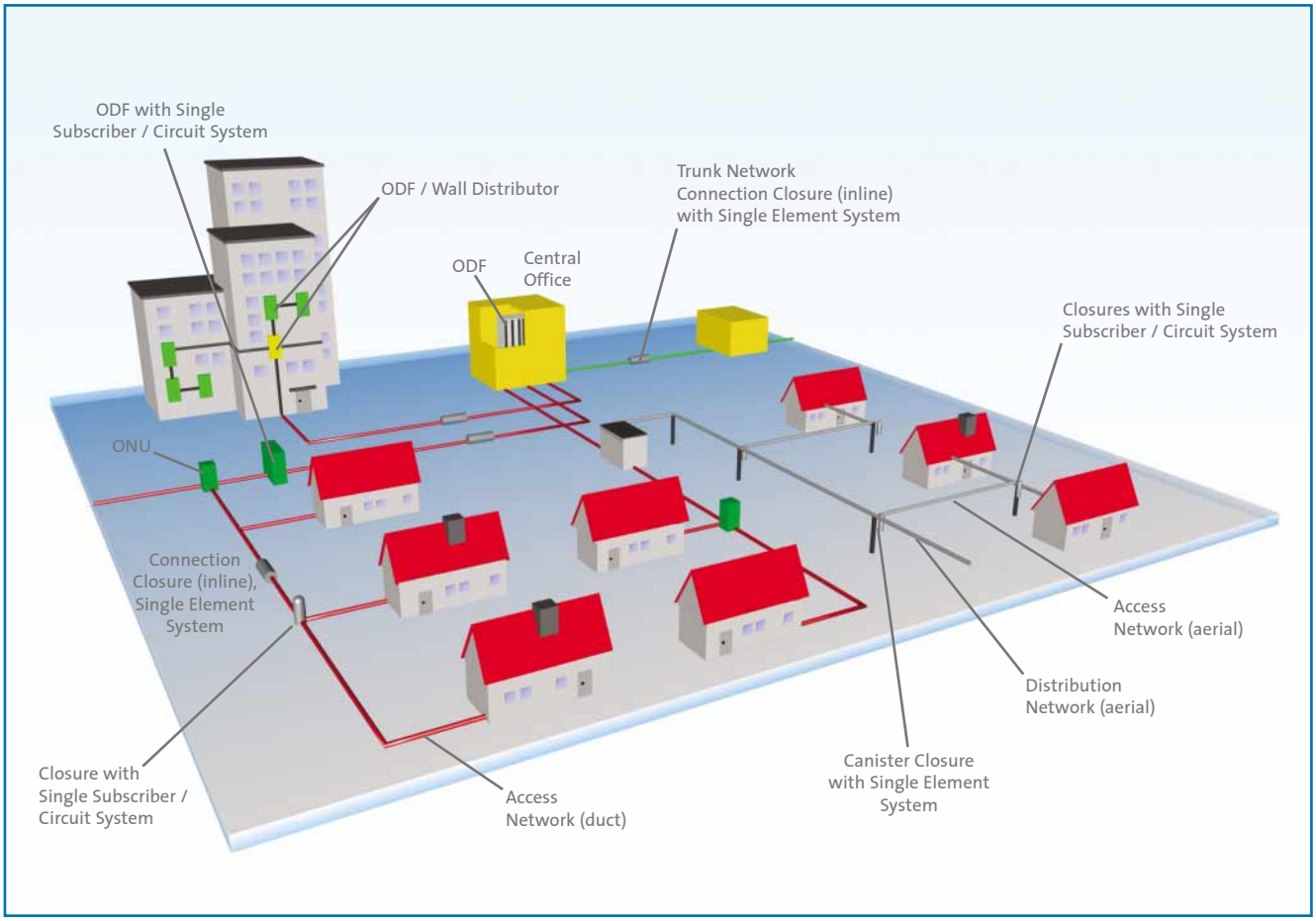
Well developed **communication paths** and infrastructures provide the critical competitive edge. The **rapid advances** in information technology make selecting the right platform for the communication infrastructure a matter requiring a great deal of planning and forethought.
The aim of this is to meet both present and future requirements for **bandwidth**, **service reliability** and **electromagnetic compatibility**.

Fiber optic (FO) cables are in many cases a suitable transmission medium for meeting these requirements. To make the deployment of optical fiber even easier, Corning has developed a complete system around the FO cable. It comprises all the components required for setting up a fiber optic network.

The use of **fiber optic cables** is already an established practice in a number of networking areas. The links between buildings, for instance, are established throughout with **fiber optic cables**. The cables in the riser area, linking the cross-connects on the different floors, are also largely fiber optic.
The next step, logically, is to extend fiber optic cables right up to the work area **(Fiber-to-the-Desk)** so that the end user can also benefit the advantages of fiber optic technology. Using advanced interconnection and termination systems, such as **UniCam™** connectors, cuts overall costs and makes installation significantly faster and easier than for copper cables.

FO cables meet not only the requirements of today's widely used networking systems, e.g. Ethernet and Token Ring, but also those of **future high-speed networks** such as FDDI, ATM or Fiber Channel.

> Fiber Optic Components in Communication Networks



Corning Products

The Corning product range provides a perfectly matched scope of interconnection and termination systems. Different cable types for virtually every application are complemented by coordinated termination and distribution elements, suchs as **fusion splicers**, **closures**, fiber optic **connection systems**, and fiber optic **hardware**.

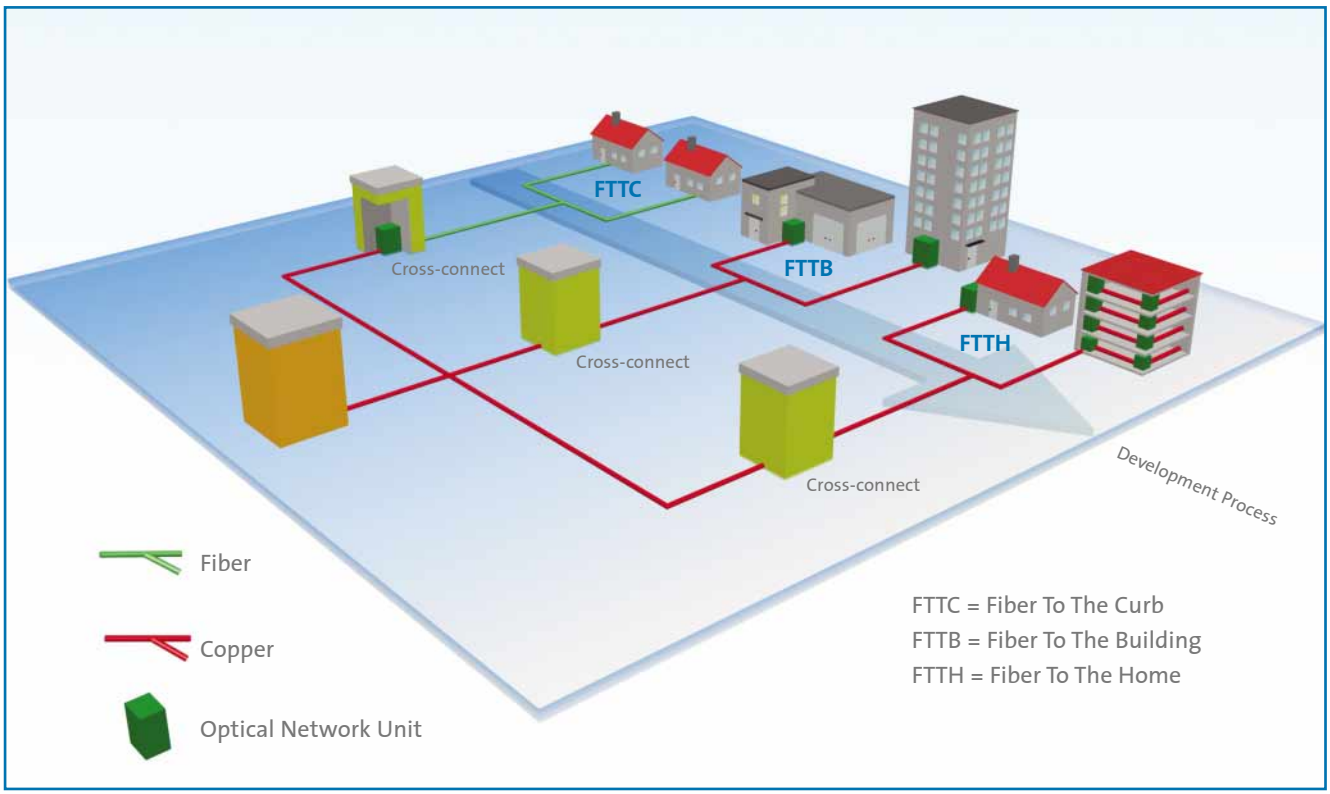
Distribution components are used for organizing outgoing and incoming FO cables and the selected connecting hardware so that subsequent reconfigurations or expansions can be carried out efficiently. The components support the use of various cable termination techniques such as **connectorized cables**, fusion splicing of **pigtails**, **mechanical splices** and **field-installable FO connectors** such as **UniCam™** being modular and compatible with all standard FO connectors and adapters. The distribution components can be installed universally in any structured cabling system.

Our product range also encompasses **training programs** to support our customers with technical expertise and product training in setting up fiber optic networks. These courses cover all the relevant aspects of fiber optic technology from the basics through to field installation.

A **communication network** is divided into 2 major areas (see next page):

- The **Trunk Network** connecting central offices,
- The **Access Network** connecting a central office with homes or offices, e.g. the customer.

> Fiber Optic Components in Communication Networks



Trunk networks

Country by country **fiber optic cables** are replacing existing high-pair copper cable networks. As the fiber is the **state-of-the-art product** almost all new trunk networks are built with fiber cables.

For all these cables the quality demands on the **accessories** are extremely high. Our product range covers the complete demand on **high-tech passive accessories** in a fiber optic trunk network, independent of the fiber count (4 to 2000) or cable structure (single fiber or ribbons; lose tube or slotted core):

- **Fiber Optic Distribution Cabinets and Frames**, e.g. HDC
- **Fiber Optic Closures**, e.g. UCNP Cosure Family or Accent™ Closures
- **Fusion Splicers**, e.g. X60 Fusion Splicer with average attenuation of less than 0.02 dB and active splice loss measurement.

Access Networks

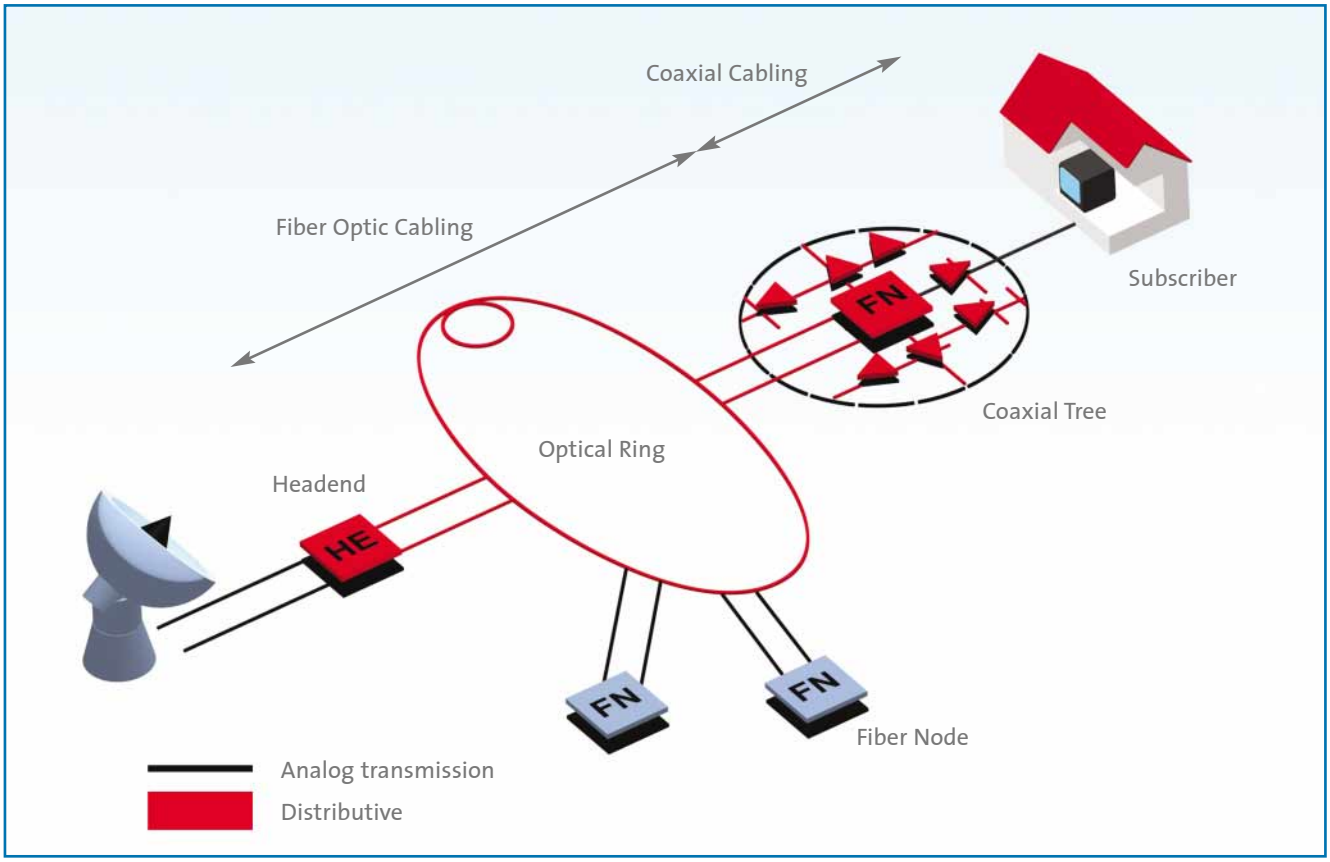
More and more telecoms use the fiber advantages also in the **access network**. The customer demand to have access to **high bandwidth** and higher speed will force fiber closer to the customer.

This will also cause an **increase of the fiber count** per cable. In the past years many projects have taken the fiber successfully close to the customer and it is expected to see direct fiber connections in the near future.

Our product range for these demands covers:

- **Fiber Optic Distribution Frames**, e.g. 19" Network Cabinet FDF 19 with application-specific accessories provided
- **Fiber Optic Closures**, e.g. UCAO or BR FO
- **Fusion Splicers**, e.g. X77 Fusion Splicer with precision core-to-core alignment.

> Fiber Optic Components in CATV Networks



CATV Networks: Focus on Fiber Optic Accessories

CATV networks are analog distribution networks in which the various television programs are transmitted. If fiber optic cables are employed in the trunk area, a dramatic **reduction** in the **amplifier cascade** can be achieved, thus raising transmission quality and network flexibility at optimized cost. Consequently modern **CATV networks use fiber optic (FO) cables** to transmit the signals in the initial sections.

The diagram above shows the architecture of a modern distribution network with its main components. Several optical fibers are combined to form an **optical ring** to which several **opto-electronic converters (FN)** are connected. In addition, unused ("dark") fibers are held in reserve for subsequent expansion. The fiber sections can range **up to 30 km** in length.
A **fiber node (FN)**, comprising an optical receiver with following broadband amplifier, forms the interface between the optical fiber ring and the tree-structured electrical coaxial distribution network that is responsible for conveying the signals from the FN to the subscriber.

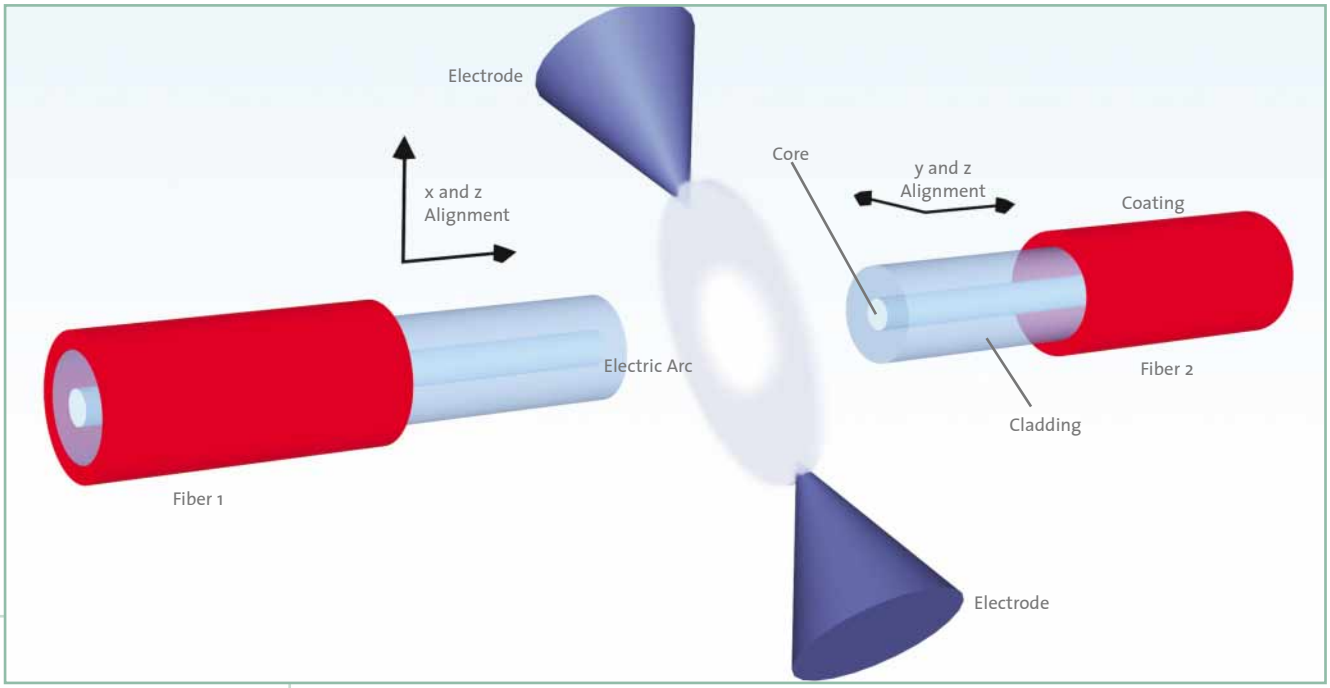
To complete the optical part of a CATV network the following of our products are a must:

- **Distribution Cabinets**, e.g. HDC
- **Fiber Optic Distribution Frame,** e.g. FDF 500
- **19" Inserts**
- **Fiber Closures,** e.g. UCAO or Accent™ Closures
- **Fusion Splicers,** e.g. X75

Fusion Splicers and Accessories

CORNING CABLE SYSTEMS

> Introduction, Fiber Alignment Methods



Principle of thermal splicing

Introduction

When planning a fiber optic (FO) network, the designer needs to take into account both the loss (attenuation) of the FO cable and the loss at the fiber interconnections.

Fiber optic joints are established by the following methods:

- **Fusion splicing**
- **Mechanical splicing**
- **Fiber optic connectors**

Fusion splicing differs from mechanical splices and connectors in that it directly fuses optical fibers together in a high-quality process using a fusion arc. The result is a physical low-loss bond between the fibers, free of air gaps and inclusions. In practical applications, fusion splicers are used for this purpose.

The splicing process typically involves six steps:

1. Stripping the fiber ends with a stripping tool
2. Preparing the endfaces with a fiber optic cleaver
3. Inserting the fiber ends in the fusion splicer and alignment of the fibers by the fusion splicer
4. Fusing the fibers using an electric arc ignited between two electrodes
5. Analyzing the finished splice
6. Protecting and storing the splice

Fusion splicing is the **most accurate and durable method** of permanently interconnecting optical fibers.
Having been prepared, the fiber ends are inserted in the splicer, aligned to each other and fused together. The crucial factor here is to align the signal-guiding fiber cores to each other as accurately as possible.

We offer a fusion splicer family comprising coordinated units designed to meet the different requirements of the various applications. The brief characterization provides an overview of the main products:

Type	Brief Characterization
X60	The **"top-end"-fusion splicer** providing ultra userfriendliness, excellent splicing results and high-reliability splice loss measurement
VISION OEM	**Top-end fusion splicer** for a wide variety of specialty fibers used in **photonic assembling factories**
VISION CDS	**Top-end fusion splicer** providing excellent splicing results by use of the **core detection system**
X77	The **"high-end" fusion splicer** in the compact fusion splicer class with precise core-to-core alignment
X76	The **mid-range model** of X7-series with 3-axis cladding alignment
X75	The **economical fusion splicer** with fully automatic fiber alignment and splice loss estimation
X75-12	The compact **multi fusion splicer** for up to 12 fibers or **fiber ribbons** with automatic fiber alignment and splice loss estimation

Fiber Alignment Methods

There are basically two different types of alignment methods:

- **Core-to-core alignment**
- **Fixed v-grooves**

Core-to-core alignment is performed automatically by stepper motors and / or high precision piezoceramic actuators. For core-to-core alignment, adjustment must be possible in three directions: vertical, horizontal and axial, i.e. in the fiber direction.

Alignment with fixed v-grooves is a passive x/y alignment. The fiber ends in the fusion splicer are adjusted vertically and horizontally by the particular v-grooves as according to the fiber outside dimensions.

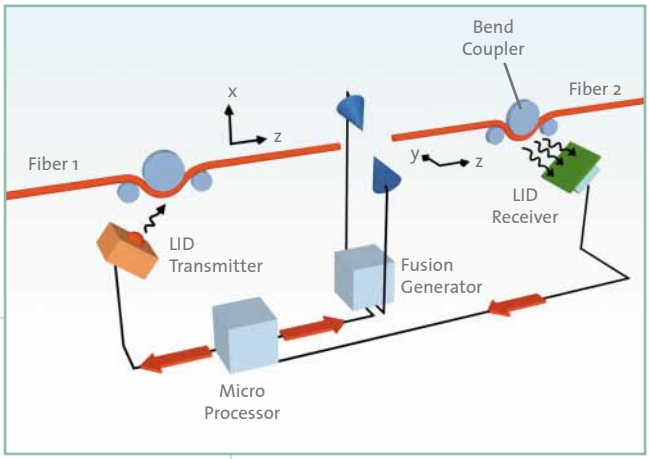
> Process Control Systems

LID-System™, AFC™

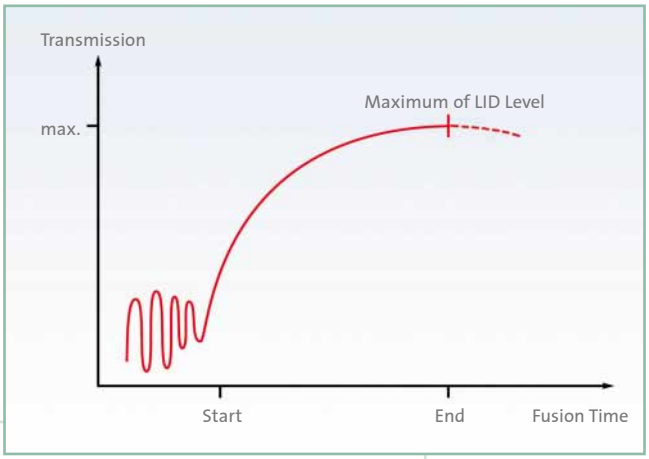
Process Control Systems

The core-to-core alignment fusion splicers X60 and X77 use two complementary systems to control the splicing process: the **LID-System** and the **L-PAS** video image evaluation system. These fusion splicers automatically select the most suitable process control system so that operator error is virtually eliminated.

The image of the fiber ends is determined in all Corning fusion splicers by the video image evaluation system **L-PAS**. The video signal is digitally analyzed and used to detect fiber position, end-face quality, contamination and mechanical damages. This controls the alignment process and estimates the splice loss.



Principle of the LID-System



Principle of Automatic Fusion-time Control AFC

LID-System (X60 and X77)

The **LID-System (Local light Injection and Detection)** enables Power Through Measurement and provides:

- **Precision core-to-core alignment of the fibers**
- **Automatic Fusion-time Control AFC**

The **LID-System of the X60** provides in addition:

- **Real splice loss measurement**
- **Automatic fiber type detection by near-field scanning**

Light in the single-mode range at the measurement wavelength of 1300 nm is injected by the left bend coupler (transmitter) into the fiber core and is detected in the bend coupler on the right (receiver).

The **LID-System** is suitable for all common fibers with 250 µm primary coating. The benefits of the LID-System can also be applied to splicing tight-buffered pigtails with coating diameters of more than 250 µm by using the appropriate pigtail adapters.

Automatic Fusion-time Control AFC (X60 and X77)

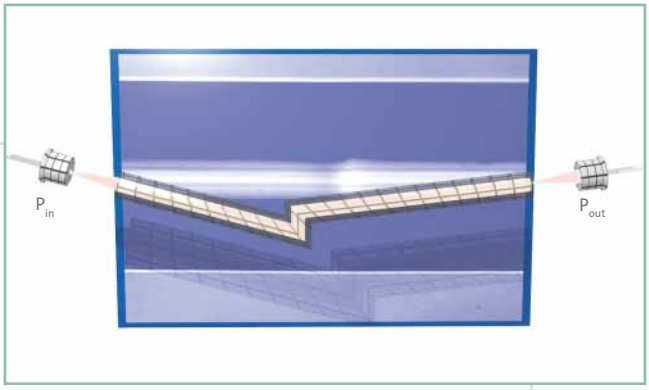
The light power transmitted through the splice during fusion is evaluated by the **AFC** which terminates fusion when the best possible transmission is reached. This automatically compensates for fiber characteristics, electrode condition as well as varying environmental conditions (humidity, barometric pressure, temperature etc.) so that the lowest possible splice loss is achieved for each individual splice.

V-LID

After splicing the loss needs to be verified. The X60's **LID** is the most accurate local splice loss measurement system, since it measures the influence on real light travelling through the splice. However the **LID-System** is restricted to 250 µm fiber coating diameter or the accessibility of a connector at one fiber end.
To overcome these limitations and to make the advantages of the **LID** accessible also for customers that need to splice e.g. 900 to 900 µm fiber Corning invented the virtual light injection and detection system (**V-LID**).

Principle of Operation

The **V-LID** idea is a transfer of the complete splice region to the virtual domain. The real splice is first 3D-scanned by the **Core Detection System (CDS)**. Based on this data the real splice refractive index distribution is replicated as a virtual splice computer model.

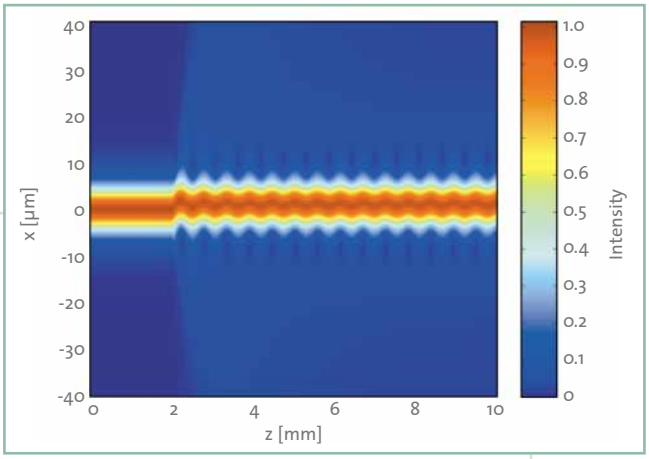


V-LID Principle of Operation

The splice loss is calculated by launching virtual light (P_{in}) into the virtual splice and detecting the virtual power after the splice (P_{out}). Since virtual light does not require any bend couplers the **V-LID** has no coating or similar restrictions.
The electromagnetic lightwave can be calculated, based on the refractive index distribution of the splice, by the beam-propagation method (BPM) in a step-by-step way, by initially launching the fundamental mode into the virtual splice model.

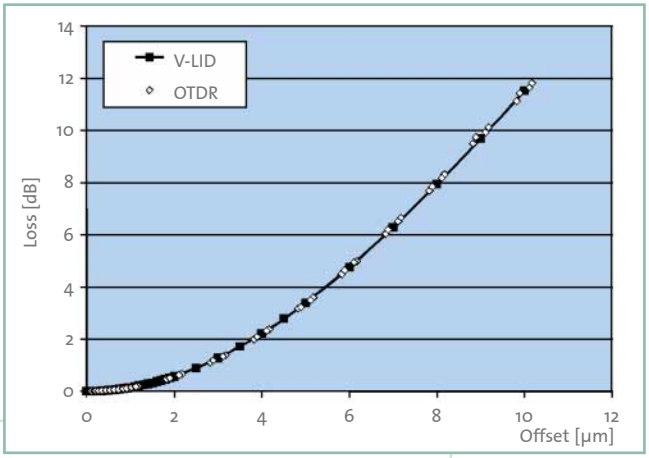
V-LID Loss Calculation Results

Below the **V-LID** simulation results for a Corning SMF-28™ standard single-mode fiber with radial fiber core offset are shown.



V-LID Simulation of Fiber Core Offset of 1 µm

Light is launched into the fiber core on the left and travels to the right. Red identifies high, blue low light intensity. Since the loss of an undisturbed fiber is nearly zero, there is no change for the first 2 mm. Then the light hits a 1 µm core offset. A part of the light is radiated out of the calculation window and higher modes are launched. Both effects contribute to the splice loss.



Results of V-LID Loss Calculation

Since the **V-LID** considers all loss mechanisms the results are nearly as accurate as with the **LID-System**. The diagram above shows loss values for certain fiber core offsets. The losses obtained by the **V-LID** show an extremely good correlation with the values measured bidirectionally by an OTDR.

> Process Control Systems

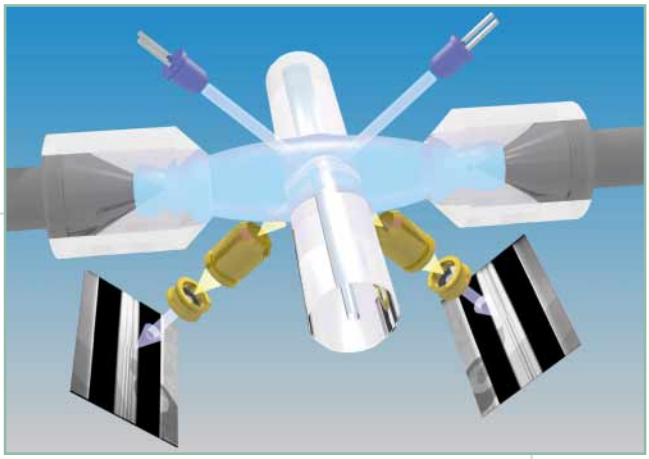
CDS Core Detection System

Introduction

To achieve lowest possible splice loss values, a 3-axis core-to-core alignment is necessary. This can be done either by through-power measurement using the LID-System (see page 20) or by image analysis using the Core Detection System CDS.

Principle of Operation

The CDS uses a high-power LED to illuminate the fiber directly at the splice location. The light crosses the fibers and is projected onto a CCD camera by a microscopic lens.

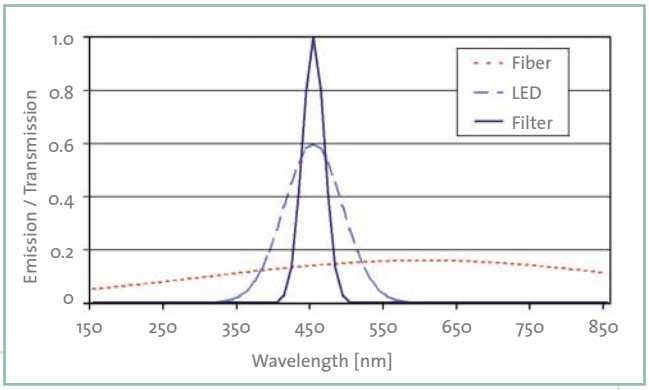


Schematic View of the Core Detection System (CDS)

The light crossing the fiber is refracted according to the fiber's refractive index profile. The rays that hit the fiber closer to its center are focused by a cylindric lens. As a result a bright focus line appears at the center of the fiber image. The light that hits the fiber core is focused even stronger, due to the increased refractive index of the fiber core. Because of the shorter focal distance of these rays the edges of the fiber core appear dark in the center of the focus line.
The resulting image is viewed by two CCD cameras. The microprocessor of the fusion splicer analyzes the images and evaluates the geometry of the fiber core for further examination (see page 21). This analysis is done in two axes (X- and Y-axis) to allow for a three-dimensional fiber core inspection.

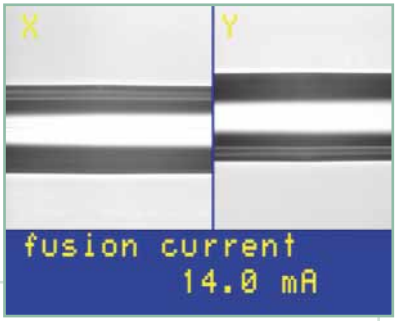
Additional Features

The structure of the fiber core is only a few micrometers in diameter. As a result the sharpness of the fiber core image is limited by the wavelength of the core imaging system. The CDS uses high-power short wavelength blue LEDs to deliver an incredibly sharp and detailed image even for fibers with extremely small core diameters like erbium doped fibers. This allows an extremely accurate fiber core alignment and loss evaluation for all fiber types.
The heated fiber irradiates very intense broad-band light during the fusion process. The imaging cameras of most splicing machines become overloaded by this, resulting in a white picture during splicing. The most critical part of the splicing process, the fusion of the fibers, can not be observed.



Light Radiation from Heated Fiber, Illumination LED and Narrow-Band Filter

The CDS system uses a special narrow-band filter to block the light radiation of the heated fiber and allows only the illumination LED light to pass through. By this the complete melting process of the fibers can be observed and controlled. The fusion splicer analyses the fiber images and adapts the splicing parameters automatically to achieve the lowest losses for each individual splice.

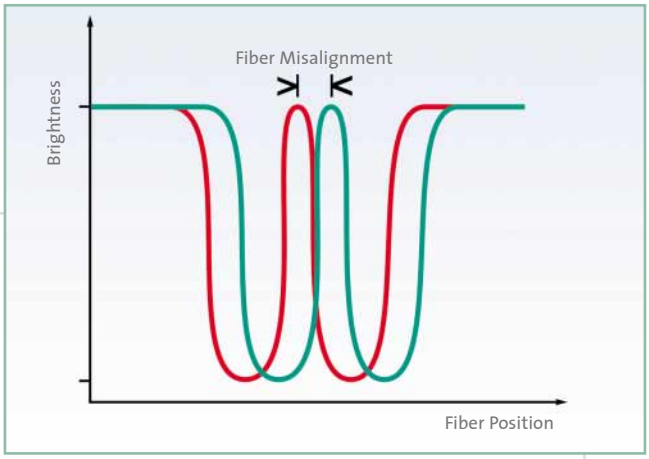


Clear CDS Fiber Image During Fusion allows to Analyze Melting Process

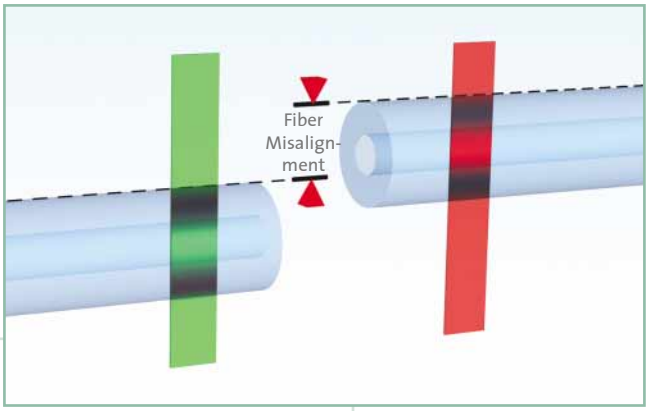
L-PAS Video Image Evaluation

The image of the fiber ends in two views is determined by the **L-PAS (Lens-Profile Alignment System)** by means of two optic systems. The **L-PAS** video image evaluation system uses the light intensity profile from the video image columns and lines. The light intensity profile comprises all visible details of the fiber, including any shadows along the center of the fiber, damages, fiber offsets as well as dust and dirt.

All relevant samples of the intensity profiles (brightness over video image columns) of the fiber pair in both directions (x- and y-view) are taken into consideration within a cross correlation function. The cross correlation function is used to calculate the offsets and fiber deformations necessary for the alignment, endface quality detection and splice loss estimation. As an example the intensity profiles of two video columns (indicated by green and red lines) of two corresponding fibers are illustrated by the pictures below.



Intensity profile over two video image columns of a corresponding fiber pair with offset



Example of intensity (brightness) over two video image columns in one fiber view

From the cross correlation function of all detected intensity values over the total fiber the offset in the two columns is calculated. The splice loss is calculated from the offset before splicing and the course of the fiber axis after splicing.

In addition the video system enables the simultaneous display (excluding **X75-12**) of both fiber views on the built-in monitor.

For increasing the magnification and image size the image can be displayed on an external monitor using the video output jack of the fusion splicers.

When used together with the **LID-System** (**X60** and **X77**) or the **CDS** (**VISION CDS** and **VISION OEM**), the **L-PAS** enables fast pre-alignment, automatic compensation for bad cleave angles up to 2.5° between both fiber ends as well as poor fiber positioning in the fiber guide, thus minimizing the need to repeat fiber preparation.

> Operation

The fusion splicers **X60, VISION OEM, VISION CDS, X77, X75, X76** and **X75-12** with **intelligent software** permit convenient control of the splice process and additional functions. All fusion splicers enable fully automatic operation by the press of one button, as well as manual operation.

During splicing the **alignment** and **fusion process** is shown on the monitor including the display of additional information, e.g. fiber offset values, fusion time, core eccentricity and the splice loss result.

All fusion splicers have **factory-preset programs** for all common types of fibers including special fibers. Nevertheless **user-defined programs** can be created easily. The parameters which are critical for splicing quality are free to program. Hence each splice process can be controlled individually. These customized combinations of splice parameters can be retrieved and modified at any time.

A password can be entered to protect all parameter sets from unauthorized or accidental changing. In multimode fiber splicing, the fiber ends are rounded before the fusion process, thus significantly reducing the risk of glass bubbling.

Multi Fusion Splicer X75-12

Fusion Splicer X60

The **core-to-core alignment** fusion splicers **Vision OEM, Vision CDS, X60** and **X77** provide in addition the selection of splice process modes. Different splice process modes can be selected to optimize splice cycle time, splice quality and accuracy of splice loss estimation.

The **fixed v-groove** fusion splicers **X75** and **X75-12** evaluate the fiber position. For pre-adjustment of splice quality the limiting values for fiber offset and endface quality of the fibers can be changed by the user. The fusion splicer will warn the operator before the fusion process is started, if the tolerance limits are exceeded and inadequate splice quality is thus foreseeable

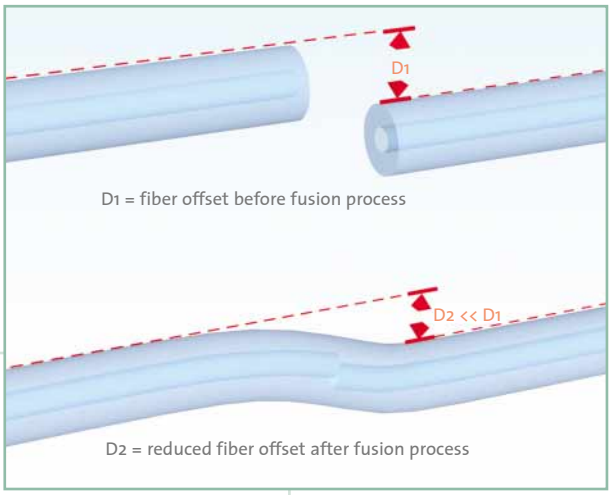
> Influences on Fusion Process

Self-centering Effect, Core Eccentricity, Fiber Endface Quality

Different factors influence the fusion process.
The main factors are:

■ **Self-centering effect:**

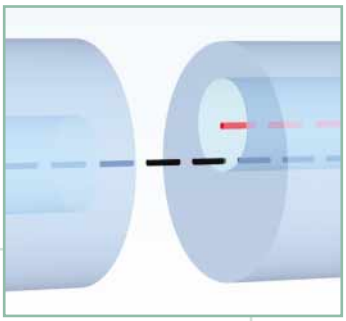
The **self-centering effect** is the tendency of the fiber to form a homogeneous joint which is consequently free of misalignment as a result of the surface tension of the molten glass during the fusion bonding process. The self-centering effect leads to **compensation of fiber offset**. For this reason it is possible for fusion splicers with fixed v-grooves to achieve average splice losses of less than 0.05 dB if the core cladding concentricity (ccc) of the fibers is low (e.g. ccc < 0.4 µm).



Principle of self-centering effect

■ **Core eccentricity:**

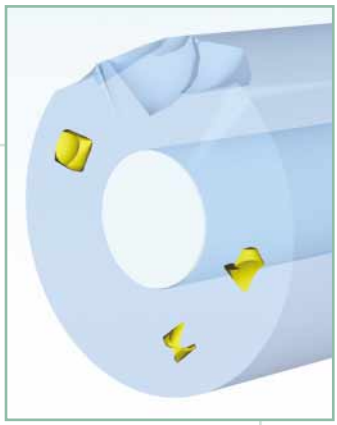
With fixed v-groove fusion splicers, fibers with high **core eccentricity** can cause, depending on the position of the relating cores, increased splice losses due to the core offset within the splice.
The core-to-core alignment fusion splicers **Vision OEM, Vision CDS, X60** and **X77** compensate the core eccentricity with their precise core-to-core alignment. Depending on the grade of eccentricity and the position of the fiber cores in relation to each other a compensation of the self-centering effect might be necessary. For this reason the eccentricity between the relating cores is displayed and taken into account.



Concentric fiber and fiber with core eccentricity

■ **Fiber endface quality:**

The **endface quality** of fibers to be fused directly influences the splice loss. Thus, when cleaving fibers for splicing, the endface of the fiber has to be clean, unchipped, flat and perpendicular to the fiber axis. **All Corning fusion splicers** compensate for bad cleave angles up to 2.5° between both fiber ends. Additionally they detect dirt and mechanical damage with their **L-PAS video image evaluation** and will give a warning message if cleaning with the cleaning arc is not successful after two attempts. This ensures that always best splice loss is achieved and fiber preparation has to be repeated only if necessary.



Bad endface quality

> Influences on Fusion Process

Fiber Preparation Quality, Dirt, Melting Characteristics, Electrode Condition

Fiber preparation quality

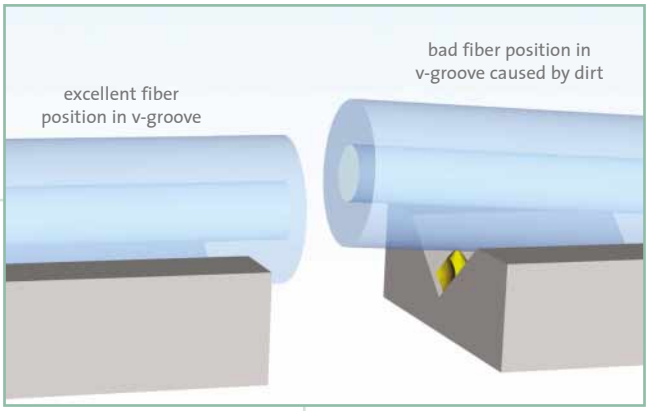
When **preparing the fibers** for splicing, e.g. when stripping the fibers, it is necessary to ensure that no damage occurs to the fiber cladding. Any damage to the unprotected glass of the fiber can produce micro-cracks causing the fiber to break during handling, splicing or storage.

The **tensile tester** incorporated in **all fusion splicers** is used to check the unprotected splice and to verify its mechanical strength prior to protection by a splice protector (e.g. crimp or heat-shrink protector) for long-life storage in the closure, splice module or splice tray. In addition the **LID-System** of the **X77** and **X60** "looks" through the splice during the tensile test to detect an increase in splice loss.

Dirt particles or coating residues in the v-grooves

Any **contamination** of the fiber cladding or in the v-grooves can lead to bad fiber positioning. This can cause fiber offset (fiber axis misalignment) and can influence the fusion process like bad cleave angles.

The **Vision OEM, Vision CDS, X60** and **X77** are able to **detect the fiber core position**. Usually, the influence of the fiber position can totally be compensated by the core-to-core alignment. In addition the **Vision OEM, Vision CDS and X60** fusion splicers **measure the fiber axis angle** of both fibers to inform the user about the v-groove condition and to correct the reference value for the splice loss measurement.



Fiber positioning in v-grooves

Fiber melting characteristics

All fusion splicers provide a special **tip rounding function** for multimode fibers prior to pre-fusion, which reduces the risk of gas bubbling and thus the need to redo the splice. This is due to the higher degree of doped core glass in multimode fibers, which are more critical than single-mode fibers, regarding the occurance of gas bubbles during the fusion process.

Electrode condition

A reproducible and stabile fusion arc is necessary for high-quality splices. The fusion arc is influenced mostly by the **electrode condition**. Due to wear and contamination, e.g. by vapouring particles during fusion, the electrode condition will change during normal operation. That is why electrode cleaning (manually or by cleaning arc) or electrode replacement is necessary from time to time.

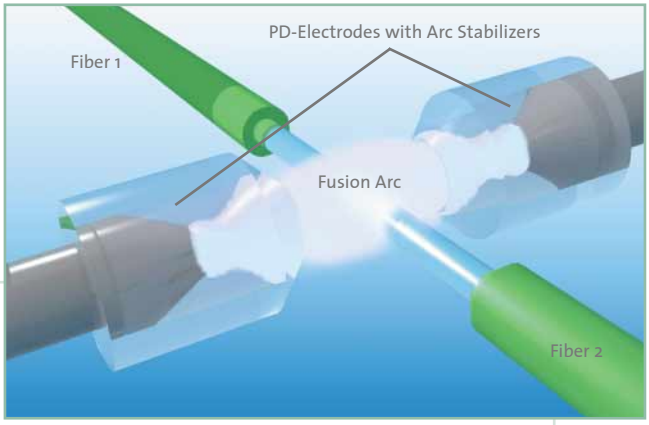
All fusion splicers are equipped with **electrode maintenance counters** to remind the operator of electrode cleaning and replacement in selectable intervals. The **X75-12** provides a **parameter optimization function** which optimizes the selected fusion parameter by means of an arc test.

> PD-Electrodes (Precise Durable)

For Fusion Splicers X60, VISION OEM, VISION CDS, X77 and X76

Application

These new **PD-Electrodes** for fusion splicers are absolutely **maintenance free**, **worry free** and will **reduce the average splice loss up to 50%**. An **arc-stabilizer** on these PD-Electrodes guarantees both high precision and long-life durability. A cleaning arc, which is applied by the splicing machine automatically, is sufficient to ensure continued low loss splicing for at least 7000 arcs with standard settings.



PD-Electrodes with arc stabilizing quartz glass tubes

Features

- **No manual cleaning** of the PD-Electrodes is necessary
- **Less maintenance time** means more splicing time
- **Stabilization** of fusion arc and heating of fibers
- **Worry free operation** regarding the condition of the arc
- **Reduction** of the average splice loss up to 50% for higher productivity
- **No training required** for removal, cleaning and re-installation
- **No damaged electrode tips**

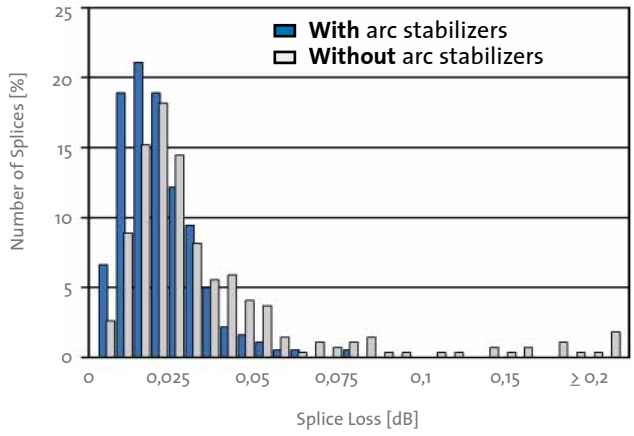
Splice Loss

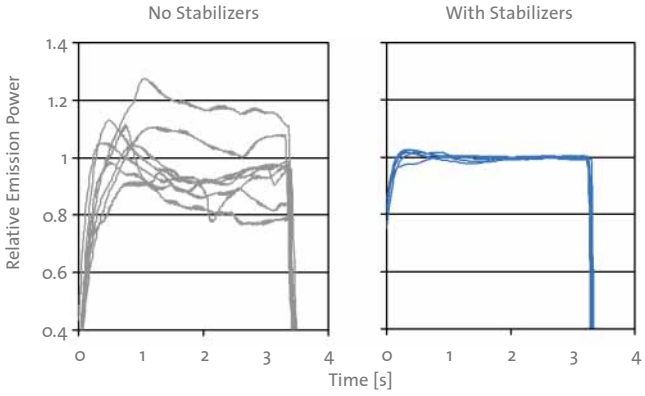
Splice tests show that the average **splice loss with PD-Electrodes is significantly lower** than splice losses with standard electrodes.

The standard deviation of the splice loss values with new PD-Electrodes was also reduced to 0.02 dB.

Average Splice loss with SMF 1528 (lab):

- **With** arc stabilizers average: **0.017 dB**
- **Without** arc stabilizers average: **0.030 dB**





Consistent Heating of Fiber

The **arc stability** ensures even and **consistent heating** of the fibers directly at the splice point which is critical in maintaining repeatable low loss splices, especially with today's non-zero dispersion fibers (e.g. LEAF™, MetroCor™, TrueWave™, Teralight™)

> Fusion Splicers

Overview

X60

VISION CDS

VISION OEM

X77

X76

X75

X75-12

Fusion Splicer Type	X60 page 30	Vision OEM page 32	Vision CDS page34	X77 page 36	X76 page 38	X75 page 40	X75-12 page 42
Application							
Single- and Multimode silica glass fibers	■	■	■	■	■	■	■
Special fiber diameters		■					
Fiber ribbons up to 3.2mm width							■
Average Splice Loss (for identical fibers)							
Standard Single-mode Fibers [dB]	< 0.015	< 0.015	< 0.025	< 0.020	< 0.030	< 0.050	< 0.050
Multimode Fibers [dB]	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020	< 0.050
Dispersion shifted fibers [dB]	< 0.035	< 0.035	< 0.040	< 0.040	< 0.100	< 0.150	< 0.150
NZDS-Fibers [dB]	< 0.025	< 0.025	< 0.035	< 0.030	< 0.120	< 0.150	< 0.150
Fiber Alignment							
No. of axis	3-axis	3-axis	3-axis	3-axis	3-axis	1-axis	1-axis
Fixed V-Grooves						■	■
Clamping on glass / coating	■ / ■	■ / ■	■ / ■	■ / -	■ / -	■ / -	■ / -
Core-to-core Alignment	LID	CDS	CDS	LID			
Fusion Time Control	AFC	AFCi	AFCi	AFC			
Video Image Evaluation	L-PAS	L-PAS	L-PAS	L-PAS	L-PAS	L-PAS	L-PAS
Splice Process							
Typically					10-20 s	< 15 s	< 1 min.
Mode "Fast"	10-20 s	15 s	15 s	10-20 s			
Mode "Precise"	25-35 s	20 s	20 s	30-40 s			
Splice Loss Analysis							
Real Splice Loss Measurement	■						
Estimation		■	■	■	■	■	■
Additional Features							
Altitude Compensation above MSL	4000 m	4000 m	4000 m	4000 m	4000 m	4000 m	3500 m
Illumination of fiber insertion area	■	■	■				
PCMCIA Card	■	■	■				
Splice Loss Memory							
- on board	1 000	1 000	1 000	250	250	250	250
- PCMCIA, 20 MB	60 000	60 000	60 000				
Magnification	100x	180x	180x	100x	100x	100x	26x
Software download	■	■	■				
Fixed Programs	13	13	13	9	7	7	10*
User Programs	50	50	50	10	10	10	-
Tensile Test	■	■	■	■	■	■	■
Automatic Power Down Function	■	■	■	■	■	■	■
Climatic Conditions							
Storage Temperature	-20°C to +70°C			-40°C to +70°C			
Operating Temperature	-5°C to +50°C						
Relative Humidity	Up to 93%						

** X75-12: parameters of fixed programs can be changed by user*

> Fusion Splicer X60

The completely re-designed **X60** offers the solution for all **precision single-fiber splicing** applications. With its new features, it is adapted to the requirements for a modern work environment with high user-friendliness and independence. Although a new design, the **X60** retains the core design that has made it known as the premier unit for precise, reliable and robust field fusion splicing.

Application

- Perfect for splicing all common single- and multimode silica glass fibers as well as special fiber types (e.g. titanium-coated, LS, CS, DS and NZDS fibers such as TrueWave™ and LEAF™ fibers).
- For networks where extremely low splice loss is required: splice loss typically less than 0.02 dB for identical standard single-mode fibers and typically less than 0.01 dB for multimode fibers.
- Provides reliable and reproducible splice results, regardless of fiber type, fiber make, fiber preparation or user skill.

Fusion Splicer X60 with mounted accessories

Features

- Precise **core-to-core alignment** with **1300 nm LID-System™**
- **Optimization of each individual splice process** to achieve the lowest possible splice loss with **Automatic Fusion-time Control AFC™**
- **High-resolution video image evaluation L-PAS™** for fast fiber pre-alignment, fiber position and end-face evaluation as well as contamination detection
- **Real splice loss measurement**
- **Fully automatic splice process** with one button operation
- Splice process modes for **fast** or **precise** operation
- **Automatic detection** of various **fiber types**
- High-contrast **5.5-inch LCD color monitor**, magnification approx.: 100 x
- **Fiber insertion area** is brightly **illuminated**
- **13 fixed programs** for all common fiber types
- **50 user-defined programs**
- **Attenuation splice function** for producing in-line attenuators from 0.1 to 10 dB
- **Erbium-doped fiber** splicing capability
- **Tensile test facility**
- Integral universal **pigtail adapter** for splicing tight-buffered pigtails with LID-System
- **Slot for two rechargeable 2.3 Ah batteries**
- **Splice data memory** for up to 1000 splice results
- Two **power outlets** for additional accessories
- **Altitude compensation** up to 4000 m (13000 ft) above sea level
- **Data interface** for download of the splice loss values and program parameters as well as for **software update**
- **PCMCIA slot** for splice memory extension and error detection

Scope of delivery and order numbers of the X60 and accessories see page 44

Technical Data X60

Fiber requirements	Single- and multimode silica glass fibers with cladding diameter of 125 µm and coating diameters from 250 µm to 900 µm
Fiber clamping	On 125 µm cladding or on 250 µm primary coating by using exchangeable fiber guides
Splice loss (with identical fibers)	■ Multimode fibers: typically < 0.010 dB ■ Standard single-mode fibers: typically < 0.015 dB ■ Dispersion-shifted fibers: typically < 0.035 dB ■ NZDS fibers: typically < 0.025 dB
Splicing operation	Fully automatic (one button operation) or manual
Splice process control	Core-to-core alignment and Automatic Fusion-time Control AFC with LID-System. Alignment and fusion process by video image evaluation L-PAS.
Fiber alignment	Pre-alignment in z-axis with stepper motors. Three-axis fine alignment with piezoceramic actuators
Splice analysis	Splice loss measurement or estimation (depending on fusion process mode); tensile test with 2.5 N (piezo controlled)
Endface evaluation	Cleave angle detection, endface quality evaluation, fiber position detection, contamination detection
Fiber display	High-contrast 5.5 inch color LCD monitor, magnification: about 100x, brightness selectable
Splice cycle time	Mode "fast": 10 to 20 sec. Mode "precise": 25 to 35 sec. incl. alignment, fusion and analysis
Operating range	Operating temp.: -5°C to +50°C, Relative humidity: < 93 %; Storage temp.: -20°C to +70°C

Dimensions	240 x 265 x 156 mm
Weight of basic unit	Without battery: 7 kg (15.4 lb) Incl. two 2.3 Ah batt.: 8.5 kg (18.7 lb)
Power supply	■ 90 to 260 V AC 50 / 60 Hz by integral 100 VA power supply ■ 12 V DC nominal, 14.5 V maximum, e.g. from a car battery ■ Internal 12 V DC from two optional 2.3 Ah batteries
Interfaces	■ RS 232 / V 24 serial via D-Sub jack 9-pin, baud rate selectable for downloading the splice loss values and splice parameter sets ■ Video signal (CCIR / PAL) via RCA jack (75 Ohm impedance) ■ PCMCIA slot for future upgrades
Additional software functions	■ 13 fixed programs ■ 50 user-defined programs ■ Automatic selection of best suitable splice process control ■ Automatic compensation for bad cleave angles up to 2.5° and poor fiber position ■ Selectable fusion process mode ■ Attenuation splice function for wavelength of 1300 and 1550 nm with 0.1 to 10 dB ■ Automatic fiber type detection ■ Altitude compensation up to 4000 m (13000 ft) above sea level ■ Selectable power save function in battery operation ■ Splice data memory for up to 1000 splice loss values ■ PCMCIA card for memory extension ■ Initial self-test ■ Operating hours and total splice counter ■ Electrode maintenance indication at selectable intervals ■ Realtime clock and date indication ■ Service support by special analysis program

> Fusion Splicer VISION OEM

The brand new **VISION OEM** offers **state of the art factory splicing**. Its precision fiber handler system, the 20 second splice process time and the unique single step flap opening guarantee highest throughput. Additional highlights like the OSP proven robust design and the maintenance free PD-Electrodes significantly reduce service effort and machine downtime. Together with Corning's factory splicing accessories (see page 58) it is ideal for high yield splice manufacturing independent of the operator's skill level.

Application

- Designed for factory splicing of all common similar and dissimilar silica glass fibers. This includes standard single- and multimode fibers, NZDS fibers as well as photonic fibers (e.g. erbium-doped fibers like PureMode™ Er 1550C3 or high index fibers like PureMode™ HI 1060)
- Meets factory splicing requirements of extremely low splice loss and high throughput. Loss is < 0.02 dB (typ.) for identical standard SM and < 0.01 dB (typ.) for MM fibers.
- Splice results are reliable and repeatable, regardless of fiber type, make, preparation or operator experience.

Fusion Splicer VISION OEM

Features

- **High-contrast Core Detection System (CDS)** with optimized 180x magnification for high-precision core-to-core alignment and accurate core inspection guarantees exceptional low loss for all fibers.
- The **CDS observes the entire splice process** including fusion, allowing online optimization of the fusion process and Automatic Fusion time Control by Image (AFCi), that optimizes each splice for the lowest possible loss.
- **V-LID based loss evaluation algorithm** detects exactly all bad splices to ensure a high yield and to prevent later failures at system test level.
- **High-speed automatic splicing process of 20 seconds** due to simultaneous observation of both fiber axes together with the **L-PAS™ high-resolution video evaluation** (for rapid fiber pre-alignment, positioning, end-face evaluation and contamination detection).
- **Very robust design** (31 g shock resistance) based on the well-known X60 provides the reliability needed for high throughput manufacturing.
- **Preset splice programs** for all common standard and specialty fiber types and **additional user-definable programs** enable turn-key splicing and custom tuning for special splice applications.
- **Tensile test up to 4.5 N** for in-line testing of finished splice.
- **High precision v-grooves** and **fiber handlers** for fast, easy and exact fiber insertion.
- The unique **single step flap opening mechanism** provides a quick and safe access to the finished splice.
- **Brightly illuminated fiber insertion area** and low profile layout for ergonomic operation especially in high throughput applications.
- **Flat top design** avoids fiber breaks and tangling during fiber routing.
- **Splicer software upgradeable** by simple download from a PC to easily keep the machine up to date with newest fiber types and splice process enhancements.
- **Integrated data interface** allows uploading complete splice and machine data to a PC for detailed evaluation.
- **Splice data memory** for more than 1,000 splices (can be upgraded via integrated PCMCIA slot); records all splice events with real time clock time stamp.
- **Integrated, completely software controlled heat-shrink oven** (optional) ensures maximum flexibility for all common shrinkable splice protectors.

Scope of delivery and order numbers of the VISION OEM and accessories see page 45

Technical Data VISION OEM

Fiber requirements	Single- and multimode silica glass fibers with cladding diameter of 125 µm and coating diameters from 250 µm to 900 µm (other diam. optional)
Fiber clamping	Fiber handler facilitate clamping on 125 µm cladding or on 250 µm coating by exchangeable fiber guides
Splice loss (with identical fibers)	■ Multimode fibers: ≤ 0.010 dB (typ.) ■ Standard single-mode fibers: ≤ 0.015 dB (typ.) ■ Dispersion-shifted fibers: ≤ 0.035 dB (typ.) ■ NZDS fibers: ≤ 0.025 dB (typ.)
Splicing operation	Fully automatic (one button operation) or manual
Splice process control	Pre-alignment by high-speed L-PAS™ video image evaluation. Core-to-core alignment by CDS high-contrast core detection system. Fusion process controlled by AFCi.
Fiber alignment	Pre-alignment in z-axis by stepper motors, three-axis fine alignment by piezoelectric actuators
Splice analysis	Splice loss estimation by CDS or L-PAS (depending on selected splice process)
Tensile test	Integrated, tensile load up to 4.5 N (piezo controlled)
Endface evaluation	Cleave angle detection, endface quality evaluation, fiber position detection, contamination detection
Fiber display	High-contrast 5.5 inch color LCD monitor, magnification 180x, adjustable brightness
Splice cycle time	Cycle time (including alignment, fusion and analysis) dependent on selected splice process: Fast: 15 s (typ.) Precise: 20 s (typ.)

Operating range	Operating temp.: -5°C to +45°C Relative humidity: ≤ 93 % Storage temp.: -20°C to +70°C
Dimensions	240 x 265 x 156 mm
Weight of basic unit	Without battery: 7 kg (15.4 lb) Incl. two 2.3 Ah batt.: 8.5 kg (18.7 lb)
Power supply	■ 90 to 260 V AC 50 / 60 Hz by integrated 100 VA power supply ■ External 12 V DC, 14.5 V maximum, e.g. from no-break power supply ■ Internal 12 V DC from two optional 2.3 Ah batteries
Interfaces	■ RS 232 / V.24 serial via D-Sub jack 9 pin, baud rate selectable for uploading splice loss values and splice parameters to a PC ■ Video signal (CCIR / PAL) via Cinch jack (75 Ω impedance) ■ PCMCIA slot for future upgrades
Additional software functions	■ 13 fixed programs ■ Up to 50 user-definable programs ■ Selectable password protection ■ Fiber handler operation ■ Automatic compensation of poor fiber position and bad cleave angles up to 2.5° ■ Selectable fusion process mode ■ Altitude compensation up to 4000 m (13 000 ft) above sea level ■ Selectable power save function when operated by battery ■ Splice data memory for up to 1000 splice loss values ■ PCMCIA card for memory extension ■ Initial self-test with status report ■ Operating hours and total splice counter ■ Electrode maintenance indication at selectable intervals ■ Real-time clock and date indication ■ Service support by special diagnostic program

> Fusion Splicer VISION CDS

Application

- Perfect for splicing all common single- and multimode silica glass fibers as well as special fibers (e.g. titan-coated, LS, CS, DS and NZDS fibers such as LEAF™ and TrueWave™ optical fibers)
- For networks, where extremely low splice loss is required: splice loss typically less than 0.02 dB for identical standard single-mode fibers and typically less than 0.01 dB for multimode fibers
- Provides reliable and repeatable splice results, regardless of fiber type, fiber make, fiber preparation or user skill

Fusion Splicer VISION CDS with mounted accessories

Features

- High-contrast **Core Detection System (CDS)** for high-precision core-to-core alignment and accurate core inspection guarantees exceptional low loss under all conditions
- CDS enables **fiber observation during the entire splice process** including fusion, allowing online optimization of the fusion process
- **AFCi (Automatic Fusion-time Control by Image)** optimizes each individual splice for the lowest possible loss
- **V-LID based loss evaluation algorithm** detects all bad splices to avoid re-splices and to prevent any unidentified bad splices in the transmission line
- **L-PAS™ high-resolution video image evaluation** provides high-speed fiber pre-alignment, fiber position and end-face evaluation as well as contamination detection
- **High-contrast 5.5-inch LCD color monitor**
- Optimized **180x fiber magnification** allows detailed evaluation of the splice while the whole splice region is viewed
- **Simultaneous observation of both fiber axes**
- **Very robust design** (31 g mechanical shock resistance) provides the reliability needed in harsh environments
- **Fixed preset splice programs** for all common fiber types
- **Up to 50 user definable splice programs**
- **Erbium doped fiber splicing capability**
- **Integrated tensile test device** allows in-line stress testing of finished splice
- **Two slots for rechargeable 2.3 Ah batteries** (optional) integrated into the machine allows standalone operation
- **Integrated power supply** for plug & play operation
- **Two power outlets** allow to run additional accessories
- **Altitude compensation** up to 4 000 m (13 000 ft) above sea level
- **Data interface** to upload splice loss data and program parameters to a PC for detailed evaluation
- **PCMCIA slot** for splice memory extension
- **Real time clock and date display**
- **Special flap design** for protection against high winds allows operation in aerial applications
- **Fiber insertion area is brightly illuminated**
- **High precision v-grooves with integrated fiber guides** provide easy and accurate fiber insertion
- The unique **single step flap opening mechanism** provides quick and safe access to the finished splice

Scope of delivery and order numbers of the VISION CDS and accessories see page 46

Technical Data VISION CDS

Fiber requirements	Single- and multimode silica glass fibers with cladding diameter of 125 µm and coating diameters from 250 µm to 900 µm
Fiber clamping	On 125 µm cladding or on 250 µm coating by using exchangeable fiber guides
Splice loss (with identical fibers)	■ Multimode fibers: ≤ 0.010 dB (typ.) ■ Standard single-mode fibers: ≤ 0.025 dB (typ.) ■ Dispersion-shifted fibers: ≤ 0.040 dB (typ.) ■ NZDS fibers: ≤ 0.035 dB (typ.)
Splicing operation	Fully automatic (one button operation) or manual
Splice process control	Pre-alignment by L-PAS™ video image evaluation. Core-to-core alignment by CDS high-contrast core detection system. Fusion process controlled by AFCi
Fiber alignment	Pre-alignment in z-axis by stepper motors, three-axis fine alignment by piezoelectric actuators
Splice analysis	Splice loss estimation by CDS or L-PAS (depending on selected splice process)
Tensile test	Integrated, tensile load 2.5 N (piezo controlled)
Endface evaluation	Cleave angle detection, endface quality evaluation, fiber position detection, contamination detection
Fiber display	High-contrast 5.5 inch color LCD monitor, magnification 180x, adjustable brightness
Splice cycle time	Cycle time (including alignment, fusion and analysis) dependent on selected splice process: Fast: 15 s (typ.) Precise: 20 s (typ.)

Operating range	Operating temp.: -5°C to +45°C Relative humidity: ≤ 93 % Storage temp.: -20°C to +70°C
Dimensions	240 x 265 x 156 mm
Weight of basic unit	Without battery: 7 kg (15.4 lb) Incl. two 2.3 Ah batt.: 8.5 kg (18.7 lb)
Power supply	■ 90 to 260 V AC 50 / 60 Hz by integrated 100 VA power supply ■ External 12 V DC, 14.5 V maximum, e.g. from a car cigarette lighter ■ Internal 12 V DC from two optional 2.3 Ah batteries
Interfaces	■ RS 232 / V.24 serial via D-Sub jack 9 pin, baud rate selectable for uploading splice loss values and splice parameters to a PC ■ Video signal (CCIR / PAL) via Cinch jack (75 Ω impedance) ■ PCMCIA slot for future upgrades
Additional software functions	■ 13 fixed programs ■ Up to 50 user-definable programs can be stored ■ Selectable password protection ■ Automatic compensation of poor fiber position and bad cleave angles up to 2.5° ■ Selectable fusion process mode ■ Altitude compensation up to 4000 m (13000 ft) above sea level ■ Selectable power save function when operated by battery ■ Splice data memory for up to 1000 splice loss values ■ PCMCIA card for memory extension ■ Initial self-test with status report ■ Operating hours and total splice counter ■ Electrode maintenance indication at selectable intervals ■ Real-time clock and date indication ■ Service support by special analysis program

> Fusion Splicer X77

The fusion splicer **X77** is the **high-end model of X7-series**. Outstanding features of this fusion splicer are the 5.5-inch color monitor and the attachment power supply 100 VA with battery accommodation. Due to its compact design, to the wide range of accessories and power options the fusion splicer can be adapted to all common requirements.
Remarkable features of the **X77** are the compact design unique in this class and a high degree of user-friendliness.

Application

- Suitable for splicing all common single- and multimode silica glass fibers as well as special fiber types (titanium-coated, lambda-shifted, DS- and NZDS-fibers, e.g. TrueWave™ and LEAF™) in all telecommunication and data networks.
- For networks where extremely low splice loss is required: splice loss typically less than 0.03 dB for identical standard single-mode fibers and less than 0.01 dB for multimode fibers.
- Ideal for applications with limited space and a demand for low weight, e.g. taut-sheath or aerial splicing application.

Fusion Splicer X77 with mounted accessories

Features

- Precise **core-to-core alignment** with **1300 nm LID-System™**
- **Optimization of each individual splice process** to achieve the lowest possible splice loss with **Automatic Fusion-time Control AFC™**
- **High-resolution video image evaluation L-PAS™** for fast fiber pre-alignment, endface evaluation and contamination detection as well as simultaneous fiber display in two views
- Precise **splice loss estimation**
- High-contrast **5.5-inch color monitor**
- **Fully automatic splice process** with one button operation
- Splice process modes for **"fast"** and **"precise"**
- **Tensile test** capability
- **Attenuation splice function** for producing high-precision, zero-reflection in-line attenuators from 0.1 to 10 dB for wavelengths 1300 nm and 1550 nm
- **External LID source (pigtail adapter)** optionally available for applying the **LID-System** to splicing tight-buffered pigtails
- **Splice data memory** for 250 splice results
- **Altitude compensation** up to 4000 m above sea level
- **Easy maintenance** of electrodes and optic system

Scope of delivery and order numbers of the X77 and accessories see page 47

Technical Data X77

Fiber types	Single and multimode silica glass fibers with cladding diameter of 125 µm and coating diameters of 250 µm to 900 µm
Fiber clamping	On 125 µm cladding
Splice loss (with identical fibers)	■ Multimode fibers: typically < 0.010 dB ■ Standard single-mode fibers: typically < 0.020 dB ■ Dispersion-shifted fibers: typically < 0.040 dB ■ NZDS fibers: typically < 0.030 dB
Splicing operation	Fully automatic or manual
Splice process control	Core-to-core alignment and Automatic Fusion-time Control AFC with LID-System. Alignment and fusion process by video image evaluation L-PAS
Fiber alignment	Pre-alignment in z-axis with stage motors and in all three axes with piezoceramic actuators
Splice analysis	Splice loss estimation; tensile test with 2.5 N (controlled by piezo)
Endface evaluation	Cleave angle detection, endface quality evaluation, dirt detection
Fiber display	Big high-contrast 5.5-inch LCD color monitor, brightness adjustable, magnification: about 100 x
Splice cycle time	Mode "fast": 10 to 20 s Mode "precise": 30 to 40 s incl. alignment, fusion and analysis
Operating range	Operating temp.: -5 °C to +50 °C, Relative humidity: < 93 %; Storage temp.: -40 °C to +70°C

Dimensions (L x W x H)	Basic unit: 230 x 185 x 100 mm Fusion splicer case 2: 500 x 420 x 200 mm
Weight	Basic unit: 2 kg; Fully equipped fusion splicer case: about 9 kg
Power supply options	12 V nominal, max. 13.8 V Possible power supplies: ■ External 12 V DC from a car battery or generator ■ Internal 12 V DC from a 2.3 Ah battery in 100 VA attachment power supply ■ AC supply 90 to 260 V AC, 50 / 60 Hz, by 100 VA attachment power supply
Interfaces	■ RS 232 / V.24 via D-Sub 9-pin jack, baud rate selectable for up to 9600; ■ Video signal (CCIR) via cinch jack (75 Ohm)
Additional software functions	■ 9 fixed preset programs ■ 10 user-defined programs ■ Automatic selection of best suitable splice process control ■ Selectable fusion process mode in user-defined programs ■ Attenuation splices 0.1-10 dB ■ Automatic compensation of bad cleave angles up to 2.5° ■ Altitude compensation up to 4000 m above sea level ■ Selectable power save time in battery operation ■ Splice data memory for up to 250 splice results ■ Initial self test and status report ■ Operating hours and total splice counter ■ Electrode maintenance indication at selectable intervals ■ Internal heat-shrink oven control

> Fusion Splicer X76

The fusion splicer **X76** is the **mid-range model of X7-series** with 3-axis cladding alignment and is particular suitable for multi-mode fiber applications and single-mode applications and also for medium size telecommunication networks with short lengths of fiber. Due to its compact design, the wide range of accessories and power options the fusion splicer can be adapted to all common requirements.
If lower splice losses are necessary, especially when splicing NZDS-fibers, fusion splicers X77 and X60 are more suitable.

Application

- Suitable for splicing all common single-mode and multi-mode silicia glass fibers as well as special fibers (e.g. DS and LS fibers).
- Mostly used in MANs, LANs, distribution networks, premises cabling systems, CATV networks and short distance telecommunication networks
- For networks with adequate loss budget and where medium splice loss is sufficient
- Ideal for applications with limited space and a demand for low weight, e.g. taut-sheat or fiber-to-the-desk application

Fusion Splicer X76 with mounted accessories

Features

- Alignment by **3-axis cladding alignment** by the use of piezo-ceramic actuators
- **High-resolution video image evaluation L-PAS™** for fast fiber alignment, endface evaluation and contamination detection as well as simultaneous fiber display in two views
- **Splice loss estimation**
- **Fully automatic splice process** with one button operation
- **Tensile test** capability
- **Splice data memory** for up to 250 splice results
- **Altitude compensation** up to 4000 m above sea level

Scope of delivery and order numbers of the X76 and accessories see page 48

Technical Data X76

Fiber types	Single and multimode silica glass fibers with cladding diameter of 125 µm and coating diameters of 250 µm to 900 µm
Fiber clamping	On 125 µm cladding
Splice loss (with identical fibers)	■ Multimode fibers: typically < 0.010 dB ■ Standard single-mode fibers: typically < 0.030 dB ■ Dispersion-shifted fibers: typically < 0.100 dB ■ NZDS fibers: typically < 0.120 dB
Splicing operation	Fully automatic or manual
Splice process control	3-axis cladding alignment and fusion process by video image evaluation L-PAS™
Fiber alignment	Pre-alignment in z-axis with stage motors and in all three axes with piezoceramic actuators
Splice analysis	Splice loss estimation; tensile test with 2.5 N (controlled by piezo)
Endface evaluation	Cleave angle detection, endface quality evaluation, dirt detection
Fiber display	Big high-contrast 5.5-inch LCD color monitor, brightness adjustable, magnification: about 100 x
Splice cycle time	typically 10 - 20 sec. incl. alignment, fusion and analysis
Operating range	Operating temp.: -5 °C to +50 °C, Relative humidity: < 93 %; Storage temp.: -40 °C to +70°C

Dimensions (L x W x H)	Basic unit: 230 x 185 x 100 mm Fusion splicer case 2: 500 x 420 x 200 mm
Weight	Basic unit: 2 kg; Fully equipped fusion splicer case: about 9 kg
Power supply options	12 V nominal, max. 13.8 V Possible power supplies: ■ External 12 V DC from a car battery or generator ■ Internal 12 V DC from a 2.3 Ah battery in 100 VA attachment power supply ■ AC supply 90 to 260 V AC, 50 / 60 Hz, by 100 VA attachment power supply
Interfaces	■ RS 232 / V.24 via D-Sub 9-pin jack, baud rate selectable for up to 9600; ■ Video signal (CCIR) via cinch jack (75 Ohm)
Additional software functions	■ 7 fixed preset programs ■ 10 user-defined programs ■ Automatic compensation of bad cleave angles up to 2.5° ■ Altitude compensation up to 4000 m above sea level ■ Selectable power save time in battery operation ■ Splice data memory for up to 250 splice results ■ Initial self test and status report ■ Operating hours and total splice counter ■ Electrode maintenance indication at selectable intervals ■ Internal heat-shrink oven control

> Fusion Splicer X75

The **X75** fusion splicer is the **economical model** in the **X7-series**. With its fixed silicon v-grooves it is ideal for multimode fiber applications and single-mode applications with medium splice loss requirements. A feature of this series is its uniform, extremely compact design and high degree of user-friendliness. With its modular design, wide range of accessories and various power options an adaption to all common requirements can be achieved.

Application

- Suitable for splicing all common single-mode and multimode silica glass fibers as well as special types (e.g. titanium-coated, DS and LS fibers).
- Mostly used in MANs, LANs, distribution networks, premises cabling systems and CATV networks
- Splice loss typically less than 0.05 dB for identical standard single-mode fibers with good core-cladding concentricity (ccc < 0.4 µm) and typically less than 0.02 dB for multimode fibers
- Ideal for applications with limited space and a demand for low weight, e.g. taut-sheath or fiber-to-the-desk applications

Fusion Splicer X75 with mounted accessories

Features

- **High-resolution video image evaluation L-PAS™** for fast fiber alignment, fiber offset detection, endface evaluation, contamination detection and simultaneous fiber display in two views
- **Splice loss estimation**
- **Fully automatic splice process** with one button operation
- **Tensile test** capability
- User-definable **alarm limit** for achieved splice loss
- User-definable **maximum for x/y offset**
- **Splice data memory** for 250 splice results
- **Altitude compensation** up to 4000 m above sea level
- **Easy maintenance** of electrodes and optic system

Scope of delivery and order numbers of the X75 and accessories see page 49

Technical Data X75

Fiber requirements	Single- and multimode silica glass fibers with cladding Ø 125 µm and coating Ø 250 µm to 900 µm
Fiber clamping	on 125 µm cladding
Splice loss (with identical fibers)	■ Multimode fibers: typically < 0.020 dB ■ Standard single-mode fibers: typically < 0.050 dB ■ Dispersion-shifted fibers: typically < 0.150 dB ■ NZDS fibers: typically < 0.150 dB
Splicing operation	Fully automatic (one-button operation), semi-automatic or manual
Splice process	Alignment and fusion by L-PAS video image evaluation
Fiber alignment	Pre-alignment in z-axis with stepper motors; Fine alignment in z-axis with piezoceramic actuator
Splice analysis	Splice loss estimation; tensile test with 2.5 N
Endface evaluation	Cleave angle detection, endface quality evaluation, dirt detection
Fiber display	Big high-contrast 5.5-inch LCD color monitor, brightness adjustable, magnification: about 100 x
Splice cycle time	typically less than 15 sec.
Operating range	Operating temp.: -5°C to +50°C, Relative humidity: < 93 %; Storage temp.: -40°C to +70°C
Dimensions (L x W x H)	Basic unit: 230 x 185 x 100 mm Fusion splicer case 2: 500 x 420 x 200 mm

Weight	Basic unit: 2 kg; Fully equipped fusion splicer case: about 9 kg
Power supply	12 V DC nominal, 13.8 V max., electronic overcurrent protection Possible power supplies: ■ External 12 V DC from a car battery or generator ■ Internal 12 V DC from 6.5 Ah battery in fusion splicer case 1 or from an optional 2.3 Ah plug-in battery in 100 VA attachment power supply ■ AC supply 90 to 260 V AC 50/60 Hz by 70 VA power supply (integrated in fusion splicer case 1 or separate) or by optional 70 VA attachment power supply
Interfaces	■ RS 232 / V 24 serial via D-Sub 9-pin jack ■ video signal (CCIR / PAL) via cinch jack (75 Ohm)
Additional software functions	■ 7 fixed preset programs ■ Up to 10 user-defined programs ■ Selectable max. x- and y- offset (fiber position detection) ■ Automatic compensation for bad cleave angles up to 2.5° ■ Altitude compensation up to 4000 m above sea level ■ Selectable power save time in battery operation ■ Memory for up to 250 loss values ■ Initial self-test with status report ■ Operating hours and total splice counter ■ Electrode maintenance indication at selectable intervals ■ Internal heat-shrink oven control

> Multi Fusion Splicer X75-12 for Fiber Ribbon

The **X75-12** is the **multi fusion splicer** model in the **X7-series**. With its fixed silicon v-grooves for up to 12 fibers it is particularly suitable for applications with ribbonized fibers or fiber ribbons.
A feature of the **X75-12** is its unique compact design and high degree of user-friendliness.

Application

- Suitable for all common single-mode and multimode silica glass fibers.
- For single fibers, two up to twelve ribbonized fibers and up to 12-fiber ribbons.
- Used in all fiber optic communication networks, particularly in network structures with high fiber density and high fiber counts (e.g. distribution networks, high density premises cabling systems and fiber optic CATV distribution networks).
- Average splice loss for identical standard single-mode 12-fiber ribbons and single fibers less than 0.05 dB with good core-eccentricity (ccc < 0.4 µm) and typically less than 0.02 dB for multimode fibers.
- Especially for applications with limited space and a demand for low weight (e.g. taut-sheath or aerial splice applications)

Fusion Splicer X75-12 with mounted accessories

Features

- **High-resolution video image evaluation L-PAS™** for fast and precise fiber alignment, fiber offset detection, endface quality inspection and contamination detection
- **Splice loss estimation** with display of average and maximum value as well as splice loss of each individual splice
- **Fully automatic splice process** with one button operation
- High-contrast **5.5 inch LCD monitor** for alternating fiber display in two views
- **Tensile test** capability
- **Arc test function** with fusion current optimization
- **User-selectable limits** for x/y-offset and length deviation
- **Splice data memory** for up to 250 splice results
- **Altitude compensation** up to 3500 m above sea level
- **Easy maintenance** of electrodes and optic system

Scope of delivery and order numbers of the X75-12 and accessories see page 50

Technical Data X75-12

Fiber requirements	Single- and multimode silica glass fibers with cladding Ø of 125 µm
Fiber ribbon requirements	Distance between fibers: 255 ± 3 µm, ribbon thickness: 230 to 400 µm, ribbon width: max. 3.2 mm; other dimensions on request
Splice loss (with identical fibers)	■ Multimode fibers: typically < 0.050 dB ■ Standard single-mode fibers: typically < 0.050 dB ■ Dispersion-shifted fibers: typically < 0.150 dB ■ NZDS fibers: typically < 0.150 dB
Splicing process	Fully automatic or manual
Splice process control	Alignment and fusion performed by L-PAS video image evaluation
Parameter optimization	By arc test function (VPO)
Fiber alignment	Fixed silicon v-grooves, alignment in z-direction by stepper motors
Splice analysis	Splice loss estimation, tensile test with 2.5 N, can be switched off
Endface evaluation	Cleave angle detection, endface quality inspection, fiber position detection, contamination detection
Resplice rate	Typically <5% with 12-fiber ribbons
Fiber display	5.5-inch LCD monitor, brightness adjustable; magnification about 25x
Splice time	Typically < 1 min. incl. alignment, fusion and analysis
Operating range	Operating temp.: -5°C to +50°C, Relative humidity: < 93 %; Storage temp.: -40°C to +70°C

Dimensions (L x W x H)	Basic unit: 230 x 185 x 100 mm Fusion splicer case 2: 500 x 420 x 200 mm
Weight	Basic unit: 2.0 kg, Basic unit equipped with fusion splicer case: approx. 9 kg
Power supply	12 V DC nominal, 13.8 V max., Possible power supplies: ■ External 12 V DC from a car battery or generator ■ Internal 12 V DC from a 2.3 Ah plug-in battery in 100 VA attachment power supply ■ AC supply 90 to 260 V AC 50 / 60 Hz by 100 VA attachment power supply
Interfaces	■ RS 232 / V 24 serial via D-Sub 9-pin jack, baud rate selectable up to 9600 Bd, for downloading the splice memory values and splice parameter sets ■ Video signal (CCIR / PAL) via cinch jack (75 Ohm impedance)
Additional software functions	■ 10 preset programs, all parameters freely changeable and password-protectable ■ Selectable limit for max. x- and y-offset and z-gap differences ■ Indication of offsets ■ Automatic parameter optimization by arc test function VPO ■ Automatic compensation for bad cleave angles up to 2.5° per side ■ Altitude compensation up to 3500 m above sea level ■ Selectable power save time in battery operation ■ Splice memory for up to 250 single splice loss values ■ Initial self-test with status report ■ Internal heat-shrink oven control ■ Operating hours and total splices counters ■ Electrode maintenance indication at selectable intervals

> Order Numbers X60

Designation	Description, Delivery Unit	Order Number
Fusion Splicer X60	The fusion splicer is supplied with an integrated power supply, power cord, maintenance tool kit, instruction manual, integrated pigtail adapter as well as two pairs of fiber guides for clamping on cladding or 250 µm coating. Batteries, cleaver, heat-shrink oven or crimping device, transport case and other accessories are to be ordered separately.	S46999-M7-A60
Workstation		
Fusion Splicer Case 4	Workstation for X60; please use splice tray holder S46999-M7-S879 only!	S46999-M7-S878
Splice Tray Holder for Workstation	With holder for the cleavers A8 and D6, for all common types of splice trays (not combinable with transport case S46999-M7-V15)	S46999-M7-S879
Work Lamp Extension	Needed if work lamp S46999-M7-S284 is used in combination with workstation S46999-M7-S878	S46999-M7-S932
Transport Case		
Fusion Splicer Case 3	Transport case for X60 and accessories please use splice tray holder S46999-M7-S871 only!	S46999-M7-V15
Splice Tray Holder for Transport Case	To be plugged in on the rear side of the X60, for all common types of splice trays (not combinable with workstation S46999-M7-S878)	S46999-M7-S871
Accessories		
Fiber Optic Cleaver D6	For single- and multimode, typ. cleave angle deviation < 0.5°	S46999-M9-D6
Heat-shrink Oven	For integration into the fusion splicer X60, heating time and temperature software controlled	S46999-M7-S869
Crimping Device	For integration into the fusion splicer X60	S46999-M7-S868
Battery 2.3 Ah	1 piece; the X60 needs two of these batteries	S46999-M7-S601
12 V Cable, 5 m	To operate the X60 from a car cigarette lighter	S46999-M7-S930
Work Lamp, Halogen	Can be operated by fusion splicer power supply	S46999-M7-S284
Anti-reflection Hood	Plug-in hood to shield LCD-Display from sunlight	S46999-M7-S867
Transport Case, Aluminum	For easy transport of fusion splicer cases 3 + 4	S46999-M26-V2
Memory Card 32 MB	CompactFlash ATA / True IDE	S46998-M7-S1
Adapter for Memory Card	CF Type 1	S46998-M7-S2
Consumables and Spare Parts		
Heat-shrink Splice Protector		
- for single fibers, 60mm	Pack of 100	S46999-A16-A4
- for single fibers, 45mm	Pack of 100	S46998-A4-A29
- for attenuation splices	Pack of 5	S46999-A16-A8
Crimp Splice Protector	Pack of 150	S45057-Z1-H590
Replacement PD-Electrodes	For X60, 1 set of 2 pieces	S46999-M7-S889
Replacement Standard Electrodes	For X60, 1 set of 2 pieces	S46999-M7-S256
Replacement Halogen Light Bulb	For work lamp, 12V / 10 W	S46999-M7-S291
Replacement Diamond Blade	For cleaver D6, typ. life time > 10,000 cleaves, exchangeable in the field	S46999-M9-S7
Cleaning Strips	Fo clean clamping jaws of the D6, 1 set of 50 pieces	S46999-M9-S15
Software Update Toolkit	Software for X60 and PC incl. RS-232 cable, running with Windows 95, 98, 2000 and NT	S46999-M7-S881

> Order Numbers VISION OEM

Designation	Description, Delivery Unit	Order Number
Fusion Splicer VISION OEM	The fusion splicer is supplied with integrated power supply, power cord, maintenance tool kit, instruction manual, one pair of 250 µm handling adapters and two pairs of fiber guides for clamping on cladding or 250 µm coating. Batteries, cleaver, heat-shrink oven or crimping device, transport case and other accessories are to be ordered separately.	S46999-M7-A81
Transport Case		
Fusion Splicer Case 3	Transport case for VISION OEM and accessories; please use splice tray holder S46999-M7-S871 only!	S46999-M7-V15
Splice Tray Holder for Transport Case	To be plugged in on the rear side of the VISION OEM; for all common types of splice trays (not combinable with workstation S46999-M7-S878)	S46999-M7-S871
Accessories		
Thermal Single Fiber Stripper	Gently removes single fiber coating without touching the bare glass	S46999-M7-S954
Ultrasonic Fiber Cleaner	Eliminates fiber stripping residuals without touching the bare glass	S46999-M7-S964
Fiber Optic Cleaver X16	For single- and multimode, typ. cleave angle deviation < 0.5°	S46999-M9-D16
Heat-shrink Oven	For integration into the VISION OEM, heating time and temperature software controlled	S46999-M7-S869
Crimping Device	For integration into the VISION OEM	S46999-M7-S868
Fiber Handling Adapters:	1 set of 2 pieces (left and right)	
- 250 µm Coating Single Fiber		S46999-M7-S959
- 900 µm Coating Single Fiber		S46999-M7-S960
Battery 2.3 Ah	1 pc.; two of these batteries are needed for standalone operation	S46999-M7-S601
Halogen Work Lamp	Can be operated by fusion splicer power supply	S46999-M7-S284
Anti-reflection Device	Plug-in hood to shield LCD-Display from sunlight; can be closed to protect display.	S46999-M7-S867
Transport Case, Aluminum	For easy transport of fusion splicer case 3	S46999-M26-V2
Memory Card 32 MB	CompactFlash ATA / True IDE	S46998-M7-S1
Adapter for Memory Card	CF Type 1	S46998-M7-S2
Consumables / Spare Parts		
Heat-shrink Splice Protector		
- for single fibers, 60mm	Pack of 100	S46999-A16-A4
- for single fibers, 45mm	Pack of 100	S46998-A4-A29
Crimp Splice Protector	Pack of 150	S45057-Z1-H590
Replacement PD-Electrodes	For VISION OEM, 1 set of 2 pieces	S46999-M7-S800
Replacement Standard Electrodes	For VISION OEM, 1 set of 2 pieces	S46999-M7-S256
Replacement Light Bulb	For halogen work lamp, 12V / 10 W	S46999-M7-S291
Replacement Diamond Blade	For cleaver X16, typ. life time > 10,000 cleaves, operator exchangeable	S46999-M9-S7
Cleaning Strips	To clean clamping jaws of the X16, 1 set of 50 pieces	S46999-M9-S15
Software Update Toolkit	Software for VISION OEM incl. RS-232 cable, requires a PC with Windows 95, 98, NT 4.0 or 2000	S46999-M7-S881

For detailed descriptions of the accessories, see pages 52 to 64.

> Order Numbers VISION CDS

Designation	Description, Delivery Unit	Order Number
Fusion Splicer VISION CDS	The fusion splicer is supplied with integrated power supply, power cord, maintenance tool kit, instruction manual and two pairs of fiber guides for clamping on cladding or 250 µm coating. Batteries, cleaver, heat-shrink oven or crimping device, transport case and other accessories are to be ordered separately.	S46999-M7-A80
Workstation		
Fusion Splicer Case 4	Workstation for VISION CDS and accessories; please use splice tray holder S46999-M7-S879 only!	S46999-M7-S878
Splice Tray Holder for Workstation	With holder for the cleavers A8 and D6, for all common types of splice trays (not combinable with transport case S46999-M7-V15)	S46999-M7-S879
Work Lamp Extension	Needed if work lamp S46999-M7-S284 is used in combination with workstation S46999-M7-S878	S46999-M7-S932
Transport Case		
Fusion Splicer Case 3	Transport case for VISION CDS and accessories (please use splice tray holder S46999-M7-S871 only)	S46999-M7-V15
Splice Tray Holder for Transport Case	To be plugged in on the rear side of the VISION CDS, for all common types of splice trays (not combinable with workstation S46999-M7-S878)	S46999-M7-S871
Accessories		
Fiber Optic Cleaver D6	For single- and multimode, typ. cleave angle deviation < 0.5°	S46999-M9-D6
Heat-shrink Oven	Heating time and temperature software controlled	S46999-M7-S869
Crimping Device	For integration into the VISION CDS	S46999-M7-S868
Battery 2.3 Ah	1 piece, the VISION CDS needs two of these batteries	S46999-M7-S601
12 V Cable, 5 m	To operate VISION CDS from a car cigarette lighter	S46999-M7-S930
Halogen Work Lamp	Can be operated by fusion splicer power supply	S46999-M7-S284
Anti-reflection Device	Plug-in hood to shield LCD-Display from sunlight	S46999-M7-S867
Transport Case, Aluminum	For easy transport of fusion splicer cases 3 + 4	S46999-M26-V2
Memory Card 32 MB	CompactFlash ATA / True IDE	S46998-M7-S1
Adapter for Memory Card	CF Type 1	S46998-M7-S2
Consumables and Spare Parts		
Heat-shrink Splice Protector		
- for single fibers, 60mm	Pack of 100	S46999-A16-A4
- for single fibers, 45mm	Pack of 100	S46998-A4-A29
Crimp Splice Protector	Pack of 150	S45057-Z1-H590
Replacement PD Electrodes	For VISION CDS, 1 set of 2 pieces	S46999-M7-S800
Replacement Standard Electrodes	For VISION CDS, 1 set of 2 pieces	S46999-M7-S256
Replacement Light Bulb	For halogen work lamp, 12 V / 10 W	S46999-M7-S291
Replacement Diamond Blade	For cleaver D6, typ. life time > 10,000 cleaves, exchangeable in the field	S46999-M9-S7
Cleaning Strips	To clean clamping jaws of the D6, 1 set of 50 pieces	S46999-M9-S15
Software Update Toolkit	Software for VIVION CDS and PC incl. RS-232 cable, running with Windows 95, 98, 2000 and NT	S46999-M7-S881

> Order Numbers X77

Designation	Description / Delivery Unit	Order Number
Fusion Splicer X77	The fusion splicer is supplied as a basic unit with maintenance tool kit and operating instructions. Power supply, cleaver, case and other accessories are to be ordered separately.	S46999-M7-A77
Workstation		
Fusion Splicer Case 5	Workstation for X77; please use splice tray holder S46999-M7-S876 only!	S46999-M7-S875
Splice Tray Holder for Workstation	With platform for the cleaver A8 (mounting block -S877 is needed); for all common types of splice trays (not combinable with transport case S46999-M7-V13)	S46999-M7-S876
Mounting Block for A8	For mounting the cleaver A8 onto the splice tray holder S46999-M7-S876	S46999-M7-S877
Battery 6.5 Ah	For fusion splicer case 5	S46999-M7-S403
Transport Case		
Fusion Splicer Case 2	Transport case for X77 and accessories (please use splice tray holder S46999-M7-S378 only!)	S46999-M7-V13
Splice Tray Holder for Transport Case	Can be combined with heat-shrink oven and crimping device; for all common types of splice trays. (not combinable with workstation S46999-M7-S875)	S46999-M7-S378
Mounting Bracket	For mounting the splice tray holder and crimping device resp heat-shrink oven directly to the X77 fusion splicer (not combinable with workstation S46999-M7-S875)	S46999-M7-S276
Accessories		
Fiber Optic Cleaver A8	For single- and multimode, typ. cleave angle deviation < 0.5°	S46999-M9-A8
Heat-shrink Oven	Heating time: 15 to 250 s, heating temperature: 90 to 140 °C	S46999-M7-S385
Crimping Device	With mounting plate for fusion splicer X77	S46999-M7-S252
Attachment power supply	100 VA, can be mounted directly under the X77	S46999-M7-S630
Battery 2.3 Ah	For attachment power supply	S46999-M7-S601
Charging Clip	For charging an additional 2.3 Ah battery with attachment power supply	S46998-Z300-A65
12 V Cable, 5 m	To operate X77 from a car cigarette lighter	S46999-M7-S957
Work Lamp, Halogen	Can be operated by fusion splicer power supply	S46999-M7-S284
Pigtail Adapter for X77	External LID Source with universal connector adapter	S46999-M7-S336
Transport Case, Aluminum	For easy transport of fusion splicer case 2	S46999-M26-V2
Consumables / Spare Parts		
Heat-shrink Splice Protector		
- for single fibers, 60mm	Pack of 100	S46999-A16-A4
- for single fibers, 45mm	Pack of 100	S46998-A4-A29
- for attenuation splices	Pack of 5	S46999-A16-A8
Crimp Splice Protector	pack of 150	S45057-Z1-H590
Replacement PD-Electrodes	For X77, 1 set of 2 pieces	S46999-M7-S700
Replacement Standard Electrodes	For X77, 1 set of 2 pieces	S46999-M7-S256
Replacement Halogen Light Bulb	For work lamp, 12V / 10 W	S46999-M7-S291
Replacement Diamond Blade	For cleaver A8, exchangeable in the field	S46999-M9-S30
Cleaning Strips	To clean clamping jaws of the A8, 1 set of 50 pieces	S46999-M9-S15

For detailed descriptions of the accessories, see pages 52 to 64.

> Order Numbers X76

Designation	Description / Delivery Unit	Order Number
Fusion Splicer X76	The fusion splicer is supplied as a basic unit with a maintenance tool kit and operating instructions. Power supply, cleaver, case and other accessories are to be ordered separately.	S46999-M7-A76
Workstation		
Fusion Splicer Case 5	Workstation for X76; please use splice tray holder S46999-M7-S876 only!	S46999-M7-S875
Splice Tray Holder for Workstation	With platform for the cleaver A8 (mounting block -S877 is needed); for all common types of splice trays (not combinable with transport case S46999-M7-V13)	S46999-M7-S876
Mounting Block for A8	For mounting the cleaver A8 onto the splice tray holder S46999-M7-S876	S46999-M7-S877
Battery 6.5 Ah	For fusion splicer case 5	S46999-M7-S403
Transport Case		
Fusion Splicer Case 2	Transport case for X76 and accessories (please use splice tray holder S46999-M7-S378 only!)	S46999-M7-V13
Splice Tray Holder for Transport Case	Can be combined with heat-shrink oven and crimping device; For all common types of splice trays. (not combinable with workstation S46999-M7-S875)	S46999-M7-S378
Mounting Bracket	For mounting the splice tray holder and crimping device resp heat-shrink oven directly to the X76 fusion splicer (not combinable with workstation S46999-M7-S875)	S46999-M7-S276
Accessories		
Fiber Optic Cleaver A8	For single- and multimode, typ. cleave angle deviation < 0.5°	S46999-M9-A8
Heat-shrink Oven	Heating time: 15 to 250 s, heating temperature: 90 to 140 °C	S46999-M7-S385
Crimping Device	With mounting plate for fusion splicer X76	S46999-M7-S252
Attachment Power Supply	100 VA, can be mounted directly under the X76	S46999-M7-S630
Battery 2.3 Ah	For attachment power supply	S46999-M7-S601
Charging Clip	For charging an additional 2.3 Ah battery with attachment power supply	S46998-Z300-A65
12 V Cable, 5 m	To operate X76 from a car cigarette lighter	S46999-M7-S957
Work Lamp, Halogen	Can be operated by fusion splicer power supply	S46999-M7-S284
Transport Case, Aluminum	For easy transport of fusion splicer case 2	S46999-M26-V2
Consumables and Spare Parts		
Heat-shrink Splice Protector		
- for single fibers, 60mm	Pack of 100	S46999-A16-A4
- for single fibers, 45mm	Pack of 100	S46998-A4-A29
Crimp Splice Protector	Pack of 150	S45057-Z1-H590
Replacement Electrodes	For X76, 1 set of 2 pieces	S46999-M7-S256
Replacement Halogen Light Bulb	For work lamp, 12V / 10 W	S46999-M7-S291
Replacement Diamond Blade	For cleaver A8, exchangeable in the field	S46999-M9-S30
Cleaning Strips	To clean clamping jaws of the A8, 1 set of 50 pieces	S46999-M9-S15

For detailed descriptions of the accessories, see pages 52 to 64.

> Order Numbers X75

Designation	Description / Delivery Unit	Order Number
Fusion Splicer X75	The fusion splicer is supplied as a basic unit with maintenance tool kit and operating instructions. Power supply, cleaver, case and other accessories are to be ordered separately.	S46999-M7-A75
Workstation		
Fusion Splicer Case 5	Workstation for X75; please use splice tray holder S46999-M7-S876 only!	S46999-M7-S875
Splice Tray Holder for Workstation	With platform for the cleaver A8 (mounting block -S877 is needed); for all common types of splice trays (not combinable with transport case S46999-M7-V13)	S46999-M7-S876
Mounting Block for A8	For mounting the cleaver A8 onto the splice tray holder S46999-M7-S876	S46999-M7-S877
Battery 6.5 Ah	For fusion splicer case 5	S46999-M7-S403
Transport Case		
Fusion Splicer Case 2	Transport case for X75 and accessories (please use splice tray holder S46999-M7-S378 only!)	S46999-M7-V13
Splice Tray Holder for Transport Case	Can be combined with heat-shrink oven and crimping device; for all common types of splice trays. (not combinable with workstation S46999-M7-S875)	S46999-M7-S378
Mounting Bracket	For mounting the splice tray holder and crimping device resp heat-shrink oven directly to the X75 fusion splicer (not combinable with workstation S46999-M7-S875)	S46999-M7-S276
Accessories		
Fiber Optic Cleaver A8	For single- and multimode, typ. cleave angle deviation < 0.5°	S46999-M9-A8
Heat-shrink Oven	Heating time: 15 to 250 s, heating temperature: 90 to 140 °C	S46999-M7-S385
Crimping Device	With mounting plate for fusion splicer X75	S46999-M7-S252
Attachment Power Supply	100 VA, can be mounted directly under the X75	S46999-M7-S630
Battery 2.3 Ah	For attachment power supply	S46999-M7-S601
Charging Clip	For charging an additional 2.3 Ah battery with attachment power supply	S46998-Z300-A65
12 V Cable, 5 m	To operate X75 from a car cigarette lighter	S46999-M7-S957
Work Lamp, Halogen	Can be operated by fusion splicer power supply	S46999-M7-S284
Transport Case, Aluminum	For easy transport of fusion splicer case 2	S46999-M26-V2
Consumables and Spare Parts		
Heat-shrink Splice Protector		
- for single fibers, 60mm	Pack of 100	S46999-A16-A4
- for single fibers, 45mm	Pack of 100	S46998-A4-A29
Crimp Splice Protector	Pack of 150	S45057-Z1-H590
Replacement Electrodes	For X75, 1 set of 2 pieces	S46999-M7-S256
Replacement Halogen Light Bulb	For work lamp, 12V / 10 W	S46999-M7-S291
Replacement Diamond Blade	For cleaver A8, exchangeable in the field	S46999-M9-S30
Cleaning Strips	To clean clamping jaws of the A8, 1 set of 50 pieces	S46999-M9-S15

For detailed descriptions of the accessories, see pages 52 to 64.

> Order Numbers X75-12

Designation	Description / Delivery Unit	Order Number
Multi Fusion Splicer X75-12	The splicer is supplied with a pair of 12-fiber handling adapters 3.1 mm, maintenance tool kit and operating instructions. Power supply, cleaver, stripper, cases and further accessories are to be ordered separately.	S46999-M7-A752
Accessories		
Cleaver D12	For cleaving single and multimode fibers, up to 12 ribbonized fibers and fiber ribbons, cleave angle deviation typically < 1°	S46999-M9-D12
Fiber Waste Deposit	For cleaver D12	S46999-M9-S70
Heat-shrink Oven	Heating time: 15 to 250 s, temperature: 90 to 140 °C	S46999-M7-S385
Splice Tray Holder	Combinable with heat-shrink oven and crimping device	S46999-M7-S378
Mounting bracket	For mounting the splice tray holder and heat-shrink oven directly to the fusion splicer X75-12	S46999-M7-S276
Thermal Stripper	For thermal stripping of ribbonized fibers and fiber ribbons	S46999-M7-S855
Ribbonizer	For arranging individual fibers to suit a ribbon	S46999-M7-S854
Handling Adapters	1 set: 2 pcs. (left and right)	
- for 250 µm fibers		S46999-M7-S593
- for 900 µm fibers		S46999-M7-S599
- for 1 to 12 single fibers		S46999-M7-S861
- for 2-fiber ribbons		S46999-M7-S594
- for 4-fiber ribbons		S46999-M7-S595
- for 6-fiber ribbons		S46999-M7-S596
- for 8-fiber ribbons		S46999-M7-S597
- for 12-fiber ribbons	Ribbon width: 3.10 mm, part of scope of delivery	S46999-M7-S598
	Ribbon width: 3.15 mm	S46999-M7-S565
	Ribbon width: 3.18 mm	S46999-M7-S586
Attachment Power Supply	100 VA, can be mounted directly under the X75-12	S46999-M7-S630
Battery 2.3 Ah	For attachment power supply	S46999-M7-S601
Charging Clip	For charging 2.3-Ah battery with the attachment power supply	S46998-Z300-A65
12 V Cable, 5 m	To operate X75-12 from a car cigarette lighter	S46999-M7-S957
Fusion Splicer Case 2	Transport case for fusion splicer and accessories	S46999-M7-V13
Transport Case	Aluminum, for easy transport of fusion splicer case 2	S46999-M26-V2
Work Lamp	Halogen, can be operated by fusion splicer power supply	S46999-M7-S284
Consumables and Spare Parts		
Heat-shrink splice protectors		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Electrodes for X75-12	1 set: 2 pcs.	S46999-M7-S452
Spare Light Bulb	For work lamp, 12 V / 10 W, halogen	S46999-M7-S291
Replacement Cleave Wheel	For cleaver D12, cleaving quality checked	S46999-M9-S50
Replacement Blade	For Thermal Stripper	S46999-M7-S641

For detailed descriptions of the accessories, see pages 52 to 64.

> Accessories for Fusion Splicers

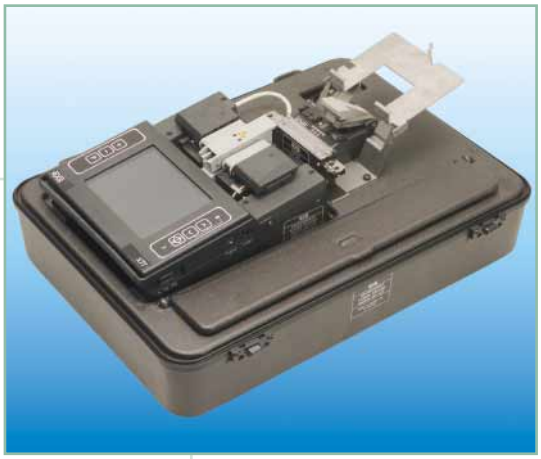
Complete Range of Accessories

We offer a complete range of **accessories** for our fusion splicers.
Please have a look on the following pages!

Transport Cases

Fiber Optic Cleavers

Splice Protection



Work Stations

Further Accessories

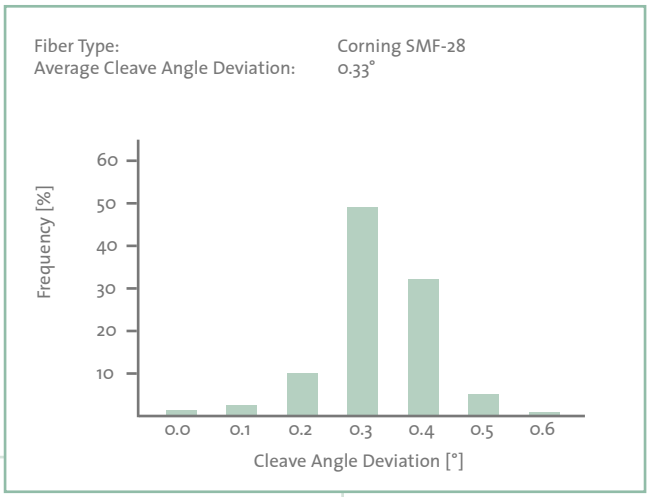
> Fiber Optic Cleaver X16

For Single-Mode, Multimode and Specialty Fibers

Application

The **X16** Fiber Optic Cleaver is especially designed for high yield factory cleaving of all common silica glass fibers, including single- and multimode, NZDS (e.g. LEAF™) and specialty photonic fibers (e.g. PureMode™ 1550C3). Its unique sequential one step operation provides a high-speed cleave process and avoids operating errors. The pivoting fiber handler support with auto fiber alignment ensures high cleave quality independent of operator skill.

X16 Fiber Optic Cleaver



Distribution of Cleave Angle Deviation

Features

- **Cleave angle deviation typically < 0.5°:** Sequential fiber clamp, cleave tension and cut mechanics provide ultra flat fiber endfaces even for complex profile fibers like NZDSF and photonics fibers.
- Easy **one step cleaving operation**: Fiber clamping, bending, scratching and cleaving with one single press
- **Tunable cleaving process** provides the lowest cleave angles even for rare special fiber types (e.g. Ti-coated)
- Optional **fiber handler with integrated guiding system** guarantees exact cleave length for every individual cleave and automatic fiber alignment while handler is inserted
- High cleave quality **independent of operator skills**
- **Pivoting fiber handler support** for easy insertion and removal of fibers without risk of damage to the glass surface
- **Automatic disposal of fiber residuals** into integrated container for a safe operator's environment
- **Industrial precision diamond cleave blade** for highest cleave quality and long life (typically > 10,000 cleaves)
- Cleave lengths: **3.5 to 15 mm**
- Coating diameters: **up to 900 µm**

Items Supplied

The X16 is supplied with detailed instructions for operation, mounting, cleaning and maintenance.

Designation	Description / Delivery Unit	Order Number
Fiber Optic Cleaver X16	For cleaving single- and multimode fibers, cleave angle deviation typically less than 0.5°; 172 x 134 x 71 mm, 794 g	S46999-M9-D16
No-handler Adapter	Allows operation of X16 without using fiber handlers	S46999-M9-S73
Cleaning Strips	To clean clamping jaws of the X16, 1 set of 50 pieces	S46999-M9-S15
Replacement Diamond Blade	Typ. life time > 10,000 cleaves, operator exchangeable	S46999-M9-S7

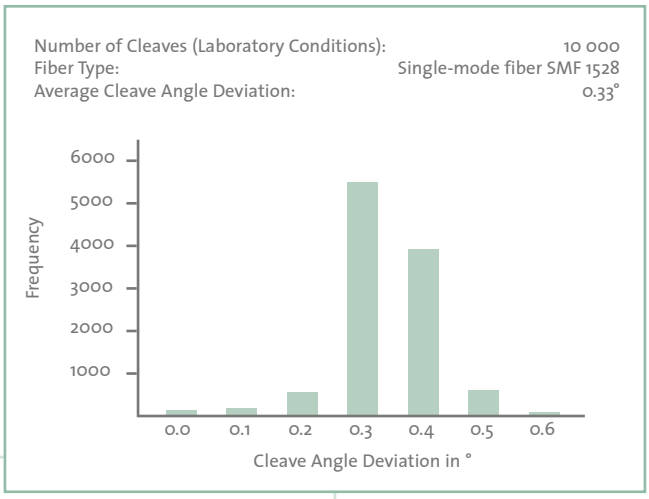
> Fiber Optic Cleaver D6

For Single- and Multimode Fibers

Application

The **D6** Fiber Optic Cleaver is suitable for precision cleaving of all common single silica glass fibers, even under harsh on-site conditions. Special cleaver designs for applications in research, measurement technology and production of optical components are available.

D6 Fiber Optic Cleaver



Distribution of Cleave Angle Deviation

Features

- **Cleave angle deviation typically < 0.5°** with highest reliability and low scattering under on-site conditions
- Easy **one step cleaving operation**: Clamping, bending, scratching and cleaving with one single action
- **Sliding Table** for easy insertion, positioning and removal of fiber without risk of damage
- **Diamond blade** for highest cleave quality and long life (typically > 10 000 cleaves)
- Fiber cleave length: **3.5 to 15 mm**
- Fiber diameter: **125 µm** nominal
- Coating diameter: **up to 900 µm**
- **Adjustable** for cleaving fibers with **increased tensile strength**, e.g. titanium-coated fibers
- **Low susceptibility** to interference and dirt

Items Supplied

The D6 is supplied in a rugged case with detailed instructions for operation, mounting, cleaning and maintenance.

Designation	Description / Delivery Unit	Order Number
Fiber Optic Cleaver D6	For cleaving single- and multimode fibers, cleave angle deviation typically less than 0.5°; 133 x 75 x 69 mm, 540 g	S46999-M9-D6
Cleaning Strips	For cleaning the clamping jaws; pack of 50	S46999-M9-S15
Replacement Blade	Diamond blade in holder, cleaving quality checked	S46999-M9-S7

> Fiber Optic Cleaver A8

For Single- and Multimode Fibers

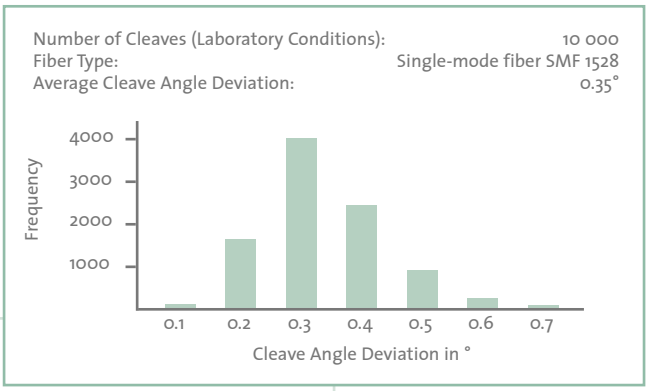
Application

The **A8** Fiber Optic Cleaver is suitable for precision cleaving of all common silica glass fibers with a cladding diameter of 125 µm even under harsh on-site conditions. It is provided with a Universal Fiber Guide as standard equipment. It is therefore particularly convenient for use with all fusion splicers. For other applications there are further fiber guides available as accessories. Special versions of the **A8** are available for connector splicing systems.

A8 Fiber Optic Cleaver

Features

- **Cleave angle deviation typically < 0.5°** under on-site conditions
- **Easy one step cleaving operation**: Fiber clamping, bending, scratching and cleaving with one single action
- **Diamond blade** for high cleave quality and long life (typically > 10 000 cleaves)
- Interchangeable **fiber guides** (options)
- The design provides **low susceptibility** to interference and dirt and facilitates **easy cleaning**



Distribution of Cleave Angle Deviation

Items Supplied

The A8 Fiber Optic Cleaver is supplied with detailed operating instructions and tools for replacing the universal fiber guide.

Designation	Description / Delivery Unit	Order Number
Fiber Optic Cleaver A8	For cleaving single- and multimode fibers, cleave angle deviation typically < 0.5°; 70 x 70 x 36 mm, 120 g	S46999-M9-A8
Cleaning Strips	For cleaning the clamping jaws; pack of 50	S46999-M9-S15
Replacement Blade	Diamond blade in holder, cleaving quality checked	S46999-M9-S30
Holder for Cleaver A8	For mounting the A8 on the splice tray holder S46999-M7-S876 in combination with the workstation S46999-M7-S875	S46999-M7-S877
Universal Fiber Guide	For fibers with coating diameters up to 900 µm	S46999-M9-S43
Fiber Guide 900 µm	For fibers with 900 µm tight-buffered secondary coating	S46999-M9-S34
Fiber Guide 3000/900 µm	For 3 mm cable with tight-buffered 900 µm secondary coating	S46999-M9-S45

> Multi Fiber Cleaver D12

For Single- and Multimode Fibers, Ribbonized Fibers and Fiber Ribbons

Application

The **D12** Fiber Optic Cleaver is suitable for precision cleaving of all common silica glass fibers and up to 12-fiber ribbons, even under harsh on-site conditions. It is provided with a Universal Single Fiber Guide for single fiber cleaving as standard equipment. When removing the fiber guide all common handling adapters can be inserted.

Features

- **Cleave angle deviation typically less than 1°** with high reliability and low scattering under on-site conditions
- **Easy one step cleaving operation**: Fiber clamping, bending, scratching and cleaving with one single action
- **Turnable cleave wheel with 12 positions** for high cleave quality and long life (typically > 6,000 cleaves with 12-fiber ribbons per cleave wheel)
- For **single fibers** as well as up to **12-fiber ribbons** and **ribbonized fibers** by using handling adapters (options)
- **Minimum fiber cleave length**: **3.5 mm** (single fibers with up to 250 µm coating); **10 mm** (single fibers with coating diameter from 250 up to 900 µm)
- Fiber diameter: **125 µm nominal**
- Coating diameter: **up to 900 µm** (single fibers)
- **Adjustable** for cleaving fibers with **increased tensile strength**, e.g. titanium-coated fibers
- **Low susceptibility** to interference and dirt
- Cleave wheel **easily exchangeable** on-site

D12 Fiber Optic Cleaver

Items Supplied

The D12 is supplied in a rugged case with a tool kit, Universal Single Fiber Guide and detailed instructions for operation, cleaning and maintenance.

Designation	Description	Order Number
Multi Fiber Cleaver D12	For cleaving single- and multimode fibers, up to 12 ribbonized fibers and fiber ribbons, cleave angle deviation typically < 1°; 95 x 72 x 55 mm, 500 g	S46999-M9-D12
Replacement Cleave Wheel	For cleaver D12, cleaving quality checked	S46999-M9-S50
Fiber Waste Deposit	For cleaver D12	S46999-M9-S70

> Heat-shrink Oven, Heat-shrink Splice Protector

Heat-shrink Oven

Heat-shrink Oven

The **Heat-shrink Oven** is used for defined application of all common types of Heat-shrink Splice Protectors to an unprotected single fiber or fiber ribbon splice.

Features

- **Fully automatic temperature control**
- **Adjustable heating time** (15 to 250 s) and **temperature** (90 to 140° C)
- **Suitable for all common heat-shrink splice protectors**
- **Operation status indicated by LED**

Heat-shrink Splice Protectors for Single Fibers

Heat-shrink Splice Protectors

The **Heat-shrink Splice Protector** lends the splice mechanical stability, protects it against environmental effects and prevents it from damages. The Heat-shrink Splice Protector for single fibers is suitable for all splices of single fibers with coating diameters of 250 to 900 µm and uncoated fiber lengths of up to 40 mm.

Features

- **Stainless steel pin** rounded at both ends for single fibers or **semi cylindrical glass support** for fiber ribbons to strengthen the spliced joint
- Inner tube of **air-tight hotmelt adhesive** and outer **heat-shrink tube jacket**

Designation	Description / Delivery Unit	Order Number
Heat-shrink Oven for X7-series	Heating time 15 to 250 s, temperature 90 to 140° C	S46999-M7-S385
Heat-shrink Oven for X60 and VISION OEM/CDS	For fixed installation into the fusion splicers	S46999-M7-S869
Heat-shrink Splice Protectors:		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6

> Crimping Device, Crimp Splice Protector

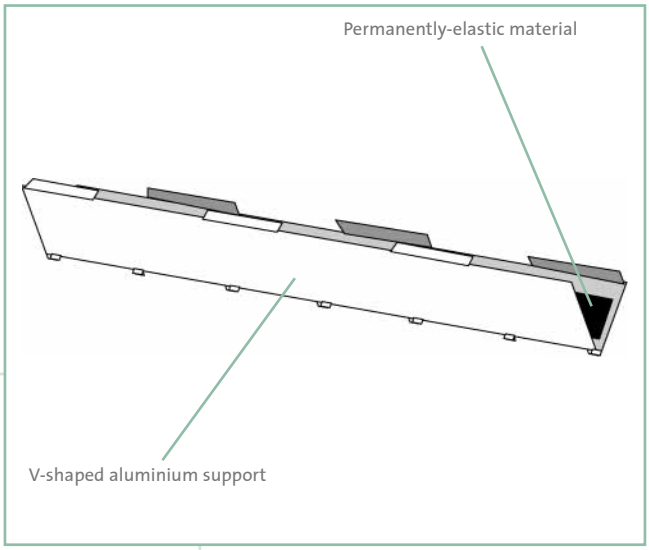
Crimping Device

Crimping Device

The **Crimping Device** is used for defined closing of the Crimp Splice Protector over the unprotected splice.

Features

- **Easy to operate**
- **Adaptable to all fusion splicers**
- **No electrical power required**
- **Maintenance-free**



Crimp Splice Protector

Crimp Splice Protector

The **Crimp Splice Protector** lends the splice mechanical stability, protects it against environmental effects and prevents it from damages during handling and splice storage. For defined closing of the Crimp Splice Protector over the unprotected splice, the Crimping Device is required.

Features

- **Simple, reliable and fast installation**
- **Protects the uncoated fiber** to a maximum bare fiber length of 22 mm
- **Resistant against corrosion**
- **For fibers with 250 µm coating diameter**
- **For high density storage** in splice trays

Designation	Description / Delivery Unit	Order Number
Crimping Device for X7-series	With mounting plate for fusion splicers of X7-series	S46999-M7-S252
Crimping Device for X60 and VISION OEM/CDS	For fixed installation into the fusion splicers	S46999-M7-S868
Crimping Device	With base plate for stand-alone use	S46999-M7-S107
Crimp Splice Protector	Pack of 150	S45057-Z1-H590

> Accessories for Fusion Splicer VISION OEM

Thermal Single Fiber Stripper

Thermal Single Fiber Stripper

- **Gently removes the coating** by heating channel technology and defined non-glass-touching cutting of fiber coating
- **Adjustable heating** allows stripping of coating sizes up to 900 µm
- **Easy press-and-strip operation** for high speed stripping
- **Auto-alignment** of stripping axis and fiber axis avoids fiber damage by stripping blade
- **Special wide funnel aperture design** for easy fiber insertion
- **Powered** by included AC power supply or directly from splicing machine
- **Desktop design** for safe in-place operation

Ultrasonic Fiber Cleaner

Ultrasonic Fiber Cleaner

- **Residual-free cleaning** of single and ribbon fibers without touching the fiber mechanically
- **Simultaneous 2 fiber operation** offers a secure resting position for both fiber handlers
- **Easy slide-in operation** for quick and precise fiber handler insertion prevents touching of the fiber
- **Adjustable cleaning time** allows to adapt for all kinds of applications
- **Integrated holders** to perform cleaning of the splicing machine's v-grooves

Designation	Description / Delivery Unit	Order Number
Thermal Single Fiber Stripper	Gently removes single fiber coating without touching the bare glass; for single fibers up to 900 µm	S46999-M7-S954
Ultrasonic Fiber Cleaner	Eliminates fiber stripping residuals without touching the bare glass	S46999-M7-S964

> Accessories for Multi Fusion Splicer X75-12

Handling Adapters, Ribbon Splitting Tool

One Pair of handling adapters

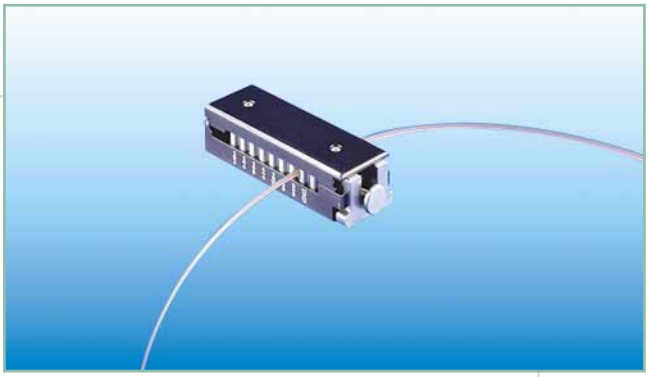
Handling Adapters

Handling adapters are used with the multi fusion splicer **X75-12**. They position the fibers in the thermal stripper, the cleaver and in the fusion splicer. They allow the fibers to be positioned correctly in the v-grooves when inserting the handling adapter into the splicer.

Designation	Order Number
Handling Adapters (2 pcs.) for:	
- 1 to 12 single fibers	S46999-M7-S861
- single fibers 250 µm	S46999-M7-S593
- single fibers 900 µm	S46999-M7-S599
- 2-fiber ribbons	S46999-M7-S594
- 4-fiber ribbons	S46999-M7-S595
- 6-fiber ribbons	S46999-M7-S596
- 8-fiber ribbons	S46999-M7-S597
- 12-fiber ribbons: - 3.10 mm	S46999-M7-S598
- 3.15 mm	S46999-M7-S565
- 3.18 mm	S46999-M7-S586

Ribbon Splitting Tool RST-000

The **RST-000** is a **ribbon splitting tool** to prepare up to 36 fiber ribbons for splicing with the ribbon fusion splicer **X75-12**. The RST-000 has nine positions which accommodate ribbons from 4 to 36 fibers, as indicated by the sum of the stacked numbers on the tool. A high-precision slider mechanism splits the ribbon matrix to create two smaller ribbons. The tool is bi-directional (i.e., ribbons can be pulled through its channels in either direction).



Ribbon Splitting Tool

Original Ribbon Fiber Count	Ribbon Configuration after Splitting
36	12/24
24	12/12
12	6/6 4/8 2/10
8	4/4 6/2
6	2/4
4	2/2

Designation	Order Number
Ribbon Splitting Tool RST-000	S46998-Z300-A72

Further Accessories for X75-12: see next page!

> Accessories for Multi Fusion Splicer X75-12

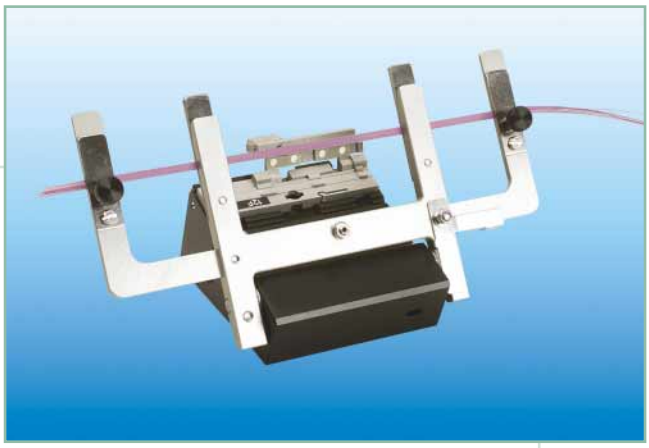
Thermal Stripper, Ribbonizer

Thermal Stripper with inserted handling adapter

Thermal Stripper

Single and ribbonized fibers as well as fiber ribbon coatings can be removed easily by heating and defined cutting of the coating. The **Thermal Stripper** is supplied with a plug-in AC power supply but can also be powered directly from the **X75-12** fusion splicer's power supplies. By simply turning the handling adapter insert, also fibers with 900 µm coating diameter can be stripped.

Designation	Order Number
Thermal Stripper	S46999-M7-S855
Replacement Blade	S46999-M7-S641



Ribbonizer with inserted handling adapter for 1 to 12 fibers

Ribbonizer

Individual fibers are arranged to suit a ribbon with the **Ribbonizer**. It is usable for 2, 4, 6, 8, 10 and 12 single fibers with 250 µm coating diameter due to turnable fiber holder accomodation. Since no adhesive is necessary, contamination of fusion splicer and accessories does not occur.

Designation	Order Number
Ribbonizer	S46999-M7-S854

> Fusion Splicer Transport Cases

Fusion Splicer Case 2 equipped with X77 and accessories

Fusion Splicer Case 2 for X7-Series

The **Fusion Splicer Case 2** is a transport case without work platform and without integral power supply.
It is especially suitable for **all X7-series** fusion splicers with attachment power supply. In addition to the fusion splicer various accessories, e.g. battery 2.3 Ah for attachment power supply, work lamp, cleaning tissues and operating instructions, can be accomodated.

- Dimensions: 500 x 420 x 200 mm

Fusion Splicer Case 3 equipped with X60 and accessories

Fusion Splicer Case 3 for X60 and VISION CDS / OEM

The **Fusion Splicer Case 3** is a transport case without work platform and without integral power supply. It is suitable for the fusion splicers **X60 and VISION CDS / OEM**. In addition to the fusion splicer the accessories, e.g. additional batteries 2.3 Ah, work lamp, cleaning tissues, operating instructions and cleaver, can be accomodated.

- Dimensions: 500 x 420 x 200 mm

Designation	Description	Order Number
Fusion Splicer Case 2	Transport case for fusion splicers X7-series	S46999-M7-V13
Fusion Splicer Case 3	Transport case for X60 and VISION OEM / VISION CDS	S46999-M7-V15

> Fusion Splicer Work Stations

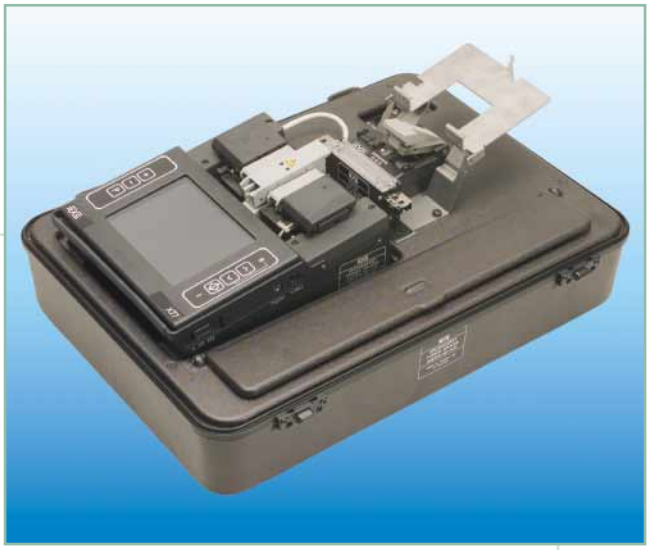
Fusion Splicer Case 4 - Workstation for X60 and VISION CDS with Cleaver D6 and Splice Tray Holder

Fusion Splicer Case 4 for X60 and Vision CDS

The **Fusion Splicer Case 4** for **X60** and **VISION CDS** fusion splicers serves as a workstation, which allows the fusion splicer to be used immediately on site.
This workstation offers a comprehensive and complete system for the fusion splicer and the necessary accessories like power supply, splice tray holder, cleaver and tool kit and enables reliable and fatigue-proof working.
The cleaver **D6** can be mounted on the hinged splice tray holder (-S879) of the workstation.

For power supply of the fusion splicer case 4 serves the integrated power supply of the fusion splicer X60.

- Dimensions: 455 x 350 x 225 mm



Fusion Splicer Case 5 - Workstation for X7-Series with Cleaver A8 and Splice Tray Holder

Fusion Splicer Case 5 for X77, X76 and X75

The **Fusion Splicer Case 5** for **X77, X76** and **X75** serves as a **workstation**, which allows the fusion splicer to be used immediately on site.
This workstation offers a comprehensive and complete system for the fusion splicer and the necessary accessories like power supply, splice tray holder, cleaver and tool kit and enables reliable and fatigue-proof working.

The cleaver **A8** (mounting block necessary) can be mounted on the hinged splice tray holder (-S876) of the workstation.

The fusion splicer case 5 is equipped with an integrated power supply 100 VA and can be also equipped with a rechargeable optional battery 6.5 Ah for powering the workstation independently of AC power.

The fusion splicers **X77, X76** and **X75** can be stored with or without attachment power supply.

- Dimensions: 455 x 350 x 210 mm

For ribbon splicer X75-12, please use fusion splicer case 2!

Designation	Description	Order Number
Fusion Splicer Case 4	Workstation for X60 and VISION CDS	S46999-M7-S878
Fusion Splicer Case 5	Workstation for X75, X76 and X77*	S46999-M7-S875

** For the ribbon splicer X75-12, the fusion splicer case 2 is recommended for transport*

> Power Options

Attachment Power Supply 100 VA and battery 2.3 Ah

Attachment Power Supply for X7-Series

The **attachment power supply** can be attached under all **X7-series** fusion splicers and accommodates the rechargable battery 2.3 Ah.
The combination of fusion splicers of X7-series and attachment power supply fits into the transport case fusion splicer case 2 and the workstation fusion splicer case 5.

Battery 2.3 Ah for Attachment Power Supply, X60 and VISION OEM / CDS

The rechargeable **battery 2.3 Ah** is for powering the fusion splicers independently of AC power. It can be slid into the **Attachment Power Supply** respectively into the fusion splicers **X60, VISION CDS** and **OEM** and exchanged without tools.

Fusion Splicer Case 5 with integral power supply and compartment for battery 6.5 Ah.

Battery 6.5 Ah for Fusion Splicer Case 5

The rechargable **battery 6.5 Ah** is for powering the fusion splicers of **X7-series** idependently of AC power. It can be integrated into the fusion splicer case 5.

12 V Cable for Car Cigarette Lighter

This cable serves as an extension cable to use the fusion splicers in the outside plant in combination with a splice truck.

Designation	Description	Order Number
Attachment Power Supply 100 VA	For all X7-series fusion splicers	S46999-M7-S630
Battery 2.3 Ah	For attachment power supply, X60 and Vision OEM / CDS	S46999-M7-S601
Battery 6.5 Ah	For fusion splicer case 5	S46999-M7-S403
12V Cable for car cigarette lighter	For X60 and Vision CDS, length: 5m	S46999-M7-S930
12V Cable for car cigarette lighter	For X7-Series, length: 5m	S46999-M7-S957

> Further Accessories

for all Fusion Splicers

Splice Tray Holders

Splice Tray Holders

The **splice tray holders** accomodate all common types of splice trays. For the workstations (Fusion Splicer Cases 4 + 5) special splice tray holders are required.

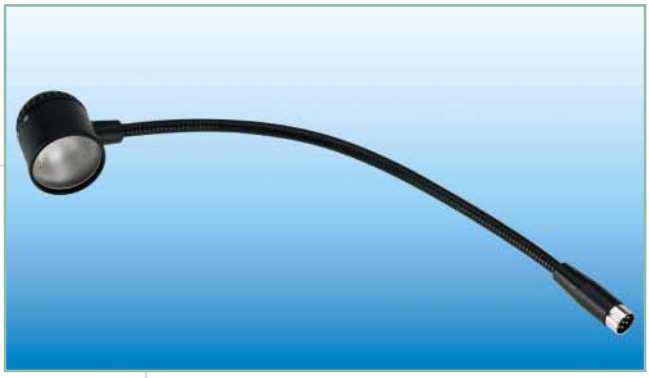
Designation	Order Number
Splice Tray Holder for X60, VISION OEM / CDS	S46999-M7-S871
Splice Tray Holder for X7-series	S46999-M7-S378
Monting Bracket for X7-series	S46999-M7-S276
Splice Tray Holder	
- for Workstation X60 / VISION CDS	S46999-M7-S879
- for Workstation X77, X76 and X75	S46999-M7-S876

Transport Case

Aluminum Transport Case

A robust and light weight **Aluminum Transport Case** with wheels and a padded insert is available for easy and safe transport of fusion splicer cases no. 2 and 3 under rough conditions.

Designation	Order Number
Aluminum Transport Case for Fusion Splicer Case 2 and 3	S46999-M26-V2



Work Lamp

Work Lamp

The halogen **work lamp** with goose neck can be operated by the fusion splicer power supplies. It fits into the storage compartments of all fusion splicer cases.

Designation	Order Number
Work Lamp	S46999-M7-S284
Spare Light Bulb, 10 W	S46999-M7-S291

FO Measuring & Testing Equipment

CORNING CABLE SYSTEMS

> Introduction

Introduction, Measurement Methods

Generally every **newly installed fiber** should be **measured** after the installation has been finished. The quality of the line should be tested and it should be made sure that every single component of this line is within its tolerances. Basically there are two different **measurement methods**:

- **Transmission measurement**
- **OTDR measurement**

Both measurements should be done on a newly installed as well as on some active fibers. With this proactive maintenance you can detect premature failures and can take care of the upcoming problems before they lead to breakdowns of the system. It is recommended to make the measurements at the same wavelength on which later on the data transmission will happen.

Transmission Test Method

By using a highly stabilized light source (a LED source at multi mode, a laser source at single mode) light is coupled very defined into a fiber with an exactly known power. At the other end of the fiber the outcoming light will be precisely measured with an **optical power meter**. The difference between these two power values is the overall loss of this specific fiber.

As this test set-up has the exact same configuration as the transmitter and receiver one can see this line later on during the data transmission. The result is **very precise** and not falsified by the measurement method. The measurement can be performed **very easily** and the interpretation is simple.

OTDR Measurement Method

The **transmission test** only gives the user a precise value of the **overall loss**. To get information of **single events** (like connectors, splices, breaks, fiber bendings) or of certain parts of the complete line (length and quality of a certain section), the so called **OTDR method** needs to be applied. **OTDR** stands for **O**ptical **T**ime **D**omain **R**eflectometer. In other words it is an optical reflective time-of-flight measurement. As sonar systems or RADAR at this method there will be a very short well defined **laser pulse** applied to a fiber and the detector monitors the power level of the backcoming light in time segments. The **OTDR** can correlate the runtime to the distance, providing the fiber type or IOR (Index of Refraction) is known.

The measurement result contains **precise information** about **different lengths, attenuation of local events and line segments** as well as **reflectivity** and **ORL** (Optical Return Loss). The correct setting of the OTDR parameters needs some user experience as well as the evaluation and documentation of such traces. But in both matters the user is well supported by the software.

Measurements using backscattered or reflected light can include some artefacts caused by some mismatch between the used fibers in a joint such as different core diameters or differences in the IOR profiles or values. Therefore it is recommended that the OTDR measurements is done **bi-directional**. The average of these two measurements gives then the real values of this fiber under test.

> Overview

340 OTDR Plus Multitester II

OTS-300

Type	Brief Characterization
OTS 300	Handheld measurement unit for transmission tests consisting of light source and powermeter
340 OTDR	OTDR-Series for single-mode and multimode fibers with built-in visual fault locator optional power meter
240 OTDR	Ideal for fiber fault location up to 140 km
Checkpoint	Fiber Identifier for active fibers

Checkpoint Plus Fiber Identifier

240 OTDR

> 340 OTDR Plus™ Multitester II

Description

Application

The **340 OTDR Plus Multitester II** offers true multi-testing capability that features field-installable single-mode, multi-mode, and quad OTDR modules, visual fault locator, as well as optional built-in power meter and single-mode laser source. The standard unit provides internal solid-state memory for 125 traces and a floppy disk drive. An optional hard drive is also offered to allow mass data storage of up to 200,000 traces and speed testing by eliminating the need to constantly exchange floppy disks in the standard drive. The product line offers a large variety of high-performance multi-mode and single-mode modules featuring a superior single-mode unit with 46 dB dynamic range, quad optics modules, and specialty modules for out of band and water intrusion testing.

Three levels of **SoftView™** emulation software provide desktop analysis and quality documentation capability.

A large 10.4-inch (26.4 cm) display is easy to read and virtually eliminates the need to jump from screen to screen to view results. Due to active matrix color, readability is further enhanced. The extraordinary strength, durability, and weather resistance of the custom polymer, modular housing protects your equipment investment.

Troubleshooting with the 340 is quick and easy with the **SmartTest™** function. At the touch of a button, the 340 selects the parameters and then tests the fiber. The **DualTrace™** function tests and displays both wavelengths on one graph.

The multi-tasking operating system provides fast fiber analysis and data collection. The **DualPulse™** feature allows measurement of the same fiber with two pulse widths to optimize resolution and distance measurements. Repetitive testing and documentation of each fiber is reduced to the shortest possible time using the **AutoIncrement™** function. Only one button per fiber is needed to record both a trace and event table at each wavelength.

Pop-up dialog boxes guide you from fiber-to-fiber and provide warnings if a fault of above-threshold loss is found.

340 OTDR Plus Multitester II

Features

- Large variety of **high-performance modules** available - single-mode **up to 46 dB** to offer significant distance capacity and enhances event search capabilities
- **SmartTest** function provides a fast, **one-button analysis** of the entire fiber
- **AutoIncrement** function speeds up repetitive as-built testing in high-fiber count projects, saving time, money, and reducing error
- **DualTrace** function shows **optimal traces** at both wavelengths on one graph **for easy analysis**
- **Multi-test** capabilities offer **all-in-one convenience** on a field-upgradeable platform
- **SoftView emulation software** offers three levels of PC-based software for batch printing and editing, trace overlay, and bidirectional analysis
- **Large display** with active matrix color eases eyestrain during periods of extended use
- Commercially available **rechargeable batteries** offer hours of autonomous operation
- **AC** adapter as well as a **12V DC** power adapter
- **Multi-lingual** operating and help screens
- Quick and efficient **location of fiber breaks** and previous event for landmarking
- **Flexible Universal Connector System**
- **Bellcore compliant**, including GR-196 formatted traces

> 340 OTDR Plus™ Multitester II

340 OTDR Kits

340 OTDR Kits

The **340 OTDR Kits** are the easiest way for a "**ready to use**" operation, including the following standard items and the items listed in the description section of each OTDR Kit:

- **Optic Module**
- **Transit Case**
- **Floppy Drive**
- **User's Manual**
- **AC Charger/Adapter, two Batteries**
- **Standard AC Power Cord** (German Schuko Connector) is supplied - other AC main power cords must be ordered as a separate line item at no charge,
- Includes choice of **UPC or APC style Universal Connector**, one **OTDR/Source Universal Adapter** (UA-**XX**) at no charge (Quad units receive two UA-**XX** at no charge)
- **Languages** included in each unit:
  English, French, Chinese, German, Portuguese, Spanish 1, Spanish 2, Russian, Italian

Connector Options

The following **connectors** are available:

OTDR / Source Connector Option

D4
SMA 905/906
FC
ST™
SC
Diamond HP HMS-10
Diamond HMS-0
Diamond HMS-10/A
FC angled connector adapter
SC angled connector adapter
DIN/HRL-10-angled connector adapter
ST angled connector adapter
Diamond E-2000™ angled connector adapter
Diamond E-2000 ultra connector adapter
DIN
Diamond GFS - 3

VFL Connector Option

FC
ST
SC

Ordering scheme, see next page!

> 340 OTDR Plus™ Multitester II

340 OTDR Basic Kits

Order Codes Basic Kits

Designation	Kit Content	Order Code
340BK-1500 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-1500-XX 30/28 dB 1310/1550 nm SM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	340BK-1500-**XX**
3400BK-2500 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-2500-XX 36/34 dB 1310/1550 nm SM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	3400BK-2500-**XX**
340BK-3600 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-3600-XX 40/40 dB 1310/1550 nm SM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	340BK-3600-**XX**
340BK-3800 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-3800-XX 46dB 1550 nm SM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	340BK-3800-**XX**
340BK-4200 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-4200-XX 24/27 dB 850/1300 nm MM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	340BK-4200-**XX**
340BK-5600 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-5600-XX-XX 24/27 dB 850/1300 nm MM and 22/22 dB 1310/1550 nm SM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	340BK-5600-**XX-XX**
340BK-5700 Basic Kit	■ 340-0 OTDR controller with color LCD ■ 340M-5700-XX-XX 24/27 dB 850/1300 nm MM and 32/30 dB 1310/1550 nm SM optical module ■ 340-CASE-DLX ■ 340-Softview OTDR emulation software	340BK-5700-**XX-XX**

OTDR / Source Connector Options (XX)

15 = D4
20 = SMA 905/906
25 = FC
30 = ST™
35A = SC
40 = Diamond HP HMS-10
45 = Diamond HMS-0
50 = Diamond HMS-10/A
60 = FC APC
65 = SC APC
70 = DIN/HRL-10 APC
75 = ST APC
80 = Diamond E-2000™ APC
82 = Diamond E-2000 UPC
85 = DIN
90 = Diamond GFS-3

VFL Connector Options (YY)

FC
ST
SC

> 340 OTDR Plus™ Multitester II

340 OTDR Deluxe Kits

Order Codes Deluxe Kits

Designation	Kit Content	Order Code
340DK-1510 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-1510-XX 30/28 dB 1310/1550 nm Single-mode, 10 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-1510-**XX**
340DK-2510 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-2510-XX 36/34 dB 1310/1550 nm Single-mode, 10 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-2510-**XX**
340DK-3610 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-3610-XX 40/40 dB 1310/1550 nm Single-mode, 10 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-3610-**XX**
340DK-3620 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-3620-XX 40/40 dB 1310/1550 nm Single-mode, 20dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-3620-**XX**
340DK-3820 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-3820-XX CATV 46 dB 1550 nm Single-mode, 20 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-3820-**XX**
340DK-4210 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-4210-XX 24/27 dB 850/1300 nm Multimode, 10 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-4210-**XX**
340DK-5610 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-5610-XX-XX 24/27 dB 850/1300 nm Multimode and 22/22 dB 1310/1550 nm Single-mode optics, 10 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-5610-**XX-XX**
340DK-5710 Deluxe Kit	■ 340-1 OTDR controller with color LCD and hard drive ■ 340M-5710-XX-XX 24/27 dB 850/1300 nm Multimode and 32/30 dB 1310/1550 nm Single-mode optics, 10 dBm PM ■ 340-CASE-DLX ■ 340-VFL-**YY** ■ 340-Softview OTDR emulation software	340DK-5710-**XX-XX**

Connector Options **XX**: see previous page

Note:
Please specify connector option for VFL (-**YY**) and Power Meter separately according to page 81

> 340 OTDR Plus™ Multitester II

Create Your Own OTDR

Customized OTDRs

For **customized OTDRs** (choice of different mainframes, modules, light source, connectors etc.) please **specify the following items:**

1. Select **Control Unit** (Main Frame)
2. Select **Optical Module**
3. Select **Power Meter Option**
4. Select **Light Source**
5. Select **Connector Style for OTDR**
   - For singlemode or multimode OTDR connector type
   - Select 2nd connector for Quad multimode

   Connector for Power Meter is the same as for OTDR if nothing else is specified
6. Select **Type of Line Cord** - at no charge - must be ordered as a separate line item
7. **Transit Case** - Recommended
8. **Softview™ Software** - Recommended
9. **Visual Fault Locator** (VFL) - Optional
   - Includes choice of connector, AC charger, internal NiCads, and manual

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340 Control Unit (Main Frame)

The 340 Control Unit includes:

- **Floppy Drive**
- **User's and Training Manuals (9 languages)**
- **AC charger/adapter, two batteries**
- **Standard AC Power Cord** (German Schuko Connector) is supplied
  - other AC main power cords must be ordered as a separate line item at no charge

Order Codes

Type	Order Code
340 OTDR Control Unit with color LCD	340-0
340 OTDR Control Unit with color LCD and hard drive	340-1

Optical Modules: see next page!

Optical Modules

The **Power Meter**, singlemode **Light Source** and **Visual Fault Locator** Options are offered in the **Plug-in Optics Module**, as well as choice of **OTDR/Source Universal Adapter** (UA -**XX**).
For units with a **Power Meter Option**, a choice of Meter Connector Adapter (MA-430-**XX**) is included)

See the instructions below for creating your custom OTDR.

340M - ☐☐ ☐ ☐ - ☐☐ - ☐☐

A B C D E (for Quad Multimode only)

A Select OTDR Optical Module

13 = 30 dB, 1310 nm Singlemode Module
14 = 28 dB, 1550 nm Singlemode Module
15 = 30/28 dB, 1310 nm Singlemode Module
23 = 36 dB, 1310 nm Singlemode Module
24 = 34 dB, 1550 nm Singlemode Module
25 = 36/34 dB, 1310 nm Singlemode Module
34 = 40 dB, 1550 nm Singlemode Module
36 = 40/40 dB, 1310/1550 nm Singlemode Module
38 = 46 dB, 1550 nm Singlemode Module
39 = 43/46 dB, 1310/1550 nm Singlemode Module
40 = 24 dB, 850 nm Multimode Module
41 = 27 dB, 1300 nm Multimode Module
42 = 24/27 dB, 850/1300 nm Multimode Module
53 = 38/40/39 dB, 1310/1550/1625 nm SM Module
54 = 36/36/36/36 dB, 1310/1410/1550/1625 nm SM Modules
56 = 24/27 dB, 850/1300 nm Multimode, 22/22 dB, 1310/1550 SM Modules
57 = 24/27 dB, 850/1300 nm Multimode, 32/30 dB, 1310/1550 SM Modules
61 = 36 dB, 1244 nm Singlemode Modules
62 = 36/36 dB, 1244/1310 nm Singlemode Modules
63 = 36/34 dB, 1244/1550 nm Singlemode Modules
64 = 36/36 dB, 1244/1625 nm Singlemode Modules
71 = 36 dB, 1625 nm Singlemode Modules
72 = 36/36dB, 1310/1625 nm Singlemode Modules
73 = 34/36 dB, 1550/1625 nm Singlemode Modules
74 = 40 dB, 1625 nm Singlemode Modules
75 = 40/40 dB 1310/1625 nm Singlemode Modules
76 = 40/40 dB, 1550/1625 nm Singlemode Modules

B Select Power Meter Options for all OTDR Optical Modules

0 = No power meter
1 = 10 dBm power meter
2 = 20 dBm power meter

C Select Light Source

0 = No Light Source
1 = Light Source

D Select Conn. Code for SM or MM OTDR connector
E Select 2nd connector for Quad multimode

15 = D4
20 = SMA 905/906
25 = FC
30 = ST™
35A = SC
40 = Diamond HP HMS - 10
45 = Diamond HMS - 0
50 = Diamond HMS - 10/A
60 = FC Angle
65 = SC Angle
70 = DIN Angle
73 = ST Compatible Angle
80 = Diamond E-2000™-Angled Connector
82 = Diamond E-2000-Ultra Connector
85 = DIN
90 = Diamond GFS - 3

More Details on Modules: see pages 74 to 79

> 340 OTDR Optical Modules

Overview / Short Range Optical Modules

Overview

There is a wide variety of different **optical modules** available for single-mode and multimode applications. These optical modules provide the **best solution** for installation, servicing and maintaining of optical fiber networks as well as for the specialized measurement tasks needed for optical communications systems and networks.

Following Types are available:

Short Range SM Optical Modules

Includes one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-13 (30 dB, 1310 nm Single-mode Modules)	
1310 nm SM	340M-1300-**XX**
1310 nm SM with +10 dBm meter	340M-1310-**XX**
1310 nm SM with +20 dBm meter	340M-1320-**XX**
1310 nm SM with light source	340M-1301-**XX**
1310 nm SM with light source, +10 dBm meter	340M-1311-**XX**
1310 nm SM with light source, +20 dBm meter	340M-1321-**XX**
340 OTDR Modules 340-14 (28 dB, 1550 nm Single-mode Modules)	
1550 nm SM	340M-1400-**XX**
1550 nm SM with +10 dBm meter	340M-1410-**XX**
1550 nm SM with +20 dBm meter	340M-1420-**XX**
1550 nm SM with light source	340M-1401-**XX**
1550 nm SM with light source, +10 dBm meter	340M-1411-**XX**
1550 nm SM with light source, +20 dBm meter	340M-1421-**XX**
340 OTDR Modules 340-15 (30/28 dB, 1310/1550 nm Single-mode Modules)	
1310/1550 nm SM	340M-1500-**XX**
1310/1550 nm SM with +10 dBm meter	340M-1510-**XX**
1310/1550 nm SM with +20 dBm meter	340M-1520-**XX**
1310/1550 nm SM with light source	340M-1501-**XX**
1310/1550 nm SM with light source, +10 dBm meter	340M-1511-**XX**
1310/1550 nm SM with light source, +20 dBm meter	340M-1521-**XX**

Connector Code **XX**: see page 73, Box D

> 340 OTDR Optical Modules

Mid Range Optical Modules

Mid Range SM Optical Modules

Includes one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-23 (36 dB, 1310 nm Single-mode Modules)	
1310 nm SM	340M-2300-**XX**
1310 nm SM with +10 dBm meter	340M-2310-**XX**
1310 nm SM with +20 dBm meter	340M-2320-**XX**
1310 nm SM with light source	340M-2301-**XX**
1310 nm SM with light source, +10 dBm meter	340M-2311-**XX**
1310 nm SM with light source, +20 dBm meter	340M-2321-**XX**
340 OTDR Modules 340-24 (34 dB, 1550 nm Single-mode Modules)	
1550 nm SM	340M-2400-**XX**
1550 nm SM with +10dBm meter	340M-2410-**XX**
1550 nm SM with +20dBm meter	340M-2420-**XX**
1550 nm SM with light source	340M-2401-**XX**
1550 nm SM with light source, +10 dBm meter	340M-2411-**XX**
1550 nm SM with light source, +20 dBm meter	340M-2421-**XX**
340 OTDR Modules 340-25 (36/34 dB, 1310/1550 nm Single-mode Modules)	
1310/1550 nm SM	340M-2500-**XX**
1310/1550 nm SM with +10 dBm meter	340M-2510-**XX**
1310/1550 nm SM with +20 dBm meter	340M-2520-**XX**
1310/1550 nm SM with light source	340M-2501-**XX**
1310/1550 nm SM with light source, +10 dBm meter	340M-2511-**XX**
1310/1550 nm SM with light source, +20 dBm meter	340M-2521-**XX**

Connector Code **XX**: see page 73, Box D

> 340 OTDR Optical Modules

Long and Extended Range Optical Modules

Long Range SM Optical Modules

Includes one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-34 (40 dB, 1550 nm Single-mode Modules)	
1550 nm SM	340M-3400-**XX**
1550 nm SM with +10dBm meter	340M-3410-**XX**
1550 nm SM with +20dBm meter	340M-3420-**XX**
1550 nm SM with light source	340M-3401-**XX**
1550 nm SM with light source, +10dBm meter	340M-3411-**XX**
1550 nm SM with light source, +20dBm meter	340M-3421-**XX**
340 OTDR Modules 340-36 (40/40 dB, 1310/1550 nm Single-mode Modules)	
1310/1550 nm SM	340M-3600-**XX**
1310/1550 nm SM with +10 dBm meter	340M-3610-**XX**
1310/1550 nm SM with +20 dBm meter	340M-3620-**XX**
1310/1550 nm SM with light source	340M-3601-**XX**
1310/1550 nm SM with light source, +10 dBm meter	340M-3611-**XX**
1310/1550 nm SM with light source, +20 dBm meter	340M-3621-**XX**

Extended Range SM Optical Modules

Includes one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-38 (46 dB, 1550 nm Single-mode Modules)	
1550 nm SM	340M-3800-**XX**
1550 nm SM with +10 dBm meter	340M-3810-**XX**
1550 nm SM with +20 dBm meter	340M-3820-**XX**
1550 nm SM with light source	340M-3801-**XX**
1550 nm SM with light source, +10 dBm meter	340M-3811-**XX**
1550 nm SM with light source, +20 dBm meter	340M-3821-**XX**
340 OTDR Modules 340-39 (43/46 dB, 1310/1550 nm Single-mode Modules)	
1310/1550 nm SM	340M-3900-**XX**
1310/1550 nm SM with +10 dBm meter	340M-3910-**XX**
1310/1550 nm SM with +20 dBm meter	340M-3920-**XX**
1310/1550 nm SM with light source	340M-3901-**XX**
1310/1550 nm SM with light source, +10 dBm meter	340M-3911-**XX**
1310/1550 nm SM with light source, +20 dBm meter	340M-3921-**XX**

Connector Code **XX**: see page 73, Box D

> 340 OTDR Optical Modules

Multimode Optical Modules

Multimode Optical Modules

Includes one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-40 (23 dB, 850 nm Multimode Modules)	
850 nm MM	340M-4000-**XX**
850 nm MM with +10 dBm meter	340M-4010-**XX**
850 nm MM with +20 dBm meter	340M-4020-**XX**
340 OTDR Modules 340-41 (26 dB, 1300 nm Multimode Modules)	
1300 nm MM	340M-4100-**XX**
1300 nm MM with +10 dBm meter	340M-4110-**XX**
1300 nm MM with +20 dBm meter	340M-4120-**XX**
340 OTDR Modules 340-42 (23/26 dB, 850/1300 nm Multimode Modules)	
850/1300 nm MM	340M-4200-**XX**
850/1300 nm MM with +10 dBm meter	340M-4210-**XX**
850/1300 nm MM with +20 dBm meter	340M-4220-**XX**

Note: 62.5 µm PC polish for multimode standard

Connector Code **XX**: see page 73, Box D

> 340 OTDR Optical Modules

Tri and Quad Wavelength Optical Modules

Tri and Quad Wavelength Single-mode Optical Modules

Includes choice of UPC or APC style Universal Connector, one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a power meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-53 (38/40/39 dB, 1310/1550/1625 nm Single-mode Modules)	
1310/1550/1625 nm	340M-5300-**XX**
1310/1550/1625 nm with +10 dBm InGaAs meter	340M-5330-**XX**
1310/1550/1625 nm with +20 dBm InGaAs meter	340M-5340-**XX**
1310/1550/1625 nm with light source	340M-5301-**XX**
1310/1550/1625 nm with +10 dBm InGaAs meter and light source	340M-5331-**XX**
1310/1550/1625 nm with +20 dBm InGaAs meter and light source	340M-5341-**XX**
340 OTDR Modules 340-54 (36/36/36/36 dB, 1310/1410/1550/1625 nm Single-mode Modules)	
1310/1410/1550/1625 nm SM	340M-5400-**XX**
1310/1410/1550/1625 nm SM with +10 dBm InGaAs meter	340M-5410-**XX**
1310/1410/1550/1625 nm SM with +20 dBm InGaAs meter	340M-5420-**XX**
1310/1410/1550/1625 nm SM with light source	340M-5401-**XX**
1310/1410/1550/1625 nm SM with +10 dBm InGaAs meter and light source	340M-5411-**XX**
1310/1410/1550/1625 nm SM with +20 dBm InGaAs meter and light source	340M-5421-**XX**

Connector Code **XX**: see page 73, Box D

Quad Wavelength Multimode/Single-mode Optical Modules

Includes two OTDR/Source Universal Adapters UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-56 (21/23.5 dB, 850/1300 nm Multimode, 20.5/19.5 dB Single-mode Modules)	
850/1300/1310/1550 nm MM/SM	340M-5600-**XX-XX**
850/1300/1310/1550 nm MM/SM with +10 dBm meter	340M-5610-**XX-XX**
850/1300/1310/1550 nm MM/SM with +20 dBm meter	340M-5620-**XX-XX**
850/1300/1310/1550 nm MM/SM with light source	340M-5601-**XX-XX**
850/1300/1310/1550 nm MM/SM with light source, +10 dBm meter	340M-5611-**XX-XX**
850/1300/1310/1550 nm MM/SM with light source, +20 dBm meter	340M-5621-**XX-XX**
340 OTDR Modules 340-57 (20.5/22.5 dB, 850/1300 nm Multimode, 32/30 dB Single-mode Modules)	
850/1300/1310/1550 nm MM/SM	340M-5700-**XX-XX**
850/1300/1310/1550 nm MM/SM with +10 dBm meter	340M-5710-**XX-XX**
850/1300/1310/1550 nm MM/SM with +20 dBm meter	340M-5720-**XX-XX**
850/1300/1310/1550 nm MM/SM with light source	340M-5701-**XX-XX**
850/1300/1310/1550 nm MM/SM with light source, +10 dBm meter	340M-5711-**XX-XX**
850/1300/1310/1550 nm MM/SM with light source, +20 dBm meter	340M-5721-**XX-XX**

Note: 62.5µm PC polish for multimode and Ultra PC polish for Single-mode standard.
All sources available on Quad Optics are SM only

Connector Code **XX**: see page 73, Box D / E

340 OTDR Optical Modules

Specialty Optical Modules

Specialty Optical Modules (1625nm)

Includes one OTDR/Source Universal Adapter UA-**XX** at no charge.
For units with a Power Meter option, a Meter Connector Adapter MA-**XX** is included at no charge.

Type	Order Code
340 OTDR Modules 340-71 (36 dB, 1625 nm Single-mode Modules)	
1625 nm SM	340M-7100-**XX**
1625 nm SM with +10 dBm InGaAs meter	340M-7110-**XX**
1625 nm SM with +20 dBm InGaAs meter	340M-7120-**XX**
1625 nm SM with light source	340M-7101-**XX**
1625 nm SM with +10 dbBm InGaAs meter and light source	340M-7111-**XX**
1625 nm SM with +20 dBm InGaAs meter and light source	340M-7121-**XX**
340 OTDR Modules 340-72 (36/36 dB, 1310/1625 nm Single-mode Modules)	
1310/1625 nm SM	340M-7200-**XX**
1310/1625 nm SM with +10 dBm InGaAs meter	340M-7210-**XX**
1310/1625 nm SM with +20 dBm InGaAs meter	340M-7220-**XX**
1310/1625 nm SM with light source	340M-7201-**XX**
1310/1625 nm SM with +10 dBm InGaAs meter and light source	340M-7211-**XX**
1310/1625 nm SM with +20 dBm InGaAs meter and light source	340M-7221-**XX**
340 OTDR Modules 340-73 (34/36 dB, 1550/1625 nm Single-mode Modules)	
1550/1625 nm SM	340M-7300-**XX**
1550/1625 nm SM with +10 dBm InGaAs meter	340M-7310-**XX**
1550/1625 nm SM with +20 dBm InGaAs meter	340M-7320-**XX**
1550/1625 nm SM with light source	340M-7301-**XX**
1550/1625 nm SM with +10 dBm InGaAs meter and light source	340M-7311-**XX**
1550/1625 nm SM with +20 dBm InGaAs meter and light source	340M-7321-**XX**
340 OTDR Modules 340-74 (40 dB, 1625 nm Single-mode Modules)	
1625 nm SM	340M-7400-**XX**
1625 nm SM with +10 dBm InGaAs meter	340M-7410-**XX**
1625 nm SM with +20 dBm InGaAs meter	340M-7420-**XX**
1625 nm SM with light source	340M-7401-**XX**
1625 nm SM with +10 dBm InGaAs meter and light source	340M-7411-**XX**
1625 nm SM with +20 dBm InGaAs meter and light source	340M-7421-**XX**
340 OTDR Modules 340-75 (40/40 dB, 1310/1625 nm Single-mode Modules)	
1310/1625 nm SM	340M-7500-**XX**
1310/1625 nm SM with +10 dBm InGaAs meter	340M-7530-**XX**
1310/1625 nm SM with +20 dBm InGaAs meter	340M-7540-**XX**
1310/1625 nm SM with light source	340M-7501-**XX**
1310/1625 nm SM with +10 dBm InGaAs meter and light source	340M-7531-**XX**
1310/1625 nm SM with +20 dBm InGaAs meter and light source	340M-7541-**XX**
340 OTDR Modules 340-76 (40/40 dB, 1550/1625 nm Single-mode Modules)	
1510/1625 nm SM	340M-7600-**XX**
1510/1625 nm SM with +10 dBm InGaAs meter	340M-7610-**XX**
1550/1625 nm SM with +20 dBm InGaAs meter	340M-7620-**XX**
1550/1625 nm SM with light source	340M-7601-**XX**
1550/1625 nm SM with +10 dBm InGaAs meter and light source	340M-7611-**XX**
1550/1625 nm SM with +20 dBm InGaAs meter and light source	340M-7621-**XX**

Connector Code **XX**: see page 73, Box D

> 340 OTDR Plus™ Multitester II

Accessories

340 OTDR AC power cord options

One power cord is free with a 340 controller but must be ordered as a separate item.

Cord Type	Order Code
US/Japan	340-AC-US/J
Europe	340-AC-EUROPE
United Kingdom	340-AC-UK
Switzerland	340-AC-SWISS
Italy	340-AC-ITALY
Australia	340-AC-AUSTRALIA

Optional Accessories for 340

Each Optional Accessory must be ordered as separate line item.

Designation	Order Code
Transport Options	
Hard Transit Case*	340-CASE-DLX
Deluxe Soft Bag	340-CASE-SFT
Printer	
Portable External Printer with Cable	340-PRINTER
Printer for 220v*	340-PRINTER-220
Printer Paper (5 rolls/pk) for 340-PRINTER	340-PAPER-R
Case of Paper (25 rolls) for 340-PRINTER	340-PAPER-C
Power Options	
12V Lead Acid Battery	340-BATT
AC/Charger US*	340-AC-POWER
Cigarette Lighter Adapter & Charger*	340-AUTO
Keyboards	
US Keyboard*	340-KEY-US
German Keyboard*	340-KEY-GE
French Keyboard*	340-KEY-FR
Spanish Keyboard*	340-KEY-SP
Italian Keyboard*	340-KEY-IT
Further Accessories	
Mounting Tripod*	340-TRIPOD
Basic Fiber Optic Training Manual	340-TMANUAL
User's Manual for 340	340-MANUAL
340-SoftView™ plus Bi-directional Analysis and Global Processing	340-SOFTVIEW
340 Serial Data Transfer Kit, includes software and cables	340-DATATRANSFER
Power Meter 10 dB Attenuator	340-MF-460

** Recommended accessories*

> 340 OTDR Plus™ Multitester II

Visual Fault Locator / Adapters

Visual Fault Locator

The Visual Fault Locator is a field installable option for 340 and must be ordered as a separate item.

Designation	Order Code
Visual Fault Locator with FC Connector	340-VFL-FC
Visual Fault Locator with ST™ Connector	340-VFL-ST
Visual Fault Locator with SC Connector	340-VFL-SC

Additional OTDR/Source Universal Adapters

There is one free universal adapter included with each 340 OTDR optical module and two free with each 340 OTDR Quad Wavelength module. Each Adapter must be added as separate item(s).

Designation	Order Code
Adapters for Ultra PC and Angled PC Connectors	
D4	UA-15
SMA 905/906	UA-20
FC	UA-25
ST	UA-30
SC	UA-35A
Diamond HP HMS-10	UA-40
Diamond HMS-0	UA-45
Diamond HMS-10/A	UA-50
FC - APC	UA-60
SC - APC	UA-65
DIN/HRL-10 - APC	UA-70
ST - APC	UA-75
Diamond E-2000™ - APC	UA-80
Diamond E-2000 - UPC	UA-82
DIN 47256	UA-85
Power Meter Connector Adapter (one included free with OTDR power meter option)	
D4	MA-15
SMA 905/906	MA-20
FC	MA-25
ST	MA-30
SC	MA-35
Diamond E-2000 APC	MA-80
DIN	MA-85
Diamond GFS-3	MA-90
Additional Power Meter Connector Adapters (not included as a no charge option for the OTDR meter - must be purchased separately)	
Bare Fiber	MA-05A
FDDI	MA-00
Power Meter Optical Attenuators	
Power Meter 10 dB Attenuator	340-MF-460
Power Meter 20 dB Attenuator	340-MG-462

> 240 OTDR

Description

Application

The **240 OTDR** is an affordable, high performance OTDR ideal for fiber fault location, maintenance or LAN fiber installations effective on fibers up to 140 km in length.

With a testing range of up to 140 km, the **240 OTDR** is unmatched in value and performance by any fault location or maintenance tool on the market. Intuitive, fully automated, one-button operation allows for superior results with minimal training. Whether viewing the full OTDR trace and results in the field or saving data to the built-in floppy drive for later recall, the **240 OTDR** offers an affordable and efficient fiber optic testing solution.

240 OTDR

Features

- **OTDR trace viewing capability** enables a highly versatile troubleshooting tool in a cost-effective package
- **Event analysis** measures connectors, splices and faults quickly and easily
- **Dual-wavelength units** discover areas of high macro-bending
- **One-button fault locate mode** simplifies operation and reduces errors
- **Real-time and timed average testing modes**
- **Multimode or single-mode** models available
- **Visual Fault Locator** option
- **30/28 db / 1310/1550 nm Dynamic Range** (85/140 km distance range)
- **70/110 km / 1310/1550 nm Automated Measurement Range** (Fault Locate Range)

> 240 OTDR

Technical Data

Optical Specifications

Optical Specifications	OTDR 240-15	OTDR 240-42
Center Wavelength	1310 nm ± 20 nm 1550 nm ± 20nm	850 nm ± 20 nm 1300 nm ± 20 nm
Fiber Type	Single-mode	Multimode 62.5 µm
Spectral Width (RMS)	≤ 15 nm	≤ 15 nm
Optical Dynamic Range (SNR=1)	30.0 / 28.0 dB typical (85 / 140 Km distance)	21.0 / 21.5 dB typical (8 / 40 Km distance)
Initial Reflective Deadzone	4 / 3 meters typical	4 / 5 meters typical
Initial Non-Reflective Deadzone	11 / 12 meters typical	8 / 12 meters typical

General Specifications

General Specifications	240 OTDR
Dimensions (H x W x D)	22.2 x 24.1 x 8.8 cm
Weight	2.95 kg
Display	12.7 cm (5 inch) diagonal VGA
Power	DC: internal/removable 12V rechargeable lead acid AC: to external charger/adapter 110/220V auto switching
Battery Life	8 hours typical
Operating Range	0° to 45° C 95% relative humidity (non-condensing)
Storage Conditions	-25° to 60° C 95% relative humidity (non-condensing)
Laser Safety	Meexts CDRH Class 1 requirements (eye safe)
Optional Equipment	635 nm visual fault locator

Order Information: see next page

> 240 OTDR

Order Numbers

There are **four different standard versions** and **four different kits** available of the **240 OTDR**. They include dual singlemode 1310/1550nm optics and dual multimode 850/1300nm optics either with or without VFL.
The section below lists the individual order numbers for each possible configuration.

240 OTDR

Includes user's manuals, AC charger/adapter, one battery and choice of one AC power cord that must be ordered as a separate line item (US/Japan, Europe, United Kingdom, Switzerland, Italy, Australia).

Designation	Order Code
SM 1310/1550nm w/ floppy drive, FC/PC Connector	240-15-0-**XX**
SM 1310/1550nm w/ floppy drive, FC/PC Connector & VFL	240-15-1-**XX**
MM 850/1300nm w/ floppy drive, FC/PC Connector	240-42-0-**XX**
MM 850/1300nm w/ floppy drive, FC/PC Connector & VFL	240-42-1-**XX**

XX
please insert
connector code:
52 = SC
54 = FC
55 = ST™

240 OTDR Kits

Includes user's manuals, AC charger/adapter, one battery and choice of one AC power cord that must be ordered as a separate line item (US/Japan, Europe, United Kingdom, Switzerland, Italy, Australia) and the accessories mentioned below.

Designation	Order Code
240-15-0-XX OTDR - Singlemode 1310/1550 nm w/ floppy drive - Softview Software - 240-SOFTCASE - 240-DATATRANSFER	240BK-15-0-**XX**
240-15-1-XX OTDR - Singlemode 1310/1550 nm w/ floppy drive - 650nm Visual Fault Locator - Softview Software - 240-SOFTCASE - 240-DATATRANSFER	240BK-15-1-**XX**
240-42-0-XX OTDR - Multimode 850/1300 nm w/ floppy drive - Softview Software - 240-SOFTCASE - 240-DATATRANSFER	240BK-42-0-**XX**
240-42-1-XX OTDR - Multimode 850/1300 nm w/ floppy drive - 650nm Visual Fault Locator - Softview Software - 240-SOFTCASE - 240-DATATRANSFER	240BK-42-1-**XX**

Accessories

The following table lists the accessories that are specific to the **240 OTDR**:

Designation	Order Code
Hard case option	240-HARDCASE
Soft bag option	240-SOFTCASE
240 OTDR Serial transfer kit, includes software and cables	240-DATATRANSFER
AC power adapter	240-AC-POWER
Manual Corning 240 User	240-MANUAL

The following table lists the **340 OTDR** accessories that are usable with the **240 OTDR**:

Designation	Order Code
Cigarette lighter adapter & charger	340-AUTO
12V lead acid battery	340-BATT
Mounting tripod	340-TRIPOD
Portable external printer with cable	340-PRINTER

> OTS-300 Express Series Power Meters / Sources and Testers

Description

Application

OTS-300

The **OTS-300 Express Series** includes intelligent, versatile **optical meters, sources, and testers** that simultaneously test and store dual wavelength attenuation measurements. The synchronized meter and source alternates between wavelengths to continually update the displayed data. This process cuts testing time in half and prevents costly errors from mismatched source and meter wavelengths. At the press of a button, dual wavelength results are stored and the next fiber measured. These test sets are used during installation, system qualification, and maintenance. The combination of practical features, simple operation, field performance, and rugged design make them perfect for virtually all fiber optic testing environments from multimode LAN to single-mode telephony and CATV.

The data storage system eliminates field paperwork by storing up to 900 dual wavelength fiber measurements. The stored data can be viewed and edited while in the field and later transferred to **LinkLoss** Windows-based PC software. **LinkLoss** stores, prints, and creates bidirectional charts. The flexibility of the PC software allows **OTS-300** data to be processed in other spreadsheet applications.

Designed for the user, the **OTS-300 Series** provides quick, intuitive operation through a simple keypad and backlit graphic display with adjustable, temperature-compensated contrast. The power meters feature selectable resolution that optimizes use for both field (0.1 dB) and production or lab environments (0.01 dB). Detection of 2 kHz pulsed "tone" via both audible and visual indication allows versatile continuity testing and fiber tracing. Both the meters and the sources can be used with compatible **OTS-311D** and **OTS-312XD** testers to provide the same intelligent testing features.

The **OTS-300** Express meters and testers make calibrated measurements at 850, 1300, 1310, and 1550 nm from +3 to -70 dBm using a high-performance InGaAs detector that minimizes reflection effects. A powerful microcontroller performs a self-test each time the unit is powered on to ensure reliable measurements.

OTS-300 Express sources and testers are available with a single port 850/1300 nm LED for multimode testing and a single port 1310/1550 nm laser for single-mode testing. The most versatile source is the **OTS-3MDSD** with four wavelengths. It incorporates a dual LED and a dual laser. The **OTS-310** meter combined with the **OTS-3MDSD** creates a complete all-purpose test kit for multimode and single-mode applications.

The rugged ABS housing and elastomeric holster, weather-resistant membrane keypad, and -18 to +50° C operating temperature enable the **OTS-300s** to be used wherever there is fiber. Internal RF shielding protects from external error-causing interference. The three-way powering provides uninterrupted operation by automatically switching between the internal rechargeable Ni-Cads, replaceable batteries, and AC power. A selectable automatic shut-off function extends battery life.

Features

- **Auto testing** provides dual wavelength display and storage that **cuts testing time in half**
- **Eliminates field paperwork** - stores up to 900 dual wavelength measurements and 50 jobs (files)
- **LinkLoss Windows-based PC software** provides storage, printing, viewing, bidirectional charts, and export
- **Four-wavelength source**: 850/1300 nm LED and 1310/1550 nm laser
- **Dual wavelength** 850/1300 nm and 1310/1550 nm sources and testers
- **Emits and detects 2 kHz "tone"** for detection, continuity, and tracing
- **Selectable 0.1/0.01 dB resolution**
- **Reliable InGaAs performance** for **+3 to -70 dBm** (standard range) and **+20 to -60 dBm** (CATV range)
- **Flexible three-way power**: AC, internal rechargeable battery, replaceable alkaline battery
- **Backlit, easy-to-read display**
- **Rugged ABS housing**
- **Wide operating temperature** range of -18 to +50° C

OTS-300 Express Series Power Meters / Sources and Testers

Specifications

Meter Specifications	OTS-310 Meter / OTS-311D and OTS-312XD Testers
Fiber Type	Multimode and single-mode: 100/140 µm to 9/125 µm
Wavelength Range	800 to 1600 nm
Detector Type	InGaAs
Calibrated Wavelengths	850, 1300, 1310, 1550 nm
Measurement Range	+3 to -70 dBm (standard) / +20 to -60 dBm (CATV) Auto mode: +3 to -55 dBm (multimode) / +3 to -60 dBm (single-mode) / +3 to -45 dBm (CATV)
Accuracy	± 0.2 dB at reference conditions, traceable to NIST calibration standards (23° C, 1310 nm, and -20 dBm)
Linearity (at 23° C)	1300/1310/1550 nm: ± 0.1 dB from 0 to -60 dBm 850 nm: ± 0.1 dB from 0 to -50 dBm
Resolution	0.01 dB / 0.1 dB (selectable)
Connector Adapters (interchangeable)	ST compatible, FC, SC, DIN

Optical Specifications	LEDs OTS-311D Tester / OTS-303D, OTS-3MDSD LED Sources	Lasers OTS-312XD Tester / OTS-304XD, OTS-3MDSD Laser Sources
Central Wavelength	850/1300 nm ± 20 nm	1310/1550 nm ± 20 nm
Output Power	>18 dBm coupled into 62.5/125 µm fiber	■ -8 dBm coupled into 9/125 µm fiber ■ CW or 2 kHz modes, switchable
Spectral Width	< 50 nm at 850 nm < 125 nm at 1300 nm (FWHM typical)	< 5 nm (RMS)
Output Stability	± 0.1 dB at 23° C for 8 hours	
Connector Type (Dedicated) Single Output	ST™ compatible, FC, SC, DIN	

General Specifications	OTS 300 Express Series Power Meters / Sources and Testers
Operating Temperature	-18° C to +50° C (0° F to +122° F)
Storage Temperature	-40° C to +60° C (-40° F to +140° F)
Display	■ dBm/dB with reference value ■ Active wavelength ■ Self-test with error messages ■ Transmitter on (TX) ■ Watts ■ 2 kHz pulsing on testers and sources ■ Low battery (last available battery) ■ Selectable automatic shut-off (30 minutes) ■ Out-of-range (positive or negative)
Data Storage Capacity	900 fibers at both wavelengths / 50 files
Power Supply	Three-way: Internal rechargeable Ni-Cad, replaceable batteries (AA / LR6, 1.5 V), AC adapter (6 V / 300 mA)
Battery Life	Meter: 34 hours typical (15 Ni-Cad and 19 lithium) Source: 26 hours typical (11 Ni-Cad and 15 lithium)
Dimensions	5.9 in x 3.4 in x 1.6 in (150 mm x 85 mm x 40 mm)
Weight	1 lb (< 0.5 kg)

> OTS-300 Express Series
Power Meters / Sources and Testers

Handheld Kits

Designation	Kit Content	Order Code
OTS-300-MD Kit	■ OTS-303D-XX 850/1300 nm LED source (1 pc.) ■ OTS-310-XX Express Meter (1 pc.) ■ Patchcords (2 pcs.) ■ Inline Adapter (1 pc.) ■ Case (1 pc.)	OTS-300MD-KIT-**XX**
OTS-300SD Kit	■ OTS-304XD-XX 1310/1550 nm Laser source (1 pc.) ■ OTS-310-XX Express Meter (1 pc.) ■ Patchcords (2 pcs.) ■ 1 Inline Adapter (1 pc.) ■ Case (1 pc.)	OTS-300SD-KIT-**XX**
OTS-3MDSD Kit	■ OTS-3MDSD-XX+D1276 Express Quad Source (1 pc.) ■ OTS-310-XX Express Meter (1 pc.) ■ Patchcords (4 pcs.) ■ Inline Adapter (2 pcs.) ■ Case (1 pc.)	OTS-3MDSD-KIT-**XX**
OTS-311D Kit	■ OTS-311D-XX 850/1300 nm LED Express Tester (2 pcs.) ■ Patchcords (4 pcs.) ■ Inline Adapter (2 pcs.) ■ Case	OTS-311D-KIT-**XX**
OTS-312XD Kit	■ OTS-312XD-XX 1310/1550 nm Laser Express Tester (2 pcs.) ■ Patchcords (4 pcs.) ■ 2 Inline Adapter (2 pcs.) ■ Case (1 pc.)	OTS-312XD-KIT-**XX**
OTS-322XD Kit	■ 1310/1550 nm Laser Express CATV Tester (2 pcs.) ■ Patchcords (4 pcs.) ■ Inline Adapter (2 pcs.) ■ Case (1 pc.)	OTS-322XD-KIT-**XX**
OTS-3CATV Kit	■ CATV Express Meter (2 pcs.) ■ Patchcords (2 pcs.) ■ Inline Adapter (1 pc.) ■ Case (1 pc.)	OTS-3CATV-KIT-**XX**

XX
please insert
connector code:
52 = SC
54 = FC
55 = ST™
57 = DIN

> Handheld Test Equipment

Power Meters / Testers

Compact Power Meters

Compact Meters including pouch, manual and a 9 volt battery. Includes one connector adapter (OT-1AXX/ OT-SC) that must be ordered as a separate no charge item.

Designation	Order Code
850/1300/1550 nm Power Meter	CPM-FULLWAVE

Basic Power Meters

Basic Meters including connector adapter of choice, rubber boot, internal NiCad, manual, AC charger.

Designation	Order Code
Standard Power Meter with dB reference	OTS-110-**XX**
CATV Power Meter with dB reference	OTS-120-**XX**

Express Meters

Express Meters including connector adapter of choice, rubber boot, LinkLoss, cable, internal NiCad, operator's manual and an AC charger.

Note:

In order for the auto wavelength feature to work properly it must be used in conjunction with the OTS-300 Express Sources.

Designation	Order Code
Express Meter with dB reference, data storage, auto wavelength	OTS-310-**XX**
CATV Express Meter with dB reference, data storage, auto wavelength	OTS-320-**XX**

Express Testers

Express Testers with data storage and auto wavelength including connector adapter of choice, rubber boot, manual and AC charger.

Designation	Order Code
850/1300 nm LED Express Tester	OTS-311D-**XX**
850/1300 nm LED Express Tester with MTRJ connector	OTS-311D-MTRJ
1310/1550 nm Laser Express Tester	OTS-312XD-**XX**
CATV Laser Express Tester	OTS-322XD-**XX**

XX
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> Handheld Test Equipment

Visual Fault Locator / Light Sources / Attenuators / Accessories

LED Light Sources

Includes AC Charger/Adapter, internal NiCads and manual.

Designation	Order Code
850/1300nm LED Source	OTS-100D-**XX**

Express Light Sources

Includes a rubber boot, AC Charger/Adapter, internal NiCads and manual.

Note:

In order for the auto wavelength feature to work properly it must be used in conjunction with the OTS-310 Express Meters.

Designation	Order Code
850/1300nm LED Express Source	OTS-303D-**XX**
1310/1550nm Laser Express Source	OTS-304XD-**XX**
Quad Express Source	OTS-3MDSD-**XX**

Three Wavelength Sources/VFL

Includes a pouch, AC Charger/Adapter, 4 "AA" batteries and manual.

Designation	Order Code
850/1300/1550nm Source	OS-301-**XX**

XX
please insert
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Optical Variable Attenuator

Designation	Order Code
1310/1550nm SM Optical Variable Attenuator	OVA-100-**XX**

Accessories for Handheld Test Equipment

Designation	Order Code
Transit Case 2 handheld units	2HH-TCASE
Transit Case 3 handheld units	3HH-TCASE
Connector Cleaning Kit	TKT-011
Connector Adapter, RX, except SC	OT-1A**XX**
Connector Adapter, RX, SC	OT-SC
Connector Adapter, MTRJ	OT-MTRJ
ST™ Bare Fiber Adapter	BFA-ST
FC Bare Fiber Adapter	BFA-FC
SC Bare Fiber Adapter	BFA-SC
DIN Bare Fiber Adapter	BFA-DIN

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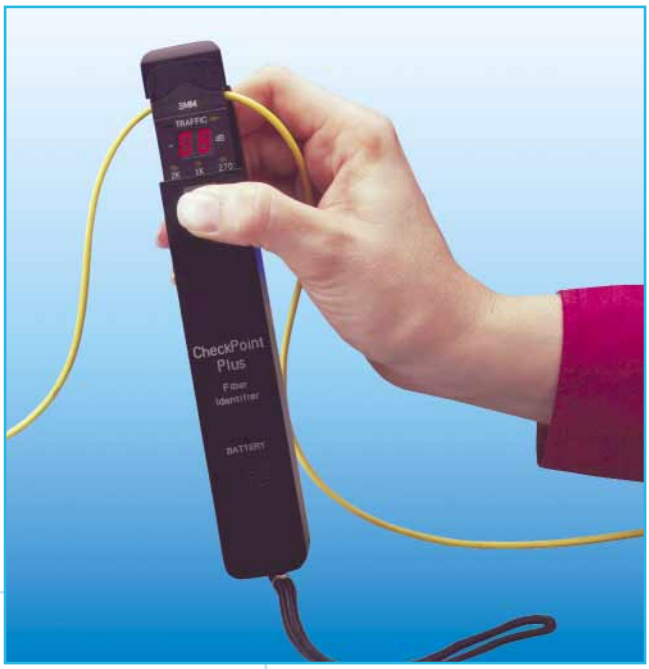
> Checkpoint™ and Checkpoint Plus™ Optical Fiber Identifiers / Power Meter

Application

The Fiber identifiers **Checkpoint** and **Checkpoint Plus** are simple self contained hand-held installation and maintenance tools which safely detect the signal path, transmission direction and modulated test signals without interrupting live traffic on the fiber. The type of signal (continous, modulated or none) and transmission direction are indicated by LEDs.
In addition, the **Checkpoint Plus** has an integral power meter that simultaneously displays the relative core power level, allowing isolation and measurement of faults and in-line components such as splitters, couplers, splices and connectors.



Checkpoint Plus Fiber Identifier

The **Checkpoint** and **Checkpoint Plus** use non-destructive local detection technology to ensure fiber integrity and provide reliable identification.

Simply inserting a fiber and closing the thumb switch provides immediate results. To distinguish a single fiber from other active or dark fibers, a 2 kHz modulated test signal of an appropriate laser source (such as OTS 312 tester) can be transmitted from one end of the fiber and detected mid-span by the **Checkpoint** (**Checkpoint Plus** detects 270 Hz and 1 kHz modulated signals as well).

These rugged units are designed for use everywhere fiber is located, inside or out, in heat or cold. Interchangeable no-tools adapters provide optimized performance on four fiber sizes – 250 µm coating, 900 µm tight buffered, 3 mm jacketed and ribbon fibers.

Features

- Identification of **live traffic** carrying fibers
- **Detection** of the signal **transmission direction** and of **2 kHz modulated test signals**
- **Interchangeable adapters** for 250 µm and 900 µm fibers, 3 mm jacketed cables, and ribbon fibers
- For 1310 nm and 1550 nm **single-mode** applications
- **High sensitivity**

Additional features of the Checkpoint Plus

- **Mid-span measurements** of relative core power level
- Detection of **270 Hz, 1 kHz and 2 kHz** modulated test signals

Order Codes

Designation	Order Code
Checkpoint SM Fiber Identifier, incl. 9V battery	CHECKPOINT
Checkpoint Plus SM Fiber Identifier with power indication, incl. 9V battery	CHECKPOINT PLUS

SmallTALK™, FTS-330, FTS-350, FTS-355 Fiber-Optic Talk Sets

Fiber-Optic Talk Sets

Application

The **SmallTALK fiber communicators** provide point-to-point communication for fiber-optic systems. These economical communication tools operate over a single fiber at 850 nm and 1300 nm respectively. These easy, walkie-talkie type talk sets are used during installation, testing, maintenance, and restoration.
The fiber communicator is designed to be a convenient addition to your fiber-optic test gear. Compact and light-weight, these 170 g units operate on a 9-V alkaline battery for up to 15 hours of operation.

The laser-equipped **FTS-330** and **FTS-350/-355** are full-featured fiber-optic talk sets for use with single-mode or multimode fiber. Full-duplex VOX operation simplifies field communication by emulating standard telephone conversation. The noise-cancelling „hands-free" headset makes these devices a good selection for any application including splicing, testing, or maintenance. The **FTS-330** can be used in systems up to **70 km**, the **FTS-350/-355** up to **125 km**.

Features

SmallTALK for Multimode, SmallTALK-SM for Single-mode

- **LED**
- **Dynamic range**
  ≥ 25 dB (850 nm), Multimode
  ≥ 30 dB (1300 nm), Single-mode
- **Walkie-talkie type** operation over single fiber
- **Push to talk** (PTT)
- **9-V alkaline battery** operation

FTS-330

- **Laser** (1310 nm)
- **Dynamic range ≥ 30 dB**
- **Full duplex** over single fiber
- **Hands-free** operation
- **Rechargeable** with low battery indicator
- **Battery charger** included
- **Call feature** – like telephone „ring"

FTS-350, FTS-355

- **Laser** (FTS-350: 1310 nm; FTS-355: 1550 nm)
- **Dynamic range ≥ 50 dB**
- **Full duplex** over single fiber
- **Hands-free** operation
- **Rechargeable** with low battery indicator
- **Battery charger** included
- **Call feature** - like telephone „ring"

XX
please insert
connector code:
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Order Codes

Designation	Order Code
SmallTALK Fiber Optic Talk Set with LED, Multimode	SmallTALK
SmallTALK-SM Fiber Optic Talk Set with LED, Single-mode	SmallTALK-SM
FTS-330 Fiber Optic Talk Set with Laser 1310 nm, dynamic range ≥ 30 dB	FTS-330-**XX**
FTS-350 Fiber Optic Talk Set with Laser 1310 nm, dynamic range ≥ 50 dB	FTS-350-**XX**
FTS-355 Fiber Optic Talk Set with Laser 1550 nm, dynamic range ≥ 50 dB	FTS-355-**XX**

> Fiber Microscope

Application

Inspection of fiber optic connectors will eliminate potential problems with installed systems. Knowing a connector meets performance standards eliminates the divide and conquer troubleshooting routine and helps to meet the system loss budget.

Cornings **Fiber Microscopes** provide a clear, flexible, and reliable solution **for fiber optic connector inspection** to indicate an acceptable connector polish, cleanliness, and core concentricity. The hand-held microscope is excellent for both field and lab use. Costly down time and troubleshooting time is virtually eliminated from fiber optic systems. Gain confidence and productivity during installation and maintenance.

The Fiber Microscopes can be used during installation, system qualification, troubleshooting, and maintenance. The combination of practical features, ease of use, field performance, and rugged design make them perfect for virtually all fiber optic testing environments from multimode LAN and Premise to single-mode telephony and CATV.

Fiber Microscope

Features

- **400x or 200x** magnification
- **Universal adaper** (fits 2.5 mm industry-standard ferrules)
- **Built-in laser safety filters**
- Comfortable **rubber eyepiece**
- **LED illumination** for extended life span
- Soft **carrying case**
- **Set of batteries**

Order Numbers

Designation	Order Code
Fiber Microscope, 200 x magnification	200FM
Fiber Microscope, 400 x magnification	400FM

Fiber Optic Connection Systems, Field-installable Connectors, Mechanical Splices, Fan-out Kits

CORNING CABLE SYSTEMS

> Introduction

Introduction

When planning a fiber optic (FO) network, the designer needs to take into account the loss performance of the fiber interconnections. Apart from the permanent joining method fusion splicing (see "Fusion Splicers and Fusion Splicing Accessories", page 17 f.) non-permanent fiber optic joints are established by the following methods:

- **Mechanical splicing**
- **Fiber optic connectors**

Mechanical Splicing

Mechanical splicing differs from fusion splicing in that the relating **fiber ends are not bonded together** but are **held mechanically** face to face. This is accomplished by using alignment mechanisms, e.g. v-grooves in which the fibers are inserted and fixed. At the point where the fiber ends meet, usually a factory-prefilled immersion fluid eliminates the difference in refractive index between glass and air. This immersion fluid has the same transmission properties as the fiber and serves to eliminate reflections and losses caused by air gaps between the fiber ends. Mechanical splices achieve typical splice losses (transmission loss) between 0.1 and 0.2 dB, its return loss is however temperature-dependent. Mechanical splices are particularly suitable for moderately demanding and temporary joints, e.g. for test or repair purposes.

FO Connectors

FO connectors form the interface between cable and transmission system and facilitate distribution and branching in cable plants. **FO connectors** differ from fusion splicing since they can be **mated many times**. Typically two connectors are mated together mechanically by a coupling adapter.
The critical loss criteria in connectors are the insertion loss and the return loss. These losses are determined directly by the type and quality of the connector end-face as well as by the installation method.

There are three common connectorization methods:

- **Field-installable connectors**
- **Pigtails** (on request)
- **Factory pre-connectorized cables** (see page 103 f.)

Field-installable FO Connectors

The advantages of **field-installable connectors** compared to pigtails and pre-connectorized cables are:

- **Save on installation time** and thus money
- **Save on pigtail splicing related hardware** and for that reason space
- **Save on administration** because handling and storing of different lengths is not necessary
- **Highest flexibility** as there is no need for making allowance for unclear cable routings and pulling of pre-connectorized cables through narrow cable ducts

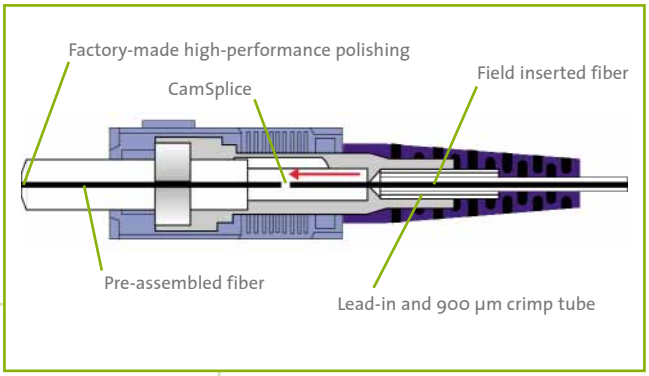
Three types of field-installable connectors are available:

- **UniCam™**
- **FuseLite™**
- **FastCure GIC**

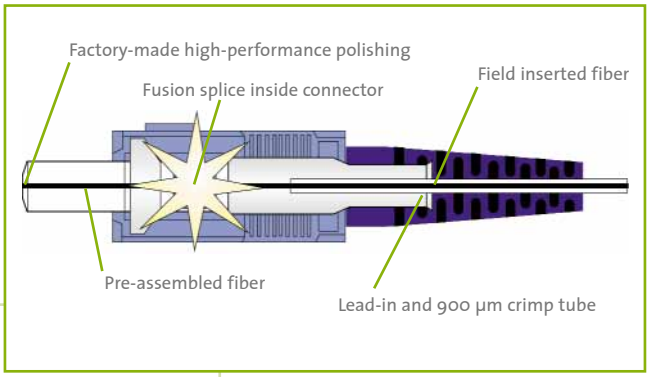
As common field-installable connectors involve the critical work steps epoxying and polishing they are not sufficient for the demands of many applications.

UniCam™

The **Connection System UniCam** incorporates a **pre-assembled fiber** end with a factory-made **high-quality connector endface polishing**.
Due to this feature this system combines the advantages of pigtails with the advantages of field-installable connectors. The Connection System UniCam permits very fast and cost-effective connector installation in the field. The UniCam connector includes a mechanical splice. Multimode and single-mode with UPC (ultra) performance are available.



UniCam principle



FuseLite principle

FuseLite™

The **FuseLite** Termination System uses a ferrule with pre-installed fiber and high-quality polished endface similar to a Unicam. However, instead of a mechanical splice, the **FuseLite** is terminated using the the FuseLite II fusion splicer.
Because the fusion splice is contained within the connector body, there is no need for extra splice protection for this very short pigtail.
The FuseLite is fast and easy to install with superior performance including APC (angled) connectors.
For further information on this product, please ask your Corning sales representative!

FastCure GIC

The **FastCure** connector is an "**epoxy and polish**" connector with improved curing principle without the need of UV-lamp or oven. This connector is the ideal solution for low cost, medium demand and fast multimode connectorization in the field.

Overview

	UniCam™	FuseLite™	FastCure GIC
Connection method	CamSplice™	Fusion Splice	Epoxy and polish
Connector type	SC, FC, ST™	SC, FC, ST	ST, SC
Fiber type compatibility	Single-mode, multimode	Single-mode, multimode	Multimode
Ferrule polish	Factory-polished	Factory-polished	Field polish
Polish types	Single-mode: UPC, SPC	Single-mode: UPC, APC	-
Installation time	< 2 minutes < 1 minute for 900 µm	< 3 minutes	< 3 minutes

> Fiber Optic Connection System UniCam™

Description

Application

The **UniCam connector** can best be described as a mini pig-tail. It incorporates a specially selected single-mode fiber stub that is fully bonded into the ferrule.
The other end is precisely cleaved and placed into the paten-ted alignment mechanism of the mechanical splice CamSplice™.

Installation requires that the field fiber be cleaved, cleaned, and inserted inside the mechanical splice section. A small installation tool (see next page) completes the connector in less than one minute on 900 µm coated fibers. Installation on jacketed cables requires merely two minutes.
The actuation method of **UniCam** connectors for SC, FC and ST compatible is identical. They are terminated by rotating cam action which holds the fibers together.

The **UniCam** connector requires no polishing and no epoxy during installation, with no compromise in performance. In addition, it is possible to have Ultra PC performance without changing installation tools and procedures. Simply order the UniCam Connectors with Ultra PC finish.

The **UniCam** Connectorization System consists of preparation and installation tool set as well as the pre-stubbed factory-polished UniCam connector itself.

Features

- Field-installable **factory-performance** connectorization
- **No epoxy, no field polish** required
- **Easy and fast** to operate
- **Eliminates cable excess length and pigtail splice storage**
- Available in **single-mode** and **multimode** versions
- **SC, FC and ST™** compatible connector types available
- **No consumables**

UniCam connectors

Technical Data

Connection System UniCam	
Fiber requirements	Single- and multimode silica glass fibers with cladding Ø 125 µm and coating Ø 900 +/- 50 µm
Cable requirements	Coating Ø 900 +/- 50 µm Cable Ø 2900 +/- 200 µm
Interconnection compatibility	All SC, FC and ST compatible connectors
Insertion loss	■ Multimode: typically < 0.30 dB ■ Single-mode: typically < 0.40 dB
Return loss	■ SPC: < - 40 dB (-40° C to +75° C) ■ UPC: < - 55 dB (-10° C to +60° C)
Durability	Change in dB; 500 rematings ■ Multimode: typically < 0.20 dB ■ Single-mode: typically < 0.30 dB
Temperature	Change in dB; - 40°C to + 75°C; 40 cycles; typically < 0.20 dB
Tensile strength	10 lb / 44 N with 2.9 mm single-fiber cable with strength member

> Fiber Optic Connection System UniCam™

Tool Set, Order Numbers

UniCam Tool Set

UniCam Tool Set

The **Tool Set for UniCam** connectors is universal for SC, FC, ST™ compatible, MTRJ, and LC both single-mode and multi-mode.

The installation procedure is the same for all **UniCam** connectors which makes the connectorization system very easy to use and provides an excellent yield rate.

Unicam CTS Tool Set

The **CTS Tool Set** (CTS = Continuity Test System) includes all the tools listed in the **Unicam** Tool Set plus an optical splitter which when used with a visual fault locator assists in Unicam installation.

Order Numbers

Designation	Order Number
UniCam Tool Set	LAXLSN-00000-C001
UniCam CTS Tool Set	LAXLSN-00000-C002
UniCam Connectors with Composite Ferrule:	
- SC / PC Multimode 62.5 µm	LAXLSS-00100-C014
- ST / PC Multimode 62.5 µm	LAXLSS-00100-C010
UniCam Connectors with Ceramic Ferrule:	
- SC / PC Multimode 62.5 µm	LAXLSS-00100-C013
- SC / PC Multimode 50 µm	LAXLSS-00100-C012
- ST / PC Multimode 62.5 µm	LAXLSS-00100-C009
- ST / PC Multimode 50 µm	LAXLSS-00100-C008
- LC / PC Multimode 62.5 µm	LAXLSS-00100-C028
- LC / PC Multimode 50 µm	LAXLSS-00100-C027
- SC / SPC Single-mode	LAXLSS-00100-C002
- FC / SPC Single-mode	LAXLSS-00100-C003
- ST / SPC Single-mode	LAXLSS-00100-C001
- SC / UPC Single-mode	LAXLSS-00100-C011
- FC / UPC Single-mode	LAXLSS-00100-C028
- ST / UPC Single-mode	LAXLSS-00100-C007
- LC / UPC Single-mode	LAXLSS-00100-C0026
SC-Duplex Clip, pack of 100	95-400-03-BP
LC-Duplex Clip, pack of 50	TRIGGER-BP-D
Fiber Optic Cleaver A8	S46999-M9-A8
Required Fiber Guides for A8:	
- 900 µm	S46999-M9-S34
- 900 / 3000 µm	S46999-M9-S45

Contents of Tool Set

Designation	Description
UniCam installation tool	Installs UniCam connector / crimps 900 µm lead-in tube
UniCam crimp tool	Crimps aramid yarn on single fiber cables
Miller stripping tool	Stripping to 125 µm
No-Nik stripper	Red-handled, for stripping 900 µm fiber coating
Clauss stripping tool WS 5	Stripping 0.8 up to 2.6 mm (jacket of single fiber cable or zipcord)
Score and snap cleaver	Precisely cuts fibers with flat endfaces
Scissors	2-inch electrician
Number markers	Book of labels
Tweezers	
Electrician's tape	
Alcohol wipes	
Permanent marker	
Strip length gauge	
Loctite 411 adhesive	For extra strain relief
Adhesive velcro strips	To replace foam on instal. tool
Installation instruction	English versions
UniCam video	PAL-version

Note: **UniCam Tool Set**
The tool set comes with score and snap cleaver as shown in the picture. For Unicam single-mode application the A8 cleaver is recommended (see page 54).

> Field-installable Connector FastCure GIC

FastCure GIC Connectors

Application

The SC and ST™ compatible **FastCure** Glass-insert multimode connectors are designed to incorporate all the polishing advantages of the glass-insert ferrule with the fast cure process of anaerobic adhesives. The two-part anaerobic adhesive epoxy process ensures fast and reliable bonding of the fiber within the connector ferrule, ensuring proper curing through the entire length of the ferrule, including the tip. The parts have been pre-assembled to save time and to improve productivity. The ferrule holder is metal, allowing the use of anaerobic adhesive without degradation of material. The **FastCure GIC** can be assembled on 900 µm tight-buffered fiber or single fiber cable with outer diameters of 2.0, 2.4 and 3.0 mm.

Features

- **No electrical power for UV lamps or ovens needed**
- **Glass-insert ferrule**; ensures proper curing and provides for a forgiving polish
- **Fast installation time** of less than 3 minutes
- **Low cost**
- Typical **insertion loss of 0.2 dB** with physical contact polish

Installation

Installation of the **FastCure GIC** is quick and easy, requiring minimal training. After cable and fiber preparation, the adhesive is injected into the ferrule. The field fiber is dipped into the primer and inserted into the connector. The fiber is then cleaved at the ferrule tip and polished using the polishing puck and lapping film included in the **FastCure GIC Tool Set**.

Technical Data

Field-Installable Connector Fast Cure GIC	
Fiber requirements	Single- and multimode silica glass fibers with cladding Ø 125 µm and coating Ø 900 +/- 50 µm
Cable requirements	Single fiber cable with outer diameters of 2.0, 2.4 and 3.0 mm
Interconnection compatibility	All SC and ST compatible connectors
Insertion loss	Typically 0.20 dB with PC polish
Field installation time per connector	■ Total: typically < 3 minutes ■ Curing: typically < 1 minute ■ Polishing: typically < 45 sec.
Durability	Change in dB; 500 rematings; typically < 0.20 dB
Temperature	Change in dB; - 40°C to + 75°C; 40 cycles; typically < 0.30 dB
Cable retention	Change in dB; < 0.2 dB, 9 kg
Thermal shock	Change in dB; - 40° C to + 60° C; 10 cycles; typically < 0.2 dB
Humidity	Change in dB; 60°C 90 to 95% RH; 504 hours; typically < 0.4 dB

Order Numbers

Designation	Order Number
FastCure GIC Tool Set; includes all necessary tools and consumables for 500 connectors	LAXLSN-00000-C004
FastCure GIC Consumables Set; includes adhesive and polishing paper for 500 connectors	LAXLSN-00000-C005
FastCure Glass-insert Multimode Connectors:	
- SC	LAXLSS-00100-C021
- ST (Metal Bayonet)	LAXLSS-00100-C019
- ST (Plastic Bayonet)	LAXLSS-00100-C020
SC-Duplex Clip (pack of 100)	95-400-03-BP

> Mechanical Splice CamSplice™

CamSplice

Application

The **CamSplice** is a simple, easy-to-use and fast mechanical splice for single-mode and multimode fibers. Its characteristic feature is the eccentric closure mechanism (cam) which fixes the inserted fibers in place without the use of adhesive. Together with a precision glass v-groove, this mechanism forms a unique, patented fiber positioning method for ensuring extremely accurate fiber alignment.
The special **CamSplice ATC** provides increased tensile strength and torsional strength with 900 µm coated fibers. The CamSplice ATC crimping tool is additionally required for crimping on the 900 µm coating.

Features

- **Universal** for fiber coating diameters of 250 to 900 µm
- **Splice loss can be optimized** during installation
- Can be **re-used** and **detached on one side**
- **No adhesive or epoxy required**
- **Self-centering** fiber positioning
- Already contains **immersion fluid**

CamSplice Tool Sets

It is advisable to perform installation using the installation tool in order to optimize the splice loss and to further simplify use of **CamSplice**. The necessary fiber preparation tools and accessories are available in pre-assembled tool sets.

Note: **CamSplice tool set 1:**
No FO Cleaver included. For CamSplice single-mode applications the A8 cleaver is recommended, see page 54.
CamSplice tool set 2:
Comes with score and snap cleaver.

Technical Data

Mechanical Splice CamSplice	
Fiber requirements	Single- and multimode silica glass fibers with cladding Ø 125 µm and coating Ø 250 to 900 µm
Splice loss	■ Multimode: typically < 0.05 dB ■ Single-mode: typically < 0.10 dB when using installation tool
Return loss	Single-mode: typically < - 45 dB
Temperature	Change in dB; - 40°C to + 80°C; 40 cycles; typically < 0.10 dB
Tensile strength	■ CamSplice: 250 g ■ CamSplice ATC / 900 µm: 1500 g
Dimensions	Length: 44 mm; diameter: 4.2 mm

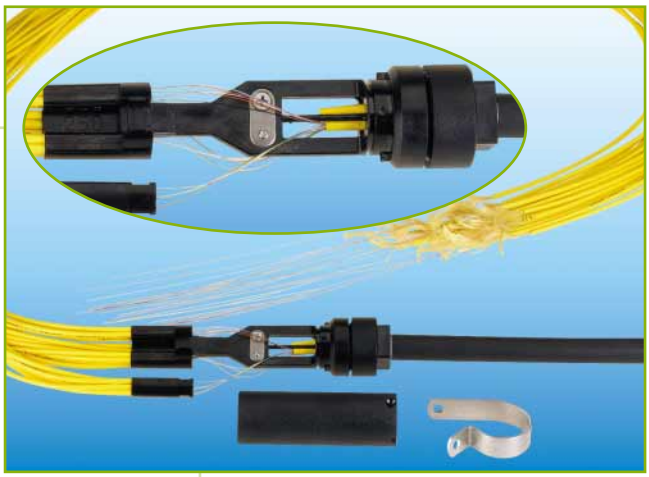
Kit Content

Designation	Description
Installation tool	Installs CamSplice
CamSplice crimp tool	Crimps CamSplice ATC tubes on 900 µm coating
Miller stripping tool	Stripping to 125 µm
No-Nik stripper	Red-handled, for stripping 900 µm fiber coating
Clauss stripping tool WS5	Stripping 0.8 up to 2.6 mm (jacket of single fiber cable)
Scissors	2-inch electrician
Number markers	Comes in a small book
Tweezers, electrician's tape, squeeze bottle, alcohol wipes, permanent marker, installation instructions (english)	

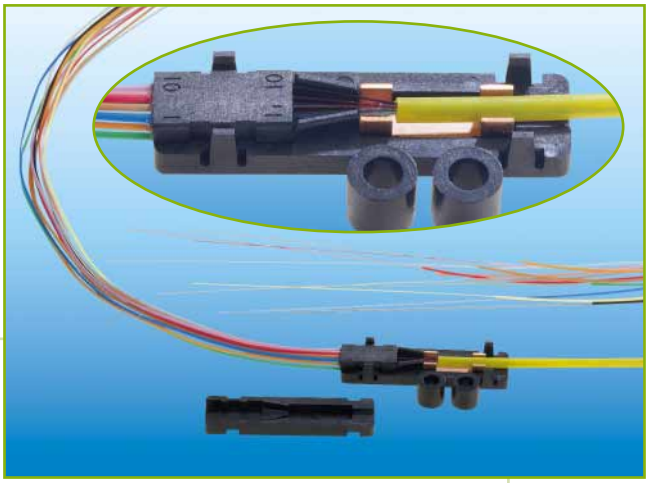
Order Numbers

Designation	Order Number
CamSplice Tool Set 1	S46998-Z300-A20
CamSplice Tool Set 2	LAXLSN-00000-C057
CamSplice, pack of 6	LAXLSK-00100-C007
CamSplice ATC, pack of 6	LAXLSK-00100-C008
CamSplice ATC Crimp Tool	LAXLSN-00000-C003
CamSplice Installation Tool	LAXLSN-00000-C056
Splice Organizer for 5 CamSplice, for standard splice tray, pack of 10	S46998-A4-R1

> Fan-out Adapters



Spider Fan-out Adapter



Fan-out Adapter

Spider Fan-out Adapter

The **Spider Fan-out Adapter** can be used, e.g. with connectorization systems, for connector installation directly to buffer tube cables or central tube (maxitube) cables with up to 24 fibers. **Extra-rugged fan-out adapter tubes** (groups of 6) with 900-µm insert, Kevlar and 3-mm jacket are placed in a plastic adapter and screw-connected to the cable with a holder. The holder includes a central member strain relief clamp and is covered by a shell. The primary coated fibers are pushed into the fan-out tubes. They can then be treated like single-fiber 3 mm indoor cables and connectorized with field-installable connectors.

Buffer Tube Fan-out Adapter

This **Buffer Tube Fan-out Adapter** can be used, e.g. with connectorization systems, for connector installation directly to buffer tubes or mini-bundles with up to 12 fibers per tube. The adapter consists of a pre-terminated 900-µm fan-out tube section with 6 or 12 tubes, a plastic top and a base into which the buffer tube is simply clipped. The individual primary coated fibers of the buffer tube can then be threaded out at a time into the fan-out tubes. The fan-out tubes are color-coded. They can be treated like 900 µm coated fibers and connectorized with field-installable connectors.

Technical Data

Spider Fan-out Adapter	
Max. diameter of adapter	31.25 mm
Fan-out tube length	approx. 1100 mm
Fan-out tube diameter	approx. 3 mm
Cable diameter range	8.6 to 15.7 mm

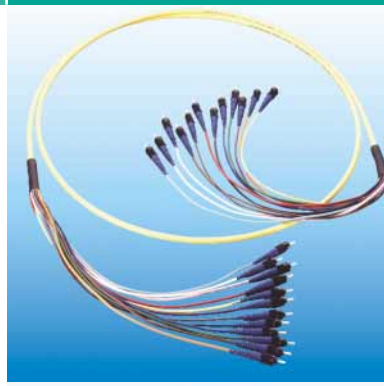
Technical Data

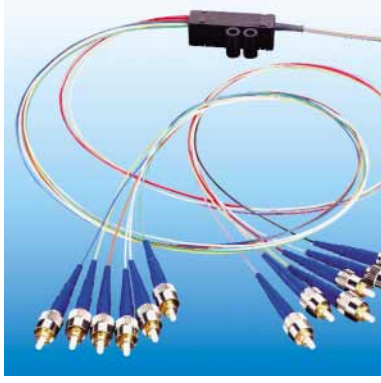
Fan-out Adapter	
Dimensions of adapter	44.5 x 19.2 x 7.7 mm
Fan-out tube length	1200 mm
Buffer tube diameter range	2.4 to 3.0 mm

Order Numbers

Type	Description	Order Number
Spider Fan-out Adapters	For single-mode fibers (yellow)	LAXLSN-00000-C006
	For multimode fibers (orange)	LAXLSN-00000-C007
Buffer Tube Fan-out Adapters	For 2 to 6 fibers per buffer tube	LAXLSN-00000-C008
	For 7 to 12 fibers per buffer tube	LAXLSN-00000-C009

Fiber Optic Cable Assemblies





CORNING CABLE SYSTEMS

> Introduction

Introduction

As the **industry's leading supplier of single-mode cable assemblies**, Corning offers the most complete line of connectors and factory-terminated cables. From single-fiber jumpers to high fiber count assemblies, Corning's products meet or exceed industry standards for reflectance and insertion loss.

Corning's state-of-the-art manufacturing process ensures **excellent connector performance**. We thoroughly screen the fibers and ferrules at the beginning of the process, assemble them in a carefully monitored and controlled automated assembly and polishing process, and quality test our assemblies at the end of the process. This automated assembly and polishing process assures the same **outstanding quality** in every connector.

Connector Performance

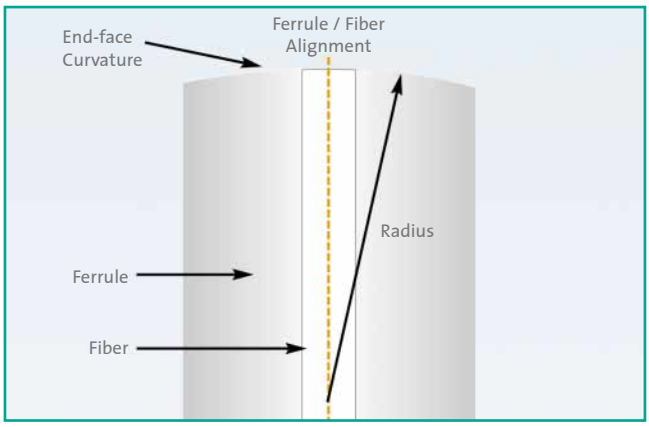
Connector Type	Boot Color	Maximum Reflection [dB]	Typical Insertion Loss [dB]
Ultra PC	Blue	< -55 dB	< 0.25
Hyper™ PC	Yellow	< -60 dB	< 0.25
APC*	Green	< -65 dB	< 0.25*

** APC: Angled Physical Contact = 8° or 9° angled polish PC*

> Connector Performance

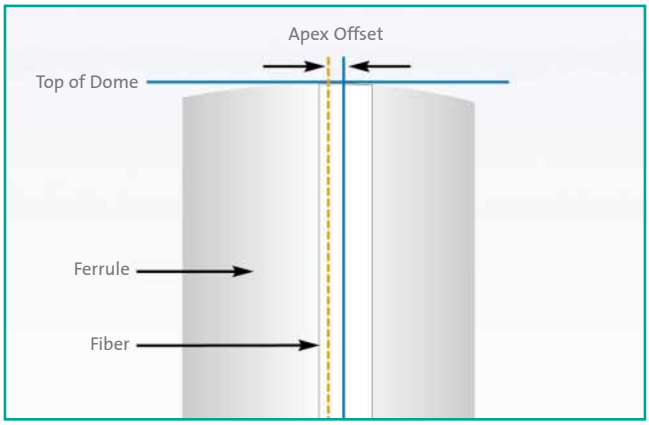
Connector Performance

Controlling **connector end-face geometry** is key to assuring network reliability. **Radius of Curvature**, **Apex Offset**, and **Fiber Undercut** are the three critical parameters that affect long-term connector performance. These parameters are **closely monitored and controlled** throughout Corning Cable Systems' automated process, thus assuring the **highest quality** in each and every connector assembly.



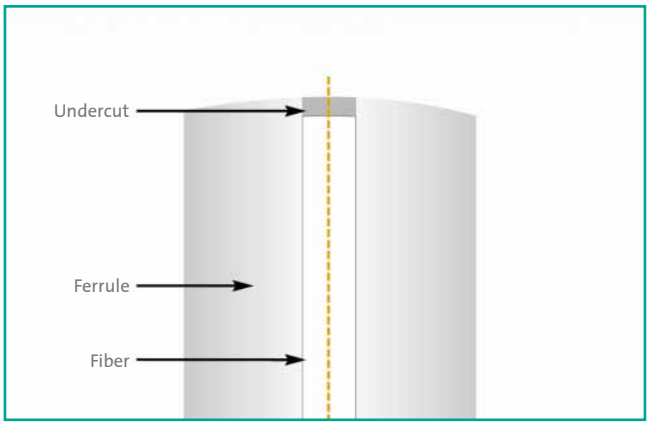
Radius of Curvature

Radius of Curvature describes the radius of the end-face surface measured from the ferrule axis. The correct Radius of Curvature is necessary to control the compressive forces on the connector endface.
Radius of Curvature values between 10 to 30 millimeters are recommended to avoid fiber damage and to assure low reflectance and insertion loss.



Apex Offset

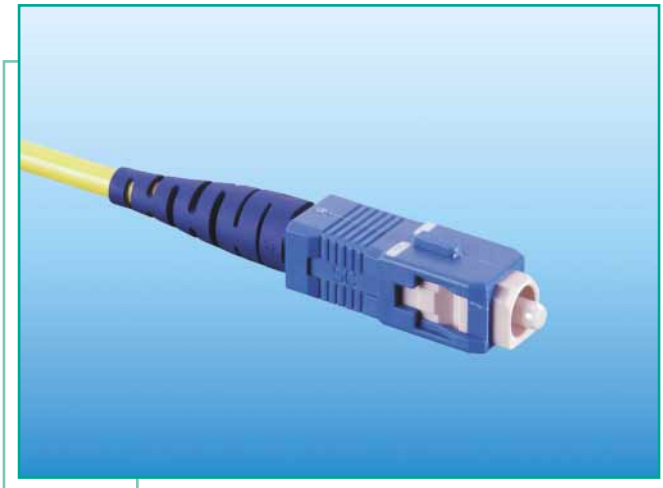
Apex Offset is the displacement between the apex of the sphere that fits the ferrule end-face and the center of the fiber core. Excessive Apex Offset can lead to lack of physical contact of the fiber cores and an increase in insertion loss.
An **Apex Offset value of < 50 microns** is recommended. Values greater than 50 microns can reduce fiber-to-fiber contact and cause increases in reflectance over the operating temperature.



Fiber Undercut / Protrusion

Fiber Undercut is the distance of the fiber above or below the fitted spherical surface of the ferrule. Proper undercut guarantees that fiber-to-fiber contact will always be maintained over the operating temperature range. An **undercut value of ± 50 nanometers** is recommended to avoid air gaps between fibers. Larger undercut values can cause changes in reflectance and insertion loss. Excessive fiber protrusion can increase the compressive load at the end of the fiber causing fiber damage or failure of the fiber-ferrule epoxy bond.

> SC, FC and ST™ Connectors



SC Connector

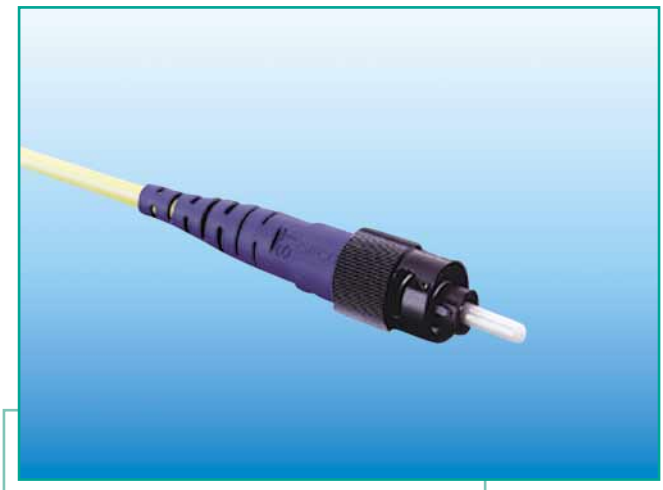
SC Connectors

- For **high density** interconnect applications
- Designed and tested following **Bellcore GR-326-CORE**, Issue 2
- **Push-Pull** latching mechanism
- Can be **clipped** for Duplex packaging

FC Connector

FC Connectors

- For **long-haul** and **local network** applications
- Designed and tested following **Bellcore GR-326-CORE**, Issue 2
- **Rugged** nickel-plated brass hardware and threaded coupling nut
- Suitable for **standard FC adapter**

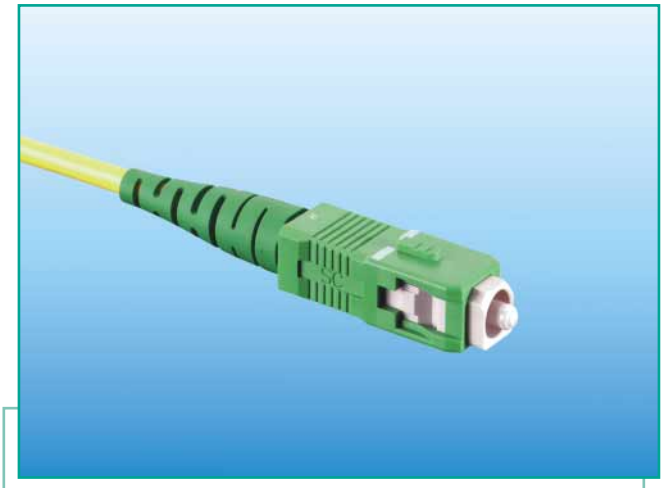


ST Connector

ST Compatible Connectors

- For **local network** applications
- High precision **zirconia ferrules**
- **Rugged composite hardware**
- Twist-lock **bayonet coupling**
- **ST compatible** connector design
- Suitable for **ST compatible adapters**

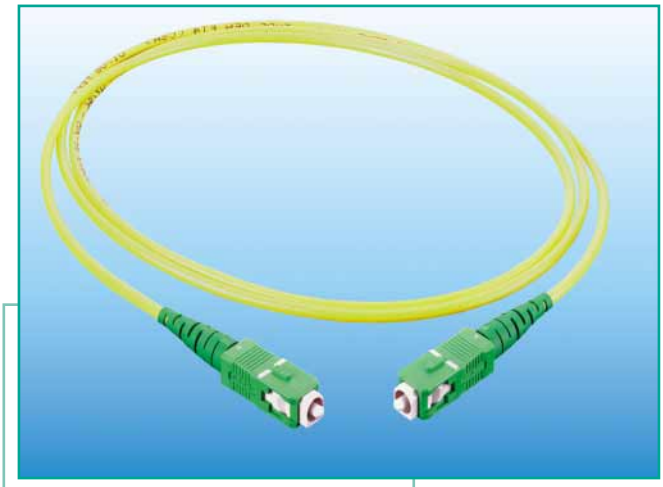
> Angled Connectors, Simplex and DIB Cable Assemblies



APC Connector

APC Angled Connectors

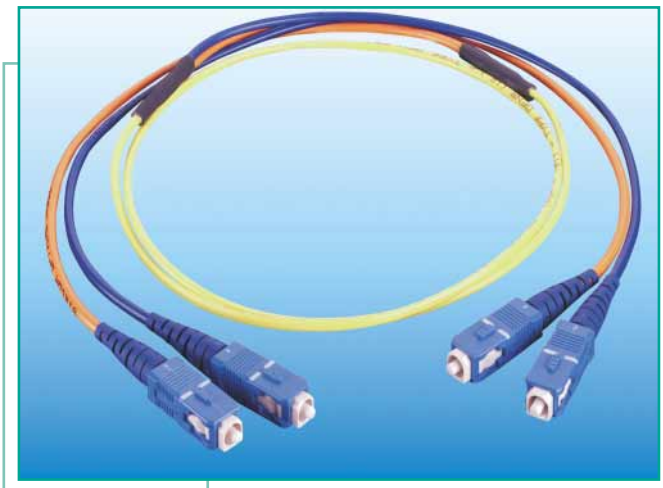
- For the **fiber network** as well as for **analog and CATV applications**
- **High precision ferrule** and hardware components
- Available in **SC and FC packages**
- **Extremely low reflectance** provided by 8- or 9-degree connector end-face angle
- **Low insertion loss** due to tuned ferrules
- Developed and tested following **EN 50550**
- 2 different **sheath materials** available:
  - **PVC**, flame retardant
  - **FRNC** (flame-retardant to IEC 60332-3 and non-corrosive to IEC 60754-2)



Simplex Cable Assembly

Simplex Cable Assemblies

- Designed for interconnecting **voice, data, and video equipment**
- Small diameter and bend radius for **easy installation and handling**
- **Rugged construction**
- 2 different **sheath materials** available:
  - **PVC**, flame retardant
  - **FRNC** (flame-retardant to IEC 60332-3 and non-corrosive to IEC 60754-2)

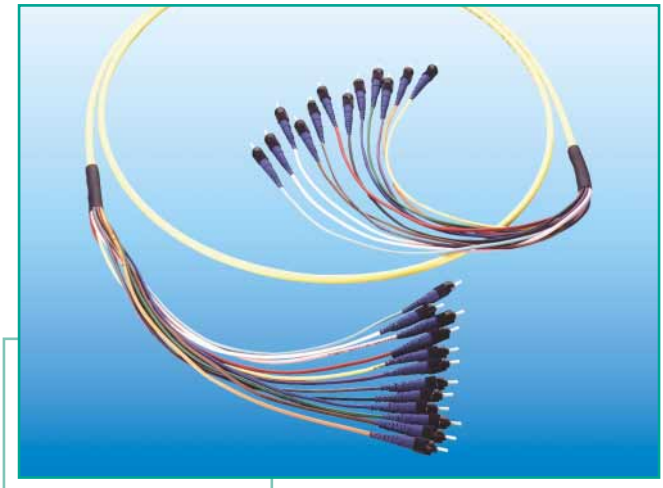


DIB Cable Assembly

DIB Cable Assemblies

- Ideal design for connections between and within **distribution frames**
- **Color-coded furcation legs** for positive fiber identification
- Compact, rugged **duplex design** (4.5 mm outer Ø)
- **Enhances fiber management** and reduces congestion in distribution hardware
- 2 different **sheath materials** available:
  - **PVC**, flame retardant
  - **FRNC** (flame-retardant to IEC 60332-3 and non-corrosive to IEC 60754-2)

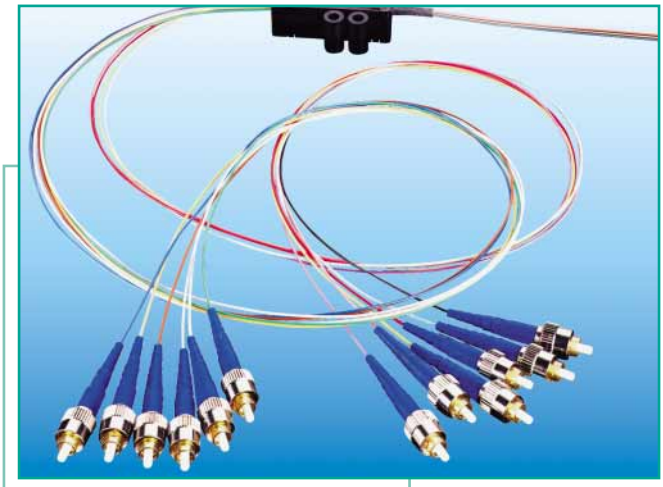
> Multifiber Cables with Maxibundles
Multi Fiber Ribbon Cables



MIC Cable

Connectorized MIC Cables

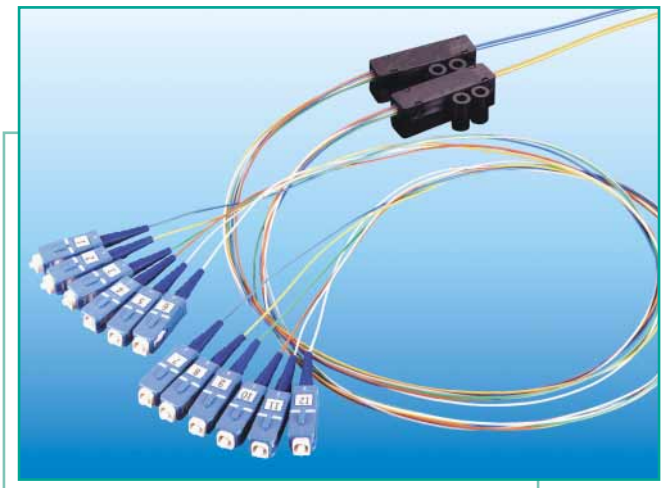
- Rugged, light-weight design with **high space efficiency**
- Available in **fiber counts from 4 to 24**
- Suitable for **indoor applications**
- **Rugged tight buffered fiber**
- Individual fibers are **color-coded** to ensure proper routing and installation
- 2 different **sheath materials** available:
  - **PVC**, flame retardant
  - **FRNC** (flame-retardant to IEC 60332-3 and non-corrosive to IEC 60754-2)



RMPC Ribbon Riser Cable

Connectorized RMPC Ribbon Riser Cables

- For **indoor and outdoor** applications
- **Fiber counts from 12 to 144**
- **All-dielectric construction**
- Individual fibers are **color-coded** to ensure proper routing and installation
- 2 different **sheath materials** available:
  - **PVC**, flame retardant
  - **FRNC** (flame-retardant to IEC 60332-3 and non-corrosive to IEC 60754-2)

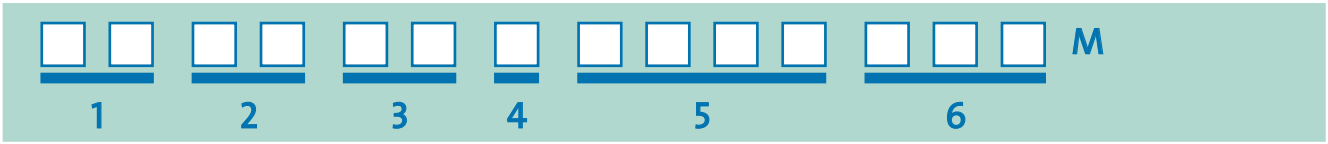


RMPC Riser Cable

Connectorized RMPC Riser Cables

- For **indoor and outdoor** applications
- Meets the industry's most stringent **water-blocking requirements** (IEC 60794-1F5)
- Ideal for **high-fiber count trunking applications** with limited vault or conduit space
- **Fiber counts from 4 to 144**
- **Color-coded fibers** for positive identification during installation
- 2 different **sheath materials** available:
  - **PVC**, flame retardant
  - **FRNC** (flame-retardant to IEC 60332-3 and non-corrosive to IEC 60754-2)

> Ordering Guide for Cable Assemblies



1 / 2 Connector Codes
(the smaller code please insert in 1!)

00 = no (pigtail); just for pos. 1
02 = LC/UPC (CCS) Simplex
04 = LC/UPC (CCS) Duplex
19 = E-2000™/APC (ceramic)
20 = E-2000/UPC (ceramic)
21 = FC/APC 8°
27 = SC/APC 9°
28 = LSA DIN/UPC
54 = FC/UPC
58 = SC/UPC
65 = SC/APC 8°
76 = FC/HPC
77 = SC/HPC
83 = ST/UPC (metal / ceramic)

3 Fiber Count

01 to 99

> 100 on request

4 Fiber Class

R = Single Mode

5 Cable Design

3120 = Simplex cable 2.0 mm riser
3Z20 = Simplex cable 2.0 mm FRNC*
3820 = Simplex cable 2.0 mm plenum
3131 = Simplex cable 2.9 mm riser
3Z31 = Simplex cable 2.9 mm FRNC
3831 = Simplex cable 2.9 mm Plenum
3Z24 = Simplex cable 2.4 mm FRNC
4131 = Tight buffer 0.9 mm TB 2 PVC, riser
4Z31 = Tight buffer 0.9 mm TB, FRNC easystrip, up to 1.5 m
5131 = Duplex cable (ZIP), riser 2 x 2.9 mm
5Z31 = Duplex cable (ZIP), FRNC 2 x 2.9 mm
5120 = Duplex cable (ZIP), Riser 2 x 2.0 mm
5Z20 = Duplex cable (ZIP), FRNC 2 x 2.0 mm*
5831 = Duplex cable (ZIP), Plenum 2 x 2.9 mm
6131 = Inside breakout cable, riser
6Z31 = Inside breakout cable, FRNC (T-VHH), up to 12 fibers
6831 = Inside breakout cable, plenum
81 = MIC cable, riser
8Z = MIC cable, FRNC, (J-VH), up to 24 fibers
88 = MIC cable, plenum

* not released

6 Fiber Length in Meter (Examples)

002 = 2 meters
7.5 = 7.5 meters
010 = 10 meters

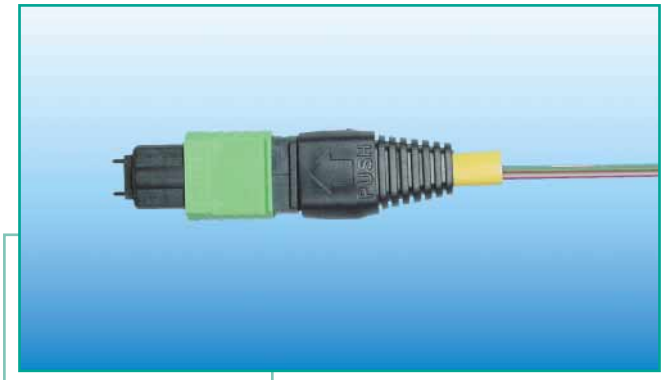
MTP Cable Assemblies for Fiber Ribbon: see next page!

> MTP™ Angled Cable Assemblies for Fiber Ribbon

Description

Corning's **Angled MTP Cable Assemblies** provide a quick and reliable connection for up to 12 single-mode optical fibers in a compact, push-pull housing. Two **MTP** connectors are mated using a low-profile bulkhead or PC card-mounted adapter; alignment is achieved with precision guide pins. Connection is assured by the spring-action side latch housing – simply push on and pull off.

MTP angled connectors are available factory-installed on ribbon fiber or individual fibers which have been ribbonized. Assemblies are available in ribbon, ribbon interconnect, flame-retardant, and outside plant constructions.



MTP Connector with pins

Features

- Available with **4- to 12-fiber** single-mode ferrule
- Meets **IEC Standard 1754-7**
- **8° angle polish**
- **Insertion Loss:** 0.25 dB typical, 0.75 dB maximum
- **Reflectance**: -55 dB maximum
- **High-precision stainless steel guide pins** with guaranteed retention
- **High-density connection:** 25 mm x 10 mm
- **User-friendly** push-pull housing
- **Segmented boot** provides cable bend relief
- All fibers are **100% factory tested** for insertion loss and reflectance

Ordering Guide

□□	□□	□□	SM	□	00	□□□	M
1	2	3		4		5	

1 / 2 Connector Codes for first (1) and second (2) end

89 = MTP Angled Connector with pins
90 = MTP Angled Connector without pins

4 Ribbon Construction

R = Ribbon in matrix
I = Interconnect cable

3 Fiber Count

04 = 4 fibers
06 = 6 fibers
08 = 8 fibers
12 = 12 fibers

5 Total assembly length in meters

Examples:

001 = 1 meter; 010 = 10 meters etc.

Closures for Fiber Optic Cables

CORNING CABLE SYSTEMS

> Introduction

Generals on FO Closures

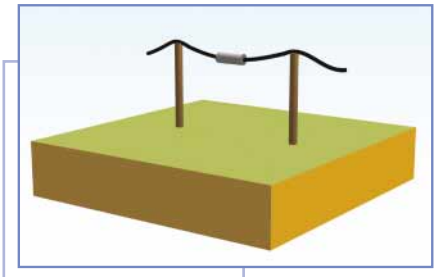
Closures for fiber optic applications are used to protect splices on interconnecting, branching and distribution cables. Moreover, they **must assure the mechanical** as well as the **electrical continuity of the cables** as if they had not been interrupted at the splice point. This must hold true independent of the cable placement: either directly buried or in cable ducts with manholes or in aerial cable networks.
The **mechanical continuity** of the cables is achieved by affixing the cable sheaths, the central members (or other strain relief members) and any aramid yarns if used. For protecting the installer and the electronic equipment, the **electrical continuity** is assured by electrically connecting the armoring and the metallic sheath elements, such as metallic layers or any metallic central members (or other strain relief members), with each other or, if existing, with external grounding points.

Closure Selection

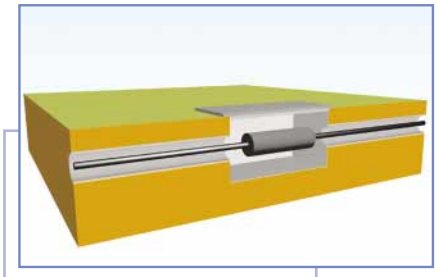
The selection of the right closure depends on the specific application of the closure within the network. Thus, for closure selection, some aspects of the network construction have to be considered (all network features mentioned below can occur in various combinations):

Network Features	Influence on Closure Selection
Network type (aerial or buried)	**Outer design** of the closure (straight or butt configuration)
Network structure (trunk or access network)	**Fiber management** / inner design of the closure or organization of splices
Capacities (number and size of cables, number of splices)	**Size** of the closure

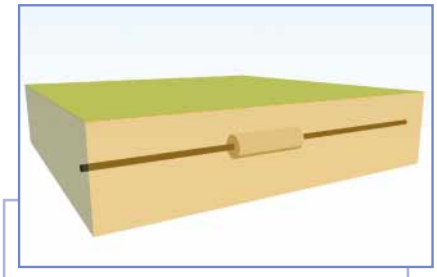
> Outer Design of the Closure



Aerial network



Cable in ducts or manholes



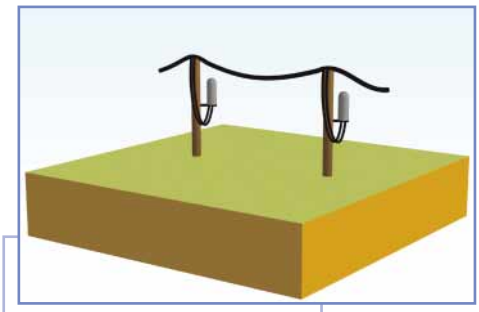
Direct buried network

Straight or Inline Closure Configuration

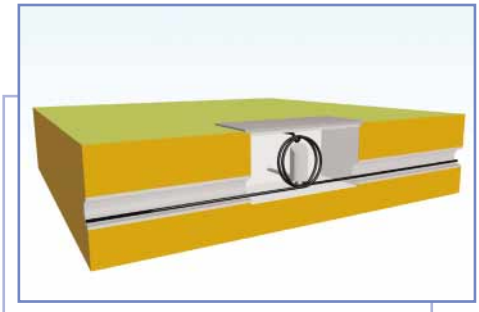
In the mid span between poles of aerial lines or especially in direct buried networks but also in duct-guided lines, closures are preferably installed directly **in line** to the cables.

Product Examples for Inline Closures:

- **UCNP**
- **BR FO**
- **UCAO**
- **BPR FO**



Aerial network



Cable in manhole

Butt Closure Configuration

In **butt closure configuration** all cables are fed into the closure on one side only. The closure body is in general formed like a canister. With excess length of cables stored preferably in a ring, the complete closure can be taken away from the storage location to a work station for installation or maintenance. Also for fiber managements installed and placed preferably in a vertical position, a butt closure configuration is of importance. Thus, butt configurated closures are mainly installed on poles of aerial lines or in manholes of duct respectively of direct buried lines.

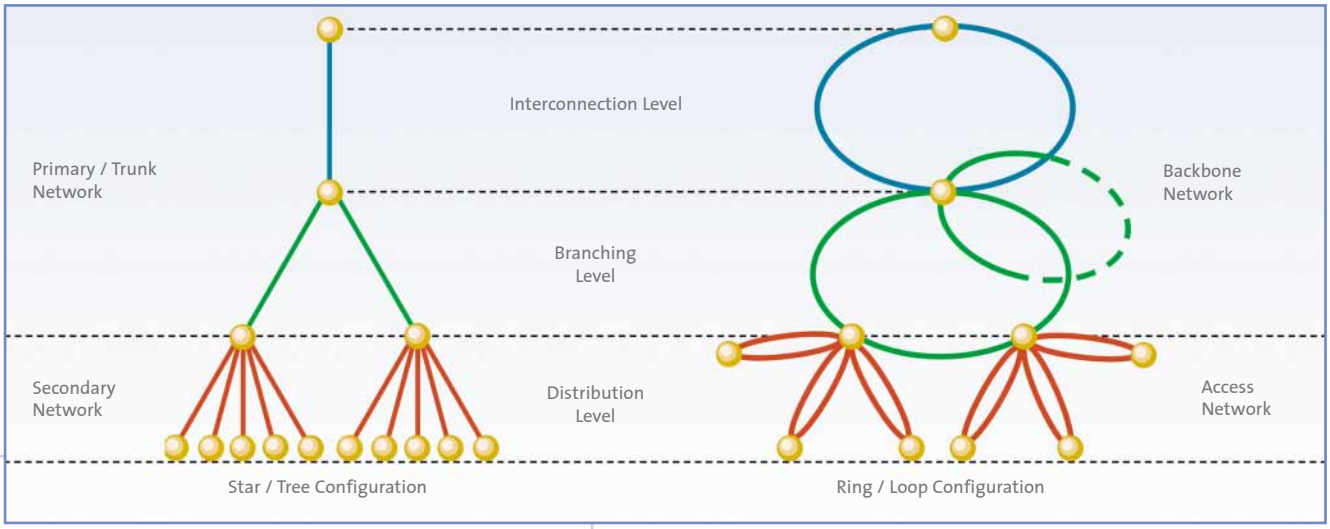
Product Examples for Canister Closures:

- **UCNCP**
- **Accent Generic Canister Closure**
- **Accent ATJ**
- **Passive ATJ**
- **STAR Closure**

> Network Hierarchy, Fiber Management Systems

Network Hierarchy

Independent of the structure of a network, which can be designed in star / tree configuration or in ring / loop configuration, there are different **hierarchy levels** which require specific fiber management systems.



Network Levels

Interconnection Level

On the **interconnection level** the trunk cables (backbone cables) form the direct links between central offices or between main branching points. Normally, future branching from these cables is not intended which means that future access to single splices is not planned.
Thus, the splices of the fiber of the cable elements (or bundles) can be stored one by one in separate splice trays (single element trays). Due to higher packing density, several splice trays are arranged as blocks (multiple tray access).
At this level ribbon cable may also be used, and closures can be supplied for this application.

For **multiple tray access** the fiber management system type "**S**" is suitable. The splice trays are arranged on the threaded rod of the tray holder and are fixed jointly as a block with a knurled screw (e.g. **UCNP 7-20 S**).
For **ribbon systems** the **ORS** fiber management system is suitable as well as the option of combining ribbon and single fibers in the **Accent™** system.

Branching Level

Closures on this network level have to protect splices at the joints of **main cables with branching cables.** On this level a future access to single splices is not planned either.
Also in this closures a fiber management system with **multiple tray access** is preferably used.

Distribution Level

These (as a rule local) networks are planned for the present and the near future. They serve as a connection between the **branching cables** and the **distribution or subscriber cables**.
The distriubution cables are guided to termination points, like the curbs (Fiber to the Curb - FTTC) or the O/E switches of CATV networks (Optical Network Unit – ONU) or subscribers like big companies.

The splices of all fibers of one cable element (or bundle) between the branching and the distribution cable are stored in separate trays (single element tray). On later demand for switching and extension, single access to each splice tray is required (**single tray access**).
This is realized either by storing the splice trays one by one (each one with excess buffer tube length) in a splice tray stacker (e.g. in the **UCNP 7-10 E**) or by linking a certain number of splice trays to each other by hinges, which allows access to the splices of one specific tray by flipping the trays on top of this (e.g. **BR FO**).

Access Networks

Part of distribution networks are also fibers of subscribers with **very large volumes of highly sensitive data traffic**, e.g. institutions or public authorities. These fibers require enhanced protection against interruption in the data flow. In closures of the whole network, at least in closures on distribution level, the fibers of individual subscribers are routed in **separate splice trays** (Single Circuit (SC) management)

These splice trays allow **undisturbed access** to the circuits and two versions are available. One allowing for flip tray design (**VIP**) and the other via hinged swing out trays (**Accent**). Each system offers compatibility with other network elements and combinations of Single Circuit (SC) and Single Element (SE) working in the same closure are possible.

> Fiber Management Systems

Fiber Management

The **fiber management** is the inner design of the closure and describes the system of the organization of the buffer tubes, the fibers, and the splice trays. The fiber management has to support the level and the configuration of a network.
All fiber management systems can be assigned to one of the following four systems:

- **Multiple Tray Access**
- **Single Tray Access** (single element access)
- **Single Subscriber Access** (single circuit access)
- **Ribbon System**

Multiple Tray Access

System „S“
in UCNP, UCNCP

Single Tray Access

System „E“
in UCNP, UCNCP, UCAO

System „Optobook“
in BR FO

Single Subscriber Access

System „VIP“
in UCNP, UCNCP

System „Accent™“
in Accent Closures, UCNP / UCNCP

Ribbon Systems

System „Accent“ for Ribbon Single Fiber Management
in Accent Closures, UCNP / UCNCP

System „ORS“
in UCNCP

> Closure Selection Chart

	UCNCP VIP	UCNCP E	UCNCP S	UCNCP ORS	UCNP VIP	UCNP E	UCNP S	Accent Canister Closure	Accent Distribution Joint	Accent Inline Closure	BR FO	BPR FO	UCAO	OPGW Closures: Accent ATJ	OPGW Closures: Accent ABJ	OPGW Closures: GTJ, GTT	OPGW Closures: STAR Closure
Page	125	125	125	130	132	132	132	140	144	145	156	160	164	168	170	172	174
Closure Application																	
aerial	■	■	■	■	■	■	■	□	■	■	■	■	■	■	■	■	■
duct / manhole	■	■	■	■	■	■	■	■	■	■	■	■	■				
direct buried	□	□	□	□	■	■	■			■	■	■	■				
Closure Configuration																	
butt / canister	■	■	■	■				■	■					■	■	■	■
straight / inline					■	■	■			■	■	■	■				
Cable Sealing System																	
mechanical	■	■	■	■	■	■	■			■	■	■	■	■	■		■
heat-shrink	■*	■*	■*	■*	■*	■*	■*	■	■							■	
Fiber Count																	
high	■	■	■	■	■	■	■	■		■	■			□			
medium	■	■	■	■	■	■	■	■	■	■	■			■	■	□	■
low	□	■	■	□	□	■	■	□	■	□	□	■	■	■	■	■	■
Network Level																	
interconnecting	□	□	■	■	□	□	■	□	□	□	□		□	■	■	■	■
branching	□	□	■	□	□	□	■	□	□	□	□		□	■	■	□	■
distributing	■	■	□		■	■	□	■	■	■	■	■	■	□	□		□
Fiber Management																	
multiple tray access			■				■					■**				■	
single tray (element) access	□	■			□	■		■	■	■	■		■	■	■		■
single subscriber (circuit) access	■				■			■	□	■				■	■		
ribbon system				■				■	■	■							

■ *Main application* □ *Possible, but not main application* * *On request* ** *Tray-less splice storage*

> Universal Closure Family UCNP / UCNCP

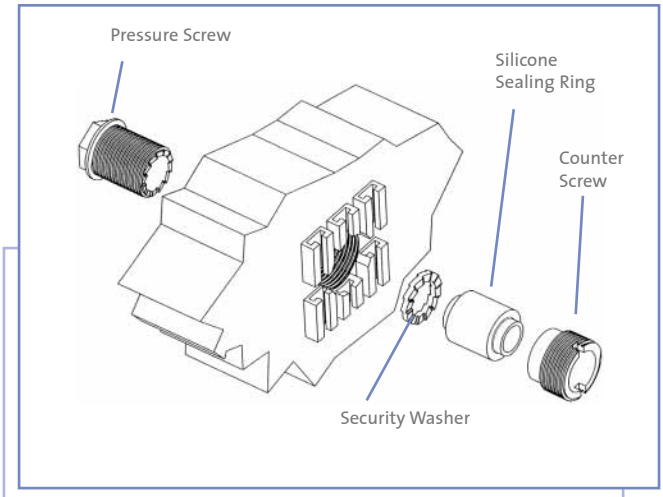
End Cap Design - Mechanical Cable Sealing

Application

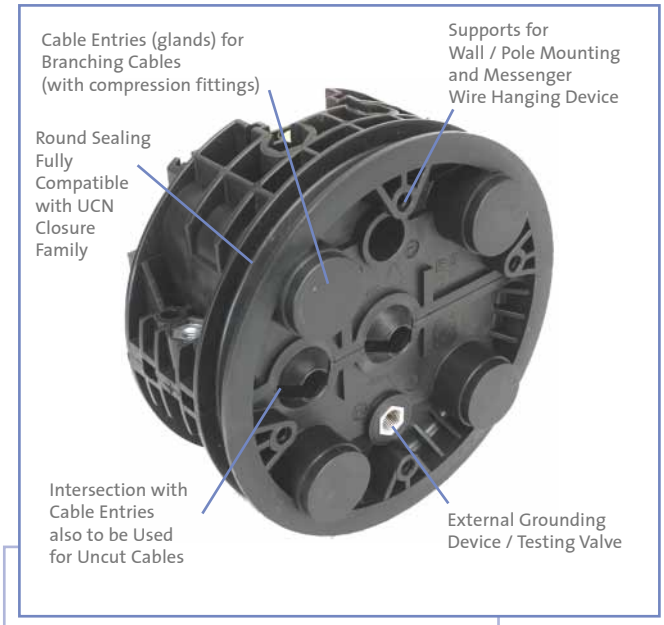
The three sizes (5", 7", 9") of **UCNP end cap** have been designed to fit into the tubes of the well-known family of **Universal Closure UCN** instead of the UCN standard two-piece end caps as well as into the different sizes of **Universal Closure canisters**.
Based on this UCNP end cap, a complete family of inline and butt closures is available for all applications on fiber optic networks.

Features

- **Complete mechanical sealing**
- **2 cable entries in the intersection** to be used also for **uncut cable**
- **Glands** for easy installation of future branching cables
- **Same end cap for butt and inline configuration**
- **Installation with common tools**
- **No power supply** (e.g. gas torch) **required** for installation
- **Same installation technique for complete closure family**
- **No external metal parts**
- **Quick re-entry** without special tools



Cable Entry Ports for Branching Cables



View to the Outside of UCNP End Cap

Design

The two-section end caps contain two **prefabricated cable entries** in the intersection to take the main cables which can also be uncut. The main cables and the intersection are sealed by the proven UCN **sealing tape**. The end cap halves with the sealing tape are screwed together by means of self-tapering screws.

According to their different size, the UCNP end caps are additionally equipped with three to six **cable ports** sealed by **compression fittings**. The name UCNP – **U**niversal **C**losure **N**ew with **P**orts – derives from these cable ports.
In delivery state, these ports are closed on the outside and, if necessary, can easily be opened with a small hand saw.
After pushing on the pressure screw the cable has to be inserted into the port. From the inside of the end cap, the security washer, the silicon sealing ring and the counter screw must be inserted into the port. Now only the pressure screw has to be tightened with the wrench contained in each closure kit - so quick the cable sealing is accomplished!

The **strain relief** of the cables against mechanical forces is provided for the cable sheaths as well as for the central members of the cables. It is integrated into the inner part of the end caps. Metallic bars slide in rims on the end cap to adjust to different cable diameters. These bars are fixed to the cable sheath by hose clamps.

A kind of fork is pushed onto the central member with its quiver for securing the central member against pushing into the splice area.

For **external grounding** and sheath connecting, the central member fixing is connected to a grounding wire.

All end caps are provided with a **feedthrough** to allow for external grounding and for inserting a valve for flash testing.

UCNP End Cap: Cable Strain Relief

Installation

Installation of the end caps can be performed with **standard tools** only – no gas torch, no drilling tool, no adapters are necessary for installation.

Sizes, Dimensions

Type	Max. Cable Ø in mm		External Grounding / Testing Valve
	intersection (cut / uncut cables)	ports with compression fittings (cut cables)	
UCNP 5	2 x (12-20)	3 x (5-15)	1 x
UCNP 7	2 x (12-22)	4 x (5-18)	2 x
UCNP 9	2 x (12-32)	6 x (12-25)	2 x

The round sealings of the UCNP end caps are the same silicon sealings as in UCN closures. Thus, the UCNP end caps are fully compatible with the whole UCN closure family.

In combination with canisters a special silicone sealing ring and a clamping ring are used for the sealing between UCNP end cap and canister.

> Universal Closure Family UCNP / UCNCP

End Cap Design - Heat-shrink Cable Sealing

Application

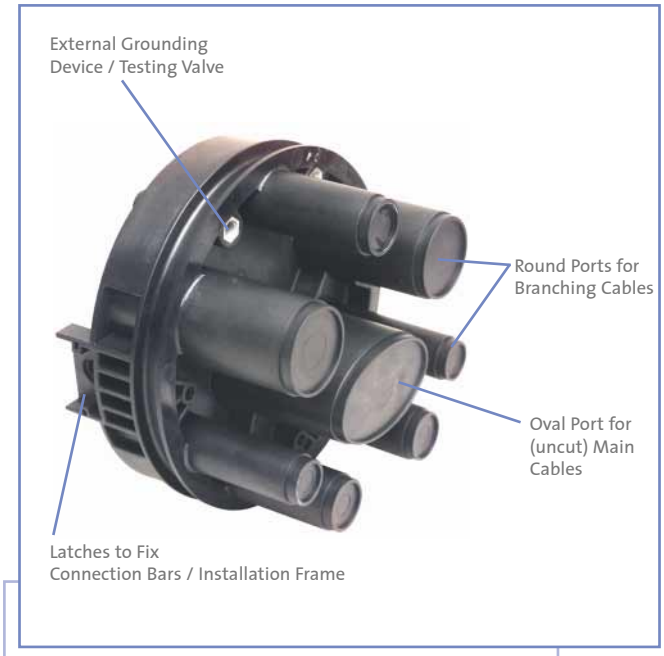
For those who feel more familiar with **heat-shrink cable entry sealing**, Corning offers on request also two series of end caps with heat-shrink ports. One series to shrink with a hot air gun – the other one to shrink by a gas torch.
Both series are designed to fit into the tubes and the canisters of the **Universal Closure Family UCN**.

Features

- **Interchangeable** with the end caps of the whole **UCNP / UCNCP Closure Family**
- One series available to use with **hot air gun**
- One series available to use with **gas torch**

Design

These one-piece end caps are designed with one **oval cable entry port** each to accommodate the installation of uncut cable as well. Depending on the size of the end cap there is a certain number of **round ports** for the entry of branching cables.
As delivered all ports are sealed. On demand they can easily be opened by tappering out e.g. with a screw driver.
All end caps are provided with a feedthrough for possibility of **external grounding** and for inserting a valve for flash testing.



View to the Outside of UCN Heat-shrink End Cap

Installation

After opening the required ports with a screw driver, the surface of the ports and the cable sheaths have to be scutted with the applied scutting paper and pre-heated afterwards to reach a better sticking of the adhesive of the shrinking tubes.
Before inserting the cable into the ports, the heat-shrink tubes have to be pushed over. The heat-shrinking process is finished, when the tubes are lying firmly to the ports and cables, the thermo-chromic paint on the tubes changes its color (which indicates a proper heat applied), and the adhesive has been melted.

UCN 5 ... O 4

UCN 7 ... O 8

UCN 9 ... O 8

Sizes, Dimensions

Type	Number and max. Diameter of Cable Entries	
	Oval Ports	Round Ports
UCN 5 ... O 4	2 x 25 mm	3 x 16 mm
UCN 7 ... O 8	2 x 32 mm	4 x 14 mm 3 x 32 mm
UCN 9 ... O 8	2 x 38 mm	2 x 20 mm 3 x 25 mm 2 x 42 mm

Order Information

For order information on Universal Inline or Canister Closures using heat-shrink end caps, please contact your local sales representative.

Universal Closure Family UCNP / UCNCP

VIP Fiber Management

Requirements of the Access Network Level

The **VIP Fiber Management** has especially been designed for the **Access Network Level**. The access network is an exceptional case of the distribution level.

The fibers of subscribers with very high data rates and hence **sensitive data traffic**, e.g. public bodies, authorities, institutes, banks or other large companies (the „VIPs"), require **special protection**.

The same special protection is required for the fibers of network carriers which are renting these fibers to frequently changing users.

For this reason, the fibers of these subscribers are assigned to **separate splice trays** in all the splice closures and distribution cabinets in the network or at least in the closures and cabinets at access level.

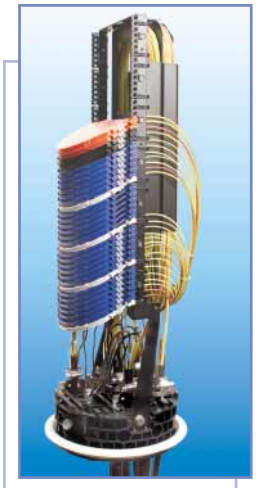
This arrangement of fibers is called **„Single Subscriber Access"** respectively **„Single Circuit Access"**.

Corning supports the access network with the **„VIP Fiber Management"**, which is based on the specially designed multi functional **VIP splice tray**.

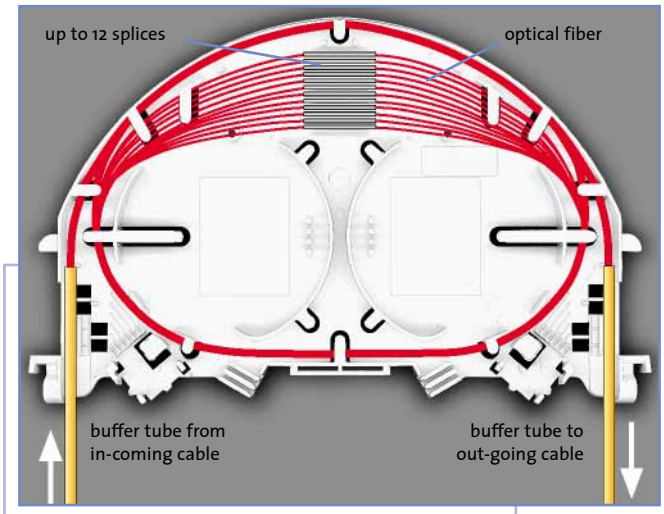
The VIP Fiber Management is employed in the **UCNCP** and **UCNP Closures** as well as in the **HDC Distribution Cabinets** and **VIP Wall Distributors**.

VIP Splice Tray System

The **VIP splice trays** are latched individually (or in modules) into the tray holder of closures or distribution cabinets one above the other – up to 49 trays e.g. in the **UCNCP 9-28 VIP**. Access to the fibers of any particular tray is possible by latching the trays above into the fixed upper position. This causes absolutely no disturbance to the fibers of any other subscribers.
Its facility for flexible organizing of buffer tubes and fibers arises from the fact that the **VIP splice tray can be used for three different functions** – as **jointing, distribution or subscriber splice tray**. This simplifies planning and stocking because less parts have to be considered.
For a better survey and identification of the fibers the VIP splice trays are available in four different colors. The splice trays are available to accomodate up to 12 heat-shrink or crimp splice protectors.
Typically and unique for the VIP Fiber Management system is that the **fibers remain best protected as long as possible in their own cable buffer tubes**. Only when dividing the fibers of one buffer tube onto a certain number of subscriber splice trays is it necessary to feed the fibers into short (approx. 10 cm) protective tubes. This assures time saving while installation.



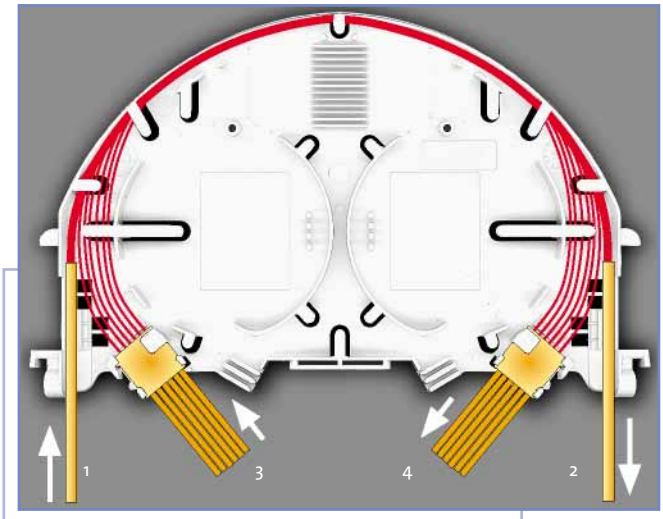
UCNCP 9-28 VIP



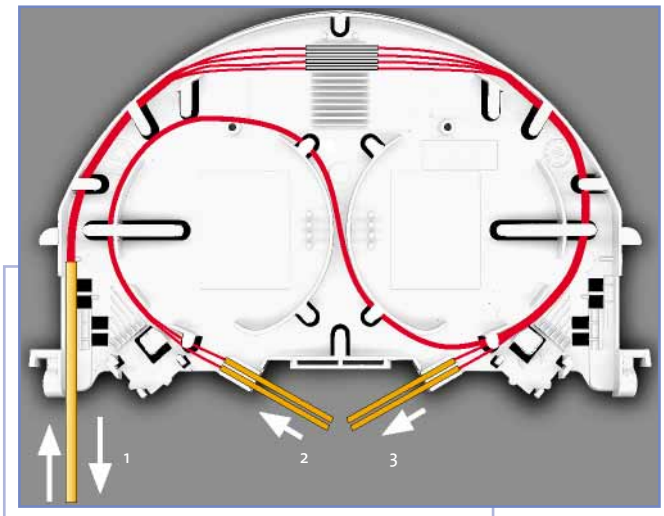
Jointing Splice Tray

Jointing Splice Tray

The VIP splice tray is used as a **standard jointing splice tray**, whenever the fibers of the buffer tubes from the in-coming and out-going cable have just to be connected. The cable buffer tubes are guided with a certain excess length, which is stored in the outer buffer tube storage of the closure, directly to the splice trays. Additional excess fiber length (approx. 1.2 m) is stored in the tray as well.
This management of the fibers and their buffer tubes (cable elements) is also called **„single element system"**. It is recommended to use a **black** tray as **jointing splice tray**.
If all splice trays of a **UCNCP 9-28 VIP** are used as a jointing splice tray, the maximum splice capacity of this closure is **49 x 12 = 588 splices**.



Distribution Tray:
1) Buffer Tube from In-coming Cable
2) Buffer Tube to Out-going Cable
3) Protection Tubes from Subscriber Splice Tray
4) Protection Tubes to Subscriber Splice Tray



Subscriber Splice Tray:
1) Buffer Tube from Subscriber Cable
2) Protection Tubes from Distribution Tray
4) Protection Tubes to Distribution Tray

Distribution Tray

If the **single subscriber** or **single circuit management** is required, the fibers of one buffer tube (element) of the main (ring) cable have to be divided in a certain number of subscriber splice trays. In this case a VIP splice tray is used as a **fan-out adapter**.
On the short distance between distribution tray and subscriber splice tray the fibers are protected by protection tubes. Six of the protection tubes are combined by a kind of jacket, which can easily be plugged into the splice tray.
Up to two fibers can be fed into each protection tube. The number of protection tubes required depends on the number of fibers per buffer tube and on the network structure (one, two or four fibers per subscriber / circuit).
It is recommended to use the **white** VIP tray as a **distribution tray**.

Subscriber Splice Tray

Within the **subscriber splice trays** the fibers of just one subscriber respectively one circuit are spliced together. By handling the fibers of only a single subscriber / circuit in one splice tray it is possible to work on these fibers without disturbing any others. We recommend to use the **blue** VIP trays for **subscriber splice trays**.
If there are more fibers than necessary for one subscriber / circuit in one buffer tube of the cable from the subscriber / circuit, the fibers of these buffer tubes have also to be divided within a further **distribution tray**.
Assuming cables with 12 fibers per buffer tube, the maximum number of subscriber splice trays within the **UCNCP 9-28 VIP, e. g., is 42** and in the **UCNCP 9-18, e. g., 18** (one distribution tray for 6 subscriber splice trays).

> Universal Closure Family UCNP / UCNCP

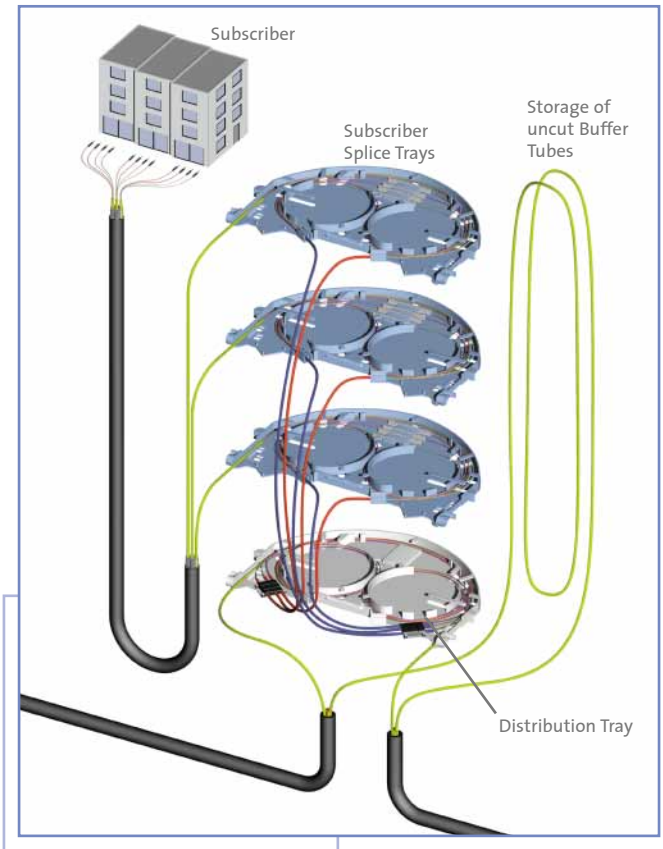
VIP Fiber Management in Universal Canister Closures UCNCP

VIP Fiber Management in Universal Canister Closures UCNCP VIP

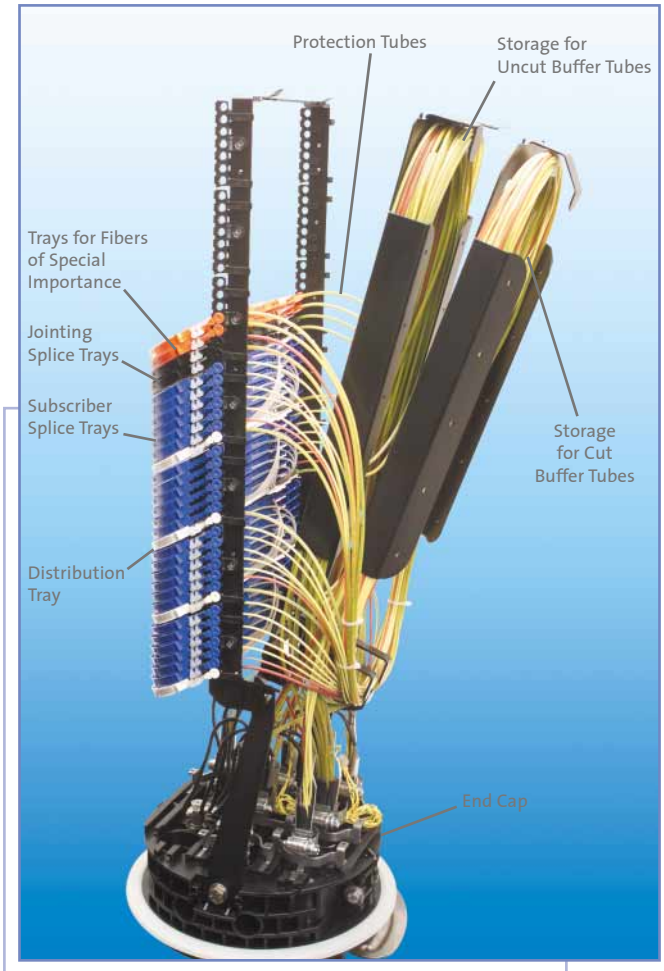
The typical closure type using single subscriber / circuit management systems are **canister closures**.
Corning has adapted the VIP Fiber Management to the canister closures **UCNCP 9-28** (max. 49 splice trays) and **UCNCP 9-18** (max. 24 splice trays).
For special applications the VIP Fiber Management has additionally been adapted into the inline closures **UCNP 7-10 up to 9-30**.

Buffer Tube Management

For optimum protection of the fibers, the **buffer tubes** of the cables are **extended to the splice trays**. It is only there that the buffer tubes are stripped off to expose the fibers for splicing. The splice trays can accomodate buffer tubes with diameters up to 3.5 mm.
Looped-through (uncut) buffer tubes are stored in a length of approx. 4 m in the **inner storage** of the closure, which allows a later cutting and splicing of the fibers on demand.



Scheme of the VIP Fiber Management

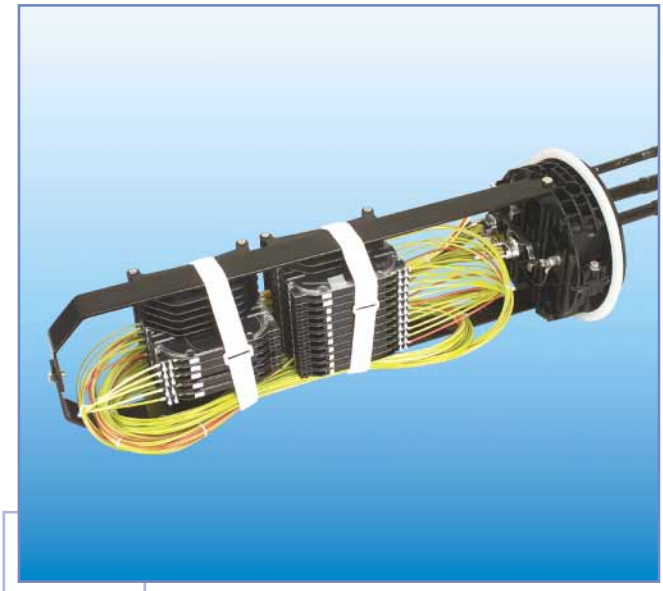


UCNCP 9-28 VIP

By having excess length also on already cut and connected buffer tubes a high grade of **flexibility** is given because it allows the re-organization of the splice trays if required.
Additionally a higher security while installation is reached: if there is not enough fiber length in the splice tray because of several times re-splicing or uncareful handling of the fiber while splicing, the extra demand of fiber length can be taken out of the buffer tube storage – therefore it is not necessary to re-install the whole cable.
The excess buffer tube lengths are stored in a separate second storage.

> Universal Canister Closures UCNCP

Description



UCNCP 9-28 E

Application

The family of Universal Closures canister type **UCNCP** is designed to protect splices and to store excess buffer length in butt configuration on fiber optic cables.
They are applicable in all network types such as aerial, duct or direct buried networks as well as in all network levels like in interconnection, branching, distribution or access levels.

Features

- Suitable for **all network applications** in butt configuration on cut and uncut FO cables
- **Fast and easy access** to the splice without special tools
- **Fast and easy insertion of branching cables** on demand without special tools
- **Choice of complete closures** including one of three different fiber management systems
- Different sizes for **up to 588 splices**
- **Same installation procedure** for canister (UCNCP) and inline closures (UCNP, see page 132)

Design

The Universal Canister Closure of the type **UCNCP** consists of a plastic end cap type UCNP (description see page 118 f.) and a plastic canister. The sealing between canister and end cap is realized by a plastic **clamping ring** which presses together the canister base and the sealing area of the end cap with the sealing ring between.
The **sealing ring** is made of a permanently elastic silicone material which allows the closure to be opened and reclosed as often as required without additional installation material.

The **end cap** incorporates the **strain relief** absorbing the mechanical forces which may be applied to the cables from the network side. A metal frame is fixed to the end cap for installation of the **fiber management system**. For easier access to the fiber management, one half of the frame can be separated (only „S“ and „E“ type).

For the correspondence of the fiber management systems to the different closure sizes see table on the next page.

Each closure is equipped with a **feedthrough** for external grounding or valve for pressure tightness testing (flash test).

Fiber Management

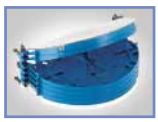
Explanation of the three different fiber management systems type „S“, „E“, and „VIP“ please find on page 114 to 116 and 122 to 124.

UCNCP closed with clamping ring

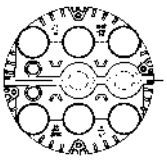
> Universal Canister Closures UCNCP

Capacities, Dimensions

Fiber Management, Types, Capacities

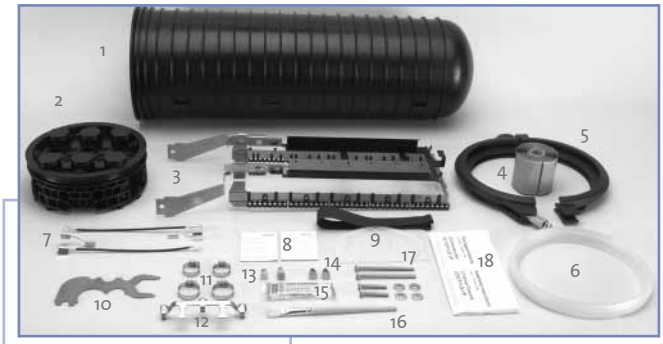
Fiber management		Closure type	Maximum number of Splice trays	Maximum number of Fusion splices (single fibers)
Standard (S)		UCNCP 5-18 S	6 Standard (without cover)	72
		UCNCP 7-22 S	12 Standard (without cover)	144
		UCNCP 7-28 S	24 Standard (without cover)	288
		UCNCP 9-28 S	36 Standard (without cover)	432
Element (E)		UCNCP 7-22 E	8 Standard (with cover)	96
		UCNCP 7-28 E	16 Standard (with cover)	192
		UCNCP 9-28 E	24 Standard (with cover)	288
VIP		UCNCP 9-18 VIP	24 VIP (without cover)	288
		UCNCP 9-28 VIP	49 VIP (without cover)	588

Dimensions

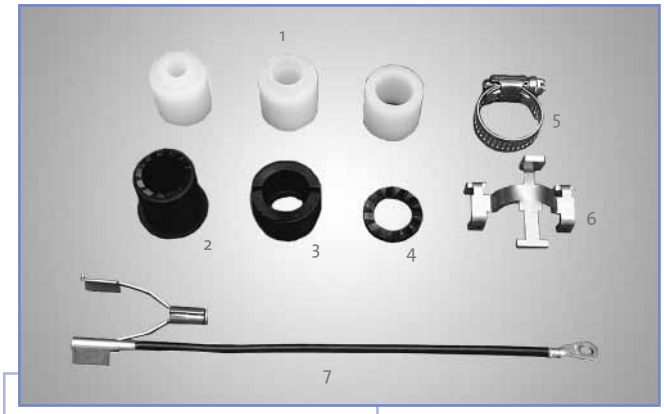
End Cap	Type	Outer Dimensions [mm]		Cable entries [mm]
		diameter	length	
	UCNCP 5-18	(5") 159	(18") 505	3 x 5-15 cut and 2 x 12-20 cut / uncut
	UCNCP 7-22	(7") 220	(22") 585	4 x 5-18 cut and 2 x 12-22 cut / uncut
	UCNCP 7-28	(7") 220	(28") 735	
	UCNCP 9-18	(9") 265	(18") 530	6 x 12-25 cut and 2 x 12-32 cut / uncut
	UCNCP 9-28	(9") 265	(28") 735	

> Universal Canister Closures UCNCP

Kit Content, Branching Set



Kit Content UCNCP (VIP shown)



Branching Set for Cable Entry Port

Kit Content

Each closure kit contains all parts required for installation of a branching closure with up to 3 cables – up to 2 in the intersection and one branching set for cable ports with compression fitting.

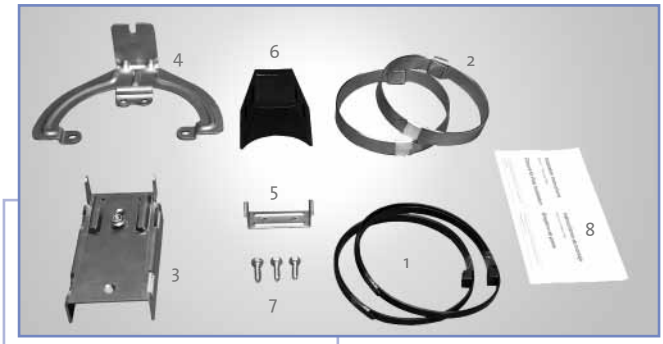
1 Closure canister
2 End cap
3 Splice tray holder (fiber management depending on selected type, VIP shown)
4 Sealing tape
5 Clamping ring
6 Sealing ring
7 Strain relief / grounding for central members
8 Cleaning tissue
9 Cover for upper splice tray with velcro strip
10 Gage / wrench
11 Cable clamps
12 Double clamps for main cable strain relief bracket
13 Grounding screws
14 Screws for tray holder
15 Lubricant
16 Brush
17 Closing screws for end cap
18 Installation instructions
19 Branching set for cable entries with compression fittings (not shown)

Branching Set for Cable Entry Port (to be ordered separately)

1 Sealings
2 Pressure screw
3 Closing screw
4 Washer
5 Hose clamp
6 Bracket, 1-way strain relief
7 Strain relief / grounding for central members

> Universal Canister Closures UCNCP

Accessories



Wall / Pole Mounting

Wall / Pole Mounting

1 Cable tie to secure canister
2 Clamping bands for pole mounting
3 Wall / pole mounting
4 Closure holder
5 Mounting plate
6 Canister holder
7 Securing screws
8 Installation instructions

Aerial Hanging Device

Aerial Hanging Device

1 Support, canister
2 Support, end cap
3 Clamp screws
4 Installation instructions

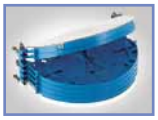
Installation Support

Installation Support

To facilitate installation an **installation support** is available for fixing the closure temporarily in a vertical position. The closure holder of the wall / pole mounting has to be fixed to the end cap with two screws. The other side of this holder can be slid into the installation support which can be clamped e. g. to a work bench.

> Universal Canister Closures UCNCP

Order Numbers

Designation		Description / Delivery Unit	Order Number
	UCNCP 5-18 S	1 kit	S46998-A2-A70
	UCNCP 7-22 S	1 kit	S46998-A2-A71
	UCNCP 7-28 S	1 kit	S46998-A2-A72
	UCNCP 9-28 S	1 kit	S46998-A2-A73
	UCNCP 7-22 E	1 kit	S46998-A2-A74
	UCNCP 7-28 E	1 kit	S46998-A2-A75
	UCNCP 9-28 E	1 kit	S46998-A2-A76
	UCNCP 9-18 VIP	1 kit	S46998-A2-A78
	UCNCP 9-28 VIP	1 kit	S46998-A2-A77
Accessories			
Branching Set		Cable entry port, with compr. fittings, set for 1 cable	
- for end cap UCNCP 5			S46998-A2-R36
- for end cap UCNCP 7			S46998-A2-R16
- for end cap UCNCP 9			S46998-A2-R37
Valve		For tightness testing (flash testing), 1 set	C45402-Z3-C31
Desiccant		50 g, 1 bag	S45056-M130-A3
Aerial Hanging Device		1 set	S46998-D1-A3
Wall / Pole Mounting		1 set	
- for UCNCP 5			S46998-M1-A3
- for UCNCP 7			S46998-M1-A4
- for UCNCP 9			S46998-M1-A5
Installation Support		1 pc.	C46197-K1-B11
Heat-shrink Splice Protectors		For details, see page 56	
- for single fibers, 60 mm		Pack of 100	S46999-A16-A4
- for single fibers, 45 mm		Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons		Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons		Pack of 25	S46999-A16-A6
Crimp Splice Protector		Pack of 150 (for details, see page 57)	S45057-Z1-H590

Further Accessories

- Splice Trays and Splice Organizers (see page 136/137)
- Tools (see page 240)
- Dummy Plugs (ask for details)

> Universal Closures UCNCP for Fiber Ribbon

Open Ribbon System ORS

Open Ribbon System (ORS)

As part of the standard UCNCP / UCNP closure family the **ORS (Open Ribbon System)** provides a quick and flexible system of ribbon splicing. It is available for **UCNCP Canister Closures**. Single fiber splicing can be combined with this ribbon system by the addition of splice trays, allowing up to 24 fibers per tray. The open system means that the closure is simple to install and ribbons of up to 24 fibers can be accommodated in the closure.

UCNCP, equipped with Open Ribbon System

Features

- **No trays required**
- **No transport tubes needed** for up to 1296 mass splices
- Available with **mechanical** or **heat shrink end cap**
- Optimized for separate **express and drop fiber storage**
- **Easily re-enterable** for future expansion
- **Re-usable sealing ring**
- **Aerial, direct buried or underground applications**
- **Telcordia GR-771 tested**

UCNCP ORS with heat-shrink end cap

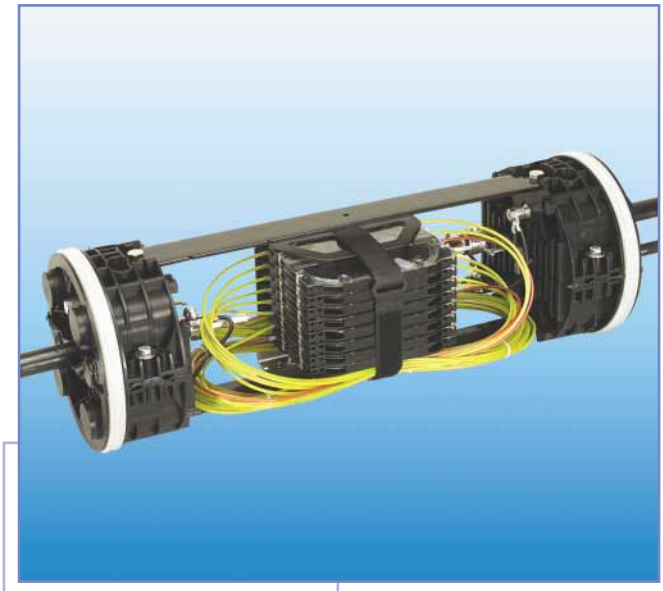
Order Numbers

Designation	Description, Delivery Unit	Order Number
UCNCP 5-18 ORS	for max. 144 Fibers; 1 pc.	SCF4C18 ORS
UCNCP 7-22 ORS	for max. 288 Fibers; 1 pc.	SCF6C22 ORS
UCNCP 7-28 ORS	for max. 432 Fibers; 1 pc.	SCF6C28 ORS
UCNCP 9-28 ORS	for max. 864 Fibers; 1 pc.	SCF8C28 ORS
UCNCP 9-28 ORS	for max. 1296 Fibers; 1 pc.	Contact us
Accessories		
Branching Set	Cable entry port, with compr. fittings, set for 1 cable	
- for end cap UCNCP 5		S46998-A2-R36
- for end cap UCNCP 7		S46998-A2-R16
- for end cap UCNCP 9		S46998-A2-R37
Valve	For tightness testing (flash testing), 1 set	C45402-Z3-C31
Desiccant	50 g, 1 bag	S45056-M130-A3
Aerial Hanging Device	1 set	S46998-D1-A3
Wall / Pole Mounting	1 set	
- for UCNCP 5		S46998-M1-A3
- for UCNCP 7		S46998-M1-A4
- for UCNCP 9		S46998-M1-A5
Installation Support	1 pc.	C46197-K1-B11
Heat-shrink Splice Protectors	For details, see page 56	
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector	Pack of 150 (for details, see page 57)	S45057-Z1-H590

The closures are delivered with mechanical end caps;
for heat-shrink end cap, please specify by adding "HS" to the order number

> Universal Inline Closures UCNP

Description



UCNP 7-10 E

Application

The family of Universal Closures type **UCNP** is designed to protect splices and to store excess buffer length inline to fiber optic cables. The closures are applicable in all network types such as aerial, duct or direct buried networks as well as in all network levels such as interconnection, branching, distribution or access levels.

Features

- Suitable for **all network applications** in inline configuration on cut and uncut FO cables
- **Fast and easy access** to the splice without special tools
- **Fast and easy insertion of branching cables** on demand without special tools
- **Choice of complete closures** including one of three different fiber management systems
- Different sizes for **up to 540 splices**
- **Same installation procedure** for inline (UCNP) and canister closures (UCNCP, see page 125)

Design

The Universal Closures **UCNP** consist of two plastic end caps type UCNP (description see on page 118 f.) and a plastic closure tube.
The longitudinally split closure tube is closed with two plastic bars. They are pushed on by using only a plastic hammer and are secured with pins. For re-entry also only a plastic hammer is required.

Permanently elastic longitudinal and round **sealings** allow the closure to be opened and re-closed as often as required without additional installation material. The round sealings are applied pre-cut with a joiner in order to allow installation on uncut cables or on rehabilitation purpose.
The two **end caps** incorporate the **strain relief** absorbing mechanical forces which may be applied to the cables from the network side. Two metal bars interconnect the two end caps. On the lower bar the fiber management system is installed.

All closure sizes are available with three different **fiber management systems** included in the pack.

Each closure is equipped with a **feedthrough** for external grounding or valve for pressure tightness testing (flash test).

Fiber Management

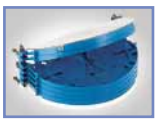
Explanation of the three different fiber management systems type „S“, „E“, and „VIP“ please find on page 114 to 116 and 122 to 124.

UCNP closed with clamping bars

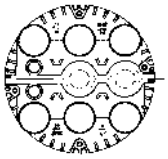
> Universal Inline Closures UCNP

Capacities, Dimensions

Fiber Management, Types, Capacities

Fiber management		Closure type	Maximum number of	
			Splice trays	Fusion splices (single fibers)
Standard (S)		UCNP 5-10 S	6 Standard (without cover)	72
		UCNP 7-10 S	12 Standard (without cover)	144
		UCNP 7-20 S	24 Standard (without cover)	288
		UCNP 9-20 S	36 Standard (without cover)	432
Element (E)		UCNP 7-10 E	8 Standard (with cover)	96
		UCNP 7-20 E	16 Standard (with cover)	192
		UCNP 9-20 E	24 Standard (with cover)	288
VIP		UCNP 7-10 VIP	8 VIP	96
		UCNP 7-20 VIP	16 VIP	192
		UCNP 7-30 VIP	24 VIP	288
		UCNP 9-20 VIP	30VIP	360
		UCNP 9-30 VIP	45 VIP	540

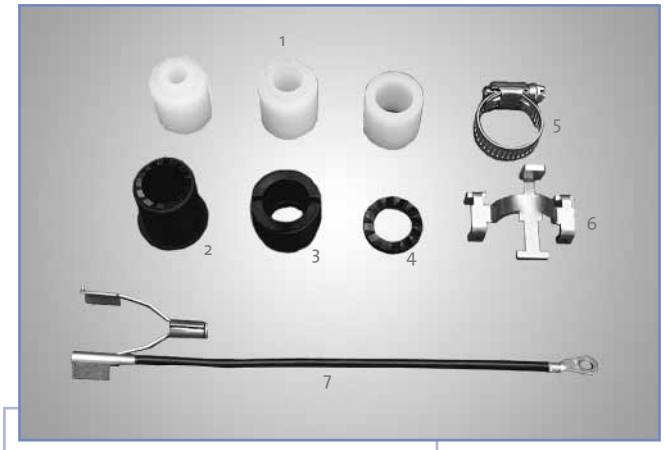
Dimensions

End Cap	Type	Outer Dimensions [mm]		Cable entries [mm]
		diameter	length	
	UCNP 5-10	(5") 150	(10") 523	3 x 5-15 cut and 4 x 12-20 cut / uncut
	UCNP 7-10 UCNP 7-20 UCNP 7-30	(7") 204 (7") 204 (7") 204	(10") 523 (20") 768 (30") 1020	8 x 5-18 cut and 4 x 12-22 cut / uncut
	UCNP 9-20 UCNP 9-30	(9") 250 (9") 250	(20") 768 (30") 1020	12 x 12-25 cut and 4 x 12-32 cut / uncut

> Universal Inline Closure UCNP

Kit Content, Accessories

Kit Content UCNP (fiber management not shown)



Branching Set for Cable Entry Port

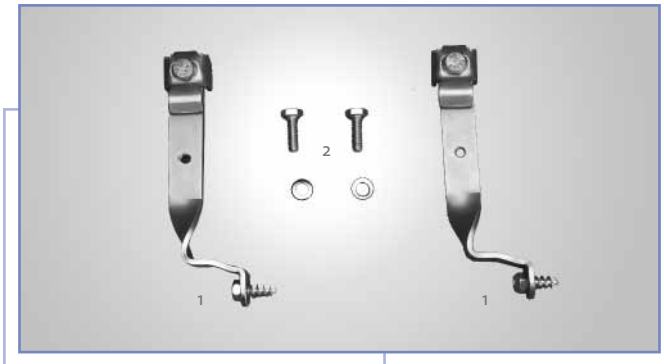
Kit Content

Each closure kit contains all parts required for installation of a branching closure with up to 5 cables – up to 4 in the intersection and one branching set for cable ports with compression fitting.

1 Closure tube
2 End cap
3 Connecting bars
4 Clamping bars
5 Dummy plugs
6 Sealing rings
7 Sealing cord
8 Strain relief / grounding for central members
9 Closing screw
10 Grounding screws
11 Gage / wrench
12 Cleaning tissue
13 Sealing paste
14 Lubricant
15 Brush
16 Closing screws for end cap
17 Cable clamps
18 Double clamp for main cable strain relief bracket
19 Support ring (for UCNP 9-30)
20 Sealing tape
21 Installation instructions
22 Fiber management according to selected type (not shown)
23 Shield connection lead (not shown)

Branching Set for Cable Entry Port (to be ordered separately)

1 Sealings
2 Pressure screw
3 Closing screw
4 Washer
5 Hose clamp
6 Bracket, 1-way strain relief
7 Strain relief / grounding for central members



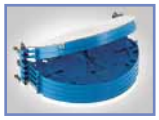
Aerial Hanging Device

Aerial Hanging Device

1 Supports
3 Clamp screws

> Universal Inline Closure UCNP

Order Numbers

Designation		Description / Delivery Unit	Order Number
	UCNP 5-10 S	1 kit	S46998-A2-A40
	UCNP 7-10 S	1 kit	S46998-A2-A41
	UCNP 7-20 S	1 kit	S46998-A2-A42
	UCNP 9-20 S	1 kit	S46998-A2-A43
	UCNP 7-10 E	1 kit	S46998-A2-A44
	UCNP 7-20 E	1 kit	S46998-A2-A45
	UCNP 9-20 E	1 kit	S46998-A2-A46
	UCNP 7-10 VIP	1 kit	S46998-A2-A60
	UCNP 7-20 VIP	1 kit	S46998-A2-A61
	UCNP 7-30 VIP	1 kit	S46998-A2-A62
	UCNP 9-20 VIP	1 kit	S46998-A2-A63
	UCNP 9-30 VIP	1 kit	S46998-A2-A64
Accessories			
Branching Set		Cable entry port, with compr. fittings, set for 1 cable	
- for end cap UCNP 5			S46998-A2-R36
- for end cap UCNP 7			S46998-A2-R16
- for end cap UCNP 9			S46998-A2-R37
Valve		For tightness testing (flash testing), 1 set	C45402-Z3-C31
Desiccant		50 g, 1 bag	S45056-M130-A3
Aerial Hanging Device		1 set, for all UCNP sizes	S45754-D1-A1
Heat-shrink Splice Protectors		For details, see page 56	
- for single fibers, 60 mm		Pack of 100	S46999-A16-A4
- for single fibers, 45 mm		Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons		Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons		Pack of 25	S46999-A16-A6
Crimp Splice Protector		Pack of 150 (for details, see page 57)	S45057-Z1-H590

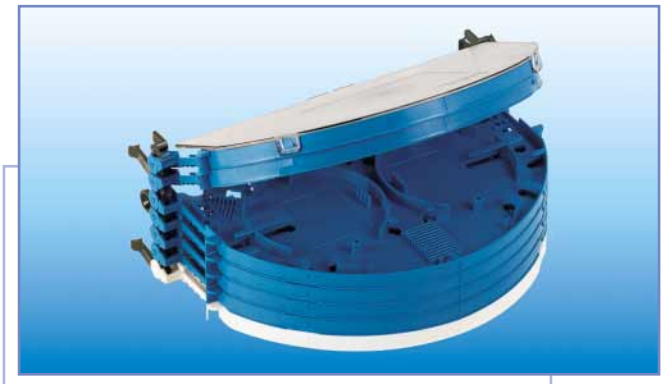
Further Accessories

- Splice Trays and Splice Organizers (see page 136/137)
- Tools (see page 240)

> Accessories for UCNP / UCNCP

Splice Trays

Standard Splice Tray



VIP Splice Tray Module

Standard Splice Trays

For storing of **mechanical** or **fusion splices** as well as **excess fiber length**. Two buffer tubes can be fixed at each of the four entries of the tray. For easier access at a future time it is recommended to store a maximum of 12 single fiber splices. The fiber excess length should be 1200 mm and is stored in the the tray. With bending diameters between 60 and 80 mm it is guaranteed that the stored fibers are free of any stress and attenuation increase.
For fiber management **type "E"** with single tray access, each tray has to be protected by the **transparent cover** which is snapped onto the tray.
For storing the splices in the Standard Splice Tray, **splice organizers** are required (see next page).

VIP Splice Trays

VIP Splice Trays are used for VIP Fiber Management. Details of this see pages 122 - 124.

Designation	Description / Delivery Unit	Order Number
Standard Splice Tray	For 12 single fibers, without cover; 2 pcs.	C46197-A7-A70
Standard Splice Tray	For 12 single fibers, without cover; 10 pcs.	C46197-A7-A66
Cover	For standard splice tray; 10 pcs.	S46998-A4-A1
VIP Splice Trays	For crimp splice protector	
- white	10 pcs.	S46998-A4-A8
- black	10 pcs.	S46998-A4-A9
- red	10 pcs.	S46998-A4-A10
- blue	10 pcs.	S46998-A4-A11
VIP Splice Trays	For heat-shrink splice protector	
- white	10 pcs.	S46998-A4-A13
- black	10 pcs.	S46998-A4-A14
- red	10 pcs.	S46998-A4-A15
- blue	10 pcs.	S46998-A4-A16
VIP Splice Tray Module	For crimp splice protector	
- 7 trays	1 distribution tray + 6 subscriber splice trays	S46998-A1-R28
- 8 trays	2 distribution trays + 6 subscriber splice trays	S46998-A1-R30
VIP Splice Tray Module	For heat-shrink splice protector	
- 7 trays	1 distribution tray + 6 subscriber splice trays	S46998-A1-R29
- 8 trays	2 distribution trays + 6 subscriber splice trays	S46998-A1-R31
Protective tube	Single, 5 m	S46998-A1-R10
Protective tube jacket	6 protective sleeves each, 105-130 mm, pack of 10	S46998-A1-R17
Protective tube jacket	6 protective sleeves each, 570-595 mm, pack of 10	S46998-A1-R38

> Accessories for UCNP / UCNCP

Splice Organizers

Splice Organizers for Heat-shrink (left) and Crimp Splice Protectors (right)

Splice Organizers for Standard Splice Trays

For storing the splices safely in the trays, different **organizers** are available according to the selected splice protector.
The organizers are simply snapped into the trays – one for crimp splice protectors for up to 12 splices or two for heat-shrink splice protectors for up to 6 splices each.
Another type of organizer is used to store either five heat-shrink protectors for 4-fiber ribbons or for five mechanical splices CamSplice™ (see page 101).
A standard splice tray can take up to two of these organizers.

Designation	Description / Delivery Unit	Order Number
Splice Organizer	For 6 heat-shrink splice protectors; 10 pcs.	S46999-Z12-A1
Splice Organizer	For 12 Crimp Splice Protectors; 10 pcs.	C46197-A7-A69
Splice Organizer	For 5 CamSplice (mechanical splice); 10 pcs.	S46998-A4-R1
Splice Organizer	For 4 to 12 fiber ribbons; 10 pcs.	S46999-A16-A7

Splice Protectors:
see page 56 / 57

> Accent™ Closure Family

Accent Fiber Management

Introduction

As one of the world's leading suppliers of optical cables and cable systems, Corning Cable Systems has developed the **Accent** range of technically advanced modular optical fiber jointing and distribution equipment. The range of equipment facilitates reliable deployment of optical fiber communication systems in access networks, trunk networks, and other applications.

The **Accent** range comprises four sub-classes of product together with a range of optional extras.

- **Sub Assemblies** – these discrete modules facilitate optical fiber splicing and splitting and are used in all Accent products for underground, exchange, and customer installations.

- **Closures** – these products are used for cable and fiber management in a variety of situations.
  - Duct (joint pit)
  - Direct burial (In-Line)
  - Aerial (tower / pole)
  - Speciality applications e.g. sewer systems (zone 1)

Accent Canister Closure

Features

The Accent product range offers:

- A fully modular, highly flexible, well-managed and robust product range
- Easily installed and reliable equipment aimed at minimising whole life costs
- An optimised supply strategy that removes waste and reduces inventory
- A thorough and well-planned system of installation documentation
- Blown fiber / cable compatible system

Modularity

Corning's **Accent** range of products comprises modular Sub Assemblies, allows single circuit management, and provides positive fiber and cable routing, which allow optical fiber networks to be built and configured as demand grows.

Flexibility

The products offer a very high degree of design **flexibility** that avoids placing unnecessary constraints on both the installer and planner. For example, enough space is provided within underground joint closures to accommodate particularly space intensive joint configuration requirements and the need to store dark fiber in Sub Assemblies has been eliminated using two novel products.

Accent Sub Assemblies

Reliability & Ruggedness

A number of design features are incorporated in the products to optimise their **reliability**. For example, each fiber splice tray incorporates a full lid, which retains the fibers in the cassette and protects them against the harmful effects of vibration. Experience has shown that cassettes that do not incorporate a full lid often suffer performance problems.

A key design feature of the **Accent** range is that once installed, the equipment can be revisited regularly in order to accommodate network growth and reconfiguration. Hence, particular attention has been paid to the **ruggedness** of the designs – all component parts are well engineered, mouldings are robust, and where parts fix together the locations are positive and secure.

Ease of Installation

Another design feature, which has been closely adhered to, is the equipment's **ease of installation** – a major consideration for access network fiber management equipment.
Throughout the network, the same sub-assemblies are used, as are fiber routing techniques and installation methodologies. All designs incorporate Sub Assemblies that are fixed in free space, thereby allowing tubes carrying fibers to be routed with relative freedom.
Where possible, equipment is supplied 'pre-wired' and, where appropriate, new products have been introduced to avoid repetitive tasks.

Details on Sub Assemblies and Accessories:
see page 146 - 155

> Accent™ Generic Canister Closure

Description

Accent Canister Closure

Application

The **Accent Generic Canister Closure** is a ready access re-enterable closure system suitable for configuring external cables in underground situations.

The closure is used to protect fiber splices and can be used to store excess buffer length, in a butt joint configuration.

It is applicable for all network levels for example long haul trunk, distribution, access branch and metro.

Features

- **Ready access** closure
- Configurable through **distribution joints**
- Sealed to **IP68**
- Available in **large** or **small** variants
- Tamper-proof **locking mechanism**
- **1 oval & 6 circular ports**
- Up to **20** cable entries
- Full range of **optional extras** for custom configurations
- **Just-in-time** build facility
- **Accent** Fiber Management System

Design

The Joint Closure comprises a **closure base** with 6 circular ports and 1 oval port, an injection-moulded **lid** (small or large – interchangeable), an internal **framework** for mounting Sub-Assemblies, and a hand-operated **clamp** ring for securing and sealing the closure. The clamp ring can be secured in position with a padlock or other security device.
A **pressure relief valve** or a Schraeder valve can be fitted to the base of the closure to safeguard against the internal build up of pressure or to pressurise the closure as required.
Connection facilities for copper pairs, moisture barrier and central strength member continuity can also be supplied as optional extras if required.

Kits for fitting and sealing cables into oval and circular ports are either included with the joint closure or supplied as optional extras – depending on the required configuration. Refer to following section for configurations.

The closure base is manufactured from an **epoxy thermoset material**, which allows heat shrink cable sealing to be carried out reliably using relatively low skilled labour by use of a gas torch or electric heat gun.

The closure base incorporates a removable **cable anchorage system**. Each cable with a Central Strength Member (CSM) which can be attached to a CSM Anchor, (or allowed to move in a controlled manor via a grow out tube). A **Breakout Disc** can be mounted on the CSM Anchor. The advantage of having a removable anchorage system is that it allows the cable to be pushed through a closure base cable port to a workable height during installation.

The Breakout Disc can cater for up to 30 cable elements and has provision for **uncut cable elements** to be routed through its centre, thereby simplifying fiber management. The Breakout Disc also allows the **introduction of resin** between the cable elements, thereby allowing a more effective cable butt seal to be achieved, if such a practice is desired.

Unbroken cable elements can be stored in the joint closure using a **Cable Element Manager Kit**, which can be supplied as an optional extra.

Fiber Management

The **Accent Fiber Management System** is used in this closure. For details of this see page 138.

> Accent™ Generic Canister Closure

Capacities, Dimensions

Capacities (Single Fibers)

Fiber Management	Lid Size	Splice Trays	Fusion Splices (single fiber)
Accent SC*	Short	28	56
	Long	56	112
Accent SE** (8 fibers/cassette)	Short	28	224
	Long	56	448
Accent SE** (12 fibers/cassette)	Short	28	336
	Long	56	672

* *SC = Single Subscriber Management*
** *SE = Buffer Tube Management*

Capacities (Fiber Ribbon)

Fiber Management	Lid Size	Splice Trays	Fusion Splices (single fiber)
Accent Ribbon	Short	14	672
	Long	28	1344

Dimensions, Cable Entry Ports

Outer Ø excl. Clamping Ring	Length	Cable Entry Ports
260 mm	470 mm (short lid) 700 mm (long lid)	1 oval, inner Ø 92 x 43 mm 6 circular, inner Ø 32 mm

> Accent™ Generic Canister Closure

Typical Joint Configurations – Straight Joint

Sub Assemblies Required	Total number of splices							
	48		96		144		288	
	Fibers/tube		Fibers/tube		Fibers/tube		Fibers/tube	
	8	12	8	12	8	12	8	12
8f SOSA SE6	1				1			
8f SOSA SE12			1		1		3	
12f SOSA SE4		1						
12f SOSA SE8				1				
12f SOSA SE12						1		2
Routing Kits								
6 Tube SE	2		4		6	4	12	8
4 Tube SE		2		4				
Port Kits								
Circular Port Kit	2	2	2	2	2	2	2	2

The numbers in the table refer to the quantities of Sub Assemblies, Fibre Routing Kits and Port Kits required.
e.g. 144 fibres @ 8f/t requires:
1 off 8f SOSA SE6, 1 off 8f SOSA SE12, 6 off 6 SE Fibre Routing Kits, 2 off Circular Port Kits

Accent™ Generic Canister Closure

Order Numbers

Designation	Description / Delivery Unit	Order Number
Accent Generic Canister Closure	Short, up to 28 cassettes; 1 kit	RM51-0200-99
Accent Generic Canister Closure	Long, up to 56 cassettes; 1 kit	RM51-0201-99
Custom Joint	For any specific fiber count	on request
Accessories		
Cable Entry Port Kits (see page 149 / 150)		
- Circular Port Kit	1 kit	RM51-0305-99
- Circular Port Kit (Universal Anchor)	1 kit	RM51-0306-99
- Oval Port Kit	1 kit	RM51-0307-99
- Oval Port Kit (Universal Anchor)	1 kit	RM51-0308-99
- 1 to 3 Way Multi-Cable Port Kit	1 kit	RM51-0336-99
- Multi-Cable Addition Kit	1 kit	RM51-0337-99
- Multi-Cable Port Kit – 2 way	1 kit	RM51-0339-99
- Multi-Cable Port Kit – 3 way	1 kit	RM51-0338-99
Cable Element Manager (see page 153)	1 pc.	RM51-0301-99
Wall Mounting Bracket (see page 153)	1 pc.	RM51-0333-99
Rawlbolts for brick (see page 153)		on request
Rawlbolts for concrete (see page 153)		on request
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590

Further Accessories

- Sub Assemblies (see page 146)
- Fiber Routing Kits (see page 151)
- Fiber Breakouts (see page 152)
- Positive Routing Tube (see page 152)
- Maintenance Kit (see page 154)
- Tools (see page 155 and 240)

On Request:

- Numbering Collets
- Schraeder Valves
- Pressure Relief Valves
- Continuity Leads
- Fiber Storage Kits
- Electrical Continuity Kits

> Accent™ Distribution Closure

Accent Distribution Closure

Application

The **Accent Distribution Closure** is a ready access re-enterable closure system suitable for configuring external cables in underground situations.
The closure is used to protect fiber splices and can be used to store excess buffer length, in a butt joint configuration.
It is applicable **for all network levels** for example long haul trunk, distribution, access, branch and metro.

Features

- Configurable as though on **distribution joints**
- Tamper-proof **locking mechanism**
- Sealed to **IP67**
- **1 oval, 4 circular ports**
- **48 splice capacity** (6 cassettes)
- **Accent Fiber Management System**

Design

The closure is an easily accessible two part, mechanically sealed, construction with 1 oval port and 4 branch ports. The oval port enables 2.2m of looped fiber (unbroken cable tubes) to be stored within the joint.
This closure is smaller than the Generic Closure and is suitable for underground duct or pole mounting with self-supporting cables.

Fiber Management

The **Accent Fiber Management System** is used in this closure. For details of this see page 138.

Dimensions, Cable Entry Ports

Outer Ø (excl. Clamping Ring)	Length	Cable Entry Ports
155 mm	450 mm	1 oval (inner Ø 54 x 34 mm); 4 circular (M32 gland)

Order Numbers

Designation	Description / Delivery Unit	Order Number
Distribution Closure	For up to 48 Fibers – SOSA SE 6 (8F); 1 kit	RM51-0614-99
Accessories CircularCable Entry Port Kit (see p. 149)	1 kit	51-0053-99

Further Accessories

- Splice Protectors (see page 56/57)
- Sub Assemblies (see page 146)
- Fiber Routing Kits (see page 151)
- Maintenance Kit (see page 154)
- Tools (see page 155 and 240)

On Request:

- Numbering Collets
- Continuity Leads

> Accent™ Inline Closure

Accent Inline Closure: UCNP Closure Body with Accent Fiber Management

Application

The **Accent Inline Closure** is designed to protect splices and to store excess buffer length. The closure is intended as an underground joint suitable for duct and direct burial and can also be used in aerial applications.

Features

- Suitable for **all network applications**
- **288 splice** capacity
- **Accent Fiber Management System**

Fiber Management

The Accent Fiber Management System is used in this closure. For details of this see page 138.

For further details, ask your local sales representative!

> Accessories for Accent™ Closure Family

Accent Sub Assemblies

Accent Sub-Assemblies

The building block of the **Accent** product range is the **Sub Assembly**. These discrete modules form part of any complete optical fiber jointing product. Typically they contain a number of splice cassettes providing secure storage for optical fiber splices, spare fiber and, where required, optical splitters.

The **Sub Assemblies** consist of horizontal stacks of splice cassettes supported on a rigid chassis ensuring that no stresses are transferred to the fibers. Each cassette has a positive location system, such that when a cassette is removed from the stack the other cassettes are retained in position. Each splice cassette can be accessed individually, without causing any transmission degradation to fibers in adjacent cassettes.

Accent Sub Assemblies

Accent Sub Assembly: easy access to the splice cassettes

There are two generic forms of Sub Assembly – the **Splice Only Sub Assembly (SOSA)** and the **Splitter Array Sub Assembly (SASA)**.

Splice Only Sub Assembly (SOSA)

The **SOSA** is supplied in four variants – Single Element (up to 8 fibers per cable element), Single Element (up to 12 fibers per element), Single Element (Ribbon) and Single Circuit (2 fibers). These Sub Assemblies are fully modular and all variants are fully intermateable. The cassettes incorporate a full lid for secure fiber storage, and the Single Circuit cassettes provide a facility for non-obtrusive testing.

In certain applications it is also possible, due to the flexible nature of the designs, to house splitter devices directly in splice cassettes. This can be particularly advantageous where splitter devices, such as Wavelength Division Multiplexers (WDMs), need to be incorporated into each circuit, for example when upgrading to dual wavelength operation.

SOSA's containing stacks of cassettes of varying numbers, can be supplied to provide all the functions necessary to install any access network system. If at any time a new size of SOSA is required in the range, then this can be easily introduced.

Single Element SOSA

Each type of **Single Element SOSA** has a stack of up to 12 splice cassettes each housing a maximum of either 12 or 8 spliced primary coated fibers or ribbon. Each type of Single Element SOSA is presently available in five cassette counts.

Single Element SOSA – Ribbon

Each **SOSA ribbon** cassette can house up to a maximum of 6 splices – which can be a combination of 4, 8 and 12 fiber ribbons. The minimum fiber splice capacity is 24 fibers per cassette. The Single Element SOSA Ribbon is available in three cassette counts.

Single Circuit SOSA

The **Single Circuit SOSA** has a stack of up to 12 splice cassettes each of which can house up to 2 spliced fibers, i.e. a single circuit. This can be two primary coated fibers, or alternatively, two primary coated fibers spliced to two secondary coated fibers. The Single Circuit SOSA is presently available in five cassette counts.

Splitter Array Sub Assembly (SASA)

The **SASA** consists of a horizontal stack of splice cassettes supported on an identical chassis to that of the SOSA's. Two arrays of optical splitters are sealed within the chassis. The optical splitters are pre-loaded on to the splice cassettes to enable interconnection with the cable fibers. The splice cassettes house only the fibers associated with one circuit. Access to any individual splice cassette does not affect transmission in other circuits within the SASA.

Materials

- End Plates: Passivated Steel
- Chassis: Flame Retardant PPO
- Cassettes & Lids: Flame Retardant PPO

Technical Data and Order Numbers:
see next page

> Accessories for Accent™ Closure Family

Accent Sub Assemblies

Dimensions

Type	Width [mm]	Depth [mm]	Height [mm]	
SOSA SE (8 fiber), SOSA SC	170	120	23 105	(2 cassettes) (12 cassettes)
SOSA SE (12 fiber)	180	140	23 105	(2 cassettes) (12 cassettes)
SOSA Ribbon	170	120	23 105	(1 cassettes) (6 cassettes)

Order Numbers

Designation	Order Number
SOSA SE, 8-splice cassettes, for heat-shrink splice protector	
- 2 Cassette	RM 51-0111-99
- 4 Cassette	RM 51-0112-99
- 6 Cassette	RM 51-0113-99
- 8 Cassette	RM 51-0114-99
- 12 Cassette	RM 51-0115-99
SOSA SE, 12-splice cassettes, for heat-shrink splice protector	
- 2 Cassette	RM 51-0121-99
- 4 Cassette	RM 51-0122-99
- 6 Cassette	RM 51-0123-99
- 8 Cassette	RM 51-0124-99
- 12 Cassette	RM 51-0125-99
SOSA SC, 12-splice cassettes, for heat-shrink splice protector	
- 2 Cassette	RM 51-0101-99
- 4 Cassette	RM 51-0102-99
- 6 Cassette	RM 51-0103-99
- 8 Cassette	RM 51-0104-99
- 12 Cassette	RM 51-0105-99

Designation	Order Number
SOSA SE, 12-splice cassettes, for crimp splice protector	
- 2 Cassette	RM 51-0151-99
- 4 Cassette	RM 51-0152-99
- 6 Cassette	RM 51-0153-99
- 8 Cassette	RM 51-0154-99
- 12 Cassette	RM 51-0155-99
Ribbon SOSA	
- 2 Cassette	RM 51-0141-99
- 4 Cassette	RM 51-0142-99
- 6 Cassette	RM 51-0143-99

Delivery unit: 1 pc.

> Accessories for Accent™ Closure Family

Accent Cable Entry Port Kits

Circular & Oval Cable Entry Port Kits

Heat-shrink sealing kits for single cable (circular port) and unbroken cable loop (oval port) in Accent underground closures (except Accent Inline Closure).

Circular Port Kit

Circular Port Kit

The **Circular Port Kit** contains all the parts necessary to complete and seal a single cable into a circular port.

Kit Content

- 20-tube breakout
- Cable tie
- Strength member anchor assembly
- Branch port kit (incl. heatshrink, aluminum foil etc.)
- Installation instructions

Oval Port Kit

The **Oval Port Kit** contains all the parts necessary to complete and seal an unbroken cable loop into the oval port of a closure.

Kit Content

- 20-tube breakout
- 2 cable ties
- 2 strength member anchor assemblies
- Oval port pack
  (incl. heatshrink, heatshield, aluminum foil etc.)
- Installation instructions

Oval Port Kit

Designation	Delivery Unit	Order Number
Circular Port Kit	1 kit	RM51-0305-99
Circular Port Kit (Universal anchor)	1 kit	RM51-0306-99
Oval Port Kit	1 kit	RM51-0307-99
Oval Port Kit (Universal anchor)	1 kit	RM51-0308-99

Multi Cable Entry Port Kits:
see next page!

> Accessories for Accent™ Closure Family

Accent Cable Entry Port Kits

Multi Cable Entry Port Kits

A series of kits for **installing or retro-fitting multiple cables** in a circular port of a Generic Joint.

Multi Cable Entry Port Kit

1 - 3 Way Multi Cable Port Kit

A kit for installing 3 guide tubes into a 3-way branch port heatshrink and installing one cable into one of the branches. The 2 remaining guide tubes are blanked off with heatshrink end-caps allowing future installation of additional cables using the Multi Cable Addition Kit.

Multi-Cable Addition Kit

A kit for installing a cable into a spare guide tube in a 1 - 3 way multi-cable port kit.

Multi-Cable Port Kit – 3 Way

A kit for installing 3 cables simultaneously into a circular port of a Generic Joint.

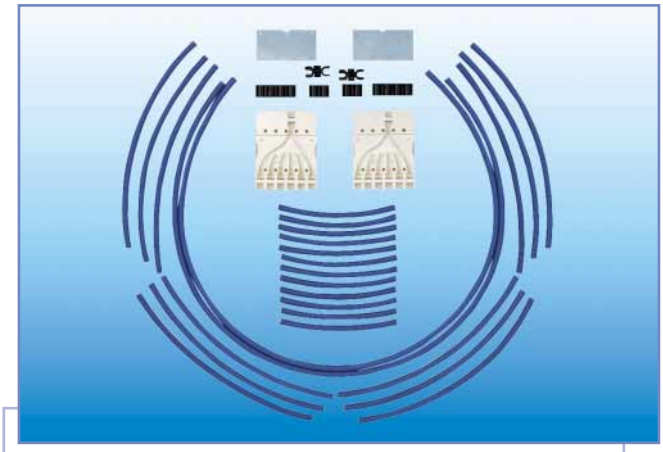
Multi-Cable Port Kit – 2 Way

A kit for installing 2 cables simultaneously into a circular port of a Generic Joint.

Designation	Delivery Unit	Order Number
1-3 Way Multi-Cable Port Kit	1 kit	RM51-0336-99
Multi-Cable Addition Kit	1 kit	RM51-0337-99
Multi-Cable Port Kit – 2 way	1 kit	RM51-0339-99
Multi-Cable Port Kit – 3 way	1 kit	RM51-0338-99

> Accessories for Accent™ Closure Family

Fiber Routing Kits



Fiber Routing Kit

Fiber Routing Kits

Kits containing **Breakout Blocks, Positive Routing Tube, Tube Clips and Tube Bend Controllers** for the installation of Sub Assemblies.

Examples

The fiber routing kit(s) needed to
install a SOSA SC 12 (8f/t) are:
1 off 1x 4 SC Routing Kit (N.B. 1 per direction)

The fiber routing kit(s) needed to
install a SOSA SE 8 (12f/t) are:
2 off 4 Tube SE Routing Kits (N.B. 1 per direction)

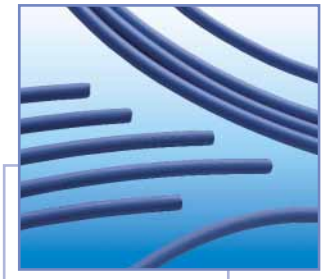
Designation	Configuration			Kit Contents						Order Number
	Fiber count	SOSA Type	Fibers per Tube	Breakouts Qty	Breakouts Type	PRT	Tube Clips R	Tube Clips 4-W	TBCs	
6 Tube SE	48	SE	8	3	2X2	6 x 700mm	2	2	2	RM51-0322-99
4 Tube SE	48	SE	12	2	2X2	4 x 700mm	2	2	2	RM51-0323-99
1x4 SC	24	SC	8	3	1X4	3 x 700mm, 12 x 220mm	2	2	2	RM51-0320-99
1x6 SC	24	SC	12	2	1X6	2 x 700mm, 12 x 220mm	2	2	2	RM51-0321-99
1x2 SC	24	SC	4	6	1X2	6 x 700mm, 12 x 220mm	3	3	2	RM51-0340-99
2x3 SC	24 SC / 48 SE	SC or SE	12 / 8	3	2x3	6 x 700mm, 9 x 220mm	3	3	2	RM51-0341-99

Delivery unit: 1 pc.

> Accessories for Accent™ Closure Family

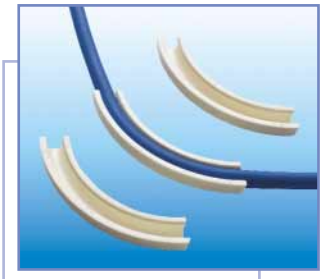
Fiber Routing and Fixing Accessories

Breakout Blocks



Prt

Tube Clips



Tube Bend Controllers

Breakout Blocks

Available in 1x2, 1x4, 1x6, 2x2 and 2x3 variants. Manufactured from polycarbonate, complete with transparent covers. Fully intermateable with each other – designed to clip onto the rear of Sub Assemblies.

Positive Routing Tube (Prt)

Available in a range of pre-cut lengths or in reels of 100 meters. Fully integrated with Sub Assemblies, Breakouts, Tube Clips and Tube Bend Controllers. Manufactured from fire retardant material

Tube Clips

Available in 4-way parallel, and 2-way rotatable (R) versions. Manufactured from fire retardant ABS

Tube Bend Controllers

Snap fit onto PRT. Ensures that the minimum bend radius is exceeded. Allows tube bends to be positioned as required.

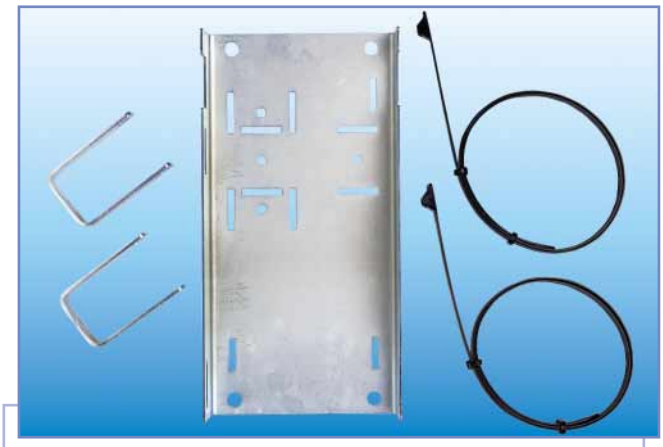
Aramid Anchors

Used to clamp aramid strength members in single fiber rug-gedised cable – allows the cable to withstand pull forces up to 70 N without transference to the fiber.

Designation	Delivery Unit	Order Number
Breakout Blocks		
- 1x2	50 pcs.	RM51-0720-99
- 1x4	25 pcs.	RM51-0715-99
- 1x6	25 pcs.	RM51-0717-99
- 2x2	100 pcs.	RM51-0714-99
- 2x3	50 pcs.	RM51-0718-99
PRT		
- 95 mm	100 pcs.	RM51-0351-99
- 180 mm	100 pcs.	RM51-0352-99
- 100 m (Reel)	1 pc.	RM51-0324-99
Tube Clips		
- Rotating	100 pcs.	RM51-0713-99
- 4-way	100 pcs.	RM51-0712-99
Tube Bend Controller	100 pcs.	RM51-0710-99
Aramid Anchors	100 pcs.	RM51-0353-99

> Accessories for Accent™ Closure Family

Accessories for Accent Generic Canister Closure



Wall Mounting Bracket

Wall Mounting Bracket for Generic Canister Closure

Designed to allow the Generic Joint to be secured to chamber walls or to cable bearers – using the saddles supplied. The Generic Joint can be readily released from the bracket by unclipping the two straps provided.

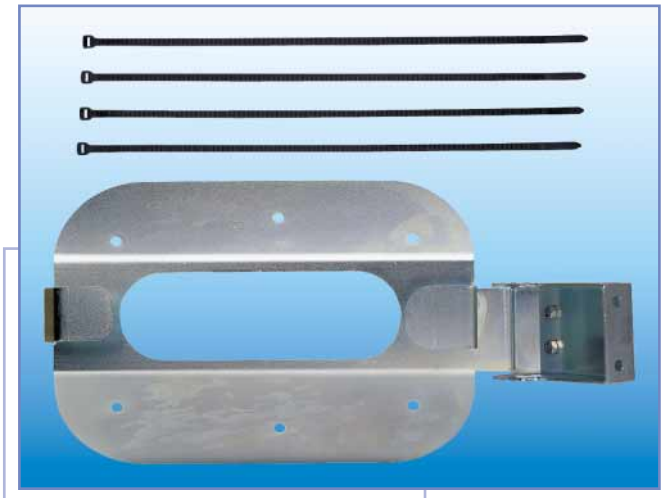
- Material: ZInc plated mild steel, passivated, post chemical treated.

Cable Element Manager for Generic Canister Closure

Provides convenient storage for unbroken cable elements. Readily fitted (or retrofitted) into Generic Joint closures.

Capable of storing a loop of 30 cable elements unbroken. Additional clips may be fitted to store micro sheath cable elements.

- Material: Passivated mild steel.
- Dimensions (L x W x D): 351 x 162 x 77 mm



Cable Element Manager

Rawlbolts

Rawlbolts

Used for attaching the Wall Mounting Bracket to chamber walls. Available in versions for fixing to concrete or brick.

Dimensions (L x Ø)

- Brick: 135 x 10 mm
- Concrete: 100 x 8 mm

Designation	Description / Delivery Unit	Order Number
Cable Element Manager	For Accent Generic Canister Closure; 1 pc.	RM51-0301-99
Wall Mounting Bracket	For Accent Generic Canister Closure; 1 pc.	RM51-0333-99
Rawlbolts for brick or concrete	For Wall Mounting Bracket	on request

> Accessories for Accent™ Closure Family

Maintenance Kit

Accent Maintenance Kit

Maintenance Kit

The kit contains a full compliment of **tools and accessories** for Accent products, including additional breakouts, routing tubes, tube bend controllers and tube clips needed for installation of SC and SE Sub-Assemblies. It also enables the user to employ methods of dark fiber storage.

The kit is contained within a robust two-tray cantilever toolbox and provides an ideal backup when installing the Accent product range.

Kit Content

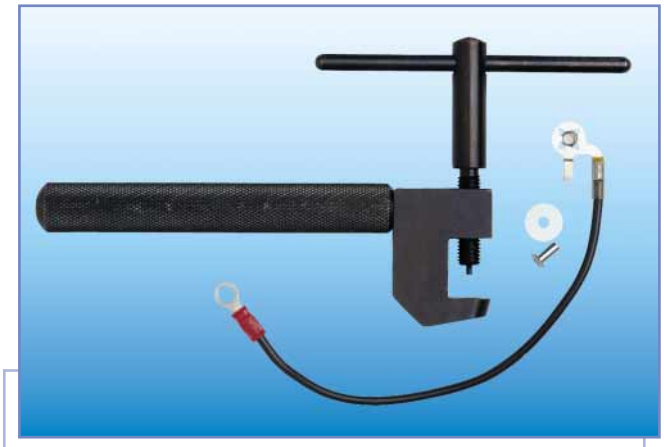
Designation	Quantity
4-Way Tube Clips	50
Rotate Tube Clips	50
Tube Bend Controllers	50
Number Collets 'C' type	30
1-12 Number Collets	50
Bifurcators	25
Quadfurcators	25
300 mm Cable Ties	100
CSM Anchor Assembly	15
Dark fiber Storage Module	25
15 Way Breakouts	30
20 Way Breakouts	15
700 mm PRT	50
180 mm PRT	50
95mm PRT	50
1x2 Breakout Block, incl. cover	25
1x4 Breakout Block, incl. cover	25
1x6 Breakout Block, incl. cover	15
2x3 Breakout Block, incl. cover	25
2x2 Breakout	25
Tube Pulling Tool	1
Tube Cutting Tool	1
Cassette Support Tool	1

Designation	Delivery Unit	Order Number
Maintenance Kit	1 Kit	RM51-0360-99

> Accessories for Accent™ Closure Family

Tools

Accent Tools



Riveting Tool

Loop Cable Insertion Tool (1)

A mandrel used for inserting a cable loop into the oval port of an underground joint – ensuring that the fiber minimum bend radius is not compromised.

Tube Cutting Tool (2)

The Tube Cutting Tool is designed to cut Positive Routing Tube securely and safely. The cutter leaves a plain square end to the tube.

Aramid Anchor Crimp Tool (3)

A plier-type tool for squeezing the two-part aramid anchor together.

Tube Pulling Tool (4)

The Tube Pulling Tool operates on a plier principal and is designed to firmly grip Positive Routing Tube thereby allowing the tube to be pulled firmly into cassette and breakout ports.

Cassette Support Tool (5)

For supporting SOSA or SASA cassettes in the open position during fiber installation.

Riveting Tool

The Riveting Tool is used to connect the electrical continuity lead for the moisture barrier firmly to the metallic armoured sheath of cables.

Designation	Delivery Unit	Order Number
Loop Cable Insertion Tool	1 pc.	RM 51-0703-99
Tube Cutting Tool	1 pc.	RM 51-0701-99
Aramid Anchor Crimp Tool	1 pc.	RM 51-0705-99
Tube Pulling Tool	1 pc.	RM 51-0702-99
Cassette Support Tool	1 pc.	RM 51-0704-99
Riveting Tool	1 pc.	RM 51-0709-99

See also Fiber Optic Tool Case, page 236!

> Inline Closure BR FO

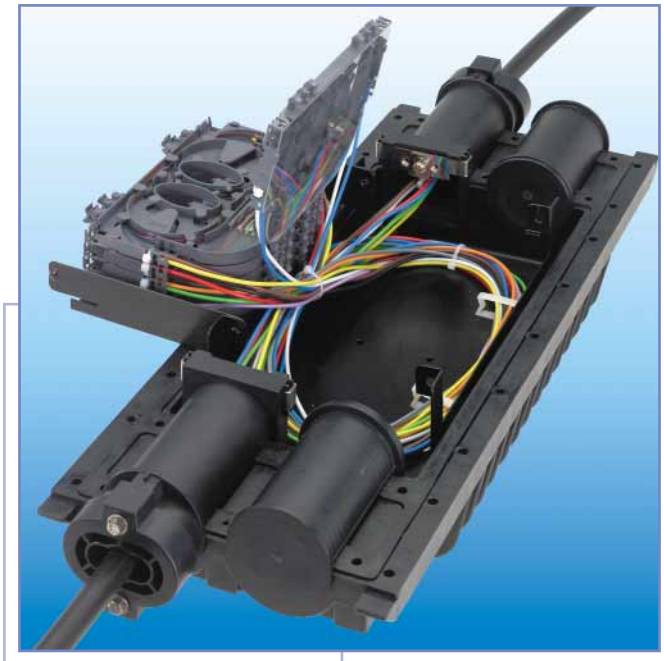
Description

Application

The **BR FO** closures are designed to protect:

- up to **144 single fiber** connections
- **288 fibers in 12-fiber ribbons**
- **288 fibers in a micro-sheath structure** with ground connection

The closure design allows links, branching and distribution of optical fibers. The **BR FO** closures are used in all connection configurations, in-line or butt, and in all network structures. They can be installed on uncut cables and used to manage uncut cable tubes.



Inline Closure BR FO

Features

- **Large space** for fiber storage
- **Clear fiber management**
- **Simple system** for accomodation of the cables
- **Preparation** of cables, sealing and strain relief system **independent from BR FO case**

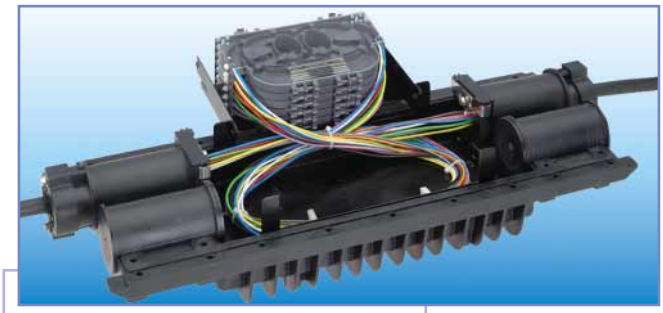
Design

BR FO closures comprise two symmetrical **half-shells** made of plastic. An **elastomer seal** prevents any water ingress and **stainless steel screws** are used for secure closing.
The slots for the sealing systems allow accomodation of up to 12 cables, depending on the model. This assembly complies with the most stringent specifications.
BR FO closures are pre-fitted with a **valve** for carrying out sealing tests (500 mbar). A slot in the lower shell can be opened up on request to fit a separately delivered **grounding system**.
No specific tools are required to install the closures, a simple 8-mm pipe wrench is sufficient.

> Inline Closure BR FO

Organizer, Cable Entries

Closed Organizer



Opened Organizer

Organizer

The **organizers** of the BR FO closures are made of a coated metal tray in two sections:

- One part, fastened to the lower shell of the closure, is used to **store and feed the tubes** or bare fibers.
- The other part, hinged to the first part, is used to release the organizer bottom off the closure and provides easy access to the **splice trays**.

Each **splice tray** is designed to:

- **organize the connections**: single heat-shrinkable protection devices + 2 Fiberlock, or heat-shrinkable ground protection devices, or Crimp protection devices
- **store excess lengths** of single fiber or ribbon.

Single Entry

Double Entry

Cable Entries

The **cable entries** are available in two versions:

- **Single entry** for one cable of 13 to 18 mm
- **Double entry** for two cables of 8 to 13 mm

The entries are specially designed to simplify preparation work and provide perfect cable sealing. They comprise two parts :

- A **sealing system** using single cable glands, easily and rapidly fitted,
- One or two systems providing **strain relief** for the cable components.

The advantage of this cable entry is that the cable(s) can be prepared outside the closure.

> Inline Closure BR FO

Kit Content, Dimensions

Kit Content BR FO

Each closure is delivered with:

- Two single entries
- A tray assembly fitted with 6 splice trays (BR FO 72), or 12 splice trays (BR FO 144).

This package can be used to connect two 72-single fiber cables (BR FO 72) or 144-single fiber cables (BR FO 144), or two 144-ribbon fiber cables (BR FO 72), or 288-ribbon fiber cables (BR FO 144).
Packages of additional single or double cable entries are available and can be delivered separately.

Kit Content

(Example BR FO 72)

1 BR FO base fitted with an organizer containing 6 splice trays
2 BR FO cover
3 Packs of screws for closing the case
4 Cable entry elements
5 Single-entry seals
6 Covers for cable entry elements
7 Screw for fastening the covers
8 Cable anchoring devices
9 Screws and washers for fixing the cable anchoring devices
10 Central strain member securing plate
11 Clamping jaws
12 Cable ties
13 Comb for holding bare fibres
14 Plastic ties
15 Cable grommet for fibres
16 Cable grommet for tubes
17 Elastomeric tape
18 Plugs for not used cable entries
19 Upper splice tray cover
20 Installation instructions (not shown)

Dimensions

Type	Outside			Inside		
	Length [mm]	Width [mm]	Height [mm]	Length [mm]	Width [mm]	Height [mm]
BR FO 72	535	210	140	320	150	90
BR FO 144	685	270	185	480	215	140

> Inline Closure BR FO

Capacities, Order Numbers

Capacities, Splice Trays

Type	Capacities		Splice Trays		Number of Cables
	Single Fiber	Ribbon Fiber or Micro-Sheath	Number	Splice Protection	
BR FO 72 Th.	72	-	6	Heat-shrink	4 - 8
BR FO 72 Cr.	72	-	6	Crimp	4 - 8
BR FO 72 R.	-	144	6	Ribbon Heat-shrink	4 - 8
BR FO 144 Th.	144	-	12	Heat-shrink	6 - 12
BR FO 144 Cr.	144	-	12	Crimp	6 - 12
BR FO 144 R.	-	288	12	Ribbon Heat-shrink	6 - 12

Order Numbers

Designation	Delivery Unit	Order Number
BR FO 72 Th.	1 kit	S46254-A9-A1
BR FO 72 Cr.	1 kit	S46254-A9-A2
BR FO 72 R.	1 kit	S46254-A9-A3
BR FO 144 Th.	1 kit	S46254-A14-A3
BR FO 144 Cr.	1 kit	S46254-A14-A4
BR FO 144 R.	1 kit	S46254-A14-A5
Accessories		
Single Entry Element	1 kit	S46254-A9-R1
Double Entry Element	1 kit	S46254-A9-R2
Double Cable Gland Set	1 kit	S46254-A9-R3
Strain Relief Set	1 kit	S46254-A9-R4
Grounding Kit	1 kit	S46254-A1-R1
Horizontal Closure Support	1 kit	S46254-A9-R5
Vertical Closure Support	1 kit	S46254-A9-R6
Kit for wiring the BR FO 144 with bare fibers*	1 kit	C46197-L13-B2
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590

** This kit is only for use with the BR FO 144, when the splice tray accomodates bare fibers.*

Fiber Optic Tools:
see page 240

> Distribution Closure BPR FO

Description

Distribution Closure BPR FO

Application

The **BPR FO** is used on optical cables. It allows branch connection of subscribers distribution cables.

Specially designed to distribute up to 10 subscribers cables, the **BPR FO** can also be used to connect or divide optical cables up to 12 fibers as well as inline closure.
The closure is designed to be installed in a manhole in place of the distribution terminals, in aerial networks in place of the distribution boxes or in buildings in place of the distribution strips.

A separate **organizer kit** allows the connection of up to 12 single fibers. Those fibers can e.g. come from an higher capacity cable (uncut cable).
For the micro-sheath cable, it can accomodate up to 144 fibers: 132 uncut fibers and 12 splices.

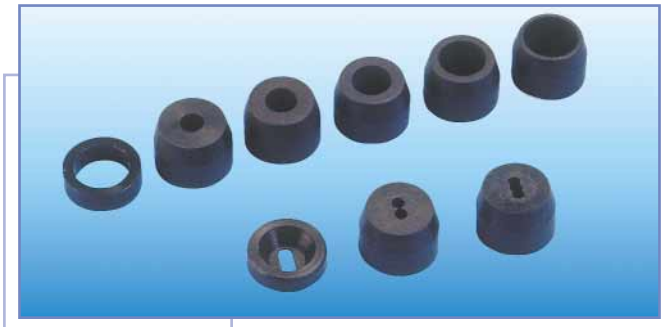
Features

- Suitable for applications in **manholes**, **buried** or **overhead** networks or in **buildings**
- **Compatible** with all types of engineering
- Provides **easy handling** of the cables and fibers
- Subscriber cables can be added **without damaging the seal**
- **Local sealing tests** possible

Design

The BPR is made of:

- A **base shell** made of black plastic
- Two half **end caps** made of black plastic providing the strain relief and sealing of the subscriber cable entries
- A black plastic **cover** fitted with screws
- A **strain relief** assembly for securing the branching cable entries
- Ten **cable glands** and clamps for the subscriber cables



Cable Glands

Sealing of subscriber cables is achieved using cable glands allowing subscribers to be connected without disturbing the sealing of cables already installed.

For subscriber cables, **cable gland seals** in the following diameters are available:

- 5.2 mm
- 8 mm
- 10 mm
- 12 mm
- 14 mm
- for “figure-eight” two-wire cables
- for three-wire cables.

Note: Standard BPR are pre-fitted with 10 dia. 5.2 mm cable gland seals – any other diameters must be given in the order (depending on the required quantities).

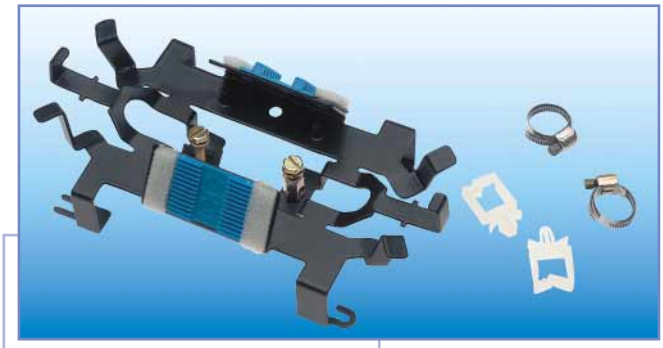
> Distribution Closure BPR FO

Kit Content, Organizer Kit

Kit Content BPR FO

Kit Content

1 Cover
2 Lower half shell with 4 cable glands (2 on each side)
3 Closing parts including 3 cable glands each
4 Sealing and strain-relief parts for multi-pair cables
5 Strain-relief elements for subscriber cables
6 Sealing element
7 Sealing tapes
8 Dummy plug
9 Knife
10 Cleaning tissues
11 Closing screws
12 Wrench
13 Measuring tapes
14 Transparent film
15 Installation instructions



Organizer Kit

Organizer Kit

The organizer kit, sold separately, is required to adapt the BPR FO to the connection of cables with up to 12 single fibers.

- Dimensions (L x W x H): 160 x 80 x 50 mm

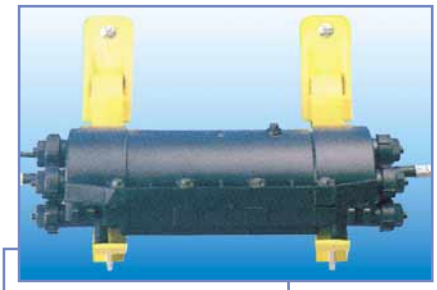
> Distribution Closure BPR FO

Dimensions, Accessories

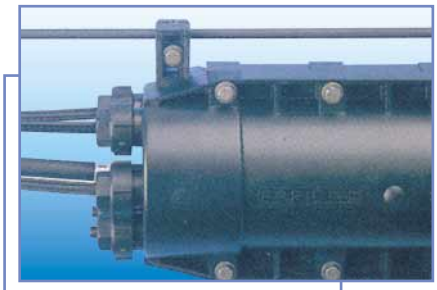
Dimensions

Type	Outside			Inside		
	Length with nuts [mm]	Width [mm]	Height [mm]	Length [mm]	Width [mm]	Height [mm]
BPR FO	328	117.5	86	173	80	63

Accessories



Wall Mounting Brackets



Messenger Strand Suspension

Pressure Test Set

> Distribution Closure BPR FO

Order Numbers

Order Numbers

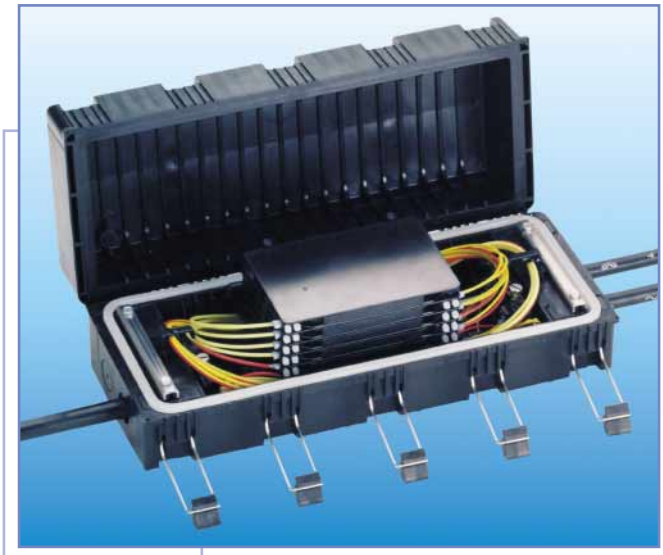
Designation	Delivery Unit	Order Number
BPR Closure*	1 kit	S45254-A5-A6
BPR FO Organizer Kit	1 kit	S46254-A11-R1
Accessories		
Cable Gland Seals		
- No. 5.2	Pack of 10	S45254-A6-R13
- No. 8	Pack of 10	S45254-A6-R3
- No. 10	Pack of 10	S45254-A6-R4
- No. 12	Pack of 10	S45254-A6-R5
- No. 14	Pack of 10	S45254-A6-R6
- Two-wire Seals	Pack of 10	S45254-A6-R7
- Three-wire seals	Pack of 10	S45254-A6-R9
Pressure Test Set	1 set	S45254-A4-R1
Messenger Strand Suspension	1 pc.	S45254-A6-R10
Wall Mounting Brackets	1 pc.	S45254-L20-A9
Grounding Device	1 Pc.	S45254-M2-R6
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590

** Can be equipped with all the seals mentioned above, depending on the required quantities.*

Fiber Optic Tools:
see page 240

> Inline Closure UCAO

Description



Inline Closure UCAO

Application

The **UCAO** Closure (**U**niversal **C**losure fast **A**ccess for **O**ptical Cables) provides an environmentally protected sealing on splices of FO cables. In addition, the unit provides excellent cable strain relief and space for excess buffer tube storage. It can be installed on all common cable sheaths and is suitable for buried, duct and aerial application.
Due to its compact design, it is ideal for connections of low to medium distribution cables. Because of its extremely easy possibility of re-opening and reclosing, the closure is of interest for access networks.

Features

- Suitable for **buried, duct and aerial lines**
- For **straight** and **branching** application
- **Fast and easy access** to individual splice trays
- Capacity for **up to 60 splices**
- Closure sealing made of **re-usable silicone**

Design

The body of the closure consists of two **half shells** made of plastic resistant against all environmental influences. The intersection of the half shells is sealed with a **re-usable silicone ring**. The closing system is realized by an integral hinge on one side and five tensioners out of stainless steel and plastic on the other side. The tensioners can be closed by hand and easily opened by flipping with a screwdriver.

To prevent against unauthorized access, an **anti-access** device can be fixed on the clips as an option.

The two **cable entries** on each endface of the closure can accommodate cables with outer diameters of up to 21 mm. The cable entries are placed between the cable entry wedges in the lower half shell. The **sealing** between the cables, the wedges and the closure body is realized by proven sealing tape. Thus, also installation of uncut cables is possible.

With a **4-cable entry set** (option), comprising a multiple **strain relief** and a filling piece, each cable entry can be adapted to take four cables of up to 8 mm diameter. Alternatively, a closure with **sealing wedges**, each containing one port with **compression fittings**, is available. These ports simplify installing of branching cables on later demand.

Both the cable sheath and the central members are **strain-relieved** with **clamps** locked into the lower half shell. The same clamps provide **electrical through-connection** and external grounding if required.

The tightness of the closure can be flash-tested by using the optional **tightness testing set**.

> Inline Closure UCAO

Fiber Management, Capacities, Dimensions

Management of the buffer tubes

Fiber Management

The tray holder contained in each closure is to be inserted into the lower half shell. It can accommodate up to five standard splice trays with single tray access.
The fibers remain best protected in their own buffer tubes up to the splice trays.

Capacities

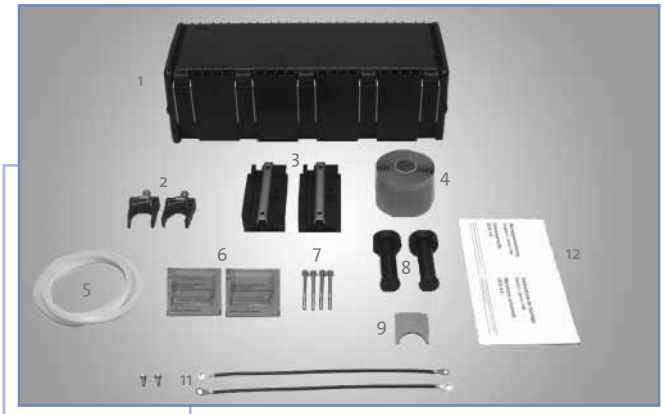
Type	Number and Outer Diameter of Cables	Number of Standard Splice Trays	Splice Capacity	Length of Buffer Tubes [mm]
UCAO 4-9 (standard)	4 x up to 21 mm	5	60	1930 (cut) 2300 (uncut)
UCAO 4-9 with compression fittings	2 x up to 21 mm 2 x 8 to 13 mm			

Dimensions

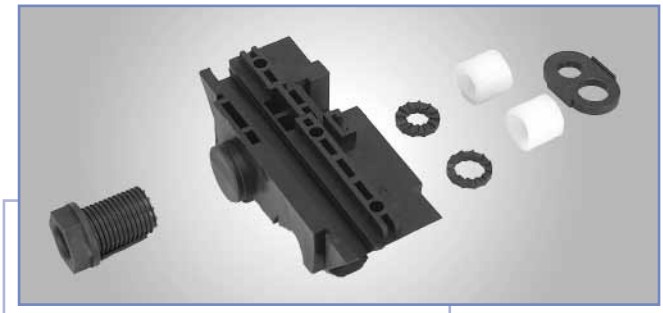
Type	Outside Dimensions			Weight
	Length [mm]	Width [mm]	Height [mm]	[kg]
UCAO 4-9	378	160	118	2.8
UCAO 4-9 with compression fittings	404			

> Inline Closure UCAO

Kit Content



Kit Content UCAO



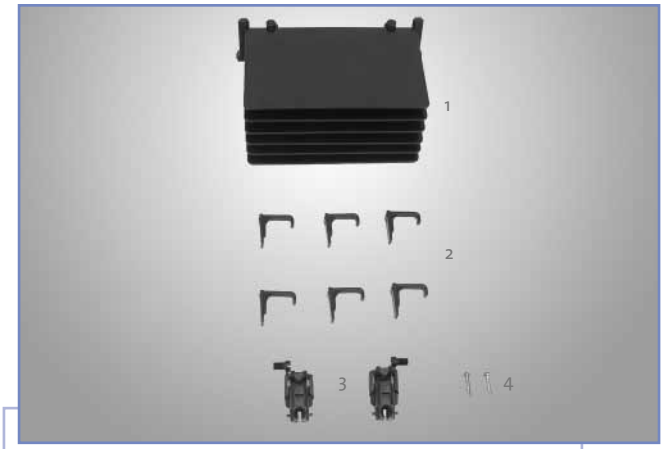
Cable entry wedge with compression fittings

Kit Content

Each closure kit contains all parts for installation of a straight joint including the equipment for fiber management. Consumables as special trays, splice organizer and splice protectors have to be ordered separately.

Closure Content

1 Half shells with tensioners
2 Cabel strain reliefs incl. grounding
3 Cable entry wedges (For UCAO 4-9 with compression fittings: see picture below)
4 Sealing tape
5 Half-shell sealing
6 Cleaning tissue
7 Bolts for cable entry
8 Dummy plug
9 Wrapping gage
10 Grounding bolts (not shown)
11 Shield connection lead
12 Installation instructions



Components for Fiber Organization

Components for Fiber Organization

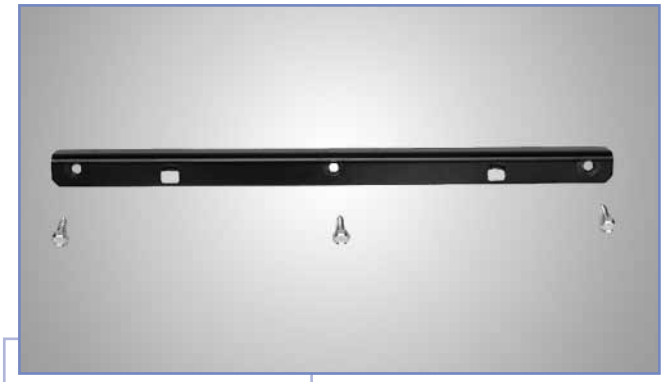
1 Tray holder, complete, for 5 standard splice trays
2 Holder for buffer tube store
3 Strain reliefs for central members
4 Bolts for strain relief

> Inline Closure UCAO

Accessories, Order Numbers

Wall / Pole Mounting

Aerial Hanging Device



Anti-access Device

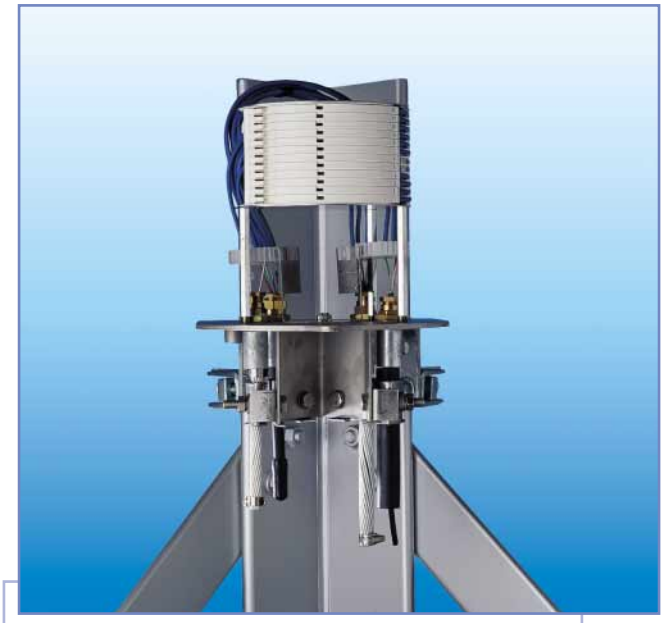
Order Numbers

Designation	Description / Delivery Unit	Order Number
UCAO 4-9		
- with Grounding Device	1 kit	S45754-A3-A16
- without Grounding Device	1 kit	S45754-A3-A17
UCAO 4-9 with Compression Fittings		
- with Grounding Device	1 kit	S45754-A3-A42
- without Grounding Device	1 kit	S45754-A3-A41
Accessories		
Branching Set	Comprising: cable and central member strain relief and shield connection, for 10 cables; 1 set	S46998-A6-R1
Grounding Set	For 10 cables, 1 set	S46998-A6-R2
4-cable Entry Set	Including strain relief element, 10 pcs.	S45756-M7-A2
System for Tightness Testing	Including valve, plug, sealing paste, 10 sets	S45756-M5-A7
Wall / Pole Mounting	1 pc.	S45756-M5-A2
Aerial Hanging Device	1 pc.	S45756-M5-A1
Sealing Tape	Pack of 10	S45756-M2-A2
Desiccant 30 g	1 pc.	S45056-M130-A2
Anti-access Device	1 pc.	S45756-M3-A2
Heat-shrink Splice Protectors (s.pg. 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590
Splice Organizer		
- for 6 heat-shrink protectors	Pack of 10	S46999-Z12-A1
- for 12 crimp splice protectors	Pack of 10	C46197-A7-A69
Standard Splice Tray	For 12 single fibers, without cover; Pack of 2	C46197-A7-A70
Standard Splice Tray	For 12 single fibers, without cover; Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

Fiber Optic Tools: see page 240

> Accent™ Aerial Tower Joint Closure (ATJ)

Description



Accent ATJ

Application

The function of the **ATJ 1816/1817** is to protect and manage the jointing and termination of aerial cables, and to store excess buffer length, primarily OPGW (all types), ADSS, Wrap and Duct cables. A bracket, the AMB1818, enables the joint to be mounted to overhead towers.

Features

- Accommodates **OPGW, Wrap & Duct** cables – diameters 6mm to 16mm. (Gland kits supplied to suit particular cables)
- **4 circular entry ports**
- Designed to allow **easy access**
- **Shotgun proof**
- **Sealed to IP67**
- Can accommodate up to 24 splice cassettes (8 or 12 fiber) – **maximum 288 splices**
- **Brackets and adapters** to affix the Aerial Tower Joint to tower steelwork.
- Clamps can be rotated through any angle – allows the ATJ to be fixed onto **various steelwork configurations**
- **Re-enterable**
- **Accent Fiber Management System**

Design

The joint comprises three parts, a **base** into which the cables are attached by means of cleats, a **chassis** attached to the base onto which cassettes are assembled and a **lid**. All major components are type 304L stainless steel.

Cables enter the joint via "**claw cleats**", attached to the base, which can accommodate conductor, cable or protective duct. The cables pass through **brass compression glands** in the base plate. Once inside the closure fibers are re-sleeved and routed to a series of **Accent 12 fiber cassettes** which house excess fiber and splice protectors.

The **lid** and body are jointed with a 3mm **silicone gasket** retained by eight captive 8mm bolts. A **chain tether** retains the lid to the base when open, **lugs** on the base & lid make provision for a security pad lock (not provided).

The assembled joint has an **integral mounting frame** which, when used in conjunction with the mounting bracket, AMB 1818, enables the joint to be mounted directly to lattice tower legs.

An **earthing boss** welded externally to the closure base, facilitates strap attachment by means of an M12 bolt (strap not provided).

Fiber Management

The **Accent Fiber Management System** is used in this closure. For details of this see page 138.

> Accent™ Aerial Tower Joint Closure (ATJ)

Capacities, Dimensions, Order Numbers

Capacities

Fiber Management	Splice Trays	Fusion Splices (single fiber)
Accent SC	24	48
Accent SE (8 fibers / tray)	24	192
Accent SE (12 fibers / tray)	24	288

Dimensions

Height [mm]	Diameter [mm]
450	265

Order Numbers

Designation	Delivery Unit	Order Number
Aerial Tower Joint (ATJ1816)	1 kit	RM51-0804-99
Aerial Tower Termination (ATJ 1817)	1 kit	RM51-0805-99
Accessories		
Aerial Mounting Bracket (AMB 1818)	1 pc.	RM19-0057-99
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590

Further Accessories

- Sub-Assemblies (see page 146)
- Fiber Routing Kits (see page 151)
- Tools (see page 145 and 240)

On Request:

- Cable Gland Kits (Brass)
- Claw Cleats

> Accent™ Aerial Box Joint Closure (ABJ)

Description

Accent ABJ

Application

The function of the **ABJ** is to protect and manage the jointing and termination of aerial cables and store excess buffer, primarily for ADSS, OPGW (all types), Wrap and Duct cables.

Features

- Accommodates **OPGW, Wrap & Duct cables** – diameters 6 mm to 16 mm.
  (Gland kits supplied to suit particular cables)
- **2/3 circular entry ports**
- Designed to allow **easy access**
- **Shotgun proof**
- Sealed to **IP67**
- Can accommodate up to 12 splice cassettes (12 fiber) – **maximum 144 splices**
- Optional bracket for **pole mounting**
- A stainless steel strap available for mounting to **tower legs or poles**. Box can be mounted in various positions. Rotated through an angle of 180° – allows the Accent Aerial Box to be fixed onto various steelwork configurations
- **Accent Fiber Management System**

Design

Typically designed for pole mounting the box can be supplied with either two or three cable entries. The closure is shotgun proof, re-enterable and manufactured from Stainless Steel. The box is designed to enable jointing of cables in the diameter range 6 to 16 mm (under armour wires).

Fiber Management

The **Accent Fiber Management System** is used in this closure. For details of this see page 138.

> Accent™ Aerial Box Joint Closure (ABJ)

Capacities, Dimensions, Order Numbers

Capacities

Fiber Management	Splice Trays	Fusion Splices (single fiber)
Accent SC	12	24
Accent SE (8 fibers / tray)	12	96
Accent SE (12 fibers / tray)	12	144

Dimensions

Width [mm]	Height [mm]	Depth [mm]
200	480	170

Order Numbers

Designation	Delivery Unit	Order Number
Accent Aerial Box Joint 2 entry	1 kit	RM10-0542-99
Accent Aerial Box Joint 3 entry	1 kit	RM10-0544-99
Accessories		
Accent Aerial Box Pole Bracket	1 pc.	RM10-0543-99
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590

Further Accessories

- Sub-Assemblies (see page 146)
- Fiber Routing Kits (see page 151)
- Tools (see page 155 and 240)

On Request:

- Cable Gland Kits (Various) Brass
- Heatshrink Gland Kits

> Generic Aerial Joints GTJ, GTT

Description

GTJ, closed (left), and with open outer and inner closure (right)

Application

The function of this products is to protect and manage the jointing and termination of aerial cables, primarily **OPGW, OPGW (Slotted Core), ADSS, Wrap and Duct cables**.

Features

- **4 single cable entry ports**
- **Ready access closure**
- **Shotgun proof**
- Sealed to **IP67**
- Accommodates **OPGW, ADSS, wrap and duct cables**
- Suitable for **tower mounting**
- Designed to allow **easy access**

Design

The joints comprise of an outer, lockable, vented **steel cabinet** with external earthing stud, sloping roof and hinged door finished in hot dip galvanise. Cables enter and exit via a **base gland plate** and are suitably anchored within the cabinet where ample provision is made for the storage of excess cable. Fiber jointing takes place within a **secondary sealed enclosure**.

Cables enter and exit via **compression type glands** where they are broken down into single tube units and routed to moulded **splice trays**. Within the trays provision is made for additional fiber storage and splice protection.

Joints are available in two forms, **Tower Joint GTJ** and **Termination Joint GTT**, both types of similar construction, the latter being larger in order to accommodate the greater bend radius of duct or underground cable. Gland plate arrangements are interchangeable and can be adapted to suit most cable configurations.
The inner closure can be removed in order to facilitate easier splice configuration.

Inner Closure: A die cast aluminium box 360mm x 160mm x 90mm is vertically mounted on brackets inside the weather-proof outdoor joint box so that it can be easily withdrawn complete with optical tails. The lid of the aluminium enclosure incorporates a neoprene gasket suitable for use at temperatures up to 90°C. The enclosure provides protection to IP 65.

Up to 10 meters of optical fiber/cable can be accommodated, partly in the weather-proof box and partly in the inner closure, so that the long tails permit the inner enclosure to be withdrawn during the jointing operation. Cable ties and wire saddles are supplied to restrain excess fiber/cable within the two closures.

> Generic Aerial Joints GTJ, GTT

Capacities, Dimensions, Order Numbers

Capacities

Type	Number of Splice Trays	Number of Splices (single fiber)
Generic Tower Joint GTJ	6	60 (heatshrink)
Generic Termination Joint GTT	6	60 (heatshrink)

Dimensions

Type	Width [mm]	Height [mm]	Depth [mm]
GTJ	300	770	200
GTT	450	770	200

Order Numbers

Designation	Delivery Unit	Order Number
Generic Tower Joint (GTJ)	1 kit	RM10-0060-99
Generic Termination Joint (GTT)	1 kit	RM10-0061-99
Generic Mounting Bracket (GMB for GTJ, GTT)	1 kit	RM19-0055-99
Accessories		
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590

Further Accessories (on request)

- Cable Gland Kits (Various) Brass
- Heatshrink Gland Kits
- Claw Cleats
- Fibral Spur Kit
- Tools (see also page 240)

> STAR Closure

Description

STAR Closure

Application

This **metallic canister closure** has especially been designed to connect and protect the fibers of Optical Ground Wire cable (**OPGW cable**) placed on top of high voltage power transmission lines.

The closure is used to connect OPGW cables with each other or with aerial cables with plastic sheath.

Features

- **Full metallic** canister closure
- Capability for **up to 72 splices** in 6 splice trays
- **Only two sizes of strain reliefs** for cable diameters from **10 to 25 mm**
- Cable entries with **compression fittings** for ground wire and plastic sheath cables
- **Canister locking** just by **one hand-driven screw**
- **Installation without special tools**

Design

Main Parts

The main parts of the closure are the **canister**, the **cable entry plate** and the **strain relief plate**. All three parts are made of aluminum.
The canister is pressed against the cable entry plate just by one screw on the top which is easy to tighten by hand. The sealing between these parts is realized by a rubber O-ring.
Fixing devices are available for poles and metal pylons.

Cable Entries

The standard **STAR Closure** comes with **two cable entries** - the main application will be to connect two cables with each other. On request the closure can be delivered with 3 or 4 cable entries.
The cable entries are **sealed with silicon inserts** within the compression fittings. The standard version accomodates central tubes from 4 to 10 mm.
Different sizes of compression fittings are available on request to allow the insertion of aerial cables with plastic sheath as well.
In the lower side of the cable entry plate there is a **plug** (sinter metal) which allows the closure to be vented.

Cable Strain Relief

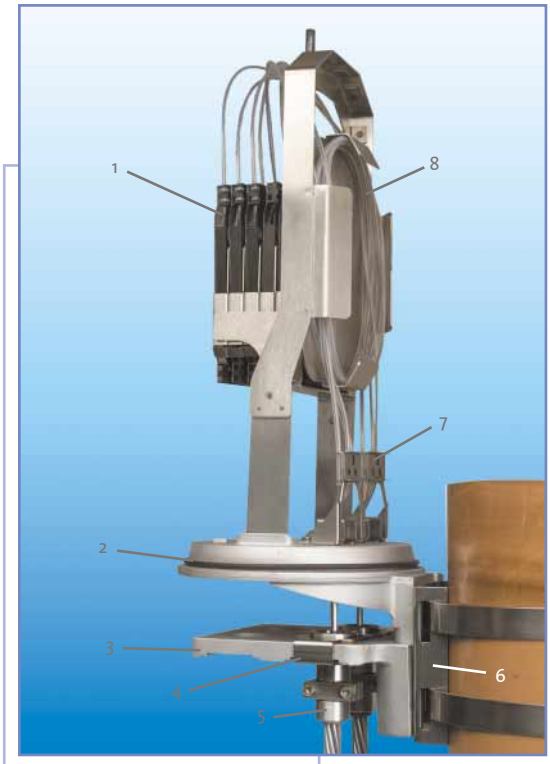
Only two sizes of **strain reliefs** can handle OPGW cables with outer diameters from 10 to 25 mm. The strain reliefs consist of the tube formed body and a clamp with two screws. Adapters for the different cable diameters are not required.
The strain reliefs can be installed apart from the closure - afterwards they are pushed into holes of the strain relief plate below the cable entry area. The strain reliefs are fixed to the plate by means of clamps which are simply clipped on.
Cable strain reliefs have to be ordered separately in accordance to the cable diameter.

Fiber Management

A small bracket on top of each cable entry is used to fix up to six **protective tubes**. The fibers out of the cables' central tubes are divided onto these protective tubes to guide them well protected to the **splice trays**.
Up to six trays are stored one by one in the tray holder. Together with the excess length of the protective tubes **single tray access** (single element access) is realized. A storage accomodates the **excess length** of the protective tubes.

STAR Closure

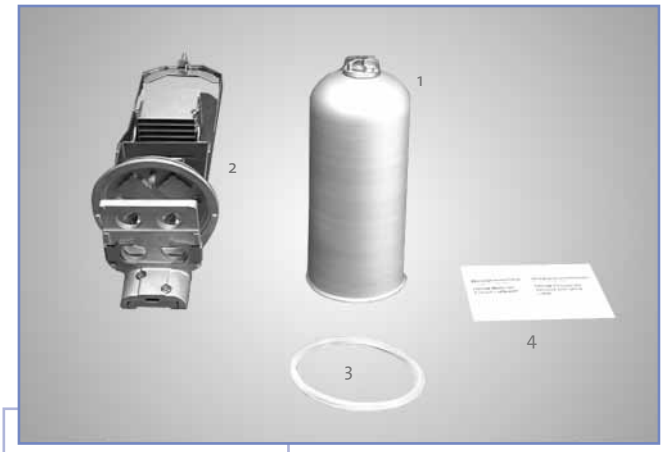
Inner Design, Kit Content



Inner Design of the STAR Closure

Inner Design

1 Splice trays
2 Cable entry plate
3 Strain relief plate
4 Clip to fix cable strain relief to strain relief plate
5 cable strain relief
6 Pole fixing device
7 Device to divide fibers of central tubes
8 Protective tube storage



Kit Content

Kit Content

1 Canister with screw
2 Closure body including:
- Strain relief plate
- Clips to fix strain reliefs
- Cable entry plate
- Cable entry (2 x PG 11)*
- Vented plug
- Device to divide fibers
- Tray holder
- O-Ring

3 Protective tubes
4 Installation instructions

Cable strain reliefs and splice trays with covers are to be ordered separately in accordance to the used cables

** For other combination of cable entries please contact your local sales representative*

> STAR Closure

Capacities, Cable Entries, Dimensions, Fixing Devices

Capacities

Type	Max. Number of Cassettes	Max. Number of Splices (single fiber)
STAR Closure	6 standard splice trays with cover	6 x 12 = 72, heat-shrink or crimp protected

Cable Entries

Size	For Cable Type	Cable Ø [mm]
PG 11	Central tubes of OPGW cables	4 to 10
PG 16	Aerial cable with plastic sheath	8 to 14
PG 21	Aerial cable with plastic sheath	17 to 25

Cable Strain Relief

Size	Cable Ø [mm]
Size 1	10 - 17
Size 2	17 - 25

Dimensions

Height [mm]	Diameter [mm]
500 (incl. cable strain relief)	170

Pole Fixing Device

Pole Fixing Device

Device to fix the STAR Closure to poles

Pylon Fixing Device

Pylon Fixing Device

Device to fix the STAR Closure to metal pylons

STAR Closure

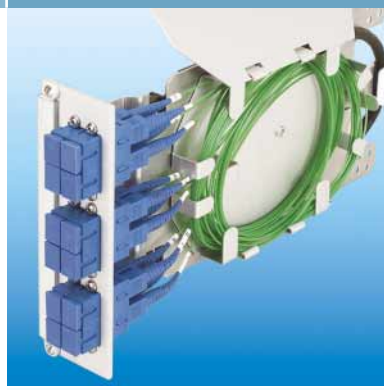
Order Numbers

Order Numbers

Designation	Delivery Unit	Order Number
STAR Closure	1 kit	S46998-A12-A1
Cable Strain Relief		
- for cable Ø 10 - 17 mm	1 kit	S46998-M1-A6
- for cable Ø 17 - 25 mm	1 kit	S46998-M1-A7
Cable Entry for aerial cable with plastic sheath, pre-installed		
- for cable diameter from 8 to 14 mm	1 pc.	On request
- for cable diameter from 17 to 25 mm	1 pc.	On request
Accessories		
Pole Fixing Device	1 pc.	S46998-M1-A9
Pylon Fixing Device	1 pc.	S46998-M1-A8
Heat-shrink Splice Protectors (see page 56)		
- for single fibers, 60 mm	Pack of 100	S46999-A16-A4
- for single fibers, 45 mm	Pack of 100	S46998-A4-A29
- for attenuation splices and up to 4-fiber ribbons	Pack of 5	S46999-A16-A8
- for 4- up to 12-fiber ribbons	Pack of 25	S46999-A16-A6
Crimp Splice Protector (see page 57)	Pack of 150	S45057-Z1-H590
Splice Organizer		
- for 6 heat-shrink protectors	Pack of 10	S46999-Z12-A1
- for 12 crimp splice protectors	Pack of 10	C46197-A7-A69
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

Fiber Optic Tools: see page 240

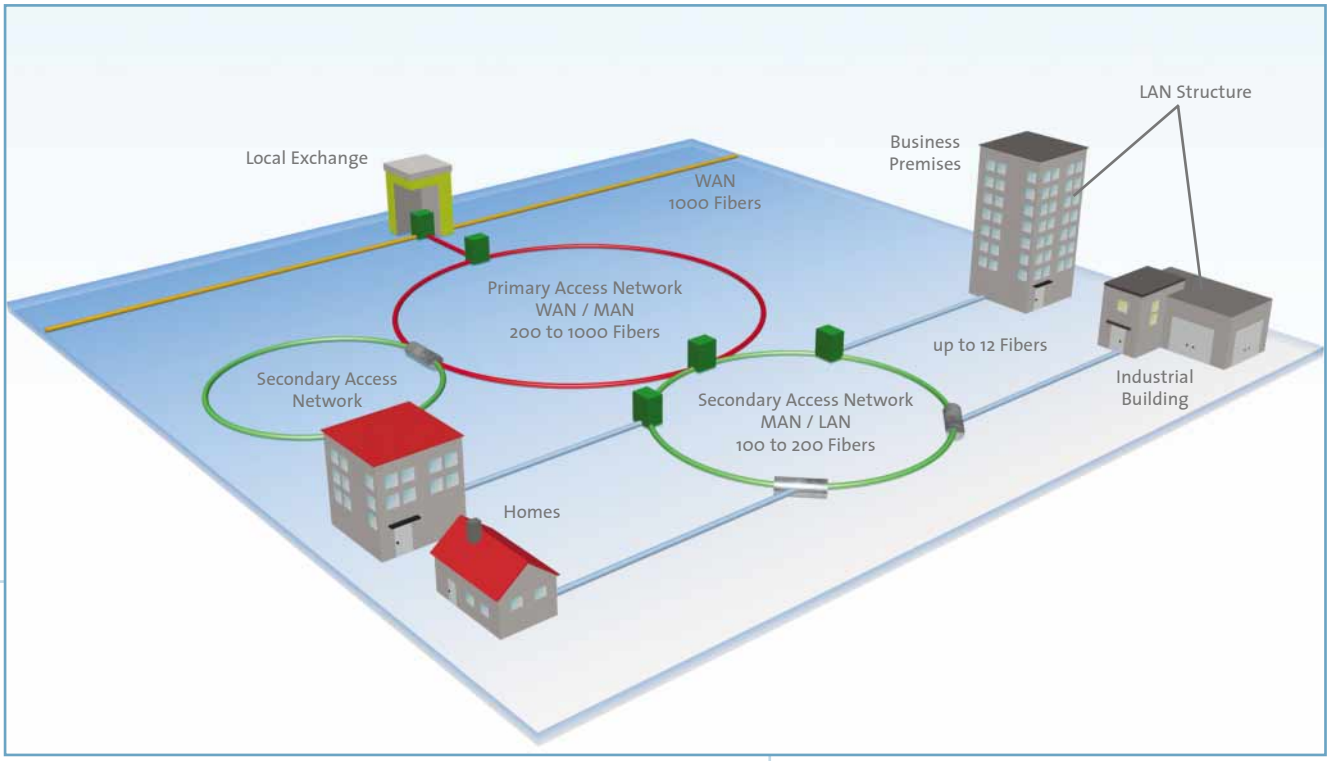
Fiber Optic Hardware



CORNING CABLE SYSTEMS

> WAN / MAN Distribution Technique

Network Topology and Single Subscriber Management



Fiber Network Structure

Passive Access Networks

Most modern **access networks** with ring or star architecture reflect the need for cables with high fiber counts to keep the entire network passive. How various customers or operators are divided up or joined together is shown in the above illustration.

Whatever the application area, the demands on **hardware components** in all networks, whether LAN (Local Area Network) / MAN (Metropolitan Area Network) / WAN (Wide Area Network), are similar. High packing density and service reliability, modularity for future expansions and modifications in the network - these are the demands that customers impose on the hardware.

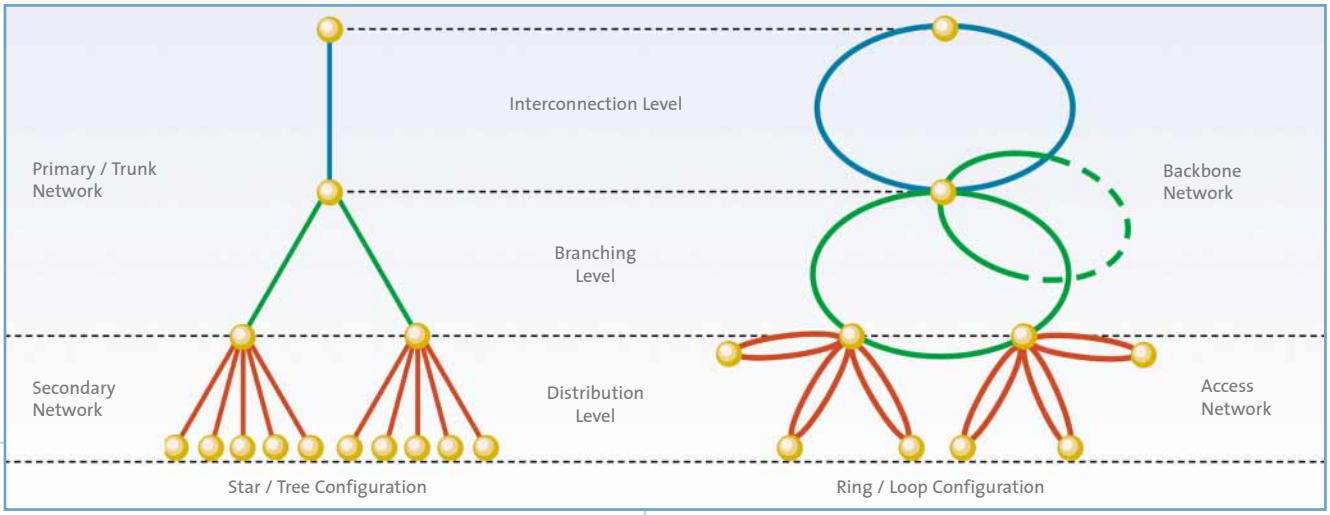
We offer a **wide range of passive hardware components** for LAN, WAN and MAN networks. The components with their modular design can be used to cover a wide range of applications.

Fiber Management (Single-Fiber Access)

In modern cable networks there is a growing trend to provide spare fibers to meet future network expansion needs. Using the **single subscriber management** components ensures that access to these fibers can be subsequently regained with little effort.

The fibers of subscribers with high-volume and sensitive data traffic, such as businesses, public bodies and authorities, need **special protection** against any break in the flow of data.

The Corning equipment provides a **comprehensive fiber management solution** to meet this need by routing the fibers of the individual subscribers in separate trays. This ensures that, while work is being performed on the fibers of one subscriber, all the other fibers remain unaffected and optimally protected.



Network Levels

Interconnection Level

At the **interconnection level** the long-distance cables establish the direct connections between switching centers or between main branching points. Normally there is no plan to branch from these cables at a later date, i.e. no access to the splices will be subsequently required. All the fibers in a buffer tube of the cable are stored in one splice tray. In order to increase the packing density, several **splice trays** are grouped together into **blocks**.

Branching Level

Splice closures and distributors at the **distribution level** protect splices at the points where high-fiber-count **main cables** are joined to **branch cables** with medium fiber-counts. Subsequent access to the splices is not envisaged at this level either.

Distribution Level

The networks at this level are normally local and planned for the present and immediate future. Closures and enclosures at this level establish the connections between the **medium-fiber-count branch cables** and the **low-fiber-count distribution cables**. The distribution cables are routed to network end points such as the curbs (Fiber to the Curb - FTTC) or to the O/E transducers of CATV networks (Optical Network Units - ONUs), or directly to the subscribers, such as large companies. The fibers of the individual buffer tubes of the branch and distribution cables are stored in **separate splice trays**. Unobstructed access to individual splice trays must be maintained for subsequent network expansions or changeovers.

Access Network Level

The access network level is a **specialized part** of the **distribution level**. The fibers of subscribers with very high-volume and hence **sensitive data traffic**, e.g. public bodies, authorities or large companies require **special protection**. For this reason, the fibers of these subscribers are assigned **separate splice trays** in all the splice closures in the network or at least in the closures at distribution level.

For this application the trays are individually latched into the tray holder one above the other. Access to the fibers in any particular tray is gained by latching the higher trays into a tilted position. This causes no disturbance to the fibers of any of the other subscribers. This type of fiber management system thus makes possible **single-subscriber access**.

> LAN Distribution Technique

Cabling Examples

Cabling Examples

The thorough planning of a structured premises cabling system is a challenging task for planners, installers and users alike. The following premises cabling examples are provided in accordance with standard EN 50173 (ISO / IEC 1801) for use as model solutions. Other solutions may of course also be adopted in order to suit individual situations. We recommend that the network should be designed as a **hierarchically configured physical star**. This star-shaped configuration will support all logical network topologies such as Ethernet / Token Ring etc.

We offer a **complete fiber-optic cabling solution** for all private data and voice networks at the established network levels:

- **Campus cabling** (primary level)
  providing the links between the buildings
- **Building backbone** (secondary level)
  linking the floors in the building
- **Horizontal level** (tertiary level)
  - conventional horizontal floor cabling
  - centralized cabling

The Next Step

It is already common practice for fiber-optic cables to be used in some areas of the network. For instance the buildings are interlinked using fiber-optic cables exclusively, and the building backbone linking the floor distributors is also largely in the form of fiber-optic cables.
In order to make the benefits of optical systems available to the end user, the obvious next step is to extend fiber-optic cables to the work area (**Fiber-to-the-Desk**). The use of advanced jointing and terminating techniques, such as **UniCam™** connectors, not only reduces the overall cost but also makes installation much easier.

Distribution Components

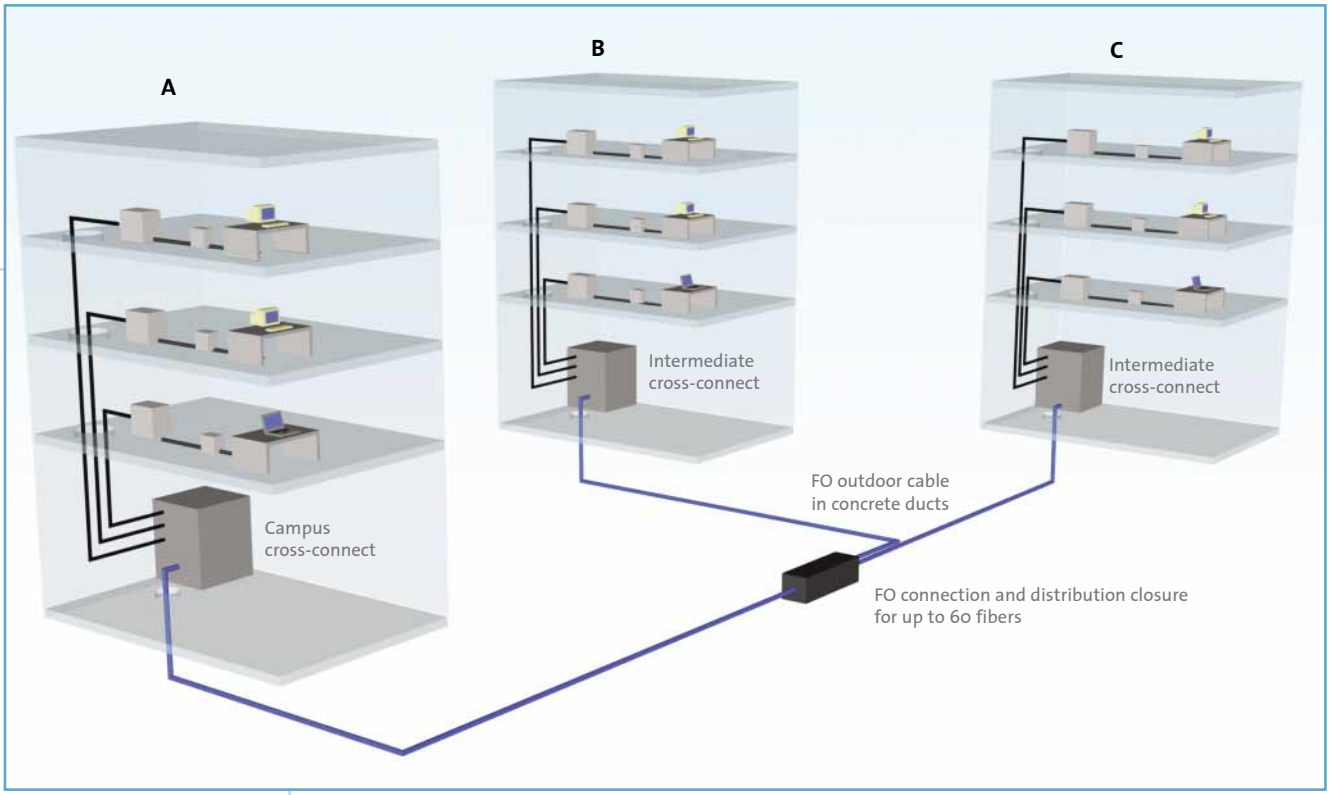
The **LAN distribution components** are used for organizing outgoing and incoming FO cables and the selected connecting hardware so that subsequent re-configurations or expansions can be carried out efficiently. The components support the use of various cable termination techniques such as connectorized cables, fusion splicing of pigtails, mechanical splices and field-installable FO connectors such as UniCam. Being modular and compatible with all standard FO connectors and adapters, the distribution components can be installed universally in any structured cabling system.
The product family of distribution components comprises the following:

- **MAN, WAN FO Distribution Cabinet HDC**
  Different versions for up to 1440 ports

- **Distribution Cabinet FDF 19 and**
  Distribution Rack FDF 500
  Universal equipment cabinet for housing individual 19" components. Designed for the installation of passive and active transmission components in campus and building backbone cabling subsystems.

- **Floor Distributor FDF 19/E**
  For mounting 19" splice boxes in the secondary plane

- **19" Distribution Units,**
  such as connector shelves, splice shelves for fiber counts of 2 up to 144 in one housing. These units are designed for installation in any standardized 19" mounting.



Example 1: Campus Cabling

Example 1: Campus Cabling

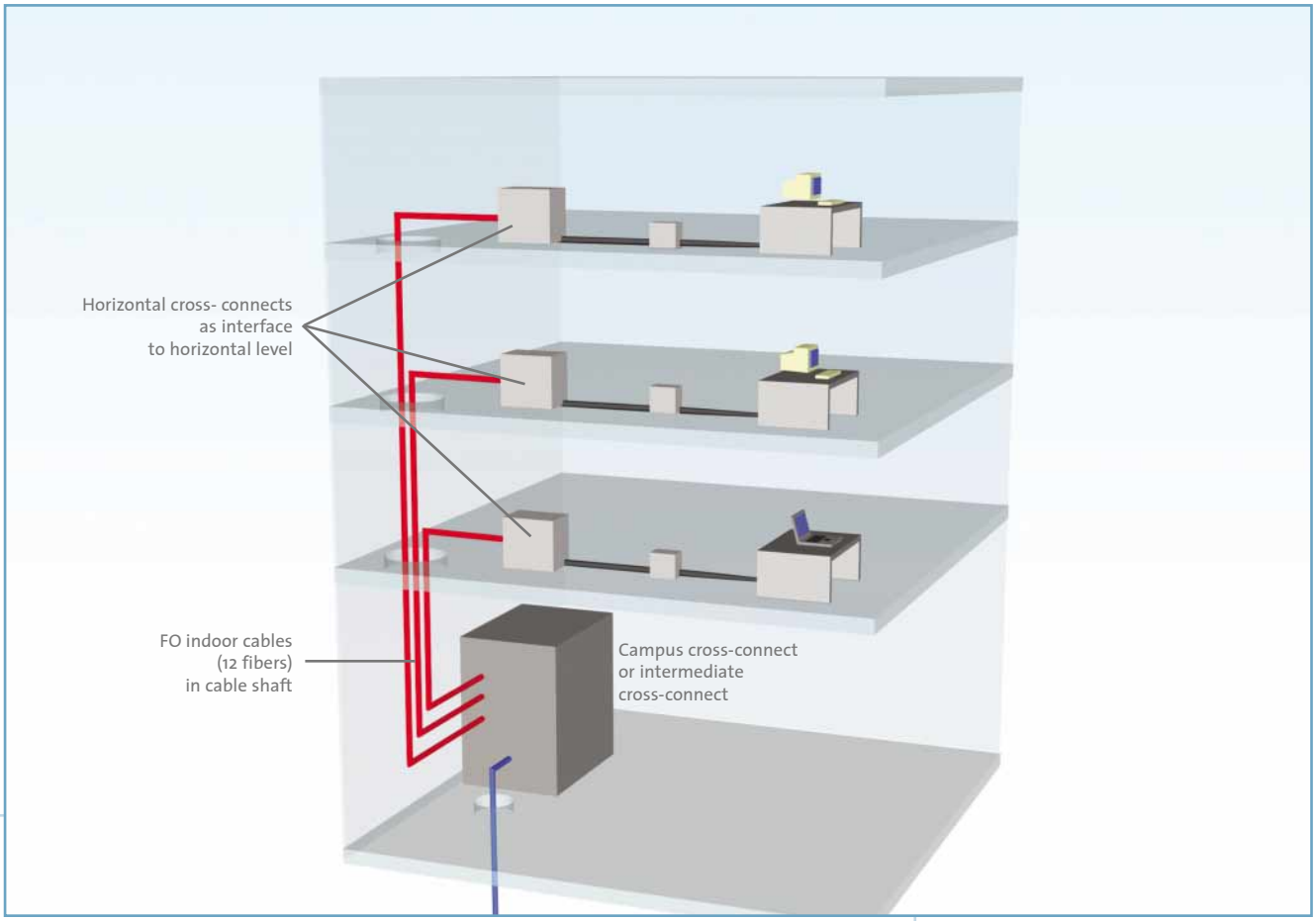
Buildings A, B and C are to be interconnected using fiber optic cables. In accordance with the guidelines for structured premises cabling, one building, in this case building "A", is selected as the main building with a **campus cross-connect** and the network is configured in the form of a **hierarchical star**. An FO outdoor cable is brought from the campus cross-connect out of the building and buried directly in the ground. Halfway towards buildings B and C, the cable is branched into two cables. This is accomplished by fusion-splicing the individual fibers together, then storing the resultant splices in splice trays and protecting these in a **fiber optic closure**. From this splice point, the two cables are routed directly to the **intermediate cross-connects** of buildings B and C. In our example, the cables are routed for this purpose through concrete ducts.

Product Examples

- **Connectors:**
  ST™ or SC fiber pigtails for terminating on the cross-connects.
- **Campus cross-connect:**
  19" cabinet or rack, 19" connector shelf for 24 FO connectors ST (simplex) or SC (simplex or duplex).
- **Intermediate cross-connect:**
  19" cabinet, 19" connector shelf for 12 FO connectors ST (simplex) or SC (simplex or duplex).
- **Cable distribution:**
  Mechanical FO half-shell closure

> LAN Distribution Technique

Cabling Examples



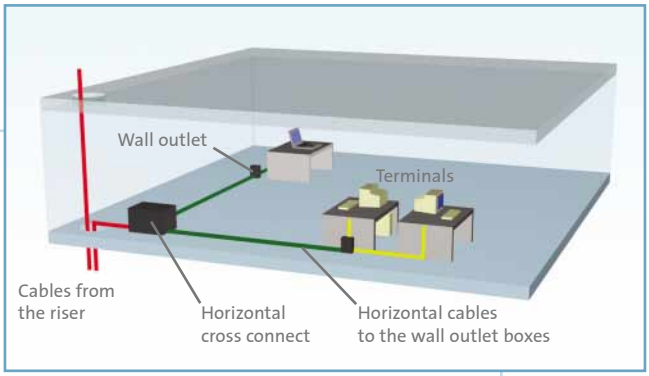
Example 2: Riser Area Cabling

Example 2: Riser Area (Secondary Level)

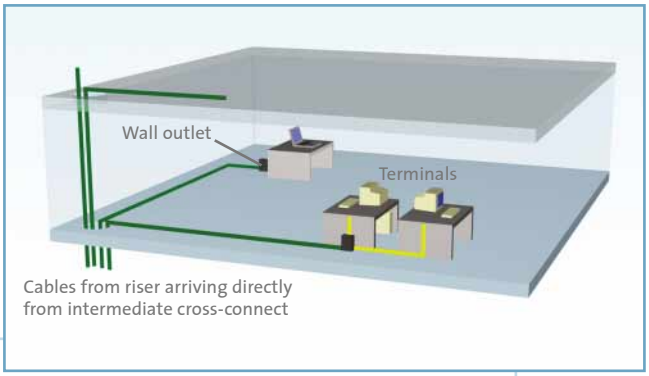
In this example, four floors of a building are interlinked by means of a fiber optic cable. According to the rules for structured building cabling systems, one floor serves as the site for the **intermediate cross-connect**. This is the ground floor in this case. From this cross-connect on the ground floor, fiber optic cables are run in a **star configuration** to link all the other floors. They are terminated at **horizontal cross-connects** on the individual floors.

Product Examples

- **Intermediate cross-connect:**
  19" cabinet FDF 19, 19" connector shelf for 24 ST™ (simplex) or 24 SC (simplex or duplex).
- **Horizontal cross-connects:**
  19" cabinet or wall box, 19" connector shelf for 12 FO connectors ST (simplex) or SC (simplex or duplex).
  Optionally, FO wall-mounted distributor for 12/24 FO connectors ST (simplex) or SC (simplex or duplex).
- **Connectors:**
  All common connector types for termination at the cross-connects and direct assembly on indoor cable.



Example 3.1: Conventional Horizontal Cabling



Example 3.2: Centralized Horizontal Cabling

Example 3: Horizontal Level (Tertiary Level)

In this example, the **cross-connect** is to be connected to **fiber optic wall outlet boxes** at the workstations so that optical fibers can be used to connect terminal equipments.
On the horizontal level, it is important to ensure flexibility and expandability. This calls for careful planning of the number of wall outlet boxes with adequate provision for reserve capacity.

3.1 Conventional Horizontal Cabling

In **conventional cabling configurations**, the horizontal cross-connects and wall outlets are linked in a **star configuration** with FO cables converging on the horizontal cross-connect as the transition point to the riser area. FO cables with 4 fibers allow 2 terminals to be connected per wall outlet box. Duplex connecting cables are run from the wall outlet box to the terminals. Unlike copper cabling practice, the wall outlets and terminals can be located **more than 100 m** away from the horizontal cross-connect. This greatly facilitates the cabling of large-area production sites and floors.

3.2 Centralized Horizontal Cabling

Since there are no strict length restrictions to observe when using FO cables to the desk, it is possible to dispense completely with horizontal cross-connects and to route the cables from the **intermediate cross-connect** via the riser **directly to the desk**.
This eliminates a transition point, reduces the space required on the individual floors and also simplifies cabling control and administration.

Product Examples

- **Horizontal cross-connect:**
  19“ wall box with FO units or FO cross-connect distributor with 24 ports.
- **Wall outlet box:**
  FO wall outlet box for 4 FO connectors and 2 terminal equipments
- **Connectors:**
  All common connector types for termination at the horizontal cross-connect and the wall outlet boxes, directly assembled on the FO indoor cable.

> Overview on Housings

HDC

HDC 300

HDC SC

ACH Hardware Family

LANscape Hardware Family

FDF 19

FDF 500

FDF 19/E

VIP Wall Distributor

Distributor 48/96

Collocation Distributor

Sheet-steel Distributor

Plastic Distributor

Vk 20/12

Distributor 24

Enclosure	Ports max.	U	Indoor / Outdoor	IP rating	Telecom/ LAN	Lockable	Dimensions W x H x D (mm)	Page
19" HDC Distribution Cabinets / Examples								
HDC	1440	45	I/O	IP 20/54	T	■	800 x 2200 x 400	188
HDC	1296	40	I/O	IP 20/54	T	■	800 x 2000 x 600	188
HDC	1152	36	I/O	IP 20/54	T	■	800 x 1800 x 600	188
HDC	1296	40	I/O	IP 20/54	L	■	800 x 2000 x 600	188
FDF 500 Frame	1296	40	I/O	IP 00	L / T	-	650 x 1900 x 400	223
19" HDC Distribution Cabinets / Preassembled with Patchcord Management System								
HDC	1440	45	I/O	IP 20/54	T	■	800 x 2200 x 600	188
HDC	1296	40	I/O	IP 20/54	T	■	800 x 2000 x 600	188
19" HDC 300 Distribution Cabinets (300 mm depth)								
HDC 300	1440	45	I/O	IP 20/54	T	■	900 x 2200 x 300	190
HDC 300	1296	40	I/O	IP 20/54	T	■	900 x 2000 x 300	190
HDC 300	1152	36	I/O	IP 20/54	T	■	900 x 1800 x 300	190
19" HDC SC Outdoor Distribution Cabinets								
HDC SC	720	45	O	IP 55	T	■	900 x 2200 x 300	191
HDC SC	720	40	O	IP 55	T	■	900 x 2000 x 300	191
Wall-mountable 19" Enclosure FDF 19/E								
FDF 19/E	576	21	I/O	IP 55	L	■	600 x 478 x 515	224
FDF 19/E	432	15	I/O	IP 55	L	■	600 x 612 x 515	224
FDF 19/E	288	9	I/O	IP 55	L	■	600 x 1012 x 515	224
Wall-mountable Enclosures								
VIP Wall Distributor	48	-	I/O	IP 54	L / T	■	400 x 500 x 150	228
Distributor 48	48	-	I	IP 20	L / T	■	500 x 500 x 120	232
Distributor 96	96	-	I	IP 20	L / T	■	500 x 900 x 120	232
Collocation Distributor	24	-	I	IP 20	L	■	400 x 250 x 120	233
Sheet-steel Distributor	24	-	I / O	IP 55	L / T	■	400 x 500 x 155	234
Plastic Distributor	24	-	I / O	IP 66	L	-	280 x 254 x 90	235
VK 20/12	12	-	I	IP 41	L / T	-	220 x 320 x 68	236
Distributor 24	-	-	I / O	IP 64	L / T	-	171 x 330 x 90	237

> 19" Distribution Cabinets HDC

19" Distribution Cabinet HDC

Application

The fiber-optic distribution system **HDC**, when fully configured, provides a high packing density of **up to 1440 ports**. It is suitable for short-haul and local networks and can be used as a fiber node and termination point in the LAN, MAN and WAN area; it is suitable for indoor and outdoor use, **IP class up to 54.**

All the networking cabinets are pre-assembled according to DIN EN 50173 and ISO/IEC 11801 and are lockable. Specially developed for high packing density applications with **integral cable and fiber management**.

Technical Description / Items Supplied

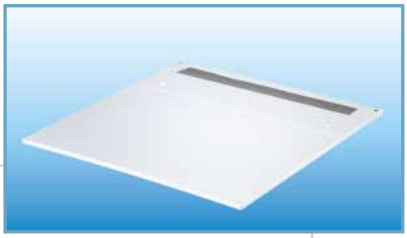
- 19" networking cabinet with glazed door with Al frame in RAL 7035, 180° hinged door
- Rear panel of sheet steel,
- Cable entry from below via 3 divided bottom panels, cable entry from above via top cover with rubber grommet strip
- All variants with 19" swing frame
- Grounding of all flat parts via enclosure frame
- 100 mm plinth installed
- Cable and fiber management material provided in adequate quantity or already mounted
- 10 pcs. cable management hoops, plastic, included.

Order Numbers

Designation	Dimensions (W x H x D)	Order Number
HDC with Full-Height 19" Swing Frame, 40 U, 1296 ports max.	800 x 2000 x 600 mm	S46998-Z104-A60
Side Walls incl. Mounting Hardware (1 set = 2 pcs.)	2000 x 600 mm	S46998-Z104-A70
HDC with Full-Height 19" Swing Frame 45 U, 1440 ports max.	800 x 2200 x 600 mm	S46998-Z104-A62
HDC with Full-Height 19" Swing Frame, 2-door version (50/50) 180°	800 x 2200 x 600 mm	S46998-A5-A69
Side Walls incl. Mounting Hardware (1 set = 2 pcs.)	2200 x 600 mm	S46998-Z104-A72
HDC with Full-Height 19" Swing Frame, 36 U, 1152 ports max.	800 x 1800 x 600 mm	S46998-Z104-A61
Side Walls incl. Mounting Hardware (1 set = 2 pcs.)	1800 x 600 mm	S46998-Z104-A71
Preinstalled HDC with Patchcord Management System (Patchcord Slack Storage on the Left Side, Swing Frame Fixed on the Right)		
- with Full-Height 19" Swing Frame, 40 U, 1296 ports max., incl. side walls	800 x 2000 x 600 mm	S46998-A5-A305
- with Full-Height 19" Swing Frame 45 U, 1440 ports max., incl. side walls	800 x 2200 x 600 mm	S46998-A5-A306
- with Full-Height 19" Swing Frame 45 U, 1440 ports max., 2-Door Version (50/50) 180°, incl. side walls	800 x2200 x 600 mm	S46998-Z104-A 71

1 U (height unit) = 44.45 mm. Other variants on request.

Fixing for Swing Frame

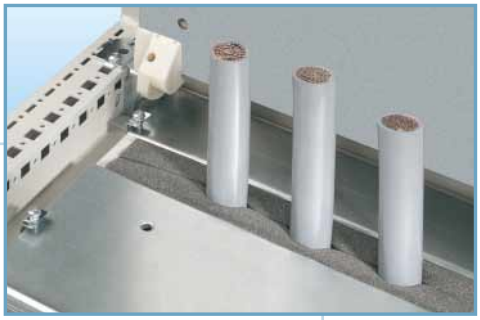


Roof Cable Entry with Sealing

19" Swing Frame

Door Opener with Safety Lock

Total View with Security Glass Door, without Side Walls



Bottom Cable Entry with Sealing

Double Door Version

> 19" Distribution Cabinet HDC 300

Depth 300 mm

HDC 300

Application

The fiber-optic distribution system **HDC 300**, when fully configured, provides a high packing density of **up to 1440 ports at a compact depth of only 300 mm**. It is suitable for short-haul and local networks and can be used as a fiber node and termination point in the LAN, MAN and WAN area; it is suitable for indoor and outdoor use.

For further technical details,
please ask your local sales representative

VIP Distribution Frame for HDC 300

HDC 300 / Depth 300 mm

Designation	Dimensions (W x H x D)	Order Number
HDC 300, with 19" Swing Frame 40 U, 1296 ports max.	900 x 2000 x 300 mm	S46998-Z104-A66
Side Walls incl Mounting Hardware; 2 pcs.	2000 x 300 mm	S46998-Z104-A 73
HDC 300, with 19" Swing Frame 45 U, 1440 ports max.	900 x 2200 x 300 mm	S46998-Z104-A67
Side Walls incl Mounting Hardware; 2 pcs.	2200 x 300	S46998-Z104-A 75
HDC 300, with 19" Swing Frame 36 U, 1152 ports max.	900 x 1800 x 300 mm	S46998-Z104-A68
Side Walls incl Mounting Hardware; 2 pcs.	1800 x 300	S46998-Z104-A 74
Patch Cable Management System for HDC 300		S46998-A5-A340

1 U (height unit) = 44.45 mm. Other variants on request.

> 19" Outdoor Distribution Cabinet HDC SC

HDC-SC

HDC-SC with Swing Frame opened

Application

The fiber-optic distribution system **HDC SC**, when fully configured, provides a high packing density of **up to 720 ports**. It is suitable for short-haul and local networks and can be used as a termination point in the LAN, MAN and WAN area and is designed especially for outdoor use.

Technical Description / Items Supplied

- Frame of stable and torsion tight aluminium hollow structured profiles
- Doors, side walls and back wall of a double wall structure
- Wall profiles both at the top and bottom with punched ventilation
- Profiles layered both inside and outside with powder spray coating
- Surface structure: RAL 7032 powder spray coating
- The structure of the roof consists of two parts and allows an effective ventilation of the entire roof construction
- 3 mm metal sheet at the bottom
- IP 55 protection rating
- Two cable fixing guides horizontally mounted inside on the back wall
- Optional: Electrical switch for the door contact.
- Optional: Air heater 350 Watt.

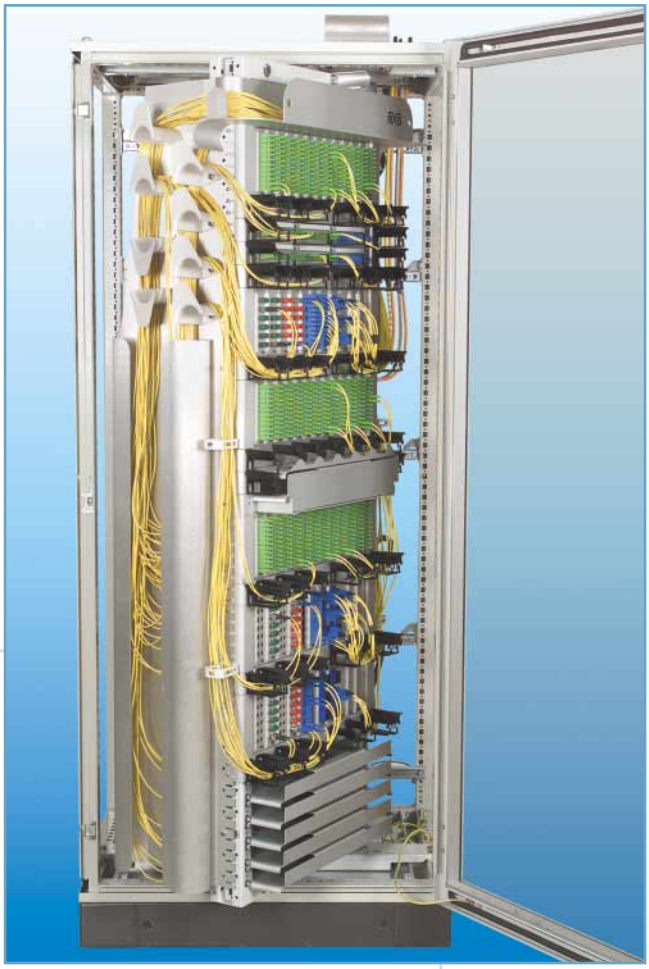
Outdoor Distribution Cabinet HDC SC

Designation	Dimensions (W x H x D)	Order Number
HDC SC, 1-Door Version (800), with 19" Swing Frame 22 U	800 x 1200 x 500 mm	S46998-A5-A301
HDC SC, 2-Door Version (800/400), with 19" Swing Frame 22 U	1200 x 1200 x 500 mm	S46998-A5-A302

1 U (height unit) = 44.45 mm. Other variants on request.

> Patchcord Management System

for 19" Distribution Cabinets HDC



Patchcord Management System mounted in the HDC

Cable Bridge 2 U

Patchcord Management System

The **Patchcord Management System** in the HDC provides an optimized bend radius for the patchcord routing guides. An integral slack storage facility on the left accommodates the patchcord slack. Being located on the left side of the swing frame it can be swung out for ready access by the installer for ease of reorganizing and tracing individual patchcords. The patchcords can be routed out to the left and right.

This provides a high degree of flexibility for new and subsequent re-configurations as well as for future growth.

The extreme high packing density combined with the highly modular distribution system makes this patchcord management system unique of its type.

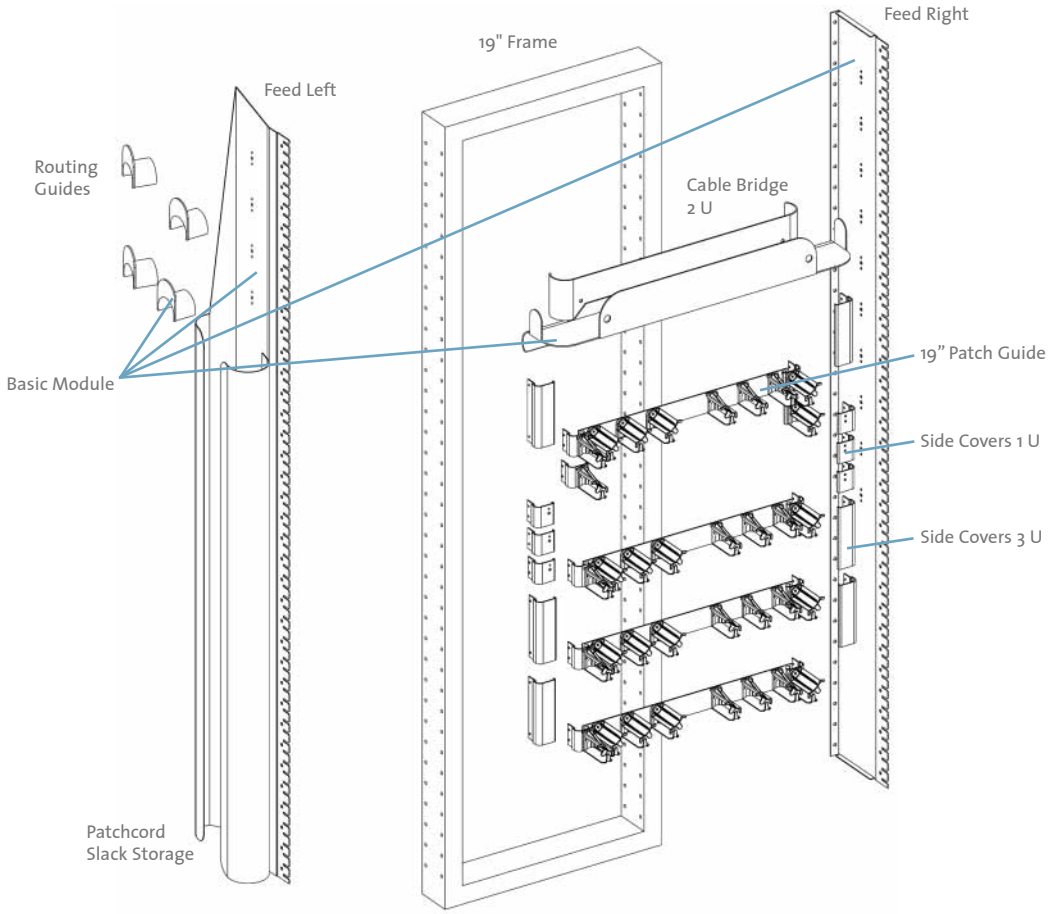
The system can be mounted in all standardized 800 mm wide 19" cabinets and racks with adequate side clearance and more than 1800 mm height (36 U).

Horizontal Patchcord Routing

Designation	Delivery Unit	Order Number
Basic Module (swing frame fixed on the **right** side) including: cable bridge 2 U, feed **right-hand**, storage **left-hand**, with feed **left-hand**, mounting / fiber guide hardware, installation instructions	1 kit	S46998-A5-A78
Basic Module (swing frame fixed on the **left** side) including: cable bridge 2 U, feed **left-hand**, storage **right-hand**, with feed **right-hand**, mounting / fiber guide hardware, installation instructions	1 kit	S46998-A5-A86

1 U (height unit) = 44.45 mm

- **Only for 600-mm Deep Cabinets!**
- **For all Cabinets with Full-Height Swing Frame**



19" Patch Guide

Fiber Guide

Side Covers

Routing Guide

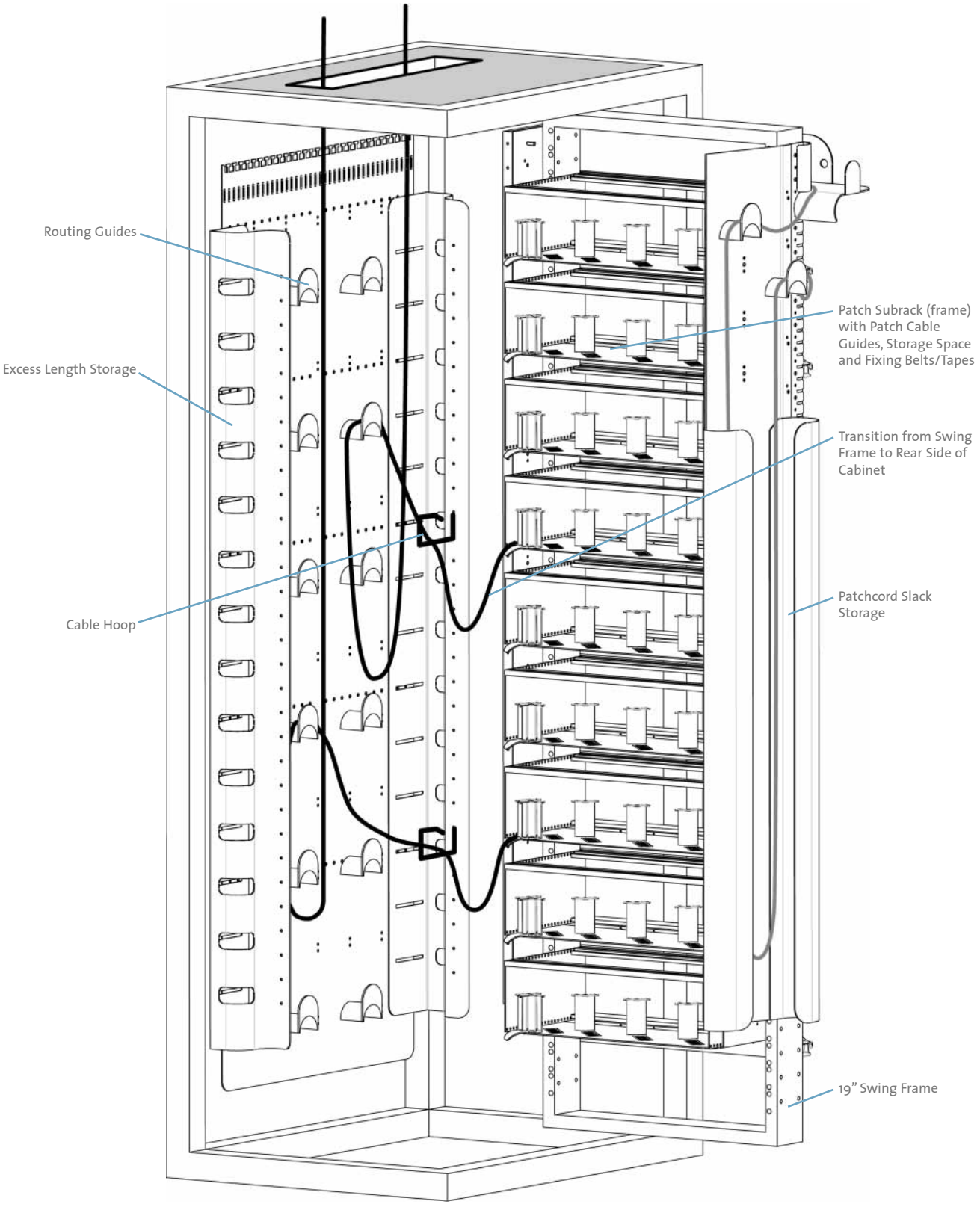
Cable Hoop

Designation	Delivery Unit	Order Number
19" Patch Guide with Side Cover and 8 Fiber Guides	1 kit	S46998-A5-R23
Fiber Guide	1 pair	S46998-A5-R22
Side Cover 3 U	1 pair	S46998-A5-R20
Side Cover 2 U	1 pair	S46998-A5-R49
Side Cover 1 U	1 pair	S46998-A5-R21
Length Adaptation PMS 4 U	1 kit	S46998-A5-R48
Routing Guide, plastic	10 pcs.	S46998-Z105-A27
Cable Hoop, plastic	10 pcs.	S46998-Z104-A34
Swing Frame Handle	1 pc.	S46998-A5-R55

1 U (height unit) = 44.45 mm

> Rear Patchcord Management System

for 19" Distribution Cabinets HDC

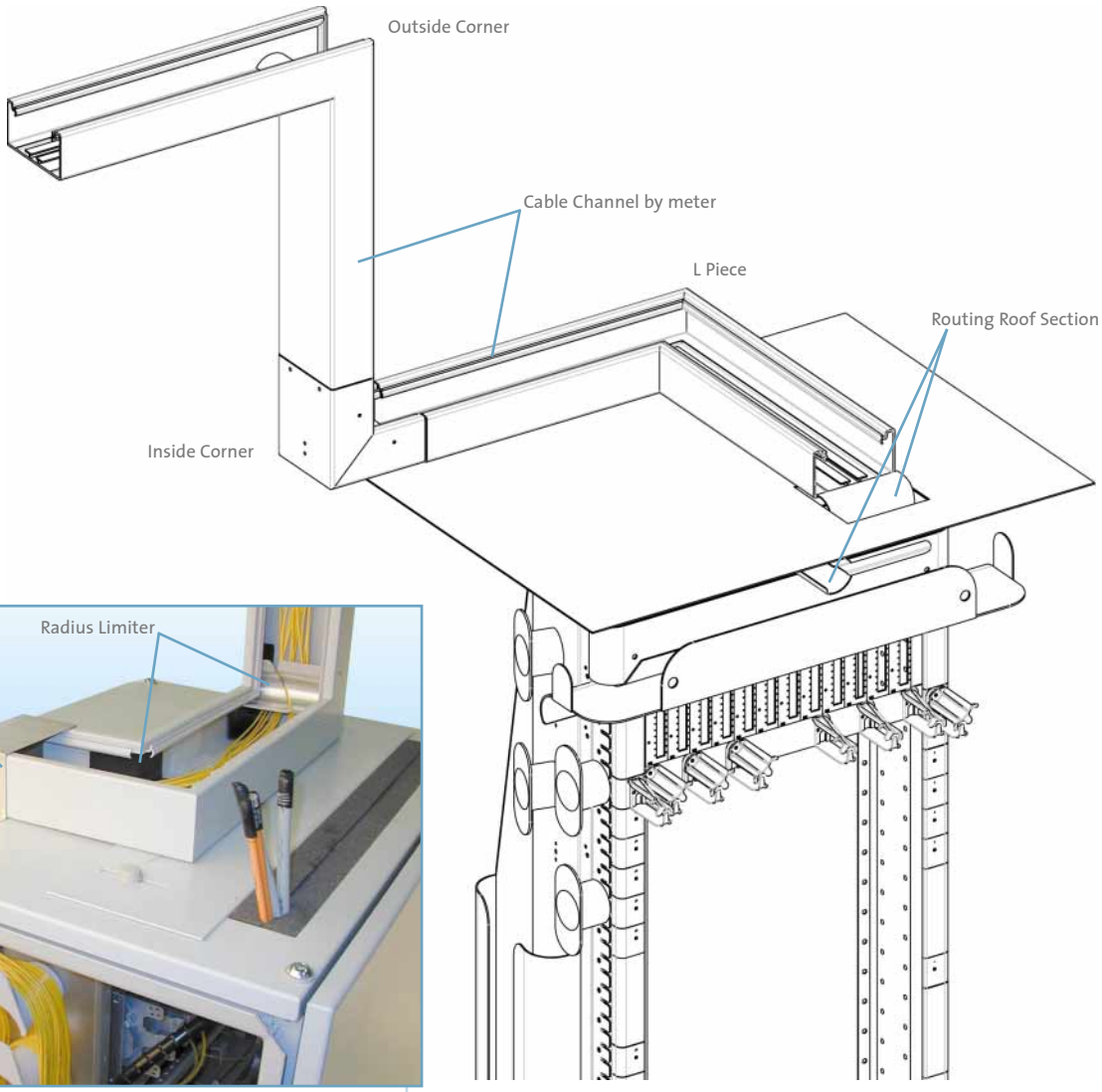


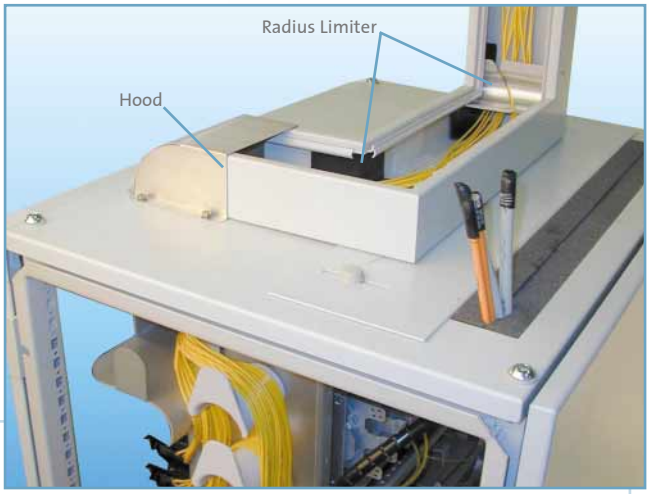
Order Numbers

Designation	Delivery Unit	Order Number
Rear Patchcord Management System including: Rear Patchcord Storage (base plate 1350 x 500 mm), Excess Length Storage 1150 x 100 mm, Routing Guides (10 pcs.), Cable Hoops (10 pcs.), Mounting Hardware, Installation Instructions	1 kit	S46998-A5-A291

> Cable Transition System

for 19" Distribution Cabinets HDC





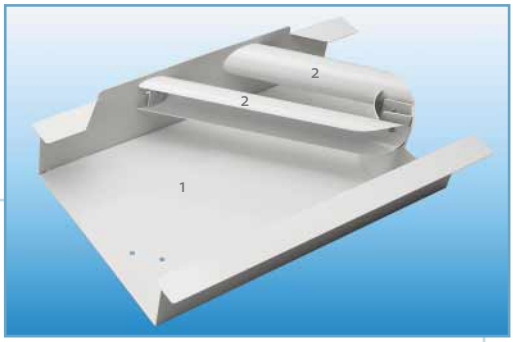
Hood for Routing Roof Section (shown for horizontal mounted cable channel)

Cable Transition System – Order Numbers

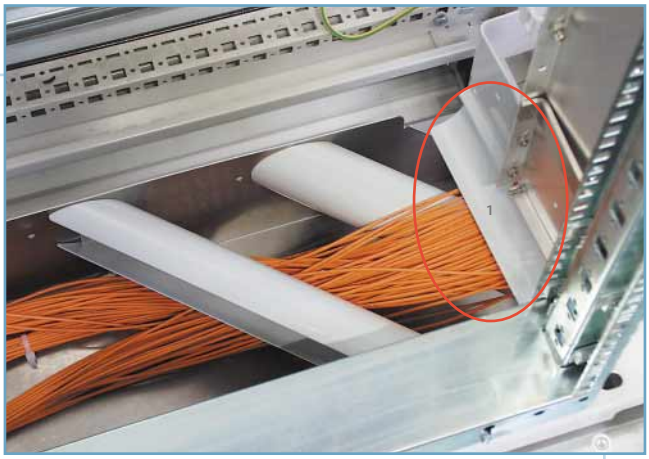
Designation	Delivery Unit	Order Number
Cable Channel by meter	2 m	S45757-Z906-A33
Channel Cover by meter	2 m	S45757-Z906-A34
Inside Corner with radius limiter	1 kit	S46998-A5-R57
Outside Corner with radius limiter	1 kit	S46998-A5-R58
L Piece with radius limiter	1 kit	S46998-A5-R56
T Piece with radius limiter (not shown)	1 kit	S46998-A5-R59
Routing Roof Section	1 kit	S46998-A5-R50
Hood for Routing Roof Section		
- for horizontal mounted cable channel	1 kit	S46998-A5-R51
- for vertical mounted cable channel	1 kit	S46998-A5-R52

> Cable Transition System Underfloor

for 19" Distribution Cabinets HDC



Bottom Section of Cable Transition System Under Floor: Basic Element (1) and Vertical Diversions (2)



Bottom Section Installed, with Horizontal Diversion (1)

Cable Transition System Under Floor – Right-hand Side with Cable Guides Small (1) and Large (2)

Cable Transition System Underfloor – Order Numbers

Designation	Delivery Unit	Order Number
Cable Transition System Under Floor	1 kit	S 46998-A5-A294

> 19" Subracks

Subrack Unit 4 U

19" Subrack Unit 4 U

Normally, the subrack, the buffer tube drawer and the patch guide form one unit.
This pre-assembled 4-U unit comprises the subrack and attached buffer tube drawer together with a patch guide. The unit allows equipping and splicing operations to be performed in front of the case. The unit is then likewise adapted into a fixed 19" frame.

Items Supplied

Subrack, buffer tube drawer, combining kit, patch guide and mounting accessories.

Designation	Order Number
19" Subrack Unit 4 U	S46998-A5-A92

19" Patch Guide 1 U

For horizontal routing of the patchcords. Complete with radius limiters.

The patch tray is mounted below the subrack and in front of the buffer tube slack drawer to provide secure horizontal routing of the patchcords. The patch tray can be used in any 19" cabinet.
The new rotatable fiber guides allow the patchcords to be routed out both to the right and to the left.

- **Material:** Aluminum anodized, patchcord hoops of PE.

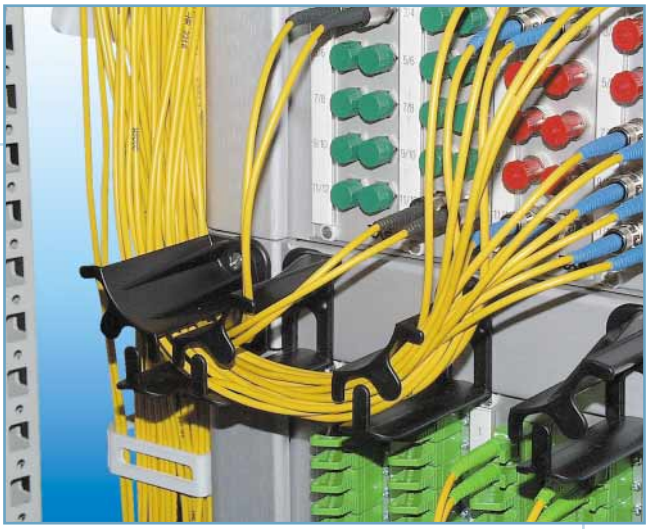
Items Supplied

8 fiber guides, 2 side covers and a 19" mounting plane.
Supplied including mounting screws and cage nuts.

Designation	Order Number
19" Patch Guide 1 U	S46998-A5-R23

1 U (height unit) = 44.45 mm

19" Patch Guide 1 U



19" Patch Guide 1 U in the application

19" Subrack 3 U

19" Subrack 3 U

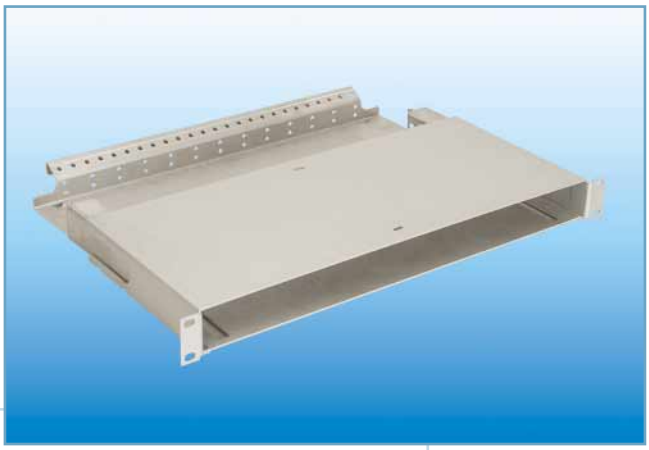
The subrack is used for mounting fiber connector modules or splice modules in 7 or 8 HP. 84 horizontal pitches HP.

- **Material:** Side panels and connecting rails of aluminum, 19" mounting rails anodized.

Items Supplied

Supplied fully assembled, including card guide holders of plastic. Mounting screws and cage nuts are included.

Designation	Order Number
19" Subrack 3 U, Fully Assembled	S46998-A5-A15



19" Buffer Tube Drawer 1 U

19" Buffer Tube Drawer 1 U

Mounted under the subrack, the slack of the incoming buffer tubes is stored and secured here.

- **Material:** Aluminum anodized.

Items Supplied

Supplied including mounting hardware.

Designation	Order Number
19" Buffer Tube Drawer 1 U	S46998-A5-A17

1 U (height unit) = 44.45 mm

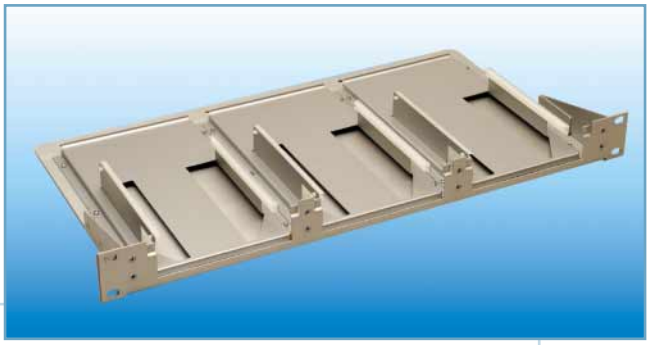
19" Subrack Combining Kit

Combining Kit

Normally, the subrack, the buffer tube drawer and the patch guide will form one unit.
The combining kit is used for assembling these parts together. The 4-U unit, thus assembled, allows equipping and splicing operations to be performed in front of the case.
The complete unit can then be mounted in the fixed 19" frame.

Designation	Order Number
Combining Kit	S46998-A5-R15

> 19” Subrack 1 U



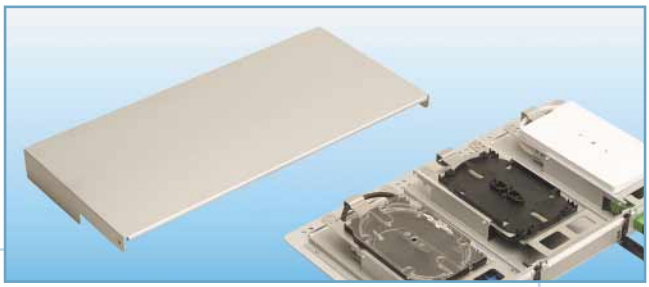
19" Subrack 1 U

19" Subrack 1 U

This new type of subrack is used for mounting fiber connector or splice modules as well as connector panels in 7 HP. Up to three modules or panels can be inserted. This provides up to 36 ports. When splice modules are used, up to 72 inline splices can be made in 6 trays.

Items Supplied

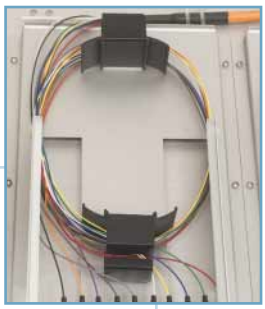
Supplied fully assembled, including card guide holders and cable management hoops.



Cover for 19" Subrack 1 U

Designation	Order Number
19" Subrack 1 U, Fully Assembled	S46998-A5-A71
Cover for Subrack 1 U	S46998-A5-A295

1 U (height unit) = 44.45 mm 1 HP (horizontal pitch) = 5.08 mm

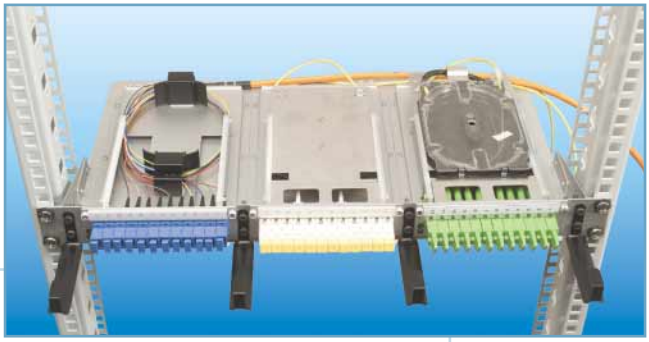


Radius Limiters

Radius Limiters for Break-Out Cables

The radius limiters are used for organizing the slack of pre-installed cables.

Designation	Order Number
Radius Limiter for Breakout Cables	S46998-A5-R17



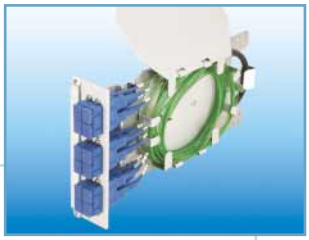
Modules and Panels for 19" Subrack 1 U

Modules and Panels for 19" Subrack 1 U

Configuration of the 19" subrack 1 U in a 19" rack (from left to right): equipped with SC connector panel and radius limiters for pre-installed cables, connector module with Optoclip adapters and a standard E-2000™ connector module.
Cable management hoops are mounted at the front, indoor cables and buffer tubes are secured and strain relieved at the rear.

> Accessories for 19" Subrack 1 U

SC Connector Module

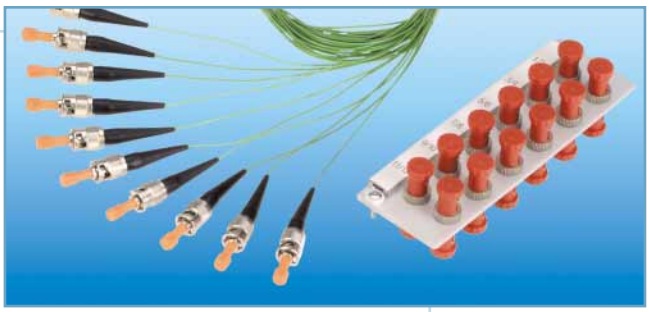


SC Duplex Connector Module

Splice Module – Left- and Right-hand Sides

Connector Modules for 19" Subrack 1 U (Samples)

Designation	Order Number
Connector Modules 7 HP (19" Subrack 1 U) with up to 12 Ports, equipped with:	
- E-2000™ Simplex / APC, with 12 Ports	S46998-A5-A20
- E-2000 Compact / APC, with 12 Ports	S46998-A5-A31
- SC / APC / SM, with 12 Ports	S46998-A5-B18
- SC / APC, with 8 Ports	S46998-A5-B30
- SC / SM, with 12 Ports	S46998-A5-B10
- SC Duplex SM, with 12 Ports	S46998-A5-B19
- SC Duplex MM / 50 µm, with 12 Ports	S46998-A5-B20
- SC Duplex MM / 62.5 µm, with 12 Ports	S46998-A5-B21
Splice Module (Module with Two Splice Trays)	S46998-A5-A24



Connector Panel with Pigtails

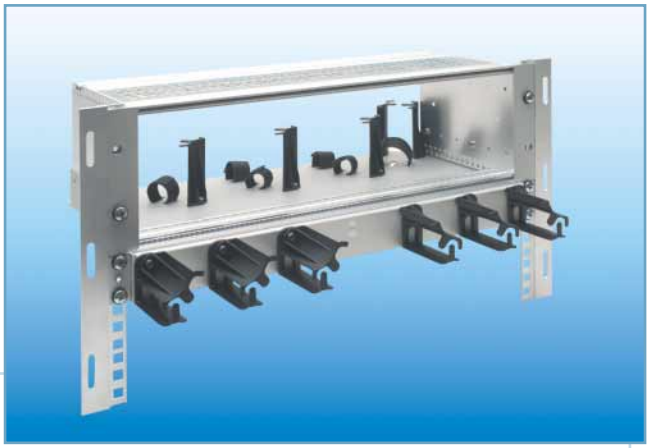
Connector Panels 7 HP for 19" Subrack 1 U

The connector panels are inserted in subracks. Each loaded panel is provided with a designation strip and a transparent cover strip. The preprinted numbering can be overwritten manually on the rear.

Designation	Order Number
Connector Panels 7 HP with 12 Ports, including Pigtails, equipped with	
- E-2000™ / APC, SM, with 12 ports	S46998-A5-A50
- E-2000 Compact / APC, SM, with 12 ports	S46998-A5-A54
- SC, SM, with 12 ports	S46998-A5-A55
Unequipped Connector Panels 7 HP for	
- E-2000 / APC	S46998-A5-A65
- SC	S46998-A5-A68
- SC Duplex	S46998-A5-A77

1 U (height unit) = 44.45 mm 1 HP (horizontal pitch) = 5.08 mm *Delivery Unit: 1 pc.*

> 19" Patch Subrack 3 U



19" Patch Subrack 3 U, mounted in 19" frame

Application

The **Patch Subrack** is used for storing and routing patch cables between the front side and the rear side of the rack The subrack shall be combined with the 1U front patch system with 8 fiber guides

- **Material:** Side panels and connecting rails of aluminum, supplied fully assembled, including plastic patch cable guides and fixing velcro strip

Designation	Order Number
19" Patch Subrack 3 U	S46998-A5-A292

Accessories

19" Patch Guide

Fiber Guide

Side Cover 1 U/3 U

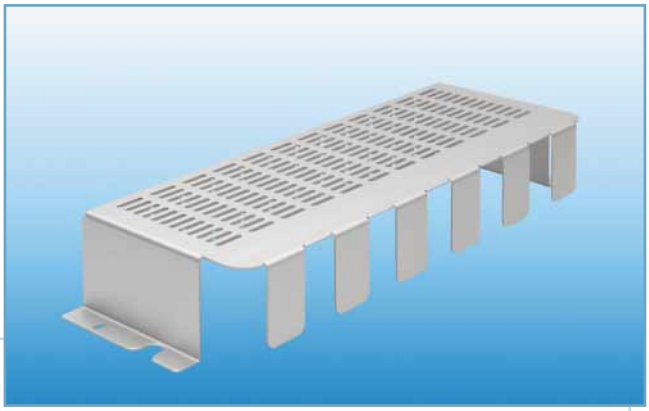
Routing Guide

Cable Hoop

Designation	Delivery Unit	Order Number
19" Patch Guide with Side Cover and 8 Fiber Guides	1 kit	S46998-A5-R23
Fiber Guide	1 pair	S46998-A5-R22
Side Cover 3 U	1 pair	S46998-A5-R20
Side Cover 2 U	1 pair	S46998-A5-R49
Side Cover 1 U	1 pair	S46998-A5-R21
Length Extension 4 U for Patchcord Management System	1 kit	S46998-A5-R48
Routing Guide, plastic	10 pcs.	S46998-Z105-A27
Cable Hoop, plastic	10 pcs.	S46998-Z104-A34

1 U (height unit) = 44.45 mm

> Collocation Protection, Connector Module Cover



Connector Module Cover

Collocation Protection

Application

Collocation is the provision of space for a customer's telecommunications equipment on the service provider's premises. For example, a web site owner could place the site's own computer server on the premises of the Internet service provider (ISP). Or an ISP could place its network router on the premises of the company offering switching services with other ISPs. The alternative to colocation is to have the equipment and the demarcation point located at the customer's premises.

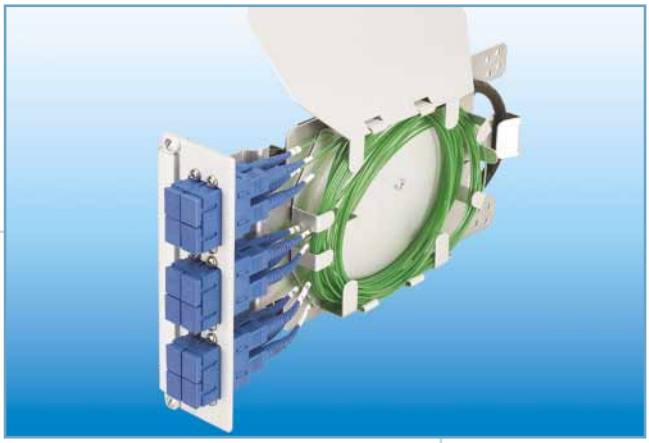
The **Connector Module Cover** protects your subrack at front, the **Collocation Protection** at the back side against any unauthorized access. The Connector Module Cover can be locked by special screws, the Collocation Protection is screwed to the buffer tube drawer.

Order Numbers

Designation	Delivery Unit	Order Number
Collocation Protection and Connector Module Cover	1 kit	S46998-A5-A290

> Fiber Connector Modules

with Corning Pigtails and Adapters



Slack Storage of an SC Duplex Connector Module

Connector Module SC Simplex with Numbered Pigtails

Fiber Connector Modules

Connector modules are used for terminating indoor and outdoor cables.
Buffer tubes can be secured, inserted and terminated in the fiber connector modules. The buffer tubes can contain up to 12 fibers which are spliced onto the prepared pigtails. The connector modules can be used in the 3U and in the 1 U subrack.

The pre-assembled connector module comprises the following parts:

- **Tray holder** with front panel including mounting screws
- **Splice tray** including lid
- **Slack tray** including lid
- **12 mounted adapters** according to choice
- **Pigtails pre-installed** and stored in the tray
- **Pigtails stripped** to the primary coating over a length of 1200 mm
- **Pigtails identified** by color or number

For types and order numbers, see next page!

Specification FC / SC / ST™ / SC Duplex	SM	MM	SM 8° (APC)
Insertion Loss (IL) in dB (IEC 1300-3-4; 1300 / 1550 nm)	< 0.4	< 0.4	< 0.3
Return Loss (RL) in dB (IEC 1300-3-6; 1300 / 1550 nm)	-50	typ. -40	max. -65
Reproducibility IL in dB	max + 0.1		
Life	min. 1000 mating cycles		
Operating Temperature in °C	-40 to + 85		
Storage Temperature in °C	-40 to + 90		
Tensile Strength (cable) in N	> 100		

Fiber Connector Modules, Equipped with Corning Pigtails and Adapters

Designation	Order Number
Connector Modules 7 HP with up to 12 Ports, equipped with	
- SC / APC / SM, with 12 Ports	S46998-A5-B18
- SC / APC with 8 Ports	S46998-A5-B30
- SC / APC, with 12 Ports and 12 Color Marked Fibers	S46998-A5-B40
- SC / UPC, with 12 Ports	S46998-A5-B31
- SC / SM, with 12 Ports	S46998-A5-B10
- SC Duplex SM, with 12 Ports	S46998-A5-B19
- SC Duplex MM 50 µm, with 12 Ports	S46998-A5-B20
- SC Duplex MM 62,5 µm, with 12 Ports	S46998-A5-B21
- DIN, with 10 Ports	S46998-A5-A85
Connector Modules 8 HP with up to 12 Ports, equipped with	
- LSA-DIN, with 12 Ports	S46998-A5-A27
- FC / PC, with 12 Ports	S46998-A5-B13
- FC / PC, with 8 Ports and pigtails	S46998-A5-B22
- SC Duplex / SM, with 12 Ports	S46998-A5-B12
- SC Duplex MM 50 µm, with 12 Ports	S46998-A5-B15
- SC Duplex MM 62.5 µm, with 12 Ports	S46998-A5-B17
- ST™ / SM, with 12 Ports	S46998-A5-B11
- ST / MM 50 µm, with 12 Ports	S46998-A5-B14
- ST / MM 62.5 µm, with 12 Ports	S46998-A5-B16

Unequipped Fiber Connector Modules

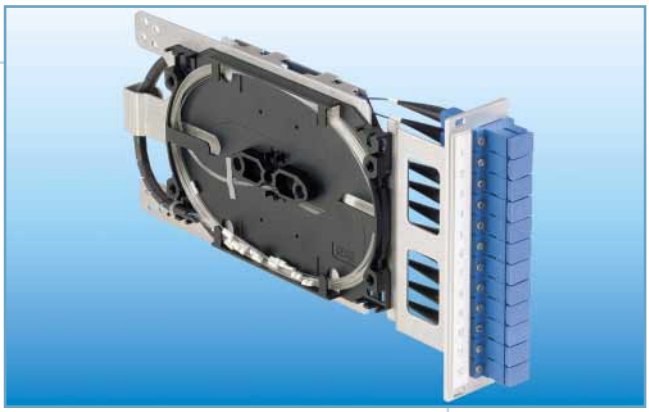
Designation	Order Number
Connector Modules 7 HP with 12 ports for	
- E-2000™ Simplex	S46998-A5-A35
- E-2000 Compact	S46998-A5-A40
- SC	S46998-A5-A48
- SC-Duplex	S46998-A5-A281
Connector Modules 8 HP with 12 ports for	
- LSA-DIN	S46998-A5-A36
- FC / PC	S46998-A5-A37
- SC Duplex	S46998-A5-A38
- ST	S46998-A5-A39
- E-2000 Compact	S46998-A5-A41
- E-2000 Simplex	S46998-A5-A34

Other variants on request *1 HP (horizontal pitch) = 5.08 mm* *Delivery Unit: 1 pc.*

> Fiber Connector Modules

with Diamond Pigtails and Adapters

E2000 Simplex Connector Module



Connector Module SC-Simplex with Numbered Pigtails

Fiber Connector Modules

Connector modules are used for terminating indoor and outdoor cables.
Buffer tubes or indoor cables can be secured, inserted and terminated in the fiber connector modules. The buffer tubes can contain up to 12 fibers which are spliced onto the prepared pigtails. The connector modules can be used in the 3 U and the 1 U subrack.

The pre-assembled connector module comprises the following parts:

- **Tray holder** with front panel including mounting screws
- **Splice tray** including lid
- **Slack tray** including lid
- **12 mounted adapters** according to choice
- **Pigtails pre-installed** and stored in the tray
- **Pigtails stripped** to the primary coating over a length of 1200 mm
- **Pigtails identified** by color or number

For types and order numbers, see next page!

Specification E-2000™	SM	MM	SM 8° (HRL)
Insertion Loss (IL) in dB (IEC 1300-3-4; 1300 / 1550 nm)	typ 0.2 max 0.4	typ 0.15 max 0.4	typ 0.2 max 0.4
Return Loss (RL) in dB (IEC 1300-3-6; 1300 / 1550 nm)	-50	min -40	min -70
Reproducibility of IL in dB	max + 0.1		
Life	min. 1000 mating cycles		
Operating Temperature in °C	-40 to + 85		
Storage Temperature in °C	-40 to + 90		
Tensile Strength (cable) in N	> 100		

Specification FC / SC / ST™ / SC-Duplex	SM	MM	SM 8° (HRL-PC)
Insertion Loss (IL) in dB (IEC 1300-3-4; 1300 / 1550 nm)	typ 0.2 max 0.4	typ 0.15 max 0.4	typ 0.2 max 0.4
Return Loss (RL) in dB (IEC 1300-3-6; 1300 / 1550 nm)	-50	typ. -40	max. -70
Reproducibility of IL in dB	max + 0.1		
Life	min. 1000 mating cycles		
Operating Temperature in °C	-40 to + 85		
Storage Temperature in °C	-40 to + 90		
Tensile Strength (cable) in N	> 100		

Fiber Connector Modules, Equipped with Diamond Pigtails and Adapters

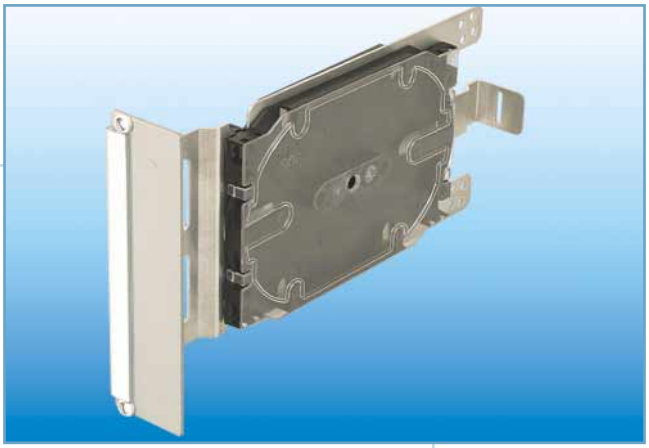
Designation	Order Number
Connector Modules 7 HP with 12 Ports, equipped with	
- E-2000™-Simplex / APC / SM	S46998-A5-A20
- E-2000-Compact / APC / SM	S46998-A5-A31
- E-2000 / APC / SM (0,1 dB)	S46998-A5-A285
- SC / PC	S46998-A5-A44
- SC / APC / SM	S46998-A5-A83
Connector Modules 7 HP with 8 Ports, equipped with	
- SC / APC / SM	S46998-A5-A81
- E-2000 / APC / SM	S46998-A5-A88
Connector Modules 8 HP with 12 Ports, equipped with	
- LSA-DIN / PC / SM	S46998-A5-A27
- FC / PC / SM	S46998-A5-A28
- E-2000-Duplex / APC / SM	S46998-A5-A32
- ST™ / PC / MM 50µm	S46998-A5-A42
- ST / PC / SM	S46998-A5-A30
- SC-Duplex / PC / MM 62.5µm	S46998-A5-A29
- SC-Duplex /PC / SM	S46998-A5-A45
Connector Modules 8 HP with 10 Ports, equipped with	
- E-2000 Simplex / APC / SM	S46998-A5-A13

Other variants on request *1 HP (horizontal pitch) = 5.08 mm* *Delivery Unit: 1 pc.*

> Fiber Connector Modules

Splice Module, Special Modules

Splice Module Left-hand Side

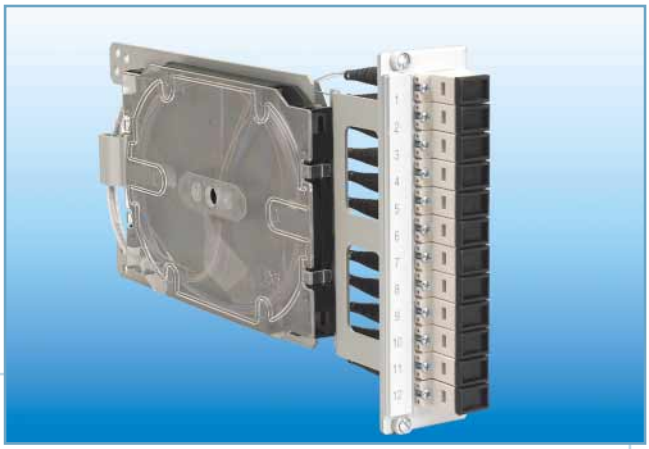


Splice Module Right-hand Side

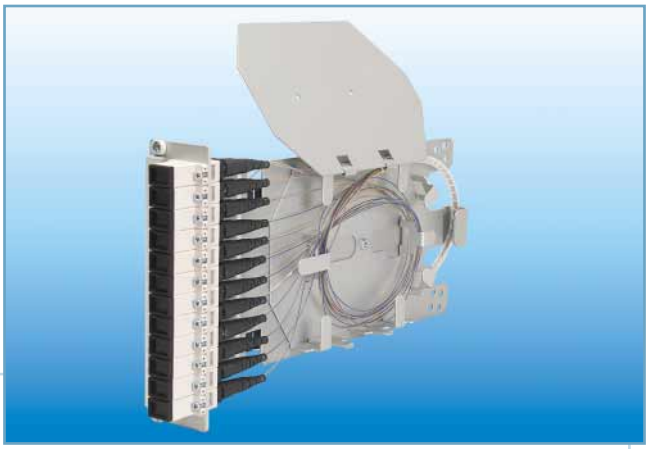
Splice Module 7 HP

The splice module, equipped with two splice trays, is used for making easy inline splices. The base part is a holder panel in Eurocard format onto which the splice trays are mounted. Front area with blank panel and inscription strip.

Designation	Order Number
Splice Module (module with two splice trays)	S46998-A5-A24



MTRJ Module: left-hand side with splice tray



MTRJ Module: right-hand side with slack storage

Connector Modules 7 HP with 12 (24) Ports

Designation	Order Number
MTRJ Module MM 50 µm	S46998-A5-A74
MTRJ Module MM 62,5 µm	S46998-A5-A75
Optoclip	S46998-A5-A43

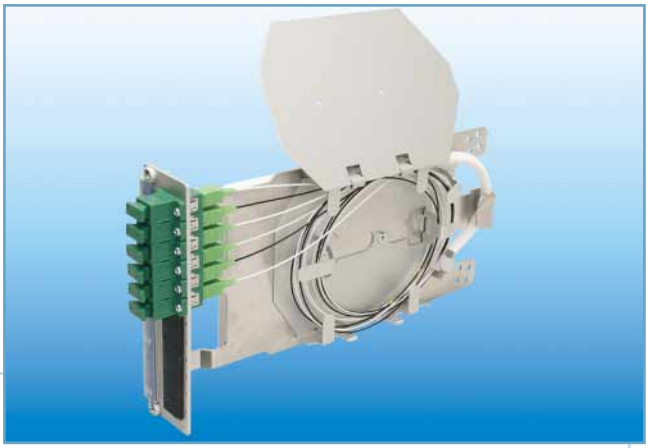
1 HP (horizontal pitch) = 5.08 mm

Delivery Unit: 1 pc.

> Fiber Connector Modules

Coupler Modules

Coupler Module: Left-hand Side with Coupler



Coupler Module: Right-hand Side with Slack Storage

Coupler Modules

These coupler modules are designed for use in HDC subracks and shelves.
They are combineable with standard FO connector modules (see page 204 - 208) in all applications.
All ports are placed on the front side and marked.

Example: 2 x Ratio 10/90

Coupler Modules 7HP, SC / APC

Designation	Order Number
2 x Ratio 10 / 90	S46998-A5-A270
4 x Ratio 10 / 90	S46998-A5-A271
2 x Ratio 50 / 50	S46998-A5-A272
4 x Ratio 50 / 50	S46998-A5-A273
2 x WDM	S46998-A5-A274
4 x WDM	S46998-A5-A275
WDM + Rat. 1550	S46998-A5-A276
WDM + Rat. 1310	S46998-A5-A277

1 HP (horizontal pitch) = 5.08 mm

Delivery Unit: 1 pc.

> VIP Fiber Management for HDC Family

Requirements of the Access Network Level

The **VIP Fiber Management** has especially been designed for the **Access Network Level**. The access network is an exceptional case of the distribution level.

The fibers of subscribers with very high data rates and hence **sensitive data traffic**, e.g. public bodies, authorities, institutes, banks or other large companies (the „VIPs"), require **special protection**.

The same special protection is required for the fibers of network carriers which are renting these fibers to frequently changing users.

For this reason, the fibers of these subscribers are assigned to **separate splice trays** in all the splice closures and distribution cabinets in the network or at least in the closures and cabinets at access level.

This arrangement of fibers is called **„Single Subscriber Access"** respectively **„Single Circuit Access"**.

Corning supports the access network with the **„VIP Fiber Management"**, which is based on the specially designed multi functional **VIP splice tray**.

The VIP Fiber Management is employed in the **HDC Distribution Cabinets** and **VIP Wall Distributors** as well as in the **UCNCP** and **UCNP Closures** .

VIP Splice Tray System

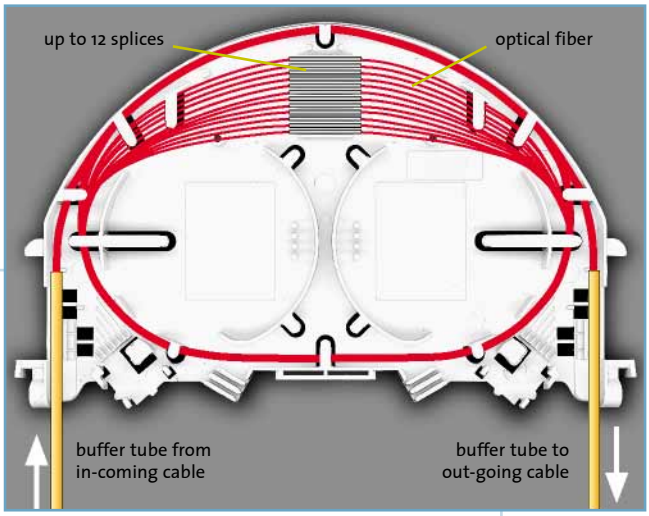
The **VIP splice trays** are latched individually (or in modules) into the tray holder of closures or distribution cabinets one above the other.

Access to the fibers of any particular tray is possible by latching the trays above into the fixed upper position. This causes absolutely no disturbance to the fibers of any other subscribers.

Its facility for flexible organizing of buffer tubes and fibers arises from the fact that the **VIP splice tray can be used for three different functions** – as **jointing, distribution or subscriber splice tray**. This simplifies planning and stocking because less parts have to be considered.

For a better survey and identification of the fibers the VIP splice trays are available in four different colors. The splice trays are available to accomodate up to 12 heat-shrink or crimp splice protectors.

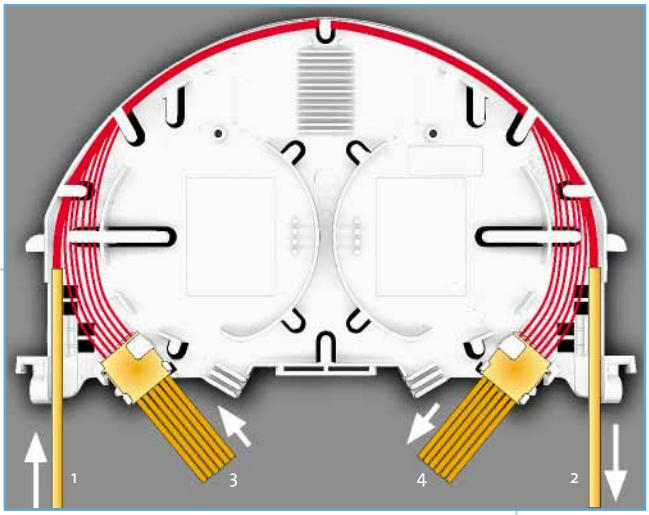
Typically and unique for the VIP Fiber Management system is that the **fibers remain best protected as long as possible in their own cable buffer tubes**. Only when dividing the fibers of one buffer tube onto a certain number of subscriber splice trays is it necessary to feed the fibers into short (approx. 10 cm) protective tubes. This assures time saving while installation.



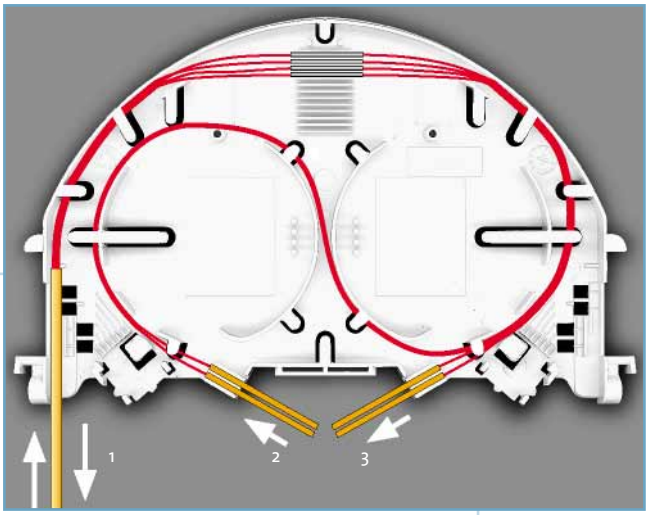
Jointing Splice Tray

Jointing Splice Tray

The VIP splice tray is used as a **standard jointing splice tray**, whenever the fibers of the buffer tubes from the in-coming and out-going cable have just to be connected. The cable buffer tubes are guided with a certain excess length, which is stored in the outer buffer tube storage of the closure, directly to the splice trays. Additional excess fiber length (approx. 1.2 m) is stored in the tray as well.
This management of the fibers and their buffer tubes (cable elements) is also called **„single element system"**. It is recommended to use a black tray as jointing splice tray.



Distribution Tray:
1) Buffer Tube from In-coming Cable
2) Buffer Tube to Out-going Cable
3) Protection Tubes from Subscriber Splice Tray
4) Protection Tubes to Subscriber Splice Tray



Subscriber Splice Tray:
1) Buffer Tube from Subscriber Cable
2) Protection Tubes from Distribution Tray
4) Protection Tubes to Distribution Tray

Distribution Tray

If the **single subscriber or single circuit management** is required, the fibers of one buffer tube (element) of the main (ring) cable have to be divided in a certain number of subscriber splice trays. In this case a VIP splice tray is used as a **fan-out adapter**.
On the short distance between distribution tray and subscriber splice tray the fibers are protected by protection tubes. Six of the protection tubes are combined by a kind of jacket, which can easily be plugged into the splice tray.
Up to two fibers can be fed into each protection tube. The number of protection tubes required depends on the number of fibers per buffer tube and on the network structure (one, two or four fibers per subscriber / circuit).
It is recommended to use the white VIP tray as a distribution tray.

Subscriber Splice Tray

Within the **subscriber splice trays** the fibers of just one subscriber respectively one circuit are spliced together. By handling the fibers of only a single subscriber / circuit in one splice tray it is possible to work on these fibers without disturbing any others. We recommend to use the blue VIP trays for subscriber splice trays.

If there are more fibers than necessary for one subscriber / circuit in one buffer tube of the cable from the subscriber / circuit, the fibers of these buffer tubes have also to be divided within a further **distribution tray**.

> VIP Distribution Frame

for Single-Subscriber Fiber Management

VIP Distribution Frame

These **19" VIP frames** enable the **VIP management system** to be used in 19" units. Optimum benefit is obtained by installing in a 19" swing frame.

The **VIP frame** provides a compact unit for splicing, distributing, terminating and patching of fibers. Patchcord slack is stored in the integral drawers.

Owing to the compact design it is possible to install a distributor for up to **144 fibers** in 6 U. Up to **12 connector panels** can be mounted at the front. From the connector panels the pigtails are run via routing systems to the splice trays.

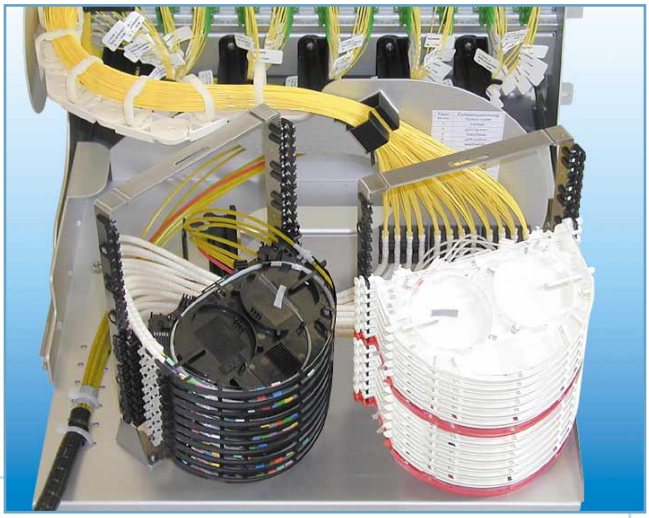
Up to **42 VIP trays** (2 x 21) can be incorporated in the VDF. Each individual tray can perform three functions (subscriber tray, distribution tray, jointing splice tray) and can be configured to suit local requirements.

Where phased network expansion is planned, fibers from buffer tubes, needing initially only to be spliced through, can be distributed to subscriber trays. When expansion is subsequently carried out, these subscriber fibers can then be spliced to a pigtail and connected to the subscriber cable.

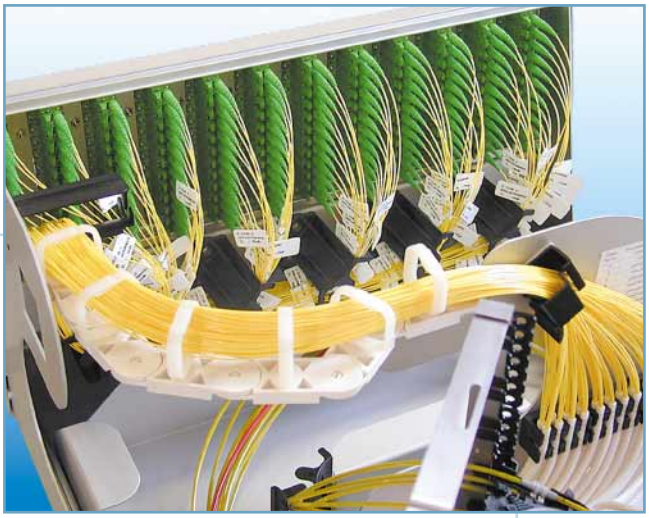
VIP Distribution Frame

Variant: 6 U for 2 blocks with 21 VIP trays in blue, 144 ports due to 12 panels (E-2000™ / APC)

VIP frames, pre-assembled with pigtails, adapters and splice trays to customer requirements on request!



VIP Distribution Frame from rear with 10 black inline splice trays on left and 2 red distribution trays combined with 6 white subscriber trays on the right



Pigtail Management System of the VIP Distribution Frame

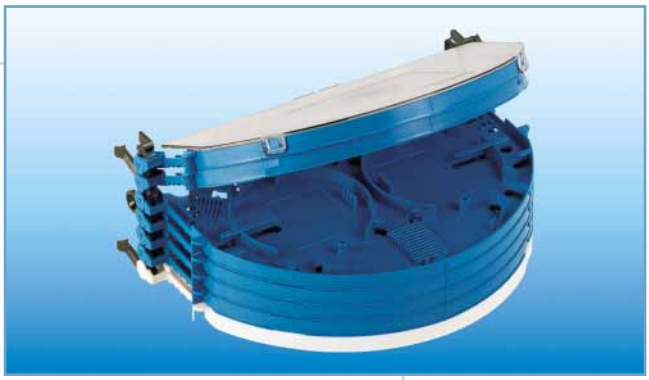
Designation	Dimensions (W x H x D)	Order Number
VIP Distribution Frame, empty, 6 U / 19"	19" (482.6 mm) x 6 U (266.7 mm) x 380 mm	S46998-A5-A46
VIP Distribution Frame, empty, 6 U / 19", equipped with 12 panels E-2000™ / APC and pigtails (0.1 dB)	19" (482.6 mm) x 6 HE (266.7 mm) x 380 mm	S46998-A5-A297

1 U (height unit) = 44.45 mm

Delivery Unit: 1 pc.

Accessories:
see next page!

> Accessories for VIP Distribution Frame



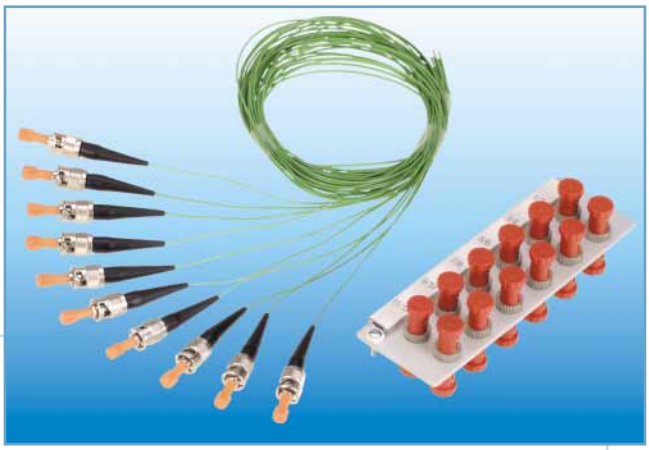
Splice Trays with VIP Fiber Management

Protective Tube Set for buffer tubes and pigtails

VIP Splice Trays and Protective Tube Sets

Designation	Description / Delivery Unit	Order Number
VIP Splice Trays		
VIP Splice Tray	For crimp splice protection	
- White	10 pcs.	S46998-A4-A8
- Black	10 pcs.	S46998-A4-A9
- Red	10 pcs.	S46998-A4-A10
- Blue	10 pcs.	S46998-A4-A11
VIP Splice Tray	For heatshrink splice protection	
- White	10 pcs.	S46998-A4-A13
- Black	10 pcs.	S46998-A4-A14
- Red	10 pcs.	S46998-A4-A15
- Blue	10 pcs.	S46998-A4-A16
Tray Module VIP for Crimp Splice Protection	As fanning block for single-fiber management of up to 12 fibers	
- 7 trays	1 white, 6 blue	S46998-A1-R28
- 8 trays	2 white, 6 blue	S46998-A1-R30
Tray Module VIP for Heat-shrink Splice Protection	As fanning block for single-fiber management of up to 12 fibers	
- 7 Trays	1 white, 6 blue	S46998-A1-R29
- 8 Trays	2 white, 6 blue	S46998-A1-R31
Tray Module VIP for Crimp Splice Protection, 8 Trays, Black	As fiber joining block for up to 96 fibers	S46998-A1-R26
Tray Module VIP for Heat-shrink Splice Protection, 8 Trays, Black	As fiber joining block for up to 96 fibers	S46998-A1-R27
Protective Tube Sets		
Protective Tube Set for VDF for Routing and Protecting Buffer Tubes and Pigtails	Spiral tube black, 1 m, inside ø 15 mm protective tube white, 10 m, inside ø 3.1 mm	S46998-A5-R16
Protective Tube	Single, 5 m	S46998-A1-R10
Protective Tube Jacket	6 protective sleeves each, 105-130 mm, pack of 10	S46998-A1-R17
Protective Tube Jacket	6 protective sleeves each, 570-595 mm, pack of 10	S46998-A1-R38

Splice Protectors: see page 56/57 Fiber Optic Tools: see page 240



Connector Panel, mounted with 12 Adapters, and 12 Pigtails attached

Connector Panels 3 U

The **connector panels** are used in VIP subracks to terminate the spliced pigtails from the VIP trays and to connect them to the patchcords.
Each loaded panel is provided with a designation strip and a transparent cover strip. The preprinted numbering can be manually overwritten on the rear.

Connector panels are available in three delivery units:

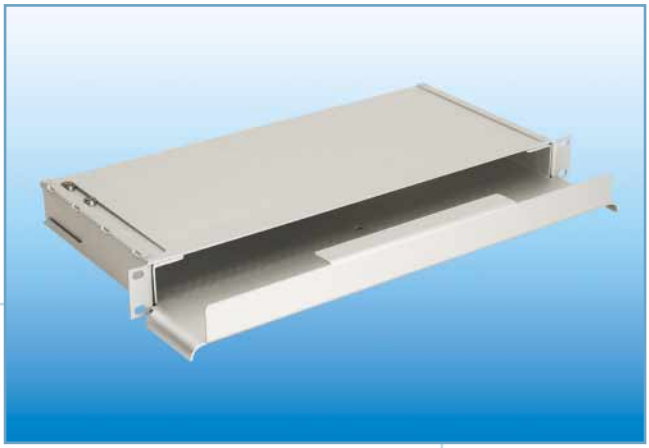
- Connector panels loaded with 12 **adapters**, 12 accompanying 900-µm **pigtails**, length 3 m
- Connector panels loaded with 12 **adapters**
- Connector panels **empty**

Designation	Horizontal Pitch (HP)	Order Number
Connector Panels with up to 12 Ports, 3 U, including Pigtails, equipped with		
- E-2000™ / APC, SM, with 12 ports	7	S46998-A5-A50
- E-2000 Compact / APC, SM, with 12 ports	7	S46998-A5-A54
- SC, SM, with 12 ports	7	S46998-A5-A55
- SC / APC, with 8 ports	7	S46998-A5-A84
- E-2000 / APC, SM, with 12 ports	8	S46998-A5-A57
- E-2000 Compact / APC, SM, with 12 ports	8	S46998-A5-A58
- LSA / DIN, SM, with 12 ports	8	S46998-A5-A59
- FC / PC, SM, with 12 ports	8	S46998-A5-A60
- SC-Duplex, SM, with 12 ports	8	S46998-A5-A61
- ST™, SM, with 12 ports	8	S46998-A5-A63
- SC-Duplex, MM 62.5 µm, with 12 ports	8	S46998-A5-A62
- ST, MM 50 µm, with 12 ports	8	S46998-A5-A64
Connector Panels with 12 Ports, 3 U, equipped with		
- SC / PC, SM / MM	7	S46998-A5-A280
- SC / APC, SM	7	S46998-A5-A82
- SC Duplex, SM	8	S46998-A5-A77
Connector Panels 3 U, empty		
- E-2000	7	S46998-A5-A65
- SC	7	S46998-A5-A68
- FC / PC	8	S46998-A5-A66
- ST	8	S46998-A5-A67
Additional Accessories		
Designation Strips for Conn. Modules, no Inscription, White, 50 pcs.		S46998-A5-R11
Cover Strips for Designation Strip, Transparent, 10 pcs.		S46998-A5-R7

1 U (height unit) = 44.45 mm

Delivery Unit: 1 pc.

> Accessories for HDC Hardware Family



19" Patchcord Drawer 1 U

19" Patchcord Drawer 1 U

The **patchcord drawers** are used for storing patchcord slack. The 19" drawers can be located at a central position in the cabinet or under each subrack below the patch tray. Provision for patchcord slack should be made as required.

- **Material:** Aluminum anodized.

Items Supplied

Supplied including mounting hardware.

Designation	Order Number
Patchcord Drawer	S46998-A5-A16

Delivery Unit: 1 pc.

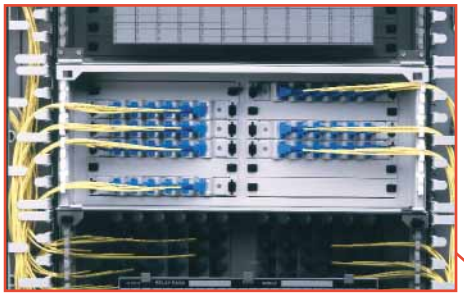
Further Accessories

Designation	Delivery Unit	Order Number
19" Blank Panels 1 U, for unassigned U	2 pcs.	S46998-Z104-A19
19" Blank Panels 2 U, for unassigned U	2 pcs.	S46998-Z104-A20
19" Blank Panels 3 U, for unassigned U	2 pcs.	S46998-Z104-A21
Blank Panel for 19" Subrack, 4 HP, for covering the subrack	1 pc.	S46998-A5-A26
Blank Panel for 19" Subrack, 7 HP, for covering an empty position	1 pc.	S46998-A5-A25
Blank Panel for 19" Subrack, 8 HP, for filling an empty position	1 pc.	S46998-A5-A12
Patchcord Hoop plastic, small, dimensions: 70 x 44 mm	10 pcs.	S46998-Z101-S21
Patchcord Hoop plastic, large, dimensions: 105 x 70 mm	10 pcs.	S46998-Z104-A22
Patchcord Hoop metal, small, dimensions: 80 x 40 mm	10 pcs.	S46998-Z104-A23
Patchcord Hoop metal, large, dimensions: 120 x 90 mm	10 pcs.	S46998-Z104-A24
Baying Kit for linking HDC Cabinets	1 kit	S45752-Z502-A111
Mounting Kit for insulating installation of the HDC	1 kit	S46998-A5-A49
Insulating Mat for HDC	1 pc.	S46998-Z105-A22
Radius Limiters for patchcords	100 pcs.	S46998-Z300-A9
Cable Guide for breakout cables	1 pc.	S46998-A5-R17
Cable Clips for HDC (strain-relief clips)		on request
Cable Ties		on request
Cover Strip for designation strip	10 pcs.	S46998-A5-R7
Designation Strip, blank white	50 pcs.	S46998-A5-R11
M6 Mounting Screws for 19" plane	100 pcs.	S46998-Z101-S90
M6 Cage Nuts for HDC	50 pcs.	S46998-Z101-S91
ETSI-19" Adapter, 3 U	2 pcs.	S46998-A5-A32
ETSI-19" Adapter, 6 U	2 pcs.	S46998-A5-A33
HDC Swing Frame Handle	1 pc.	S46998-A5-A55
PG Fittings (Protection rating IP54)		
PG 13.5 (cable Ø 6-12 mm)	10 pcs.	S45752-Z502-A162
PG 16 (cable Ø 10-14 mm)	10 pcs.	S45752-Z502-A143
PG 21 (cable Ø 13-18 mm)	10 pcs.	S45752-Z502-A144
PG 29 (cable Ø 18-25 mm)	10 pcs.	S45752-Z502-A145
Adapter Ring f. PG 13.5	10 pcs.	S45752-Z502-A146
PG Cable Entry Glands, Adapter Ring (Protection rating IP66)		
PG 13.5 (cable Ø 6-12 mm)	10 pcs.	S45752-Z502-A161
PG 16 (cable Ø 10-14 mm)	10 pcs.	S45752-Z502-A140
PG 21 (cable Ø 13-18 mm)	10 pcs.	S45752-Z502-A141
PG 29 (cable Ø 18-25 mm)	10 pcs.	S45752-Z502-A142

1 U (height unit) = 44.45 mm *1 HP (horizontal pitch) = 5.08 mm*

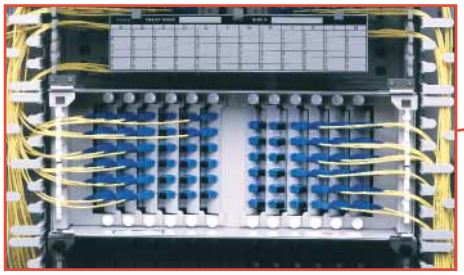
> ACH Hardware Family

Fiber Distribution Centers and Components – Overview



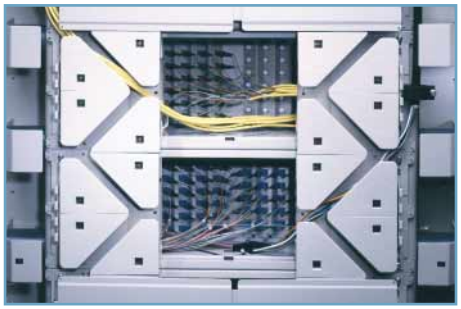
Horizontal Housings

The ACH Horizontal Housings accommodate both fiber termination and the inclusion of couplers/splitters and WDMs in the fiber optic network.



Connector Housing

The ACH Connector Housing accommodates panels with a variety of popular connector types and fiber counts and features engineered jumper routing.

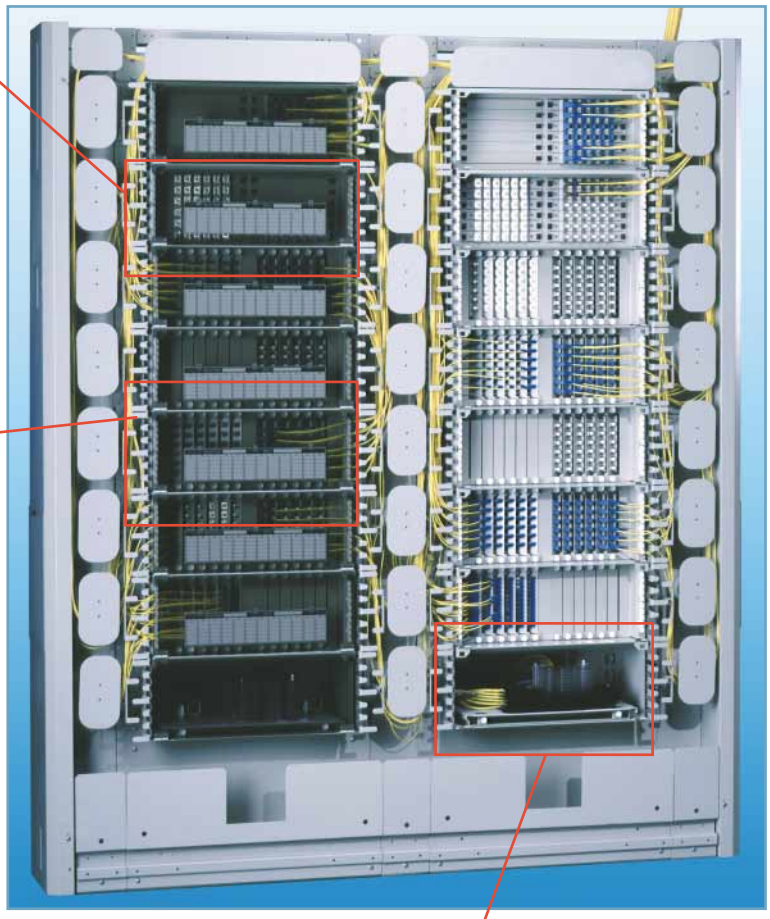


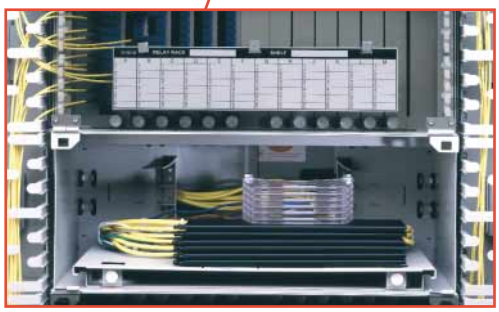
Rear View of ACH Housing

All ACH Housings feature engineered routing for buffer tubes and cables, as well as enhanced access to fiber in the rear of the housing.

Application

The ACH product family is designed to organize and manage high fiber-count cross-connect and interconnect installations and allows a complete package tailored to the needs of your installation.



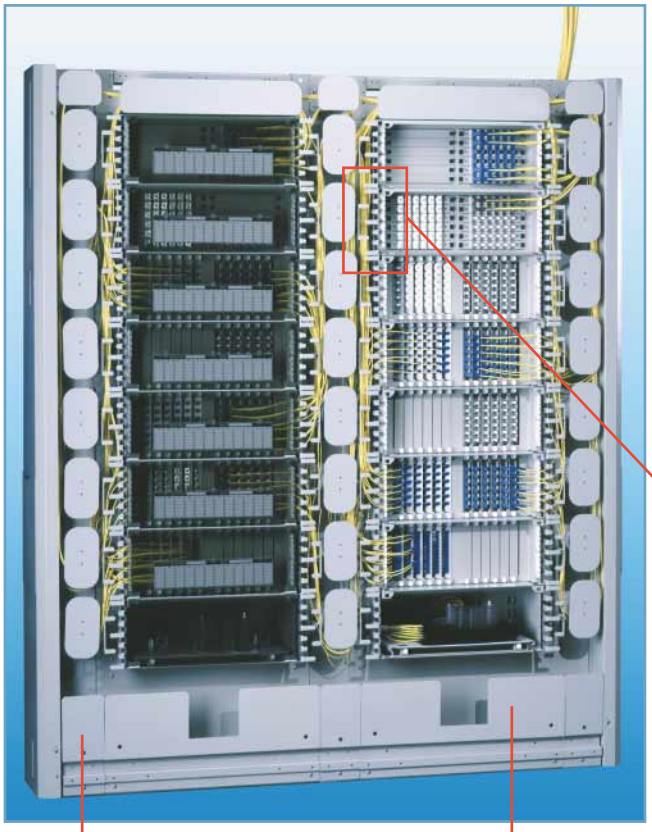


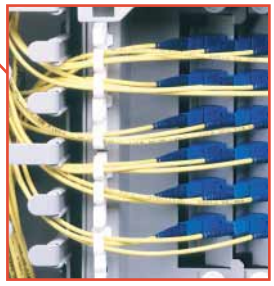
Splice Housing

The ACH Splice Housing enables on-the-rack splicing and accommodates up to 168 splices.

ACH Hardware Family

Frames and Components – Overview





Network Bay

The ACH Network Bay includes vertical routing guides that organize and retain jumpers while also offering easy access.

Interbay Storage Unit

The ACH Interbay Storage Unit enables organized jumper routing and slack storage.

Jumper trough

The deep jumper trough in the ACH Network Bay provides extra room for slack storage.

Rear Bay

The ACH Rear Bay Storage Unit offers organized routing of cables on the rear of the ACH system.

For further Information, please ask your Corning sales representative

> LANscape™ Hardware Family

Fiber Cable Management Solutions – Overview

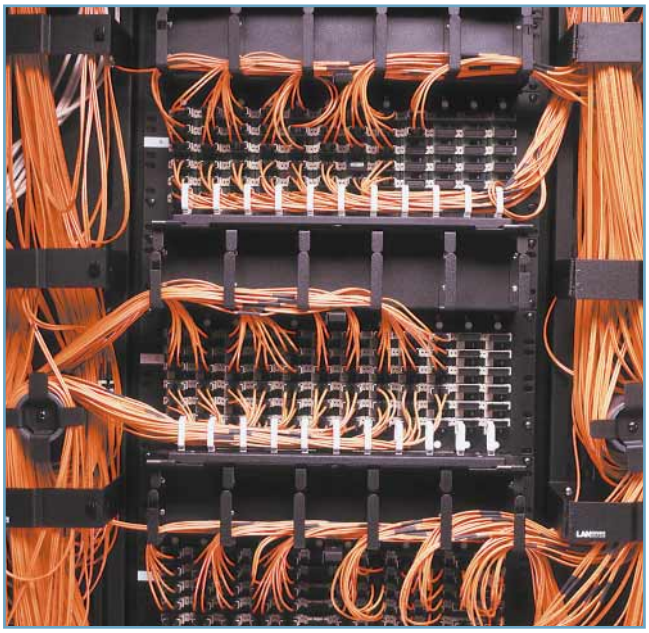
Modular Components

- **CCH – Closet Connector Housings:**
  1 U, 2 U, 3 U , and 4 U sizes*;
  12 - 144 fiber capacities
- **CJP – Jumper Storage and Management:**
  Panels: 1 U, 2 U, and 3 U
- **CSH – Closet Splice Housing:**
  3 U and 5 U; up to 264 splice capacity
- **CDF – Closet Distribution Frame:**
  Standard 19", height 2134 mm;
  aluminum equipment rack
- **IBS – Interbay Slack Storage:**
  removable covers and dust cap holders
- **CJT – Jumper Trough:**
  1 U and 2 U
- **BRP – Blank Out Filler Panels:**
  1 U, 2 U, 3 U, 4 U, and 5 U

** 1 U (height unit) = 44.45 mm*

Features

- **Enhanced cable strain relief**
- **Cable routing guides for bend radius control**
- **Colored icon circuit identification**
- **Advanced Labeling – EIA / TIA compliant**
- **On-board documentation panels**
- **Integrated splice tray options – pigtail splicing**
- **Engineered jumper management and protection**



Application

- **MAN**
- **LAN**
- **Building entrance facilities**

For further Information, please see our catalog "FutureLink™ Modular - Fiber Optic Cabling System", order number C1-K18-2-7600, or ask your Corning sales representative

> 19" Network Cabinet FDF 19

19" Network Cabinet FDF 19

Application

The **Network Cabinet FDF 19**, pre-assembled, was designed with networking specialists to meet practical needs and is provided with application-specific accessories. Such accessories as cable management hoops, adjustable feet, cable strain relief bars, etc. are included.

Items Supplied

Network cabinet, transparent door at front with AL frame, RAL 7035, 180° hinges, 3-mm single pane safety glass (designation strips can be inserted in upper and lower cross members), door handle and security insert, top cover for cable entry, 3-section bottom panel, 100-mm base with venting slots, star grounding to potential equalizing bar, cabinet painted in textured RAL 7032.

Also included:

- 4 spacing bolts, 10 mm, to raise the top cover for ventilation
- 4 adjustable feet
- 6 C-section rails for cable strain relief
- 10 jumper hoops, 70 x 44 mm
- 50 snap-in nuts with screws and plastic washers
- 19“ mounting rails, (19“) 42 U, front
- Mounting rails, (19“) 42 U, rear
- Side panels, lockable, same lock as front doors
- Rear door of steel with door handle and security insert
- Neutral grounding

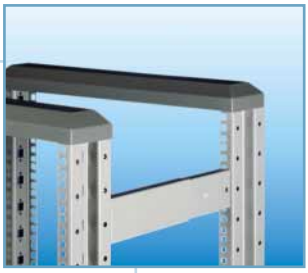
Designation	Order Number
Network Cabinet FDF 19, 800 x 2000 x 800 mm (WxHxD)	S46998-Z101-A4

1 U (height unit) = 44.45 mm

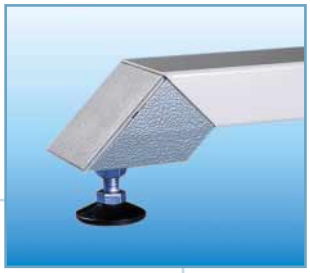
Delivery Unit: 1 pc.

> 19" Distribution Frame FDF 500

Distribution Frame FDF 500 / with 2nd Plane



Depth Member



Leveling Feet

Cable Channeling

Technical Description / Items Supplied

19" frame, welded from 2-mm sheet steel,
painted RAL 7032, incl. installation accessories, 40 U

Designation	Order Number
Distribution Frame FDF 500, 550 x 1900 x 750 mm (WxHxD)	S46998-Z101-A7
Second Fixing Plane for FDF 500	S46998-Z101-S16
Depth Member	S46998-Z101-S17
Leveling Feet	S46998-Z101-S18
Cable Channeling	S46998-Z101-S19
Baying Kit	S46998-Z101-S20

1 U (height unit) = 44.45 mm

Delivery Unit: 1 pc.

> 19" Wall-Mount Distributor FDF 19/E

Wall-mount Distributor FDF 19/E

19" Wall-Mount Fiber Distributor FDF 19/E

Used e.g. as **intermediate entrance** for high-fiber-count cables. Three-section, hinged 19" wall-mount enclosure of 1.5-mm sheet steel fully assembled.
Suitable for small distribution nodes with up to 576 fibers.
Installation of VIP Distribution Frame possible.

Items Supplied

- 1 wall section of 1.5-mm sheet steel
- 1 cable gland plate for top, closed, and 1 cable gland plate for bottom with brush inserts
- 1 hinged section of 1.5-mm sheet steel with two 19" rails mounted on C-rails
- Steplessly adjustable throughout depth
- IP 65 to EN 60529

Designation	Order Number
Wall-Mountable 19" Cabinet FDF 19/E	
- with 9 U, 600 x 478 x 515 mm (WxHxD)	S46998-Z104-A17
- with 15 U, 600 x 746 x 515 mm (WxHxD)	S46998-Z101-A6
- with 21 U, 600 x 1012 x 515 mm (WxHxD)	S46998-Z104-A18
Gland Plate With Brush Insert for Cable Entry	S46998-Z101-S15

1 U (height unit) = 44.45 mm

Delivery Unit: 1 pc.

> 19" FO Units

Adaptable in all 19" Cabinets and Frames

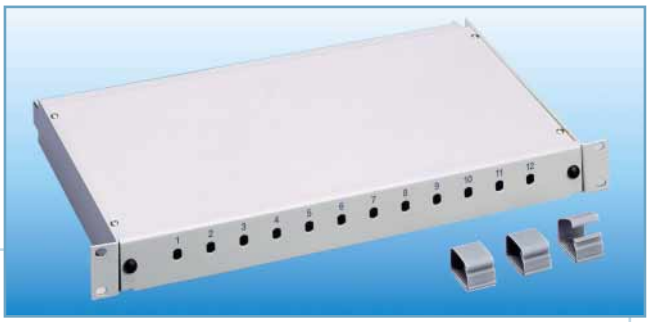
Description

The **FO unit** can accommodate 2 splice trays and can be installed in any network distributor with 19" mounting. It is used for final termination or distribution of optical fibers. All common splice trays can be installed. The FO unit is infinitely depth adjustable within the 19" flanges up to 100 mm. In addition the splice box can be removed completely from the 19" flanges.

- **Installation Depth:** 302 mm

Items Supplied

Incl. mounting accessories, cable management clips and tray cover. Supplied without patch panel (order separately). Patch panels are available for the splice unit with suitable knockouts for fitting various FO adapters. The patch panels are secured to the splice box with rapid fasteners.
Panels are to be ordered separately!



19" FO Unit 1 U for up to 2 splice trays

Designation	Order Number
19" Basic Unit 1 U	S46998-Z101-A14
Panels 1 U for:	
- 12 ST™	S46998-Z101-S50
- 20 E-2000™ / E-2000-APC / SC / SC-APC	S46998-Z101-S51
- 12 SC-Duplex	S46998-Z101-S56

1 U (height unit) = 44.45 mm *Delivery Unit: 1 pc.*

19" FO Unit 2 U for up to 4 splice trays

Designation	Order Number
19" Basic Unit 2 U	S46998-Z101-A16
Panels 2 U for:	
- 24 ST	S46998-Z101-S70
- 40 E-2000 / E-2000-APC / SC / SC-APC	S46998-Z101-S71
- 24 SC-Duplex	S46998-Z101-S76

1 U (height unit) = 44.45 mm *Delivery Unit: 1 pc.*

Further FO Units:
see next page!

> 19" FO Units Slidable

Adaptable in all 19" Cabinets and Frames

Description

The **FO unit** accomodates 2 splice trays and can be installed in any network distributor with 19" mounting. It is used for final termination or distribution of optical fibers. The fully extending telescopic drawer optimizes access to the splice trays and the cable strain relief. All popular splice trays can be installed.

- Installation Depth: 363 mm

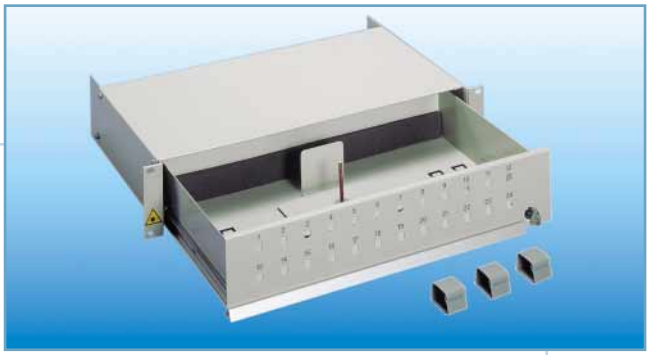
Items supplied

Incl. mounting accessories for patch panel, cable management clips, security lock and tray cover. Supplied without patch panels (order separately).
Patch panels are available for the splice unit with suitable knockouts for fitting various FO adapters.
Panels are to be ordered separately!

19" FO Unit, slidable, 1 U, for up to 2 splice trays

Designation	Order Number
19" Basic Unit 1 U, slidable	S46998-Z101-A13
Panels 1 U for:	
- 12 ST™	S46998-Z101-S40
- 12 FC-PC	S46998-Z101-S41
- 20 E-2000™ / E-2000-APC / SC / SC-APC	S46998-Z101-S42
12 SC-Duplex	S46998-Z101-S47

1 U (height unit) = 44.45 mm *Delivery Unit: 1 pc.*



19" FO Unit, slidable, 2 U, for up to 4 splice trays

Designation	Order Number
19" Basic unit 2 U, slidable	S46998-Z101-A15
Panels 2 U for:	
- 24 ST	S46998-Z101-S60
- 24 FC-PC	S46998-Z101-S61
- 40 E-2000 / E-2000-APC / SC / SC-APC	S46998-Z101-S62
- 24 SC-Duplex	S46998-Z101-S67

1 U (height unit) = 44.45 mm *Delivery Unit: 1 pc.*

19" FO Unit, slidable, 3 U, for up to 6 splice trays

Designation	Order Number
19" Basic unit 3 U, slidable	S46998-Z101-A17
Panels 3 U for:	
- 48 ST	S46998-Z101-S80
- 48 FC-PC	S46998-Z101-S81
- 48 E-2000 / E-2000-APC / SC / SC-APC	S46998-Z101-S82
- 36 SC-Duplex	S46998-Z101-S87

1 U (height unit) = 44.45 mm *Delivery Unit: 1 pc.*

> 19" FO Units, Assembled, with Diamond Pigtails

Adaptable in all 19" Cabinets and Frames

19" FO Unit, assembled

Description

Adapters screwed into patch panel, 2.5 m pigtails as 900 µm composite-buffered fiber, connectors in the adapters, open end stored in the splice trays, splice trays mounted on central element. All fibers are prepared for splicing. A length of 1200 mm without coating is stored in the splice trays.

When ordering, select the appropriate fiber and adapter type from the following order matrix.
Delivery unit: 1 pc.

Adapters	19 " FO Units 1 U		
	Order Number SM 9/125 µm	Order Number MM 50/125 µm	Order Number MM 62.5/125 µm
12 ST™	-	S46998-A5-A138	S46998-A5-A176
12 FC / PC	S46998-A5-A101	S46998-A5-A139	S46998-A5-A177
20 E-2000™	S46998-A5-A102	S46998-A5-A140	S46998-A5-A178
20 E-2000 / APC	S46998-A5-A103	-	-
20 SC	S46998-A5-A105	S46998-A5-A143	S46998-A5-A181
20 SC / APC	S46998-A5-A106	-	-
12 SC Duplex	S46998-A5-A107	S46998-A5-A145	S46998-A5-A183
10 E-2000 Duplex	S46998-A5-A104	S46998-A5-A142	S46998-A5-A180

Adapters	19 " FO Units 2 U		
	Order Number SM 9/125 µm	Order Number MM 50/125 µm	Order Number MM 62.5/125 µm
24 ST	-	S46998-A5-A153	S46998-A5-A191
24 FC / PC	S46998-A5-A116	S46998-A5-A154	S46998-A5-A192
40 E-2000	S46998-A5-A117	S46998-A5-A155	S46998-A5-A193
40 E-2000 / APC	S46998-A5-A118	-	-
40 SC	S46998-A5-A120	S46998-A5-A158	S46998-A5-A196
40 SC / APC	S46998-A5-A121	-	-
24 SC Duplex	S46998-A5-A122	S46998-A5-A160	S46998-A5-A198
20 E-2000 Duplex	S46998-A5-A119	S46998-A5-A157	S46998-A5-A195

Adapters	19 " FO Units 3 U		
	Order Number SM 9/125 µm	Order Number MM 50/125 µm	Order Number MM 62.5/125 µm
48 ST	-	S46998-A5-A168	S46998-A5-A206
48 FC / PC	S46998-A5-A131	S46998-A5-A169	S46998-A5-A207
48 E-2000	S46998-A5-A132	S46998-A5-A170	S46998-A5-A208
48 E-2000 / APC	S46998-A5-A133	-	-
48 SC	S46998-A5-A135	S46998-A5-A173	S46998-A5-A211
48 SC / APC	S46998-A5-A136	-	-
36 SC Duplex	S46998-A5-A137	S46998-A5-A175	S46998-A5-A213
40 E-2000 Duplex	S46998-A5-A134	S46998-A5-A172	S46998-A5-A210

1 U (height unit) = 44.45 mm

For further 19" FO units, please see our catalog "FutureLink Modular - FO Cabling Systems", order number C1-K18-2-7600

> VIP Wall Distributor

for Outdoors and Indoors

VIP Wall-Mount Distributor, closed

VIP Wall-Mount Distributor with VIP Frame swung open

VIP Wall Distributor

The **VIP Wall Distributor** is designed for VIP fiber management applications. This compact unit facilitates the splicing, distribution, termination and patching of fibers. This distributor can accommodate **42 VIP trays and 48 ports** via panels.

During installation, access is possible from all sides and the entire VIP tray block can be swung to the side. After installation, door and side covers are screwed to the base plate.

The enclosure comprises a **base plate** to which a **gland plate** is attached at the top and bottom. The cables are secured to these gland plates and fed into the enclosure. At the bottom is a **strain-relief** for the central strength members. It is possible to use both PG glands and a special cable gland unit that enables **uncut cables** to be fed through the enclosure.

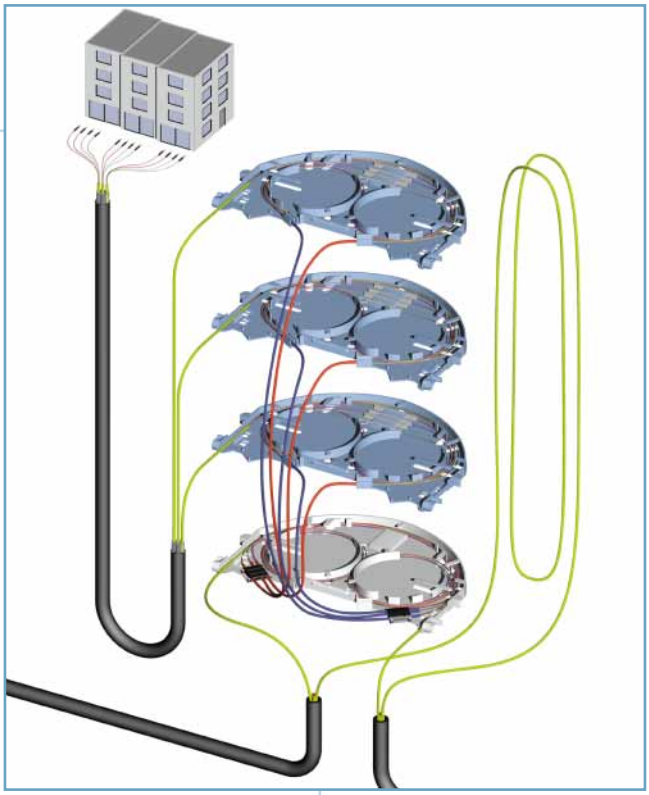
The left side of the enclosure accommodatesup to **42 VIP trays** which are pivot-mounted. Behind the trays is **slack store** for the buffer tubes. Here, the incoming buffer tubes are stored and routed to the trays and the spliced pigtails are routed to the **patch panel** on the right-hand side. There are **48 connector positions** available that can accommodate different types of adapter. Patchcords are also brought out via the cable gland unit.

Items Supplied

Wall-mount enclosure, sheet steel, painted RAL 7032, fitments for VIP management on mounting panel, 4 patch panel holders for up to 48 fiber adapters.
Mounting panel with integral strain relief for cable sheaths as well as for central members.

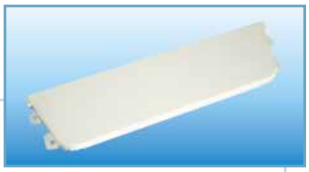
Supplied with blind plate top and rubber foam gland plate bottom. Other variants on request

- **Possible protection rating:** **IP 54**
- **Standard protection rating:** **IP 20**

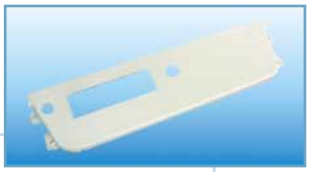


Layout of the VIP System

Equipped VIP Distributor

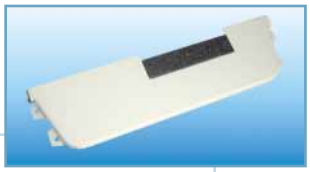


Blind Plate



Entry Plate for Cable Gland

Cable Gland



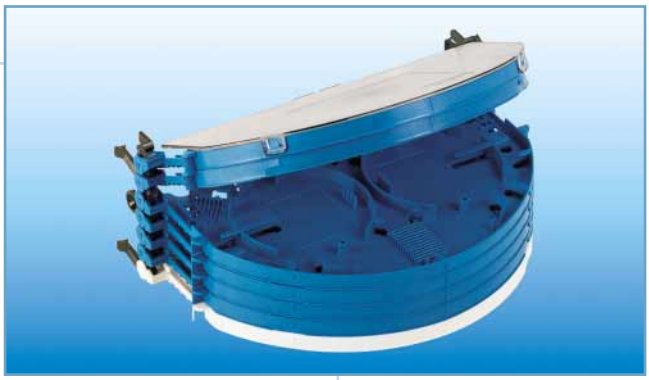
Entry Plate with Rubber Foam

Order Numbers

Designation	Description / Delivery Unit	Order Number
VIP Wall Distributor	400 x 500 x 200 mm, 1 pc.	S46998-A5-A79
Wall-Mounting Bracket	4 pcs.	S46998-Z101-A23
Cable Entry Plates:		
- Blind Plate		S46998-A5-R65
- for Bottom	Including Cable Gland, for 2 cables Ø 8 - 36 mm, 1 pc.	S46998-A5-R63
- for Top	Including Cable Gland, for 2 cables Ø 8 - 36 mm, 1 pc	S46998-A5-R64
- for Bottom	With Rubber Foam, for up to 5 cables with Ø up to 22 mm, 1 pc.	S46998-A5-R61
- for Top	With Rubber Foam, for up to 5 cables with Ø up to 22 mm, 1 pc.	S46998-A5-R62
PG Glands		see page 217

Accessories for VIP Wall Distributor:
see next page!

> Accessories for VIP Wall Distributor



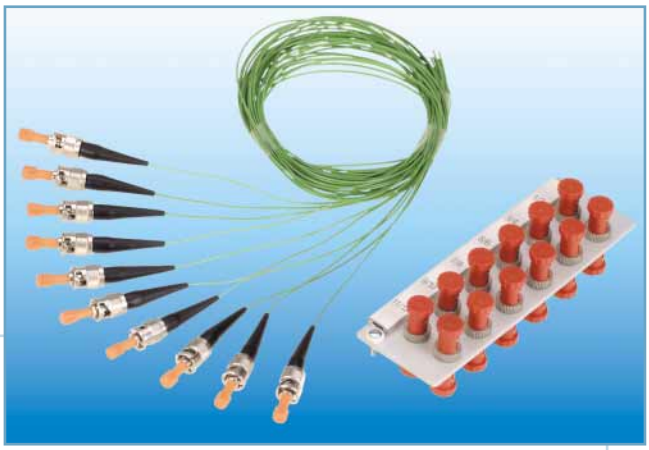
Splice Trays with VIP Fiber Management

Protective Tube Set for buffer tubes and pigtails

VIP Splice Trays and Protective Tube Sets

Designation	Description / Delivery Unit	Order Number
VIP Splice Trays		
VIP Splice Tray	For crimp splice protection	
- White	10 pcs.	S46998-A4-A8
- Black	10 pcs.	S46998-A4-A9
- Red	10 pcs.	S46998-A4-A10
- Blue	10 pcs.	S46998-A4-A11
VIP Splice Tray	For heatshrink splice protection	
- White	10 pcs.	S46998-A4-A13
- Black	10 pcs.	S46998-A4-A14
- Red	10 pcs.	S46998-A4-A15
- Blue	10 pcs.	S46998-A4-A16
Tray Module VIP for Crimp Splice Protection	As fanning block for single-fiber management of up to 12 fibers	
- 7 trays	1 white, 6 blue	S46998-A1-R28
- 8 trays	2 white, 6 blue	S46998-A1-R30
Tray Module VIP for Heat-shrink Splice Protection	As fanning block for single-fiber management of up to 12 fibers	
- 7 Trays	1 white, 6 blue	S46998-A1-R29
- 8 Trays	2 white, 6 blue	S46998-A1-R31
Tray Module VIP for Crimp Splice Protection, 8 Trays, Black	As fiber joining block for up to 96 fibers	S46998-A1-R26
Tray Module VIP for Heat-shrink Splice Protection, 8 Trays, Black	As fiber joining block for up to 96 fibers	S46998-A1-R27
Protective Tube Sets		
Protective Tube Set for VDF for Routing and Protecting Buffer Tubes and Pigtails	Spiral tube black, 1 m, inside ø 15 mm; protective tube white, 10 m, inside ø 3.1 mm	S46998-A5-R16
Protective Tube	Single, 5 m	S46998-A1-R10
Protective Tube Jacket	6 protective sleeves each, 105-130 mm, pack of 10	S46998-A1-R17
Protective Tube Jacket	6 protective sleeves each, 570-595 mm, pack of 10	S46998-A1-R38

Splice Protectors: see page 56/57 Fiber Optic Tools: see page 240



Connector Panel, mounted with 12 Adapters, and 12 Pigtails attached

Connector Panels

The **connector panels** are used to terminate the spliced pigtails from the VIP trays and to connect them to the patch-cords.
Each loaded panel is provided with a designation strip and a transparent cover strip. The preprinted numbering can be manually overwritten on the rear.

Connector panels are available in three delivery units:

- Connector panels loaded with **12 adapters**, 12 accompanying **900-µm pigtails**, 3 m long
- Connector panels loaded with **12 adapters**
- Connector panels **empty**

Designation	Horizontal Pitch (HP)	Order Number
Connector Panels with up to 12 Ports, including Pigtails, equipped with		
- E-2000™ / APC, SM, with 12 ports	7	S46998-A5-A50
- E-2000 Compact / APC, SM, with 12 ports	7	S46998-A5-A54
- SC, SM, with 12 ports	7	S46998-A5-A55
- SC / APC, with 8 ports	7	S46998-A5-A84
- E-2000 / APC, SM, with 12 ports	8	S46998-A5-A57
- E-2000 Compact / APC, SM, with 12 ports	8	S46998-A5-A58
- LSA / DIN, SM, with 12 ports	8	S46998-A5-A59
- FC / PC, SM, with 12 ports	8	S46998-A5-A60
- SC-Duplex, SM, with 12 ports	8	S46998-A5-A61
- ST™, SM, with 12 ports	8	S46998-A5-A63
- SC-Duplex, MM 62.5 µm, with 12 ports	8	S46998-A5-A62
- ST, MM 50 µm, with 12 ports	8	S46998-A5-A64
Connector Panels with 12 Ports, equipped with		
- SC / PC, SM / MM	7	S46998-A5-A280
- SC / APC, SM	7	S46998-A5-A82
- SC Duplex, SM	8	S46998-A5-A77
Connector Panels, empty		
- E-2000	7	S46998-A5-A65
- SC	7	S46998-A5-A68
- FC / PC	8	S46998-A5-A66
- ST	8	S46998-A5-A67
Additional Accessories		
Designation Strips for Conn. Modules, no Inscription, White, 50 pcs.		S46998-A5-R11
Cover Strips for Designation Strip, Transparent, 10 pcs.		S46998-A5-R7

Delivery Unit: 1 pc.

> Wall-mounted Distributor 48/96

Indoor

Distributor 48/96

Patch Panel

Splice Tray Holder for 8 splice trays

Technical Description / Items Supplied

- **Housing**, two-section, made from 1.5 mm sheet steel, powder-coated in textured RAL 7032, in two versions for accomodating up to 48 or 96 optical fibers
- **Wall-mounting section** with holes for wall-mounting
- **11/16 jumper guides** for jumper cable/fiber excess
- **1/2 splice tray holders** for 8 / 16 splice trays
- 2 comb strips for **cable strain relief** and **brush inserts** for dust protection
- **Simple mounting** of patch panel on wall-mounting section
- **Cover** with hook-in mechanism and two twist locks
- **IP 20** rated as per EN 60529/10.91

Capacity

Up to 48 / 96 fibers (2 / 4 panels), up to 8 / 16 splice trays.

Application without Patch Panel

When the distributor 48 is used without patch panel, 1 / 2 splice tray holders can be retrofitted (max. splice capacity 16/32).

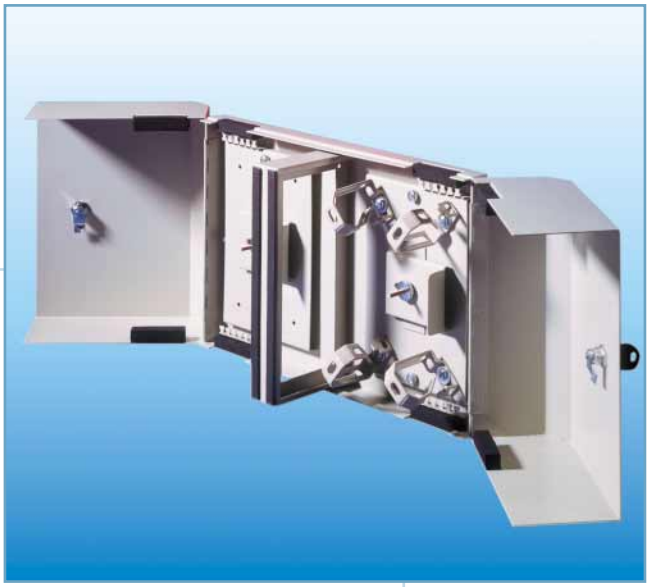
Locking Systems

Standard double-bit lock insert, replaceable by 15" lock from Zeiss-Ikon.

Designation	Delivery Unit	Order Number
Distributor 48, 500 x 500 x 120 mm (WxHxD)	1 pc.	S46998-Z101-A8
Distributor 96, 500 x 900 x 120 mm (WxHxD)	1 pc.	S46998-Z101-A9
Accessories		
Patch Panels		
- for 24 SC Duplex Connectors	1 set	S46998-Z101-S25
- for 48 ST™ Connectors	1 set	S46998-Z101-S23
- for 48 SC / E-2000™ Connectors	1 set	S46998-Z101-S24
Splice Tray Holder	1 pc.	S46998-Z101-S26
Lock 15"	1 pc.	S46998-Z101-S27
Key 15 "	1 pc.	S46998-Z101-S28
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
(for details of this and for splice organizers, see pages 136/137)	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

> Wall-mounted Collocation Distributor

Indoor



Collocation Distributor

Patch Panel

Splice Tray Holder

Technical Description / Items Supplied

- **Housing with doors** made from 1-mm sheet steel, powder-coated in RAL 7032 for accomodating up to 24 optical fibers with separate access
- **Wall-mounting section** with holders for wall mounting
- **4 jumper guides**
- **2 mountings**, each holding 2 splice trays on left and right
- 4 comb strips for **cable strain relief** and **rubber sealings** for dust protection
- **Simple mounting** of patch panels on wall-mounting section
- One **door** for covering and protecting the **splice tray holder**, separately locked.
- Second **door** for covering and protecting the **jumper area** / splice tray holder, separately locked
- **IP 20** rated as per EN 60529/10.91

Capacity

Up to 24 fibers (1 panel), up to 2 splice trays.

Application without Patch Panel

When the cross-connect is used without patch panel, 4 splice trays can be fitted.

Designation	Delivery Unit	Order Number
Wall-mounted Collocation Distributor, 400 x 250 x 120 mm (WxHxD)	1 pc.	S46998-Z101-A10
Accessories		
Patch Panel		
- for 24 ST™ Connectors	1 set	S46998-Z101-S29
- for 24 SC / E-2000™ Connectors	1 set	S46998-Z101-S30
- for 12 SC Duplex Connectors	1 set	S46998-Z101-S31
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
(for details of this and for splice organizers, see pages 136/137)	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

Splice Protectors: see page 56/57
Fiber Optic Tools: see page 240

> Wall-mounted Distributor / Sheet Steel

Outdoor / Indoor

Distributor / Sheet Steel

Description

The housing made of sheet steel is ideal for applications involving breakout of multifiber buffer tubes from a through cable. The only fibers of the break-out cable which are processed in the housing are those that are actually needed. The rest are put to storage in the housing and can be used for a further node. The housing can be used with or without patch panel. It can also accomodate multifiber buffers and splice trays.

Capacity

Up to 48 fibers (4 Panels), up to 4 splice trays

Items Supplied

- **1 housing** of sheet steel
- **2 flanged panels** of sheet steel, **for side**
- **1 flanged panel, for bottom**
- **7 cable routing guides** 70 x 40 mm
- **2 strain relief clamps**
- **1 cable strain relief bar**, double
- **1 door** of sheet steel, with 2 hinges on right
- **1 mounting plate** of sheet steel with 6 **cable routing guides** 70 x 44 mm
- **4 holders for patch panel**
- **1 splice tray holder**
- Painted in **RAL 7035**
- **IP 55** rated as per EN 60 529/10.91

Designation	Delivery Unit	Order Number
Wall-mounted Distributor / Sheet Steel, 400 x 500 x 155 mm (WxHxD)	1 pc.	S46998-Z101-A11
Accessories		
Patch Panels		
- for 24 ST™ Connectors	1 set	S46998-Z101-S33
- for 24 SC, E-2000™ Connectors	1 set	S46998-Z104-A25
- for 12 SC Duplex Connectors	1 set	S46998-Z104-A26
Wall Holder	1 pc.	S46998-Z101-S34
Cable Flanged Panel	1 pc.	S46998-Z101-S32
Security Lock Insert	1 pc.	S46998-Z101-S35
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
(for details of this and for splice organizers, see pages 136/137)	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

> Wall-mounted Distributor / Plastic

Outdoor / Indoor

Distributor / Plastic

Capacity

Up to 24 fibers (2 Panels), up to 2 splice trays.

Equipped Distributor

Mounting Plate

With facility for accomodating one or two splice trays, the width being variable from 92 to 120 mm.

Cable Entry

To facilitate cable insertion the distributor is pre-punched for PG cable glands. Optionally, cables can also be inserted with connectors. The cable can be held in the preformed holes by a 2-section cable inlet or cable feedthrough grommets depending on cable diameter.

Technical Description / Items Supplied

- **Housing and cover** of glass-reinforced polycarbonate for accomodating splice trays and patch panels
- Housing cover with **2 hinges**, housing **pre-punched for PG glands**; the relevant **PG cable glands** (12 x PG 7 and 1 x PG 16) are **included**
- **Mounting plate** with variable 2 splice tray capacity and integral rotation stop
- **Separating plate** to cover the splice tray
- **Mounting facility** for 2 patch panels and comb strip for cable strain relief
- 2 polyamide sealable **cover screws**, **insulating plugs** for wall-fixing screws made of polyamide

Features

- High **IP 66** rating as per EN 60 529/10.91
- **Hinged** housing cover
- **Sealable** closing screws
- **Cable glands** supplied as standard

Designation	Delivery Unit	Order Number
Wall-mounted Distributor / Plastic, 180 x 254 x 90 mm (WxHxD)	1 pc.	S46998-Z101-A12
Accessories		
Patch Panels		
- for 24 ST™ Connectors	1 set	S46998-Z101-S33
- for 24 SC, E-2000™ Connectors	1 set	S46998-Z104-A25
- for 12 SC Duplex Connectors	1 set	S46998-Z104-A26
Wall Holders	40 pcs.	S46998-Z101-S36
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
(for details of this and for splice organizers, see pages 136/137)	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

Splice Protectors: see page 56/57 | Fiber Optic Tools: see page 240

> Wall-mounted Distributor Vk 20/12

Indoor

Vk 20/12

Application

The distributor meets these demands as it is suitable to accomodate **24 optical fibers**. The distributor can be used for surface and flush installations.

Items Supplied

The distributor mainly consists of:

- **Box** made of sheet-steel according to DIN 47615, **with door and lock**
- **Aluminum tray** for the accomodation of max. 2 splice trays (24 fibers)
- Metal **cable support**
- **IP 41** rated as per EN 60529/10.91

Screws and dowels for surface installation are included in the kit content.

Installation

A pre-formed cable inlet area provides for easy introduction of the optical fibers. The trays guarantee simple and reliable guidance of the fiber buffers and distribution cables.

Designation	Delivery Unit	Order Number
Wall-mounted Distributor Vk 20/12 (indoor), 220 x 320 x 68 mm (WxHxD)	1 pc.	S46999-B8-A10
Accessories		
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
(for details of this and for splice organizers, see pages 136/137)	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

Splice Protectors: see page 56/57
Fiber Optic Tools: see page 240

> Wall-mounted Distributor 24

Outdoor / Indoor

Wall-mounted Distributor 24

Application

The distributor is used as jointing and branch-off sleeve. It has a housing capacity of 2 splice trays. Thus up to 24 fibers (fusion splices) or up to 20 fibers (mechanical splices, e.g. CamSplice) can be contained. The distributor can be wall- and pole-mounted in aerial networks.

Capacity

Up to 24 fibers (2 splice trays).

Items Supplied

- Glass-fiber reinforced **polyester housing**
- Stainless steel **optical fiber insert** with a maximum capacity of 2 splice trays
- **Cover plate** for trays
- **Support clips** for two cables
- **IP 64** rated as per EN 60529/10.91

The bottom plate of the distributor is provided with two metal stuffing boxes and three cable entries equipped with rubber sealings. The strain relief of the fibers is guaranteed via the central element and the sheath clip.

Installation

The steel insert provides a simple and safe guidance of fibers.

Designation	Delivery Unit	Order Number
Wall-mounted Distributor (Outdoor / Indoor), 330 x 171 x 90 mm (WxHxD)	1 pc.	S46999-B14-A1
Accessories		
Fastening Strap for pole mounting with 2 screws, 1 set nuts, without clamping band and lock	1 set	S45052-Z505-A10
Clamping Band	1 pc.	S45057-Z51-H631
Lock	1 pc.	S45055-Z14-A21
Standard Splice Tray for 12 single fibers, without cover	Pack of 2	C46197-A7-A70
(for details of this and for splice organizers, see pages 136/137)	Pack of 10	C46197-A7-A66
Cover for standard splice tray	Pack of 10	S46998-A4-A1

Splice Protectors: see page 56/57
Fiber Optic Tools: see page 240

Fiber Optic Tools

CORNING CABLE SYSTEMS

> Fiber Optic Tools

FO Tool Case

Fiber Optic Tool Case

FO Tool Case	Order Number
- with Basic Equipment	S46998-M2-A5
- with Complete Equipment	S46998-M2-A6
- for Indoor Cable Installation	S46998-M2-A4
- for Outdoor Cable Installation	S46998-M2-A3

Application

Installation of fiber optic cables and fibers requires **special tools**. The high-quality tools are available separately, e.g. for complete or additional assembly for special applications, as well as combined in FO tool cases. The following equipment sets cover the typical need for additional tools.

Equipment Sets

The **FO tool case** is available in four different equipment sets (see table). Basically, the case has two removable, double-sided tool plates, a cover tool plate, a plastic shell in the bottom and a document compartment in the case lid.
The equipment sets of the FO tool case can be taken from the table on the right page. The pre-assembled cases are delivered completely, the additional components separately.
You will find a listing of further components and consumables on page 242.

Fiber Optic Tools

> Fiber Optic Tools

Equipment Sets of Tool Case, Tools

Pos.	Designation	Application	Equipment: Standard	Equipment: Complete	Equipment: Indoor	Equipment: Outdoor	Order Number
	FO Tool Case, empty	For attaching FO tools	■	■	■	■	C46365-K1-A1
1	Cleaning Buds, Foam Material, 50 pcs.	Cleaning of connectors / adapters	■	■	■	■	S46998-Z303-A9
2	Cleaning Buds, Cotton, 100 pcs.	General cleaning	■	■	■	■	S46998-Z303-A8
3	Universal Buffer Tube Cutter UAT	Buffer tube cut at any position, universally adaptable to different buffer tube diameters		■			S46998-Z302-A2
4	Hot Air Blower, 230 V AC	Smoothing fibers, removing twist		■			S45756-Z401-A5
5	Slot Screwdriver Size 7	Universal		■	■	■	S45056-Z436-A8
6	Cross-slot Screwdriver Size 1	Universal (e.g. for UCAO)		■	■	■	S46998-Z303-A2
7	Cross-slot Screwdriver Size 2	Universal		■	■	■	S45056-Z436-A23
8	Stripping Tool, Ø 0.6 - 1.1 mm	Stripping of 900 µm coating	■	■	■	■	C46407--A9-A7
9	Stripping Tool, Ø 0.18 - 0.30 mm	Stripping of 250 µm coating	■	■	■	■	V26824-B408-V14
10	Stripping Tool for Buffer Tubes	Stripping up to Ø 3.2 mm	■	■	■	■	C46407-Z5-C1
11	Compressed Air Ball	Blowing away of dirt particles	■	■	■	■	S46999-Z10-A5
12	Buffer Tube Cutter OFAT for Buffer Tubes with Ø 2.4 - 3.1 mm	Buffer tube cut at any position		■			S46998-Z302-A1
13	Swab Moistener PE, Closeable	Alcohol dispenser	■	■	■	■	S46998-Z303-A10
14	Miller Stripping Tool	Stripping to 125 µm bare fiber		■			C46407-Z6-C1
15	Clauss Stripping Tool WS 5	Stripping 0.8 to 2.6 mm Ø	■	■			C46407-Z9-C2
16	Length / Diameter Measuring Tape	Measuring of lengths up to 1.4 m and diameters up to 320 mm	■	■	■	■	S46998-Z303-A3
17	Gutta-Percha Knife	Universal		■	■	■	S45056-Z407-A1
18	Tweezers, Metal	Universal	■	■	■	■	S45056-Z465-A6
19	Telephone Scissors 130 mm	Universal, cutting of Kevlar	■	■	■	■	S45056-Z405-A1
20	Scissors, Metal	Universal	■	■	■	■	S45056-Z405-A9
21	Marking Rings, Numbers 0 - 9	For Ø 0.8 - 1.1 mm, 300 pcs. per no.		■		■	see next page
22	Marking Rings, Numbers 0 - 9	For Ø 2.3 - 3.4 mm, 300 pcs. per no.		■		■	see next page
23	Tesa Fabric Tape	Universal	■	■	■	■	S45057-Z51-H4
24	Permanent Marker, Black	Markings	■	■	■	■	S45757-Z908-A3
25	Cable Stripper "Jokari"	Cable sheath cuts		■	■	■	S45056-Z420-A5
26	Socket Wrench SW 8	Screw M5 (e.g. UCAO)		■		■	S46998-Z303-A5
27	Socket Wrench SW 10	Screw M6 (e.g. UCSO)		■		■	S45056-Z426-A3
28	Thread Cutter / Separator	Cutting and separating of Kevlar threads and various fabric tapes	■	■			S46998-Z303-A4
29	Socket Wrench SW 13	Screw M8 (e.g. UCNC)		■		■	S45056-Z426-A2
30	Socket Wrench SW 11	Screw M6 (e.g. UCTL)		■		■	S45056-Z426-A24
31	Pliers 140 mm	Universal	■	■	■	■	S45756-Z401-A6
32	Side Cutting Pliers	Universal		■	■		S45056-Z419-A15
33	Cable Cutter	Universal	■	■		■	S45056-Z419-A13
34	Bolt Croppers	Cutting of central members with steel core	■	■		■	S46998-Z303-A1
35	Tube Cutting Tool	Cutting of central tubes				■	S45056-Z479-A4
36	Spare Cutting Wheel	For tube cutting tool				■	S45056-Z479-A5

> Fiber Optic Tools

Further Components, Consumables

Mounting Table

Pos.	Designation	Order Number
1	Cleaning Buds, Foam Material, 50 pcs.	S46998-Z303-A9
2	Cleaning Buds, Cotton, 100 pcs.	S46998-Z303-A8
23	Tesa Fabric Tape	S45057-Z51-H4
24	Permanent Marker, Black, 10 pcs.	S45757-Z908-A3
36	Spare Wheel for Tube Cutting Tool (pos. 35)	S45056-Z479-A5
37	Swab Moistener, Glass (Alcohol Dispenser)	S45058-Z537-H1
38	Cable Cleaner, 1l*	S45056-M84-A1
39	Isopropyl Alcohol, 2.5 l*	S45057-Z201-H108
40	Paper Cleaning Tissues, 200 x 210 mm, 100 pcs.*	S45757-Z908-A2
41	Connector Cleaning Cassette (for Connector Endfaces)	S46998-Z303-A11
42	Spare Cleaning Tape for pos. 41	S46998-Z303-A12
43	Plastic Fleece Tissues, Blue, 35 pcs.*	S45757-Z901-A57
44	Hand Microscope 100 x (Inspection of SC-, ST- , FC- and similar connector endfaces)	S46998-M2-A7
45	Stripping Tool 0.25-0.6 mm (Stripping of coatings with Ø 400 and 500 µm)	V26824-B408-V11
46	Clauss Stripping Tool WS4 (Stripping of fiber coatings up to 900 µm)	C46407-Z9-C1
47	Cable Cleaning Tissue, Isopropyl Alcohol, 100 pcs.*	S46998-M2-R1
48	Mounting Table, Foldable*	C45362-Z1-C1
49	Tube Cutter	S45756-Z401-A7
50	Stripping Tool for 900 µm Single Fibers	C46407-Z3-C3
51	Ceramic Cevlar Scissors	S45056-Z472-A3
52	Longitudinal Cable Sheath Cutter with 2 Attachments	S45056-Z472-A3

** The quantity / amount supplied or the dimensions are as big that they do not or not completely fit into the FO tool case*

Longitudinal Cable Sheath Cutter

Marking rings, labelled, 300 pcs. per number

Number	Order Number for Ø 0.8 - 1.1 mm	Order Number for Ø 2.3 - 3.4 mm
0	S46998-M2-R2	S46998-M2-R12
1	S46998-M2-R3	S46998-M2-R13
2	S46998-M2-R4	S46998-M2-R14
3	S46998-M2-R5	S46998-M2-R15
4	S46998-M2-R6	S46998-M2-R16
5	S46998-M2-R7	S46998-M2-R17
6	S46998-M2-R8	S46998-M2-R18
7	S46998-M2-R9	S46998-M2-R19
8	S46998-M2-R10	S46998-M2-R20
9	S46998-M2-R11	S46998-M2-R21

Additional Information

CORNING CABLE SYSTEMS

> Training

Training: expertise for your personnel

Total solutions are becoming ever more important for communication networks. Of particular importance in this context are solutions for local networks (LANs) for use on customer premises, and in the carrier area (e.g. telecommunication, CATV IP networks) because the future lies in the integration of speech, image and data.

At the same time, as world-spanning information infrastructure grows, also the quality requirements to be met by networked communication solutions are growing. This demands knowledge – **knowledge that we can pass on to you**.

Continous training avoids costly installation errors

No-one can do everything – but everything can be learned

Techniques and products are subject to constant change. This makes it essential to have staff **trained to the highest levels**, who know how to utilize technical progress to your advantage. This can only be achieved by **continuous training**.

Knowledge is precious – which is why we pass it on

As a **leading manufacturer** of communication cables, cable accessories and networks we are working with our customers to build communication bridges for the 21st century.
We realize that the planning, installation and maintenance of cable systems involves **comprehensive knowledge** – something we want to share with you as part of a genuine partnership.

We do the training – you get the profit

Our worldwide knowledge in cable and network technology is channeled into our **Training Center**. On the basis of this knowledge, we develop diverse seminars for your staff.
Our training is aimed at all those who set up or operate carrier or customer premise cable networks.
By undertaking training before starting on a project you will **avoid costly installation errors**, and will put in place a critical prerequisite for the successful implementation of your project.

Practical orientation, not theoretical dreams

The balance is critical: theory is necessary, but practicality dictates what must be done. From their **many years of practical experience**, our trainers know which knowledge and skills are required for each task, and they are in constant contact with development, sales and projects engineering at Corning

We offer many different courses on our products, fiber optic cable splicing and measurement techniques.
For information about current courses and dates please contact your local sales representative
or visit our website at
http://www.corning.com/cablesystems/europe

> Fiber Optics Glossary

Absorption
The attenuation (loss) of radiation as it passes through material. A portion of the radiated energy of light is converted e.g. to heat.

Alignment
Optimal positioning of the ends of the ➜ optical fiber for ➜ splice joints. In the case of fusion splicing of single-mode fibers, alignment of optical fibers can be carried out with the ➜ LID-System.

Armoring
Protective element (usually of steel wires or strips) used in cables for special service conditions, as in undersea and mining applications, rodent protection etc. It is applied over the ➜ cable sheath.

Attenuation
Reduction in the signal power between two cross-sections of a fiber. It is dependent on the wavelength. Main causes: scattering, absorption. It is expressed in "dB", defined as: -10 log P(L1) / P(L2).

Backscattering Technique
Measures the reflectance of lines and their connections along the entire path by means of an OTDR.

Bandwidth
Apart from attenuation the bandwidth is the second parameter characterizing the properties of an optical fiber. The bandwidth is a measure of the ➜ dispersion of an ➜ optical fiber.

Bandwidth length product
This product describes the effect that the bandwidth of a given fiber is inversely proportional to the length of the fiber. The bandwidth length product is usually expressed in MHz x km or GHz x km.

Bend Radius
Smallest radius through which a fiber may be bent without introducing additional loss.

Butt Coupling (butt joint, butted fibers)
Signal transmission across fibers joined together end to end.

Cable Sheath
Sheath or jacket usually of polyethylene (PE) or poly-vinyl-chloride (PVC) which protects the core from environmental influences.

CATV (Cable TV)
CATV networks are analog distribution networks in which the various television programs are transmitted over tree-configured coaxial cables and large amplifier cascades to the subscriber.

Cladding
The glass surrounding the core of an optical fiber; the cladding has a lower refractive index than core glass.

Coating
A plastic coating applied for mechanical protection to the surface of the fiber cladding.

Composite Buffered Fiber
Combination of single-fiber loose buffer and tight buffered fiber. The slight gap between fiber and buffer tube is filled with a gliding layer.

Connector
A means of providing a readily separable plug-in connection between two optical fibers. As a rule the ➜ insertion loss of a connector is higher than the transmission loss of a ➜ splice.

Core Glass
Core of an optical fiber with a refractive index higher than that of the cladding glass.

Coupler
Passive component for transmitting / branching light to one or more fibers. The incoming optical power is divided up or, viewed in the opposite direction, merged together.

> Fiber Optics Glossary

Crimping
Compression of a sleeve around a fiber to provide mechanical protection.

Crosstalk
Unwanted transfer of energy, e.g. between two adjacent fibers of a cable.

Dispersion
Dispersion causes light pulses in a fiber to spread in time. A distinction is made between modal, material and waveguide dispersion.

Duplex Connector
Two fiber optic connectors held together by a clip or by design usually to provide go and return paths.

Duplex Operation (two-path transmission)
Information transmission in both directions on one fiber.

FDDI (Fiber Distributed Data Interface)
Fiber optic network with dual, counter-rotating ring topology and 100-Mbit/s data transfer rate. The FDDI provides a fault-tolerant response to cable breaks and node failures.

Fiber
See Optical waveguide

Fiber Multiplexing
Transmission method in which each transmission channel is assigned a fiber.

FITL (Fiber In The Loop):
Depending on where the fiber terminates, it may be referred to as:

- FTTB - Fiber to the building
- FTTC - Fiber to the curb
- FTTH - Fiber to the home
- FTTD - Fiber to the desk

Graded-Index Fiber
The graded-index fiber is an optical waveguide with a ➜ graded-index profile.

Graded-Index Profile
Refractive index of a fiber that decreases in a parabolic curve with increasing distance from the center of the fiber core cross section.

GRP Element
Support and tensile strength member made from glass filaments (GRP glass fiber reinforced plastic).

Indoor Cable
Cables for applications inside buildings. They are not generally suitable for installation outdoors.

Insertion Loss
The transmission quality of a connector is judged by reference to its insertion loss, i.e. by determining the extent to which the attenuation of an optical transmission path increases when a connector is inserted in this path.

ISDN (Integrated Services Digital Network)
Data, voice and images are switched and transmitted across the digital network via a single connection.

LAN (Local Area Network)
A local network for serial transmission between inde-pendent terminal equipments.

L-PAS™
The video image evaluation system L-PAS (Lens-Profile Alignment System) is used for splice process control. The fiber ends to be fused together are imaged by one or more CCD cameras. The video signal is used not only to display the fibers on the monitor and to control fiber alignment but also to evaluate the splice loss.

Launch Angle
Angle between the direction of propagation of the inci-dent light and the optical axis of an optical fiber. For the incident light to be launched, this angle must be between zero and a maximum value which is depend-ent on the point of incidence at the fiber endface and on the difference in refractive index at that point and at the cladding.

LID-System™
The LID-System (Local Injection and Detection) is used for precision alignment of the fibers in the x/y and z axes. It comprises two bend couplers (transmitter and receiver). The light on the transmit side is injected into the fiber. The transmitted optical power is received and measured on the receive side. The criterion for optimum alignment of the fibers is attained when the optical power transmitted via the splice reaches maximum.

Light Waves
Electromagnetic waves in the region of optical frequencies. The term light originally referred merely to the radiation visible to the human eye with a wavelength between 400 and 800 nm. It is however usual to call radiation in the bordering spectral ranges (e.g. infrared) light also.

MAN (Metropolitan Area Network)
Data network system permitting data and voice transmission. Links ➜ LANs in cities to provide better performance than is possible with ➜ WANs.

Microbending
Bends in a fiber causing light losses and hence increased attenuation.

Modes
All the optical waves that can propagate in an optical fiber.

Multifiber Buffer
Consists of several loose fibers in a common tube.

Multimode fiber
Optical fiber whose core diameter is large relative to the ➜ wavelength of the light, thus allowing two or more ➜ modes to propagate.

Optical Waveguide
Transparent dielectric waveguide for the transmission of electromagnetic waves in the region of visible light.

Outdoor Cable
Cables which are designed to meet all the requirements encountered in buried and ducted cable systems.

Pigtail
Short length of optical fiber for interconnecting components, one end being provided with a connector, theother end being connected by fusion splicing.

PON (Passive Optical Network)
A passive network for ➜ FITL with passive components such as ➜ couplers, ➜ splitters and ➜ connectors.

Receiver
Component for converting optical signals to electrical form. It comprises a photodiode which converts the in-coming optical signal to a photocurrent which is then amplified in a (low-noise) amplifier. It may incorporate further electronic circuits, e.g. decoders, for signal processing.

Reflection
Return of rays (waves) from interfaces between two different materials.

Refraction
Change in direction which an electromagnetic wave (e.g. light) undergoes when it passes from one material to another and the ➜ refractive index of the two materials is of differing magnitude.

Refractive Index
The factor by which the velocity of light in an optical medium (e.g. glass) is less than it is in vacuum.

> Fiber Optics Glossary

Ribbon Fiber
The fibers are arranged parallel to each other and joined together equally spaced in a flat plane (e.g. bonded directly or between two adhesive films); several ribbons can be grouped into stacks inside a cable.

Self-Centering Effect
The self-centering effect is the tendency of the fiber to form a homogeneous joint which is consequently free of misalignment as a result of the surface tension of the molten glass during the fusion bonding process.

Single Fiber Loose Buffer
Comprises a fiber surrounded by a loose buffer tube.

Single-Mode Fiber
Optical fiber whose core diameter is so small relative to the ➜ wavelength of the light that only a single ➜ mode is propagated.

Slotted Core Cable
Cable in which the fibers are located in slots formed in the surface of the cable's central member.

Splice
Permanent joint made between two optical fibers by fusion or adhesive bonding.

Splitter
Optical component for distributing the optical power from one fiber to several other fibers.

Star Coupler
Active or passive component providing a uniform distribution of optical power between equal numbers of incoming and outgoing fibers.

Step-Index Profile
Fiber with the refractive index declining abruptly between core and cladding but staying constant within the core and cladding themselves.

Tight Buffered Fiber
A fiber having a plastic buffer jacket applied directly over its protective coating.

Time Division Multiplexing
Transmission method in which several digital signals arriving in parallel are transmitted as a serial data stream over the same fiber.

Transmission Bandwith
The frequency at which the magnitude of the transfer function of an optical fiber has fallen to a specified value. The transmission bandwidth of an optical fiber is approximately reciprocal to its length.

WAN (Wide Area Network)
A network which encompasses interconnectivity between devices over a wide geographic area.

Wavelength
Length of a complete cycle (period) of a wave. Optical communications usually employ three wavelength ranges. These lie at 850 nm, 1310 nm and 1550 nm.

Wavelength Multiplexing
Transmission method in which several signals are transmitted simultaneously at different wavelengths over the same fiber.

> Catalogs Available in our Product Range

The following catalogs can be ordered at any time on the internet **www.corning.com/cablesystems/europe** or from fax number **+ 49 - 89- 32 94 22 88**:

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