Catalog

Connectors

Technical
Information

Standardization of optical connector systems

Quality classes according to **IEC 61753-1 (SM) und IEC 61753-122-2** [1] **(MM)**

Singlemode attenuation grades at 1310 nm and 1550 nm

Attenuation grade	Max. Attenuation[2] (≥97% of samples) [dB]	Mean Attenuation[2] [dB]	Comments
A	≤0,15	≤0,08	under discussion
B	≤0,25	≤0,12	
C	≤0,50	≤0,25	
D	≤1,00	≤0,50	used for some multifibre connectors

Singlemode return loss grades at 1310 nm and 1550 nm

Return loss grade	Return loss (mated) [dB]	Comments
1	≥60	unmated ≥55 dB
2	≥45	
3	≥35	
4	≥25	

Multimode attenuation grades at 850 nm and 1300 nm

Attenuation grade	Max. Attenuation[2] (≥97% of samples) [dB]	Mean Attenuation[2] [dB]	Comments
A	≤0,75	≤0,25	≤0,30 dB against reference
B	≤1,00	≤0,35	
C	≤1,50	≤0,50	

Multimode return loss grades at 1300 nm

Return loss grade	Return loss (mated) [dB]	Comments
1	≥20	

[1] stil not published
[2] Random

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TIE-CON-V002

For a complete overview of connectors visit our website at www.foc-fo.com.

Connectors ▶ Singlemode Class A Connectors ▶

LSH Class A Connector


Adapter simplex with screw mounting clip


Adapter simplex with quick mounting clip


Adapter compact (Dx) with integrated fixing springs


Adapter compact (Dx) with 2- hole flange


Adapter duplex


Adapter Low Profile (Dx)

General Information

The LSH Class A connector from FOC® meets the highest optical performance as well as safety standards. Due to the proven stable structure, selected ferrules in combination with FOC®'s own Class A manufacturing technology and its good mechanical properties they achieve excellent optical values.

Material

- Connector external parts: plastic
- Connector internal parts: metal
- Ferrule: zirconia
- Adapter: plastic housing with split and floating zirconia alignment sleeve
- Dust Cap: laser proofed

Standards

- LSH: CECC 86 275, IEC 61754-15
- LSH-HRL: CECC 86 275, IEC 61754-15

Connector Types

- LSH Class A simplex
- LSH Class A compact

Adapter Types

- LSH Class A simplex
- LSH Class A compact (Dx)
- LSH Class A duplex
- LSH Class A Low Profile (Dx)
- Standard delivery: screw mounting
- Optional delivery: quick mounting

Colour Coding

- LSH Class A: blue
- LSH-HRL Class A: green

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

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DBE-CON-0146V008

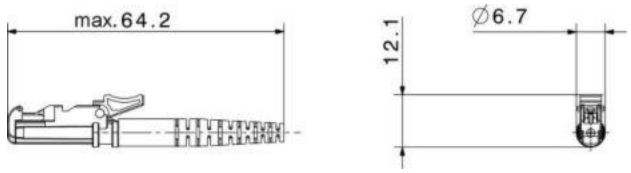
Connector Specifications

Standard	Singlemode PC	Singlemode APC	Unit	Test conditions
Insertion Loss (IL)	max: 0,1	max: 0,1	dB	IEC 61300-3-34
Return Loss (RL)	min: 50	min: 85[1]	dB	IEC 61300-3-6
Repeatability (IL)	max: ± 0,05	max: ± 0,05	dB	
Durability	1000 matings			
Operating temperature range	- 40 to + 85		°C	depends from used type of cable

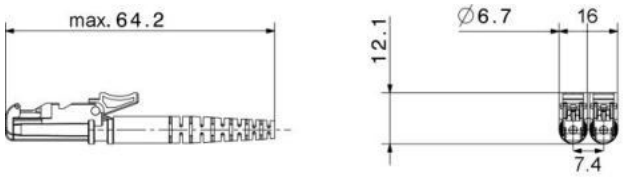
[1] measured with precision reflectometer

Dimensions

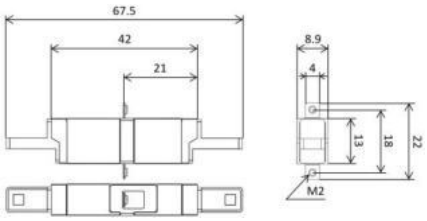
Connector simplex



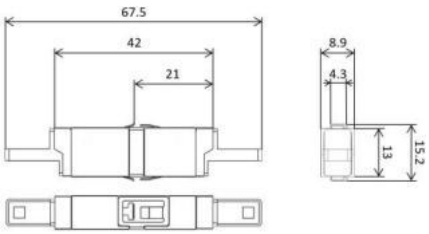
Connector compact



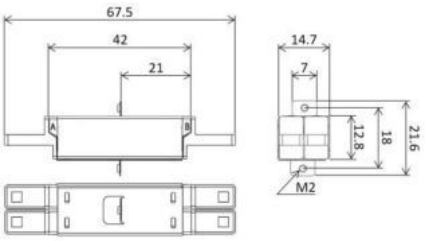
Adapter simplex with screw mounting clip



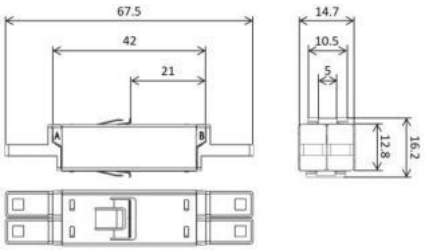
Adapter simplex with quick mounting clip



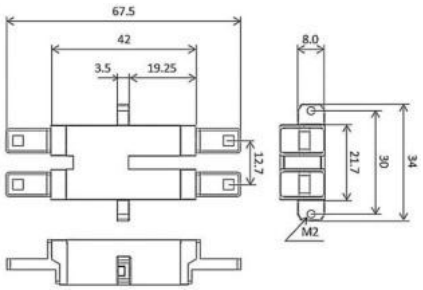
Adapter compact (Dx) with 2-hole flange



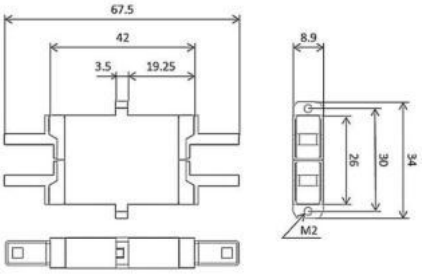
Adapter compact (Dx) with integrated fixing springs



Adapter duplex



Adapter Low Profile (Dx)



For a complete overview of connectors visit our website at www.foc-fo.com.

Connectors ▶ Singlemode Class B Connectors ▶

LSH Class B Connector

Adapter simplex with screw mounting clip

Adapter simplex with quick mounting clip

Adapter compact with integrated fixing springs

Adapter compact with 2- hole flange

General Information

The LSH Class B connector from FOC® meets the optical performance as well as safety standards. It is among the most widely used optical connector systems in the world. Due to their compact design and good mechanical properties they achieve very good optical measurement values (IEC 61755-1 Grade B).

Material

- Connector: plastic
- Adapter: plastic housing respectively metalplastic housing with split and floating zirconia alligment sleeve
- Ferrule: zirconia
- Dust Cap: laser proofed

Standards

- LSH: CECC 86 275, IEC 61754-15
- LSH-HRL: CECC 86 275, IEC 61754-15

Connector Types

- LSH Class B simplex

Adapter Types

- LSH Class B simplex
- LSH Class B compact
- Standard delivery: screw mounting
- Optional delivery: quick mounting

Colour Coding

- LSH Class B: blue
- LSH-HRL Class B: green

Applications

- Telecommunication, CATV, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

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Subject to modifications
DBE-CON-0236V006

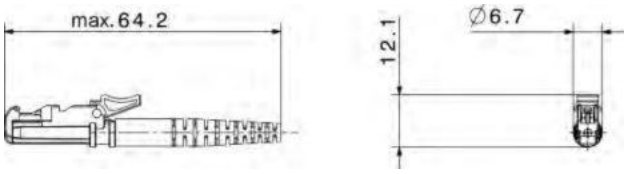
Connector Specifications

Standard	Singlemode PC	Singlemode APC	Unit	Test conditions
Insertion Loss (IL)	typ: 0,12[1] max: 0,25[1]	typ: 0,12[1] max: 0,25[1]	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50[2] min: 45[2]	typ: 70[3] min: 65[3]	dB	IEC 61300-3-6
Repeatability (IL)	max: ± 0,1	max: ± 0,1	dB	
Durability	1000 matings			
Operating temperature range	- 40 to + 85		°C	depends from used type of cable

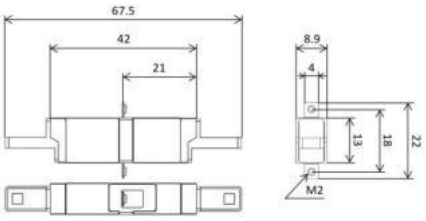
[1] IEC 61755-1 Grade B [2] IEC 61755-1 Grade 2 [3] IEC 61755-1 Grade 1

Dimensions

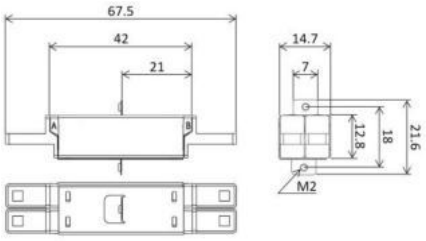
Connector simplex



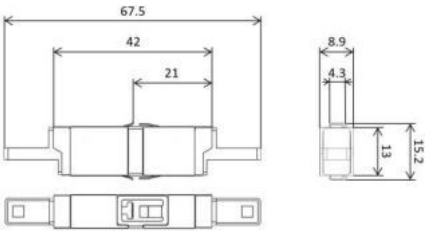
Adapter simplex with screw mounting clip



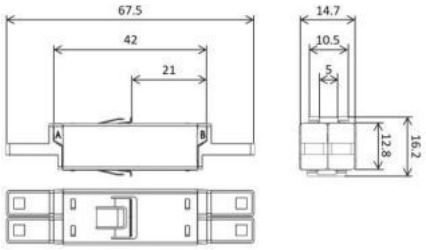
Adapter compact with 2-hole flange



Adapter simplex with quick mounting clip



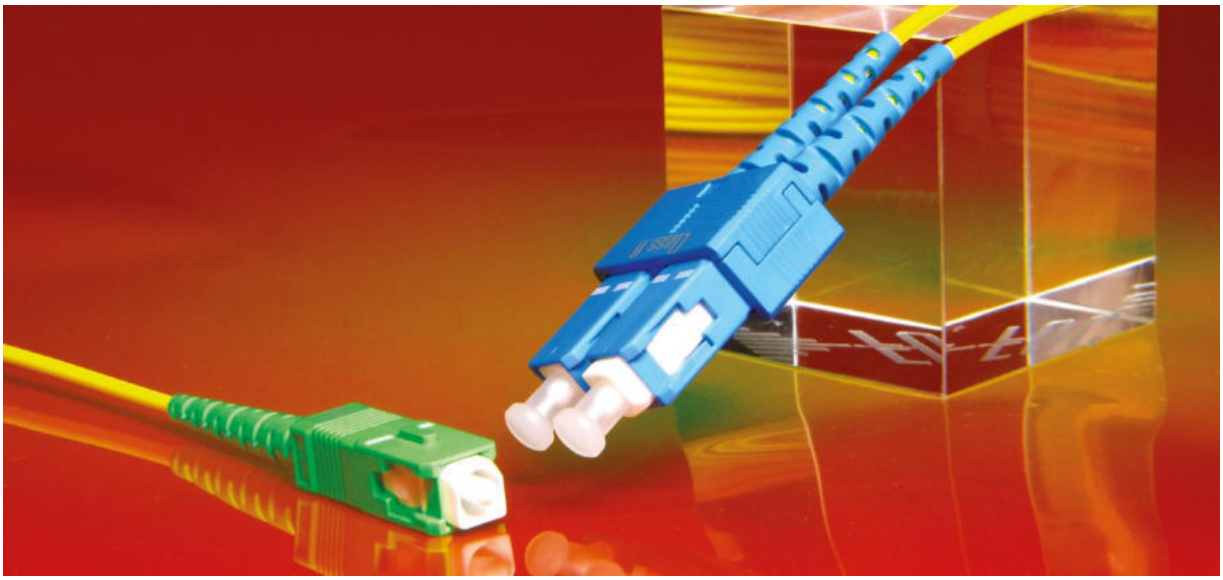
Adapter compact with integrated fixing springs

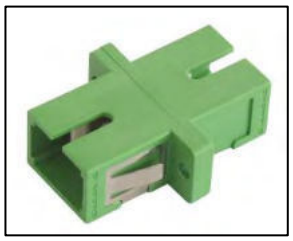


For a complete connector overview visit our website www.foc-fo.com.

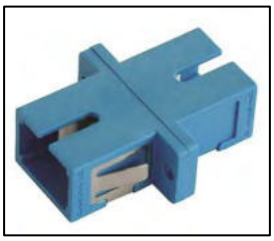
Connectors ▶

SC Class A-Connector



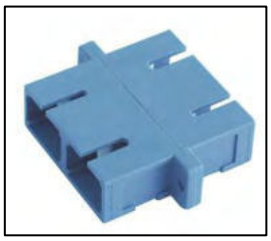


Adapter Simplex with quick mounting



Adapter Simplex with quick mounting

Adapter Duplex with screw mounting



Adapter Duplex with screw mounting

General Information

SC connectors are among the most widely used optical connector systems in the world. Due to their good mechanical properties they achieve excellent optical measurement values.

Material

- Connector: plastic
- Adapter: plastic housing with split and floating zirconia alignment sleeve
- Ferrule: zirconia
- Dust Cap: plastic

Standards

- SC-PC: NTT-SC, CECC 86 260, IEC 61754-4
- SC-APC: IEC 61754-4

Design Connectors

- SC-Simplex and SC-Duplex

Design Adapters

- SC-Simplex and SC-Duplex
- with/without self-closing dust cap
- Standard delivery: screw mounting
- Optional delivery: quick mounting

Colour coding

- SC-PC: blue
- SC-APC: green

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

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Subject to modifications
DBE-CON-0242V003

Specifications of connectors

Standard	Singlemode PC	Singlemode APC	Unit	Test conditions
Insertion Loss (IL)	max: 0,1	max: 0,1	dB	IEC 61300-3-34
Return Loss (RL)	min: 50	min: 85[1]	dB	IEC 61300-3-6
Repeatibility of IL	max: ± 0,05	max: ± 0,05	dB	
Durability	1000 matings			
Operating temperature range	- 40 bis + 85		°C	depends from used type of cable

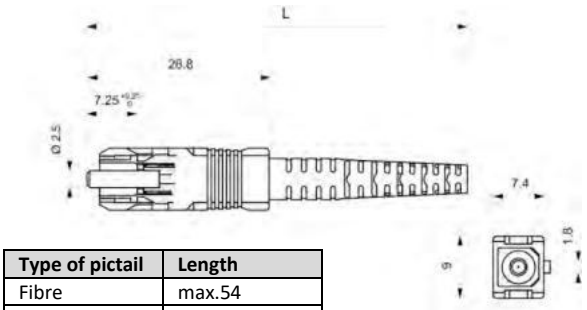
[1] measured with precision reflectometer

Active specifications

Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable**.

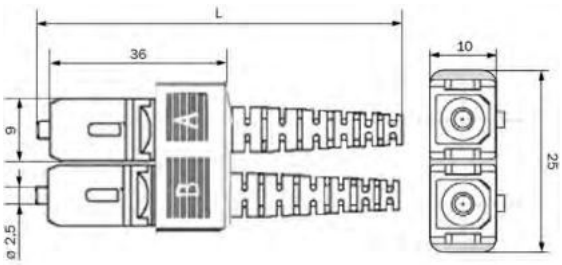
Dimensions

SC Class A Simplex

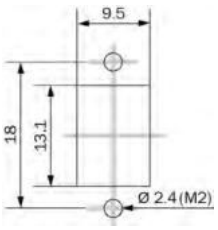


Type of pictail	Length
Fibre	max.54
Cable	max.58

SC Class A Duplex

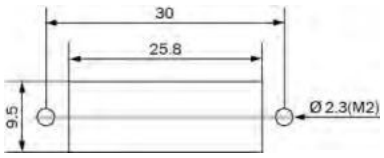


Adapter Simplex without shutter



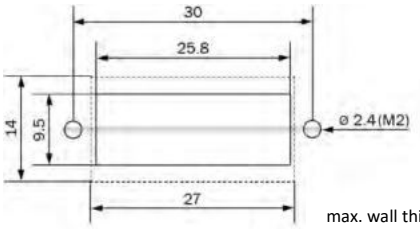
max. wall thickness 1.6

Adapter Duplex without shutter

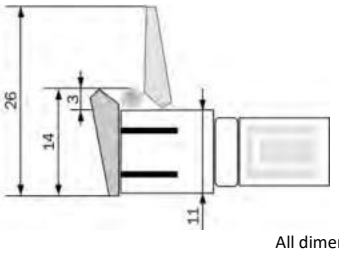


max. wall thickness 1.6

Duplex Adapter with shutter



max. wall thickness 1.6



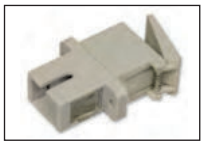
All dimension units are mm.

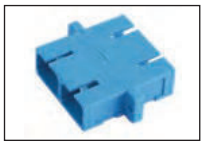
For a complete connector overview visit our website **www.foc-fo.com**.

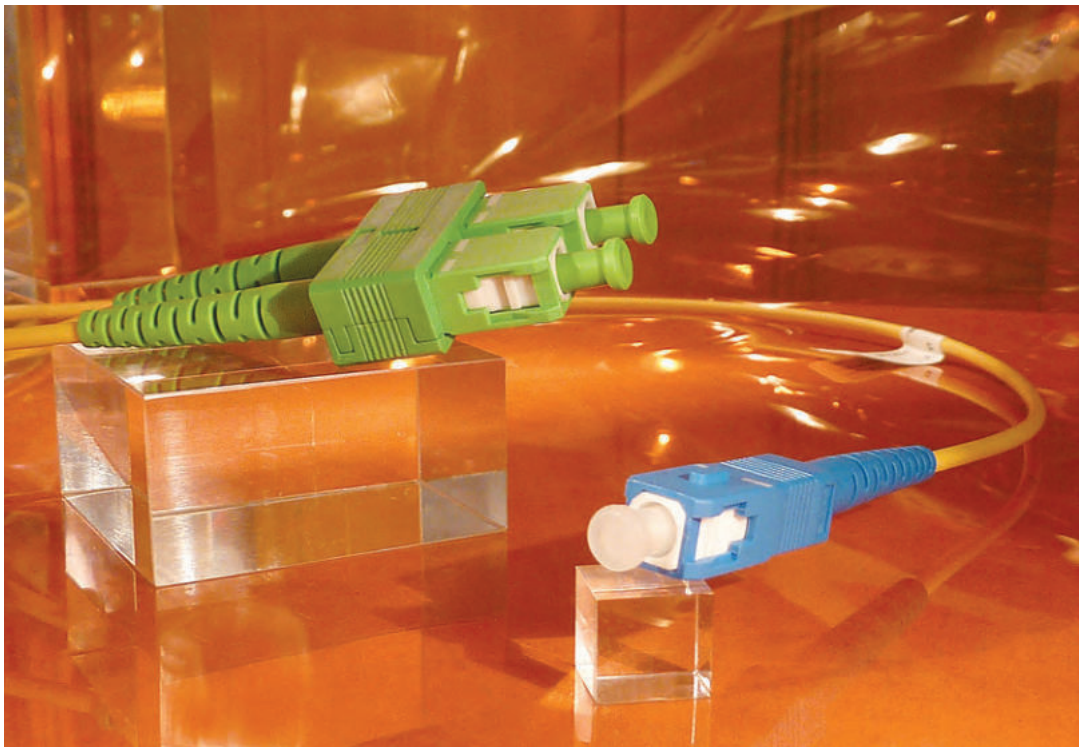
Connectors ▶

SC-Simplex & SC-Duplex









SC connectors are among the most widely used optical connector systems in the world. Due to their good mechanical properties they achieve excellent optical measurement values.

Material

Connector	plastic
Adapter	plastic housing with split and floating zirconia aligment sleeve
Ferrule	zirconia
Dust Cap	plastic

Standards

- SC-PC: NTT-SC, CECC 86 260, IEC 61754-4
- SC-APC: IEC 61754-4

Design

Connectors:

- SC-Simplex and SC-Duplex

Adapters:

- SC-Simplex and SC-Duplex
- with/without self-closing dust cap
- Standard delivery: screw mounting
- Optional delivery: quick-mounting

Colour coding:

- SC-PC: blue
- SC-APC: green
- SC-MM: beige

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

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Subject to modifications
DBE-CON-0132V003

Specifications of connectors

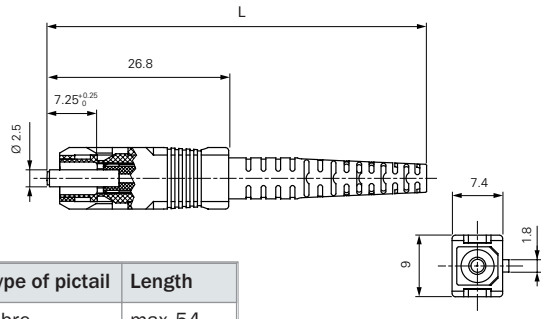
Standard	Singlemode PC	Singlemode APC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ: 0,12 [1] max: 0,25 [1]	typ: 0,12 [1] max: 0,25 [1]	typ: 0,25 [2] max: 0,40 [2]	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50 [3] min: 45 [3]	typ: 70 [4] min: 65 [4]	typ: 40 min: 35	dB	IEC 61300-3-6
Repeatibility of IL	max: ±0,1	max: ±0,1	max: ±0,1	dB	
Durability	>1000 matings				
Operating temperature range	-40 to +85			°C	depends from used type of cable

■ [1] IEC 61755-1 Grade B ■ [2] IEC 61753-122-2 Grade A ■ [3] IEC 61755-1 Grade 2 ■ [4] IEC 61755-1 Grade 1

Active specifications

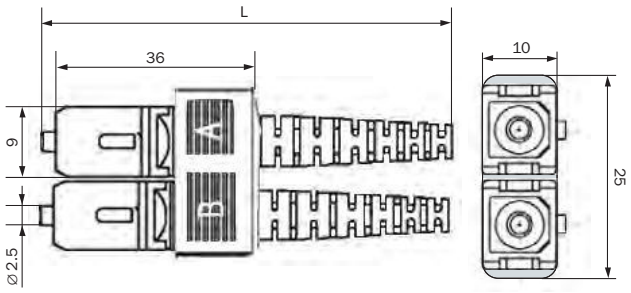
Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable.**

SC-Simplex

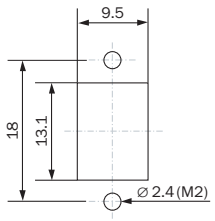


Type of pictail	Length
Fibre	max. 54
Cable	max. 58

SC-Duplex

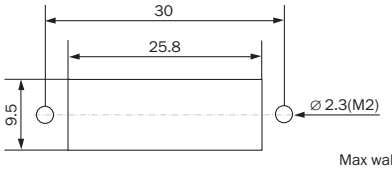


Assembly dimensions SC-Simplex Adapter without cap



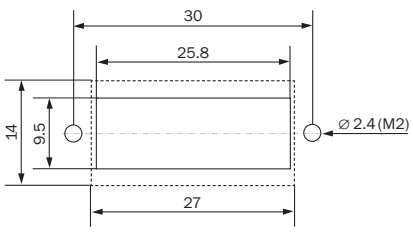
Max wall thickness 1.6

Assembly dimensions SC-Duplex Adapter without cap

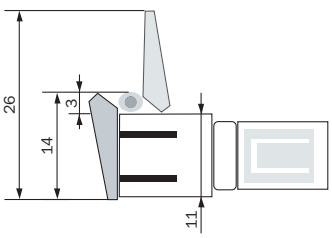


Max wall thickness 1.6

Assembly dimensions SC-Duplex Adapter with cap



Max wall thickness 1,6

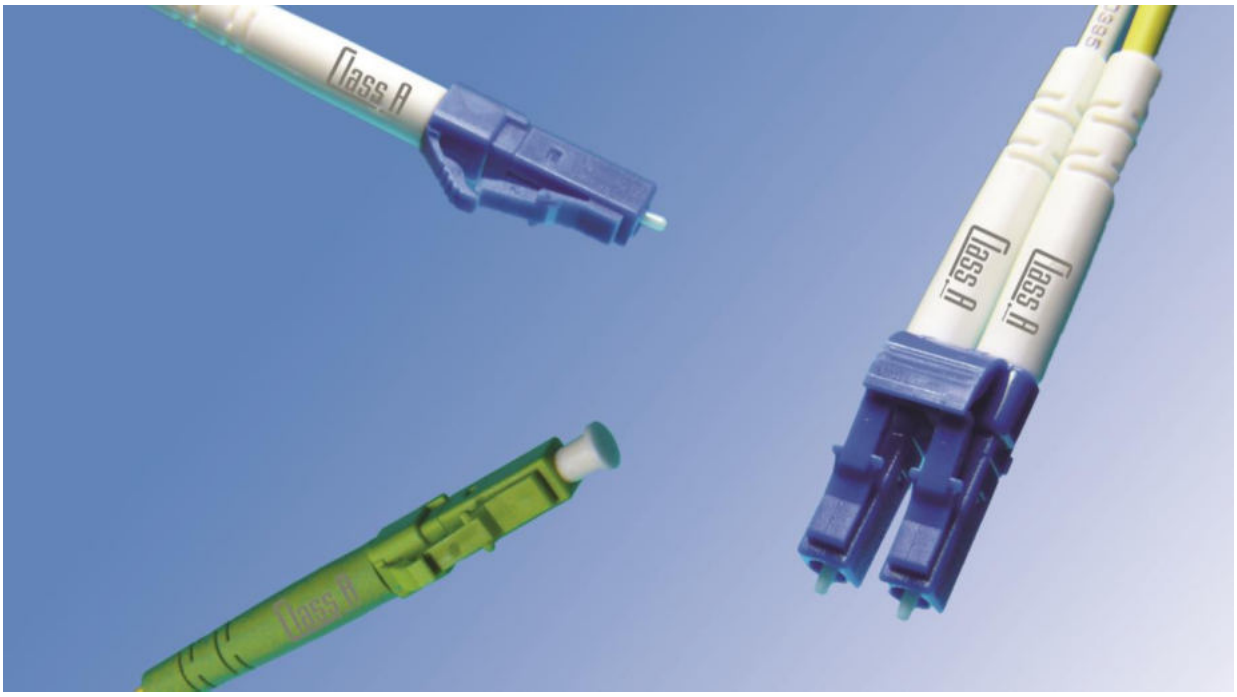


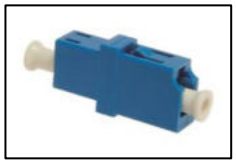
All dimension units are mm.

For a complete connector overview visit our website www.foc-fo.com.

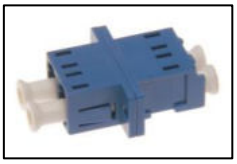
Connectors ▶

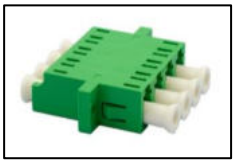
LC Class A-Connector

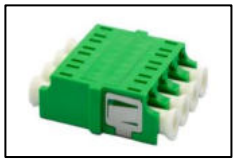



Adapter Simplex


Adapter Simplex


Adapter Duplex


Adapter Quad
screw mounting


Adapter Quad
quick mounting

General Information

LC connectors are part of the optical small form factor (SFF) connector family with a ferrule diameter of 1.25mm. Due to their compact design and good mechanical properties they achieve excellent optical measurement values.

Material

- Connector: plastic
- Adapter: metal with split and floating zirconia alignment sleeve
- Ferrule: zirconia
- Dust Cap: plastic

Standards

- LC-PC: IEC 61754-20
- LC-APC: IEC 61754-20

Design Connectors

- LC-Simplex and LC-Duplex

Design Adapters

- LC-Simplex, LC-Duplex and LC-Quad
- Simplex delivery: quick mounting
- Duplex and Quad:
  Screw mounting (standard delivery)
  Quick mounting (optional delivery)
- Other Duplex types with external dust cap or internal shutter (on request)

Colour coding

- LC-PC: blue
- LC-APC: green

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems

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Release 26.08.2020
Subject to modifications
DBE-CON-0244V004

- Industry, medical engineering, sensor technology

Specifications of connectors

Standard	Singlemode PC	Singlemode APC	Unit	Test conditions
Insertion Loss (IL)	max: 0,1	max: 0,1	dB	IEC 61300-3-34
Return Loss (RL)	min: 50	min: 70[1]	dB	IEC 61300-3-6
Repeatibility of IL	max: ± 0,05	max: ± 0,05	dB	
Durability	1000 matings			
Operating temperature range	- 40 bis + 85		°C	depends from used type of cable

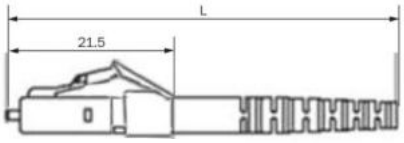
[1] measured with precision reflectometer

Active specifications

Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable**.

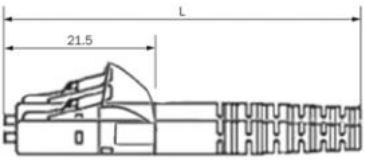
Dimensions

LC Class A Simplex

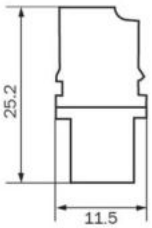


Type of pictail	Length
Fibre	max.50
Cable	max.50

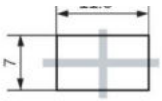
LC Class A Duplex



Adapter Simplex without shutter



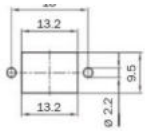
quick mounting

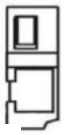


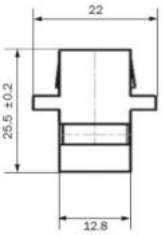
max. wall thickness 1.6

Adapter Duplex without shutter

screw mounting

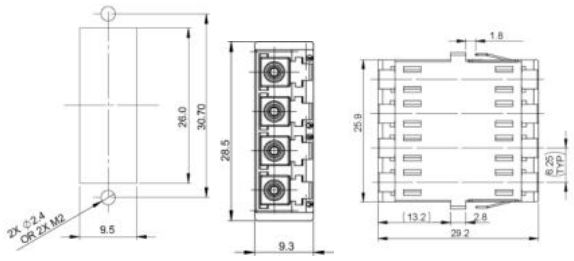




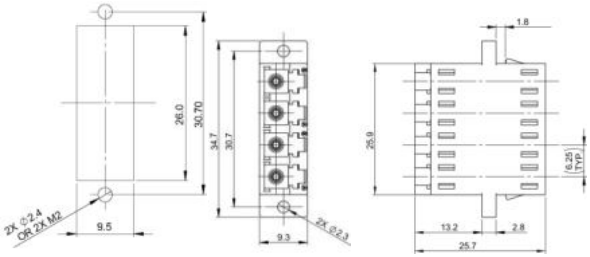


max. wall thickness 1.6

Adapter Quad for quick mounting



Adapter Quad for screw mounting



All dimension units are mm.

For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ►

LC-Simplex & LC-Duplex

LC connectors are part of the optical small form factor (SFF) connector family with a ferrule diameter of 1.25 mm. Due to their compact design and good mechanical properties they achieve excellent optical measurement values.

Material

Connector	plastic
Adapter	metal with split and floating zirconia alignment sleeve
Ferrule	zirconia
Dust cap	plastic

Standards

- LC-PC: IEC 61754-20
- LC-APC: IEC 61754-20

Design

Connectors:

- LC-Simplex and LC-Duplex

Adapters:

- LC-Simplex, LC-Duplex and LC-Quad
- Simplex delivery: quick-mounting
- Duplex and Quad:
  Screw mounting (standard delivery),
  Quick mounting (optional delivery)
- Other Duplex types with external dust cap or internal shutter (on request)

Colour coding:

- LC-PC: blue
- LC-APC: green
- LC-MM: beige

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring system
- Industry, medical engineering, sensor technology

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Release 26.08.2020
Subject to modifications
DBE-CON-0142V005

Specifications of connectors

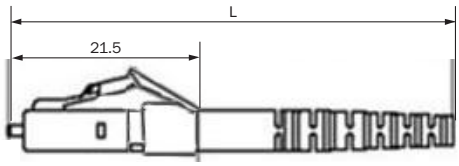
Standard	Singlemode PC	Singlemode APC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ: 0,12 [1] max: 0,25 [1]	typ: 0,12 [1] max: 0,25 [1]	typ: 0,25 [2] max: 0,40 [2]	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50 [3] min: 45 [3]	typ: 70 [4] min: 65 [4]	typ: 40 min: 35	dB	IEC 61300-3-6
Repeatibility of IL	max: ±0,1	max: ±0,1	max: ±0,1	dB	
Durability	>1000 matings				
Operating temperature range	-40 to +85			°C	depends from used type of cable

■ [1] 61755-1 Grade B ■ [2] 61753-122-2 Grade A ■ [3] 61755-1 Grade 2 ■ [4] 61755-1 Grade 1

Active specifications

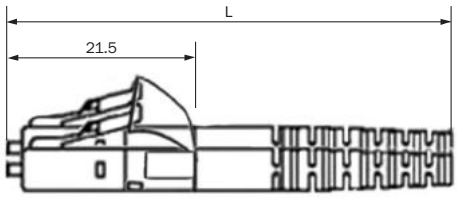
Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable.**

LC-Simplex

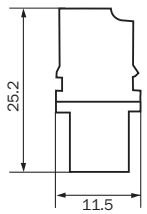


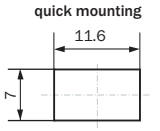
Type of pictail	Length
Fibre	max. 50
Cable	max. 50

LC-Duplex



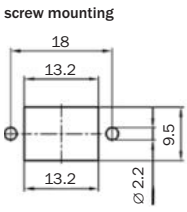
LC-Simplex Adapter without cap



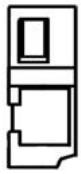


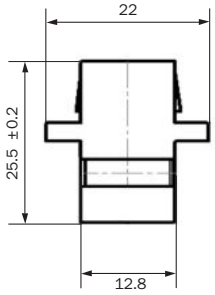
Max wall thickness 1.6

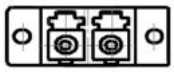
LC-Duplex Adapter without cap



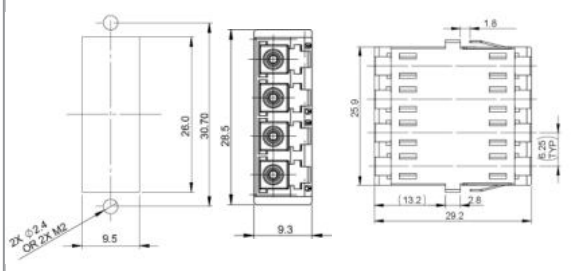
Max wall thickness 1.6



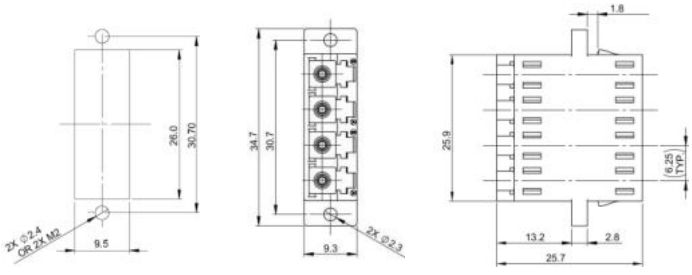




LC-Quad Adapter for quick mounting



LC-Quad Adapter for screw mounting

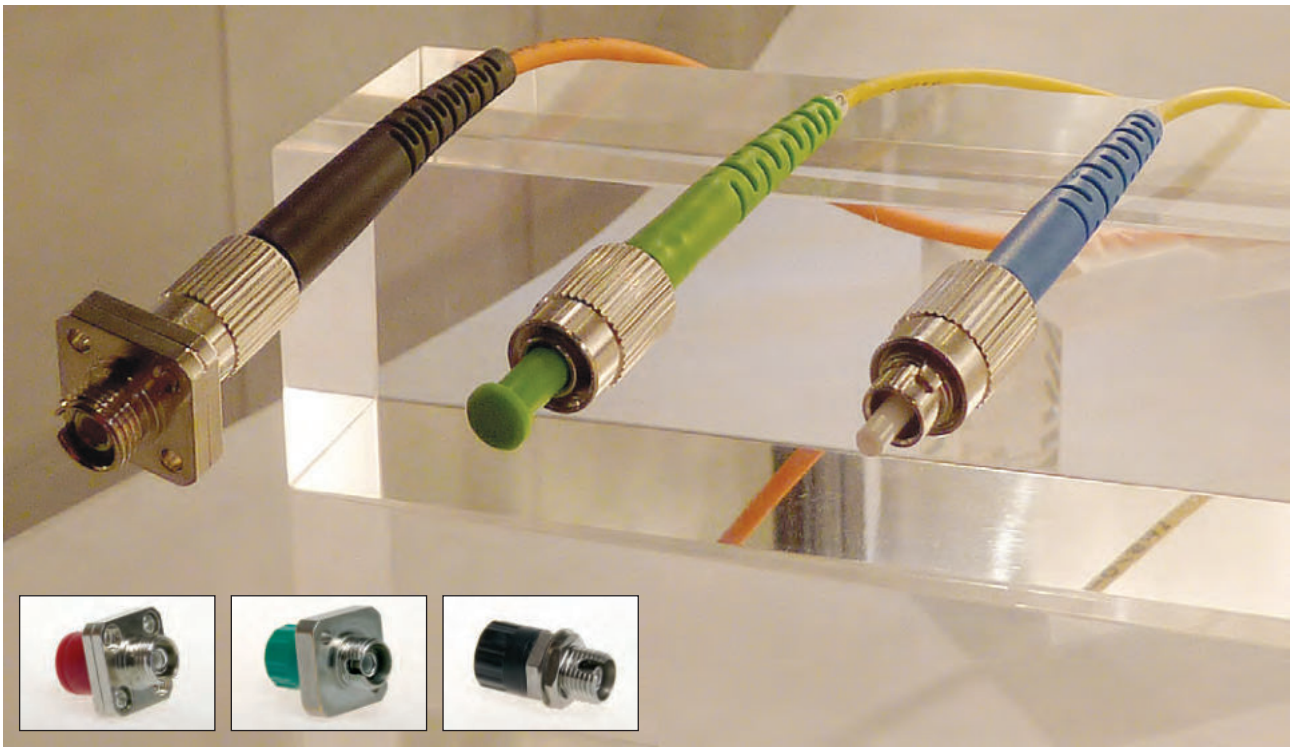


All dimension units are mm.

For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ▶

FC-Simplex



FC connectors are among the worldwide used optital connector systems.
Due to their good mechanical properties they achieve excellent optical measurement values.

Material

Connector	metal
Adapter	metal with split and floating zirconia alignment sleeve
Ferrule	zirconia
Dust Cap	plastic

Standards

- FC-PC: IEC 61754-13
- FC-APC: IEC 61754-13

Design

Connectors:

- FC-Simplex

Adapters:

- FC-Simplex
- Standard delivery: screw mounting (flange)
- Optional delivery: hexagon nut

Colour coding (Dust cap):

- FC-PC: red
- FC-APC: green
- FC-MM: black

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

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Release 22.04.2020
Subject to modifications
DBE-CON-0144V003

Specifications of connectors

Standard	Singlemode PC	Singlemode APC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ: 0,12 [1] max: 0,25 [1]	typ: 0,12 [1] max: 0,25 [1]	typ: 0,25 [2] max: 0,40 [2]	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50 [3] min: 45 [3]	typ: 70 [4] min: 65 [4]	typ: 40 min: 35	dB	IEC 61300-3-6
Repeatibility of IL	max: ±0,1	max: ±0,1	max: ±0,1	dB	
Durability	>1000 matings				
Operating temperature range	-40 to +85			°C	depends from used type of cable

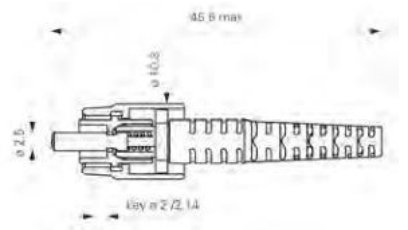
■ [1] IEC 61755-1 Grade B ■ [2] IEC 61753-122-2 Grade A ■ [3] IEC 61755-1 Grade 2 ■ [4] IEC 61755-1 Grade 1

Active specifications

Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable.**

Dimensions

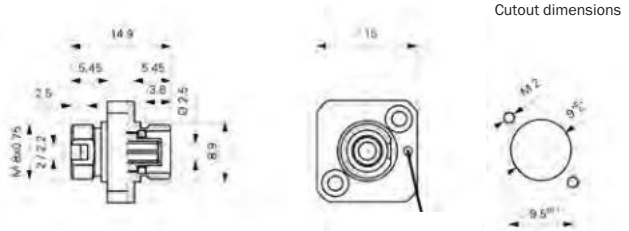
FC-Connector



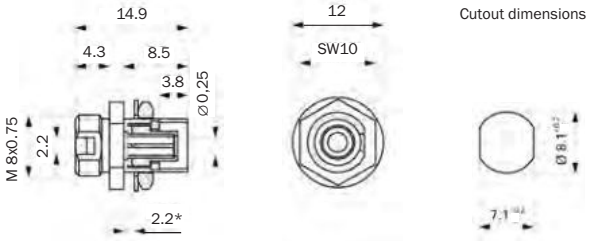
Type of pictail	Length
Fibre	max. 42
Cable	max. 46

FC-Adapters

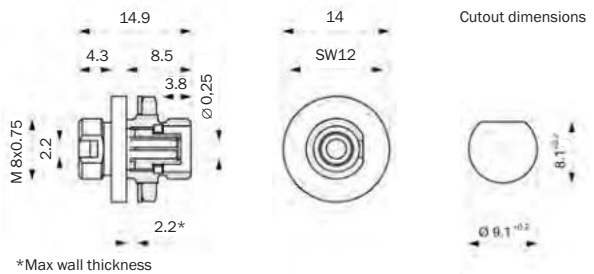
Size 1 (Standard)



Size 2 (DD-mount)



Size 3 (D-mount)

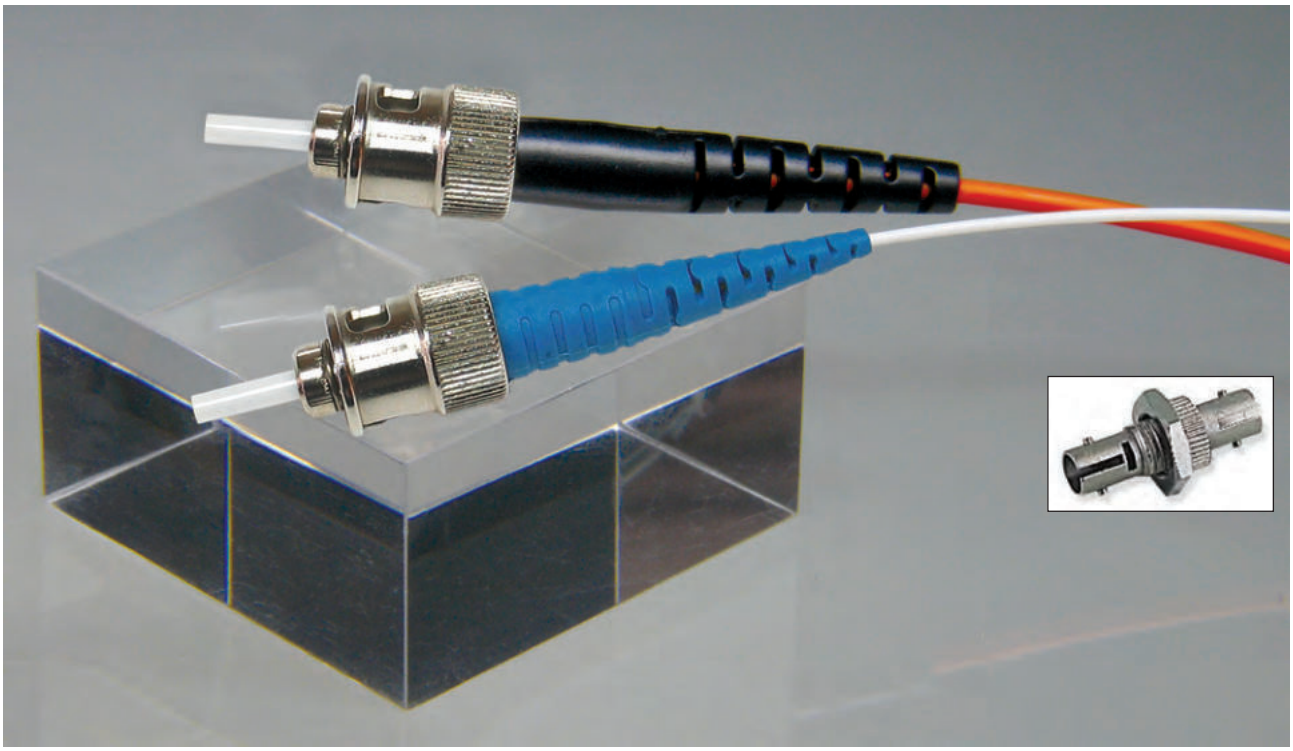


All dimension units are mm.

For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ▶

ST-Simplex (BFOC/2,5)



ST connectors are used for active components, in measurement technology as well as in LAN applications.
It is a rugged connector with bayonet-type locking which offers both good mechanic properties and achieves good optical measurement values.

Material

Connector	metal
Adapter	metal with split and floating zirconia alignment sleevemetal
Ferrule	zirconia
External parts	metal, bayonet-type locking
Dust cap	plastic

Standards
- ST-PC: IEC 61754-2, IEC 60874-10
- ST-MM: IEC 61754-2, IEC 60874-10

Design

Connectors:
- ST-Simplex

Adapters:
- ST-Simplex

Colour coding:
- ST-PC: blue
- ST-MM: black

Applications
- Telecommunication, CATV, LAN, measuring systems
- Industry, medical engineering, sensor technology

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Release 22.04.2020
Subject to modifications
DBE-CON-0140V003

Specifications of connectors

Standard	Singlemode PC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ: 0,2 max: 0,4	typ: 0,25 [1] max: 0,40 [1]	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50 [2] min: 45 [2]	typ: 40 min: 35	dB	IEC 61300-3-6
Repeatibility of IL	max: ±0,1	max: ±0,1	dB	
Durability	>1000 matings			
Operating temperature range	-40 to +85		°C	depends from used type of cable

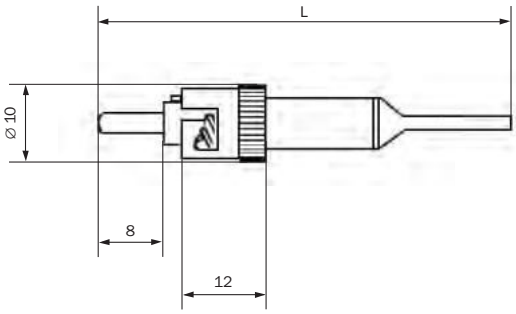
■ [1] IEC 61753-122-2 Grade A ■ [2] IEC 61755-1 Grade 2

Active specifications

Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable.**

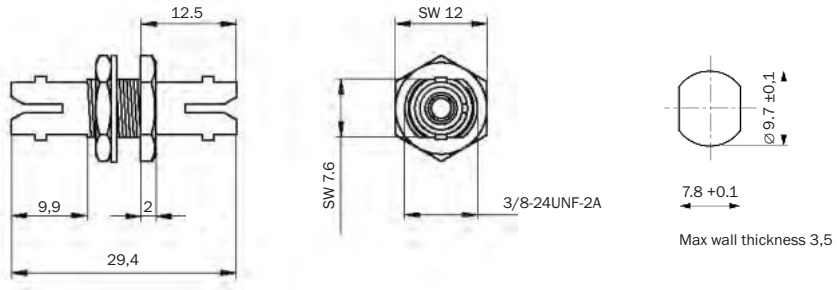
Dimensions

ST-Connector



Type of pictail	Length
Fibre	max. 46
Cable	max. 52

ST-Adapter

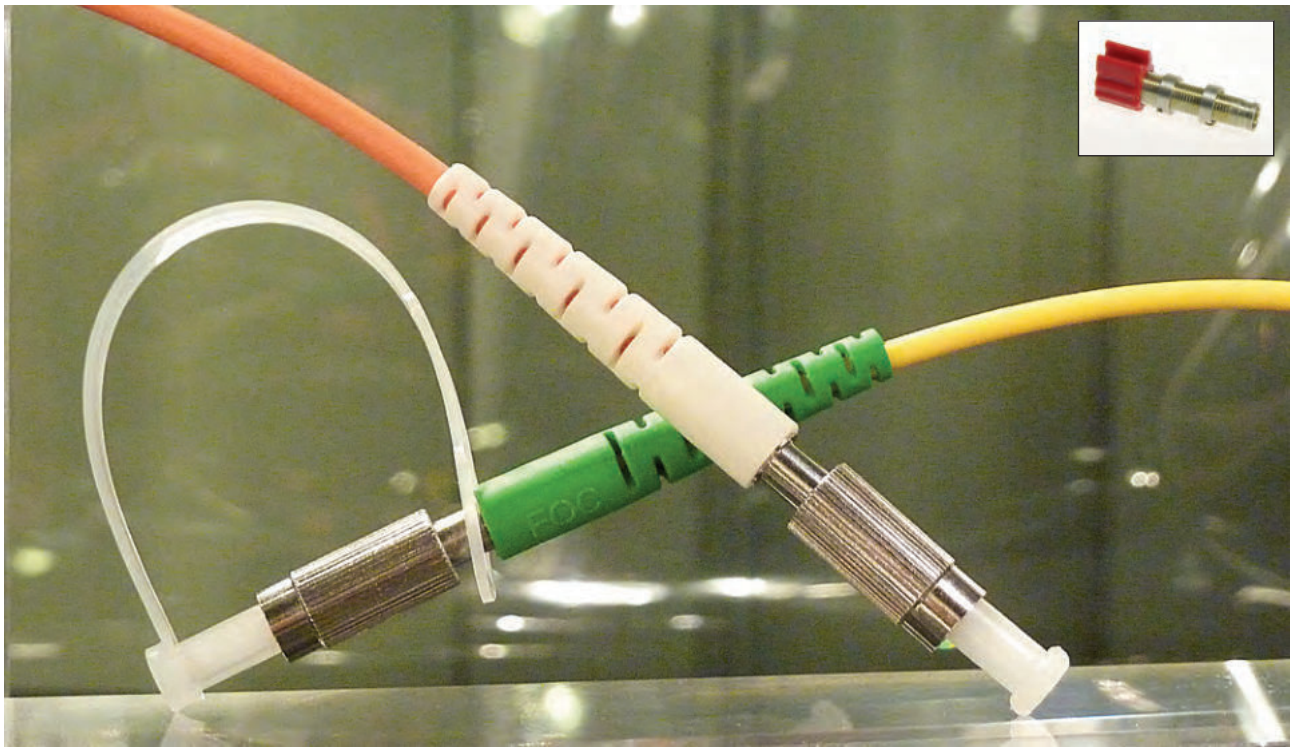


All dimension units are mm.

For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ►

DIN-Simplex



DIN connectors are among the most widely used optical connector systems in Europe.
Due to their good mechanical properties they achieve excellent optical measurement values.

Material

Connector	metal
Adapter	metal with split and floating zirconia aligment sleeve
Ferrule	zirconia
Dust cap	plastic

Standards

- DIN-PC: IEC 61754-3
- DIN-APC: IEC 61754-3

Design

Connectors:

- Simplex

Adapters:

- Simplex

Colour coding:

- DIN-PC: white
- DIN-APC: green
- DIN-MM: white

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

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Release 22.04.2020
Subject to modifications
DBE-CON-0148V003

Specifications Connectors

Standard	Singlemode PC	Singlemode APC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ: 0,12 [1] max: 0,25 [1]	typ: 0,12 [1] max: 0,25 [1]	typ: 0,15 max: 0,4	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50 [2] min: 45 [2]	typ: 70 [3] min: 65 [3]	typ: 40 min: 35	dB	IEC 61300-3-6
Repeatibility of IL	max: ±0,1	max: ±0,1	max: ±0,1	dB	
Durability	>1000 matings				
Operating temperature range	-40 to +85			°C	depends from used type of cable

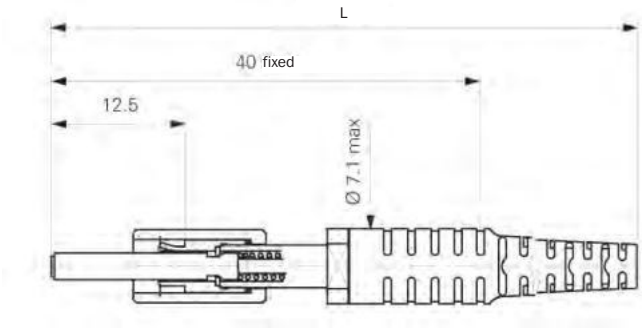
■ [1] IEC 61755-1 Grade B ■ [2] IEC 61755-1 Grade 2 ■ [3] IEC 61755-1 Grade 1

Active specifications

Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable.**

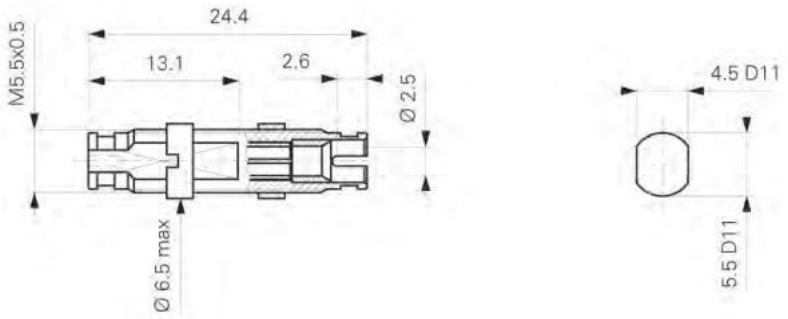
Dimensions

DIN - Connector



Type of pictail	Length
Fibre	max. 60
Cable	max. 60

DIN - Adapter

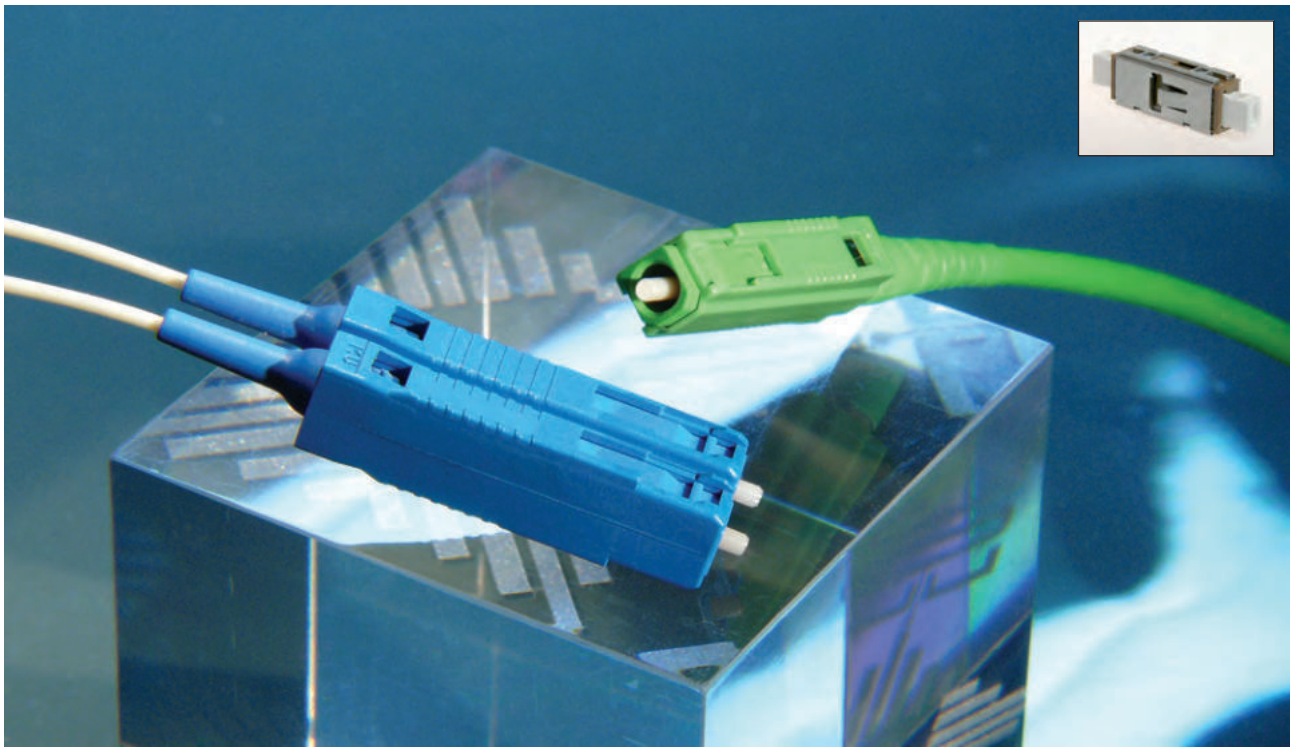


All dimension units are mm.

For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ►

MU-Simplex & MU-Duplex



MU connectors are part of the optical small form factor (SFF) connector family with a ferrule diameter of 1.25mm. Due to their compact design and good mechanical properties they achieve excellent optical measurement values.

Material

Connector	plastic
Adapter	plastic/metal with split and floating zirconia alignment sleeve
Ferrule	zirconia with metall insert
Dust cap	plastic

Standards

- MU-PC: IEC 61754-6
- MU-APC: IEC 61754-6

Design

Connectors:

- MU-Simplex and MU-Duplex

Adapters:

- MU-Simplex and MU-Duplex
- Standard delivery: quick-mounting
- Optional delivery: screw mounting

Colour coding:

- MU-PC: blue
- MU-APC: green
- MU-MM: beige

Applications

- Telecommunication, CATV, LAN, MAN, WAN, measuring systems
- Industry, medical engineering, sensor technology

Specifications of connectors

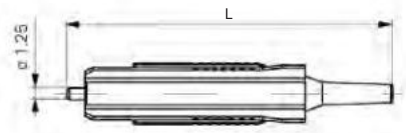
Standard	Singlemode PC	Singlemode APC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ: 0,12 [1] max: 0,25 [1]	typ: 0,12 [1] max: 0,25 [1]	typ: 0,25 [2] max: 0,40 [2]	dB	IEC 61300-3-34
Return Loss (RL)	typ: 50 [3] min: 45 [3]	typ: 70 [4] min: 65 [4]	typ: 40 min: 35	dB	IEC 61300-3-6
Repeatibility of IL	max: ±0,1	max: ±0,1	max: ±0,1	dB	
Durability	>1000 matings				
Operating temperature range	-40 to +85			°C	depends from used type of cable

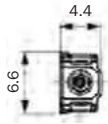
■ [1] IEC 61755-1 Grade B ■ [2] IEC 61753-122-2 Grade A ■ [3] IEC 61755-1 Grade 2 ■ [4] IEC 61755-1 Grade 1

Active specifications

Type of fibre, geometry of cable, material of cable: please inform in the Technical Information **FOC list of cable.**

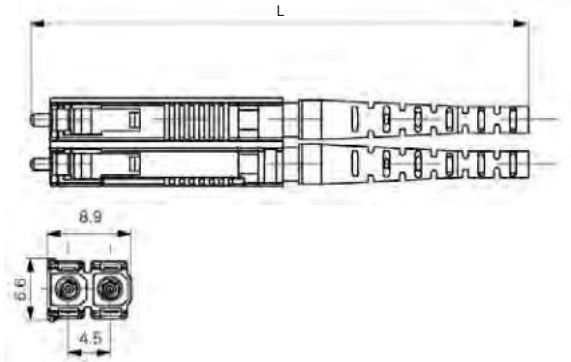
MU-Simplex





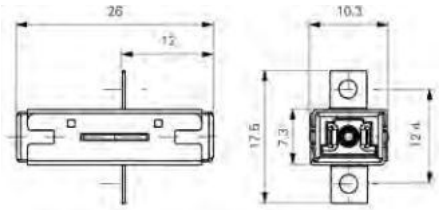
Type of pictail	Length
Fibre	max. 35
Cable	max. 50

MU-Duplex

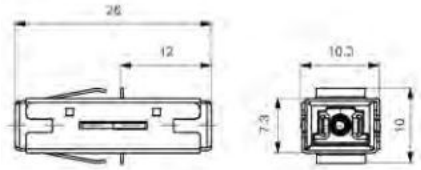


MU-Simplex Adapter

a)

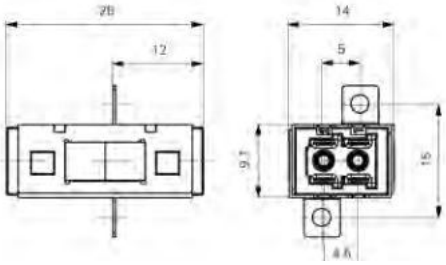


b)



MU-Duplex Adapter

a)



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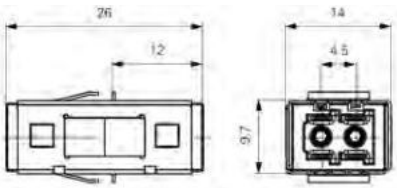
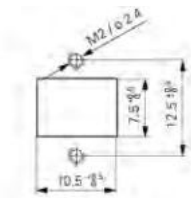


Assembly dimensions MU-Simplex Adapter

a)

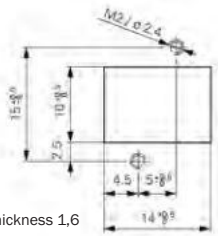


b)

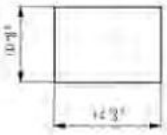
Max wall thickness 1,6

Assembly dimensions MU-Duplex Adapter

a)



b)



Max wall thickness 1,6

All dimension units are mm.

For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ▶ LC Connector Standard ▶ Attenuation Element ▶

OAF-LC-PC and OAF-LC-APC

Application
The attenuation element adjusts the incoming signal level to the dynamics of the receiver. The attenuation is independent of the wavelength.

Compatibility
With all LC-PC and LC-APC fiber-optic connectors and adapters (IEC 61754-20).

OAF-LC-PC body color blue
OAF-LC-APC body color green

Design/Materials

Polishing	0° PC, 8° APC
Ferrule	ø 1,25 mm, zirconia, rotation locked
Centering sleeve	zirconia split, floating
Exterior parts	plastic

Parameter

	Single Mode (PC)						Single Mode 8° (APC)				Unit
Fibre	9/125										µm
Wavelength	1240-1650										nm
InsertionLoss nom.	1	2	3	4	5	6	10	15	20	25	dB
Tolerance*	±0,5	±0,5	±0,5	±0,5	±0,5	±0,7	±0,7	±1	±1,5	±1,5	dB
Repeatibility	< 0,5 during live time										dB
Durability	min. 1000 matings										
Return Loss	> 50						> 65				dB
Operating temperature range	-40/+85										°C

* Measured at 1310 und 1550 nm. Additional loss from modal noise of 0.05 dB/dB (max.). The 2 transition points of the light may induce a connector-dependent additional loss of 0.5dB (max.). Other loss values on request.

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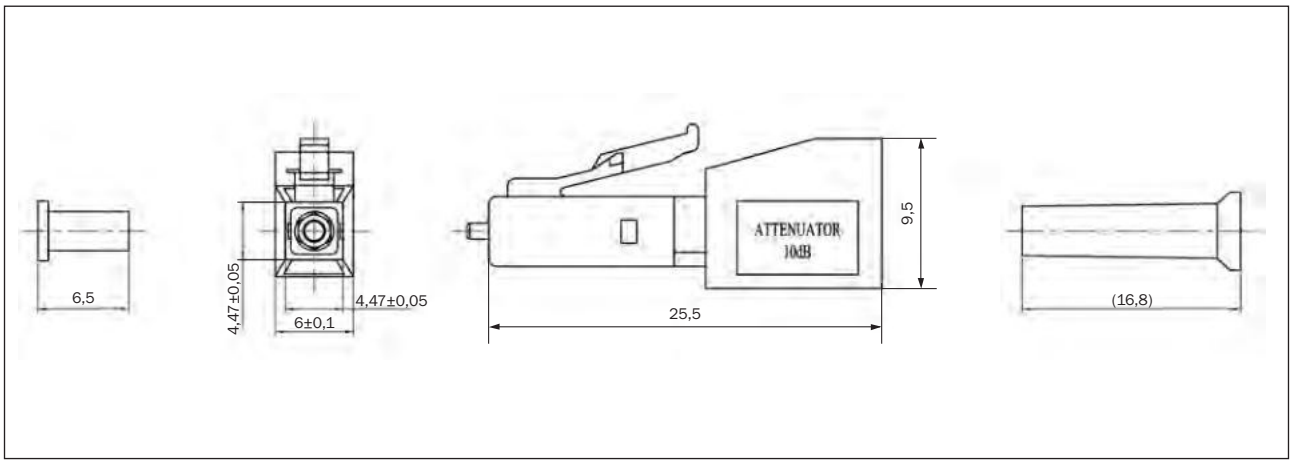
Release 22.04.2020
Subject to modifications
DBE-CON-0166V005

Dimensions Standard



For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ► LSH Connector Standard ► Fixed Attenuator ►

OAF - LSH-HRL

Application
The fixed attenuator adjusts the incoming signal level to the dynamics of the receiver. The attenuation is independent of the wavelength.

Compatibility
With all LSH-HRL fiber-optic connectors and adapters (IEC61754-15).

OAF-LSH-HRL body color green

Design/Materials

Polishing	8° APC
Ferrule	ø 2,25 mm, zirconia, rotation locked
Centering sleeve	zirconia split, floating
Exterior parts	plastic

Parameter

	Single Mode 8° (APC)										Unit
Fibre	9/125										µm
Wavelength	1240-1650										nm
InsertionLoss nom.	2	4	5	6	10	15	20	25	30	25	dB
Tolerance*	±0.5	±0.5	±0.5	±0.5	±1	±1.5	±2	±2.5	±2.5	±1,5	dB
Repeatibility	< 0,5 during live time										dB
Durability	min. 1000 matings										
Return Loss	> 65										dB
Operating temperature range	-25/+70										°C

* Measured at 1310 und 1550 nm. Additional loss from modal noise of 0.05 dB/dB (max.). The 2 transition points of the light may induce a connector-dependent additional loss of 0.5dB (max.). Other loss values on request.

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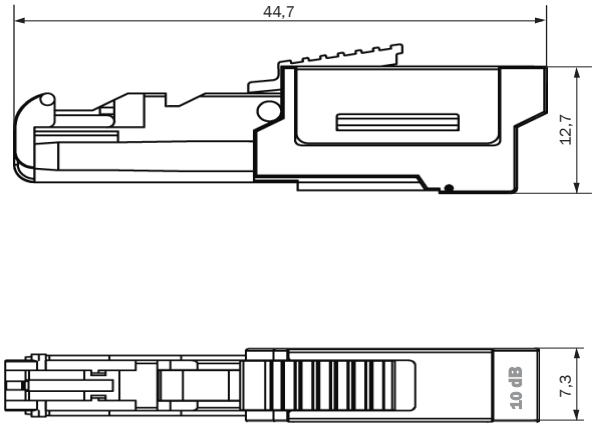
Release 14.07.2021
Subject to modifications
DBE-CON-0228V004

Dimensions standard



For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ▶ MU Connector Standard ▶ Attenuation Element ▶

OAF-MU-PC and OAF-MU-APC

Application
The attenuation element adjusts the incoming signal level to the dynamics of the receiver. The attenuation is independent of the wavelength.

Compatibility
With all LC-PC and LC-APC fiber-optic connectors and adapters (IEC 61754-20).

OAF-MU-PC body color brown
OAF-MU-APC body color green

Design/Materials

Polishing	0° PC, 8° APC
Ferrule	ø 1,25 mm, zirconia, rotation locked
Centering sleeve	zirconia split, floating
Exterior parts	plastic

Parameter

	Single Mode (PC)						Single Mode 8° (APC)				Unit
Fibre	9/125										µm
Wavelength	1240-1650										nm
InsertionLoss nom.	1	2	3	4	5	6	10	15	20	25	dB
Tolerance*	±0,5	±0,5	±0,5	±0,5	±0,5	±0,7	±0,7	±1	±1,5	±1,5	dB
Repeatibility	< 0,5 during live time										dB
Durability	min. 1000 matings										
Return Loss	> 50						> 65				dB
Operating temperature range	-40/+85										°C

* Measured at 1310 und 1550 nm. Additional loss from modal noise of 0.05 dB/dB (max.). The 2 transition points of the light may induce a connector-dependent additional loss of 0.5dB (max.). Other loss values on request.

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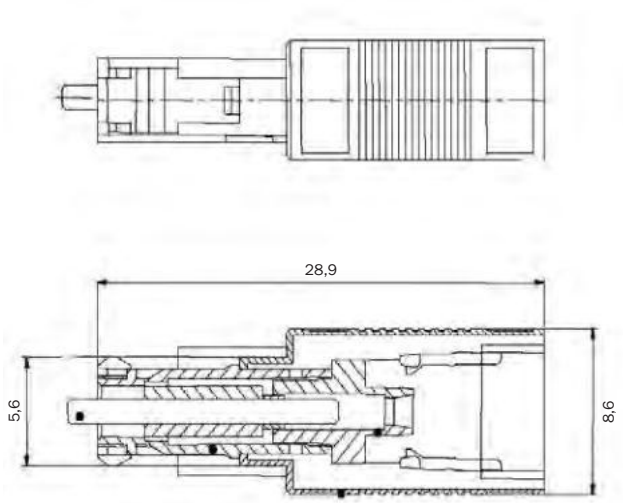
Release 22.04.2020
Subject to modifications
DBE-CON-0214V003

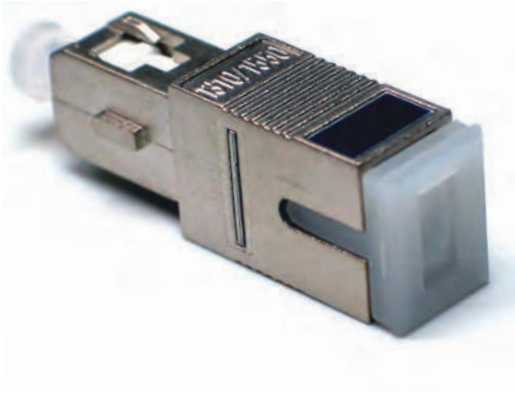
Dimensions Standard



For a complete connector overview visit our website **www.foc-fo.com**.

Connectors ▶ SC Connector Standard ▶ Attenuation Element ▶

OAF-SC-PC and OAF-SC-APC



Application
The attenuation element adjusts the incoming signal level to the dynamics of the receiver. The attenuation is independent of the wavelength.

Compatibility
With all SC-PC and SC-APC fiber-optic connectors and adapters (IEC 61754-4-x).

OAF-SC-PC
Metallic body color, marking blue
OAF-SC-APC
Metallic body color, marking green

Design/Materials

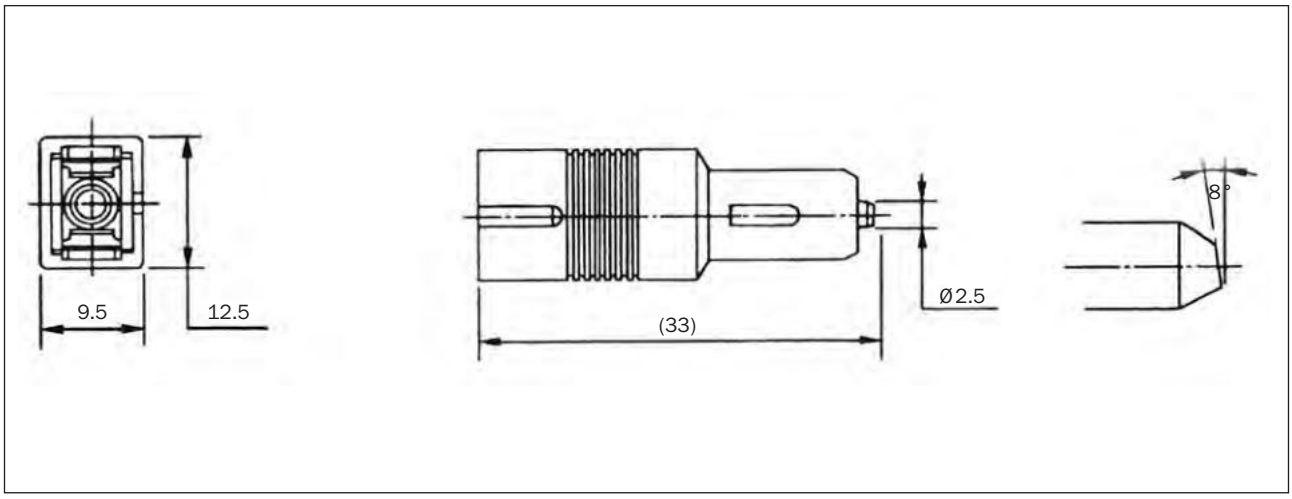
Polishing	0° PC, 8°APC
Ferrule	ø 2,5mm, zirconia, rotation locked
Centering sleeve	zirconia split, floating
Exterior parts	plastic, metal

Parameter

	Single Mode (PC)						Single Mode 8° (APC)				Unit
Fibre	9/125						9/125				µm
Wavelength	1240-1650						1240-1650				nm
Insertion Loss nom.	1	2	3	4	5	6	10	15	20	25	dB
Tolerance*	±0,5	±0,5	±0,5	±0,5	±0,5	±0,7	±0,7	±1	±1,5	±1,5	dB
Repeatibility	< 0,5 during live time										dB
Durability	min. 1000 matings										
Return Loss	> 50						> 65				dB
Operating temperature range	-40/+85										°C

* Measured at 1310 and 1550 nm. Additional loss from modal noise of 0.05 dB/dB (max.). The 2 transition points of the light may induce a connector-dependent additional loss of 0.5dB (max.). Other loss values on request.

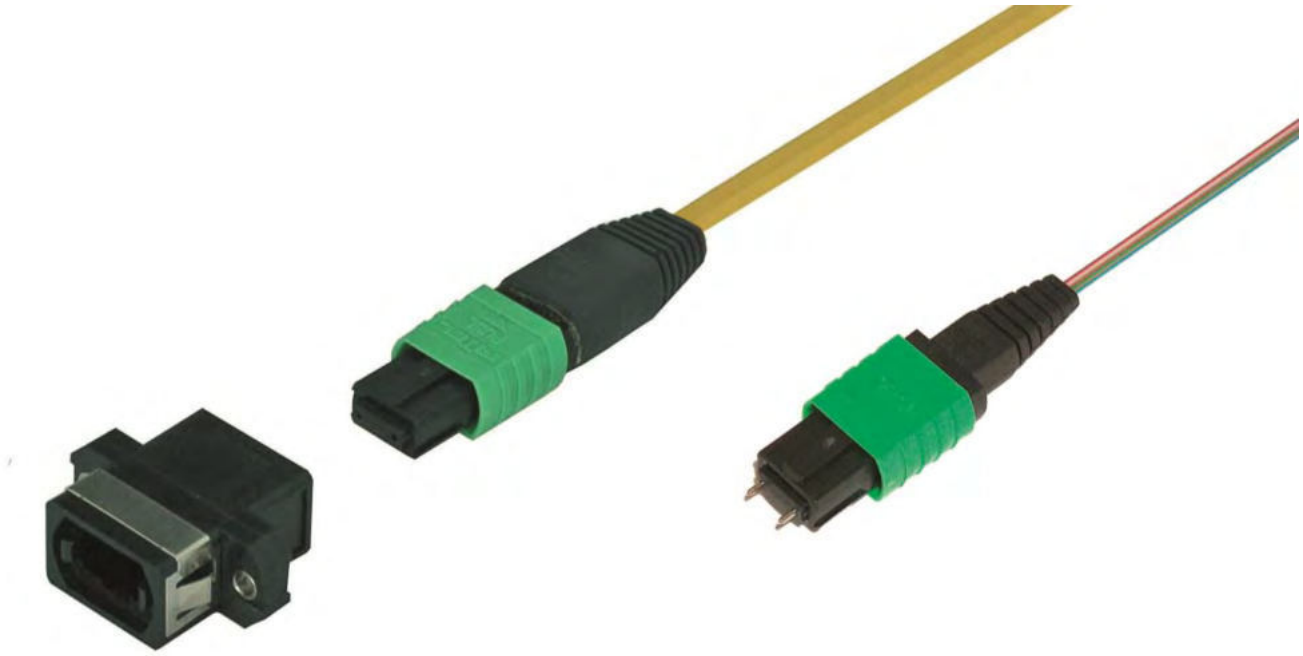
Dimensions



For a complete overview of connectors visit our website at www.foc-fo.com.

Connectors ▶

MPO Connector



General Information

The MPO connector system is a multi-fibre connector system with a high packing density on the basis of a high-precision MT ferrule. The spring-loaded push/pull locking mechanism of the MPO is easy to handle while guaranteeing the secure mating of the connectors - both important properties for critical connections with high packing densities.
High-precision guiding pins ensure the exact adjustment of the ferrule. The MPO made by FOC is available as a 4-, 8-, and 12- channel version, both in PC and APC design, and with multimode and singlemode fibres. Its exceptional optical performance (low IL and high RL values) is achieved by FOC's sophisticated polishing process.

Features

- Accommodation of up to 12 fibres
- Low costs per mated connection for applications with high packing densities
- Push/pull mechanism
- Comfortable handling
- High-precision MT ferrule and sophisticated polishing process
- Lowest IL values and high repeatability

Applications

- Patch cords and fan-out assemblies
- ATM and DWDM high-speed communication systems
- Multimedia applications
- CATV and video transmissions
- Data transmission and telecommunication networks
- Industrial applications

Standards

- IEC 61754-7 Fibre optic connectors interfaces - Type MPO connector family

Available as

- Terminated connector

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Release 22.04.2020
Subject to modifications
DBE-CON-0210V005

Specifications

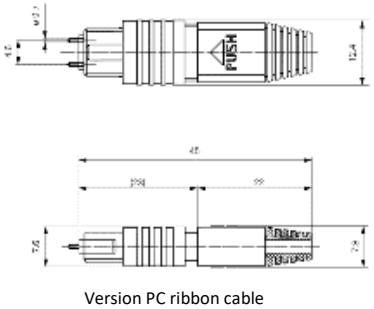
Standard	Singlemode PC	Singlemode APC	Multimode	Unit	Test conditions
Insertion Loss (IL)	typ. 0,25 max. 0,75	typ. 0,25 max. 0,75	typ. 0.35	dB	IEC 61300-3-4; λ = 1300/1550nm
Return Loss (RL)	min. 40	min. 60[1]	typ. 20	dB	IEC 61300-3-6; λ = 1300/1550nm
Repeatability of IL	max. ± 0,2			dB	over complete life time
Durability	1000 matings				
Operating temperature range	- 40 to + 85[2]			°C	
Storage temperature range	- 40 to + 90[2]			°C	

[1] measured with precision reflectometer
[2] The temperature range of the cable used may limit the connector specifications.

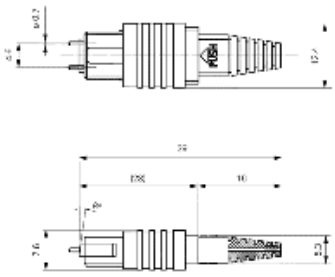
Dimensions

MPO-A1 connector (with pins)

Designs: MPO-A1 - PC, MPO-A1 - APC
Ferrule material: MT (plastics)
External parts: Plastics



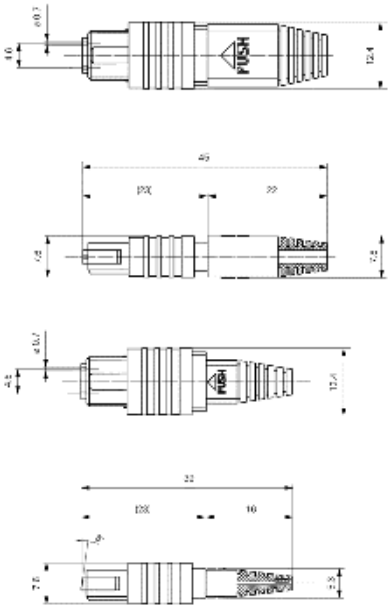
Version PC ribbon cable



Version APC ribbon cable

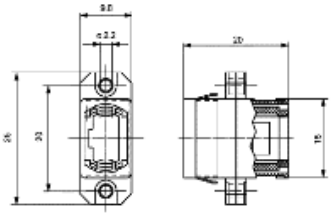
MPO- A2 connector (without pins)

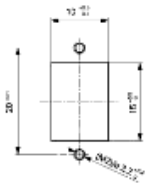
Designs: MPO-A2 - PC, MPO-A2 - APC
Ferrule material: MT (plastics)
External parts: Plastics



Adapter

External parts: Plastics, black





Mounting holes
max. wall thickness 1.6mm

Network Systems

For a complete overview of Network Systems visit our website at **www.foc-fo.com**.

Network Systems ▶ Splice & Patch Modules ▶

Fiberbox 19”/1HU

The 19”/ 1HU Fiberbox is an innovative splice and patch box for holding up to 48 fibres. As a distribution box it can alternatively be used for coupler modules and WDM systems.
The front panels are available for all connector standards. A lock on the front panel prevents any unauthorised access. The optical cables can be entered variably into the rear and lateral cable entries and be retained tightly using cable fasteners or metric threaded glands. The slide-out drawer rests on rails running on ball-bearings. It provides a two-chamber system for separately storing buffer tubes and pigtails. This ensures a secure installation and allows easy access for later additions or for service needs.

Features

- 19”/1HU distribution box completely made of aluminium, for accommodating up to 48 fibres or couplers/WDM modules.
- 19” side brackets can be adjusted continuously up to a depth of 35 mm.
- Front panel for LSH (Class A), SC and F-3000™/LC simplex and duplex connectors (other connector types on request).
- 4 cable entries (2 x on the rear and 2 x on the sides).
- Including splice cassettes with cover, splice holder and mounting material.

Material	aluminium anodized
Colour	RAL 7035

Options
ETSI mounting bracket, Patch cord tray, single-fibre management, lead-in connector installed at 45°

Delivery complete with splice cassettes, including mounting hardware. The Fiberboxes are delivered ready for splicing (lead-in connectors installed, pigtails stripped, inserted, marked in telecom standard colours).

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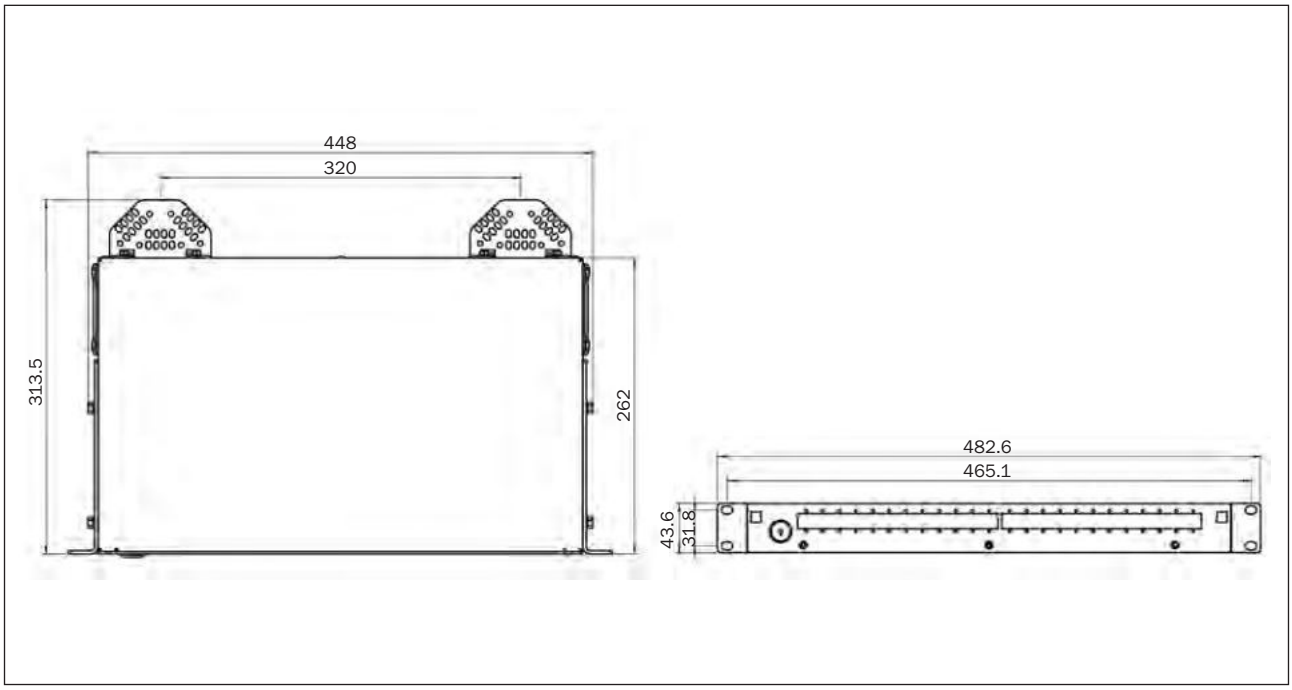
Release 22.04.2020
Subject to modifications
DBE-NWS-0022V005

Specifications

Modul type	Function
Monitoring module I	continuous signal monitoring
Service module	connection for continuous OTDR measurements
Isolator module	back reflection protection
Splitting module I	symmetrical power splitting (1xN or 2xN)
Splitting module II	asymmetrical power splitting
WWDM module I	multiplexing and demultiplexing of 1310/1550nm signals
WWDM module II	multiplexing and demultiplexing of 1490/1550nm signals
CWDM module I	multiplexing and demultiplexing of CWDM signals
CWDM module II	add/drop multiplexing of CWDM signals
DWDM module I	add/drop multiplexing of CWDM signals
DWDM module II	add/drop multiplexing of DWDM signals

Dimensions



For a complete overview of Network Systems visit our website at **www.foc-fo.com**.

Network Systems ▶ Splice & Patch Modules ▶

Fiberbox 19”/ 2 HU

The 19”/ 2HU Fiberbox is an innovative splice and patch box for accommodating up to 96 fibres. As a distribution box it can alternatively be used for coupler modules and WDM systems. The front panels are available for all connector standards. A lock on the front panel prevents any unauthorised access. The optical cables can be entered variably into the rear and lateral cable entries and be retained tightly using cable fasteners or metric threaded glands. The slide-out drawer rests on rails running on ball-bearings. It provides a two-chamber system for separately storing buffer tubes and pigtails. This ensures a secure installation and allows easy access for later additions or for service needs.

Features

- 19”/2 HU distribution box completely made of aluminium, for accommodating up to 96 fibres or couplers/WDM modules.
- 19” mounting brackets can be adjusted continuously up to a depth of 35 mm.
- Front panel for LSH (Class A), SC and F-3000™/LC simplex and duplex connectors (other connector types on request).
- 4 cable entries (2 x on the rear and 2 x on the sides).
- Including splice cassettes with cover, splice holder and mounting material.

Material	aluminium anodized
Colour	RAL 7035

Options

Patch cord tray, single-fibre management, lead-in connector installed at 45°

Delivery complete with splice cassettes, including mounting hardware. The Fiberboxes are delivered ready for splicing (lead-in connectors installed, pigtails stripped, inserted, marked in telecom standard colours).

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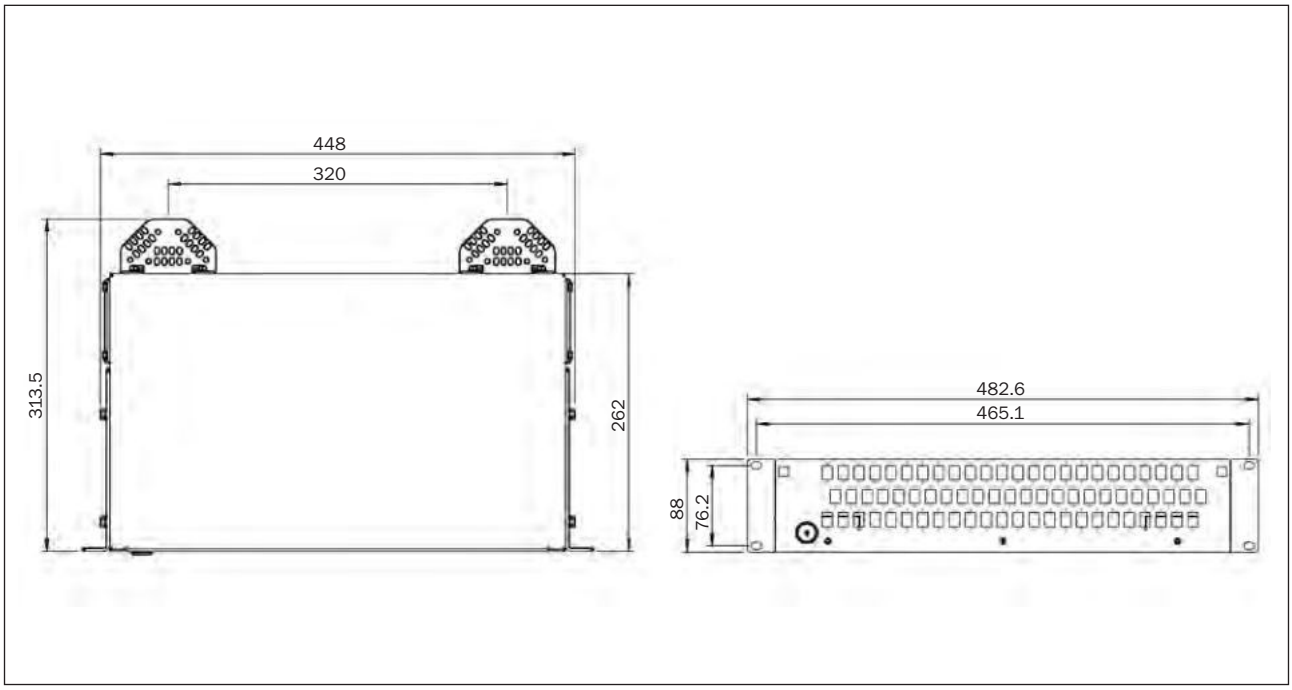
Release 22.04.2020
Subject to modifications
DBE-NWS-0024V006

Specifications

Modul type	Function
Monitoring module I	continuous signal monitoring
Service module	connection for continuous OTDR measurements
Isolator module	back reflection protection
Splitting module I	symmetrical power splitting (1xN or 2xN)
Splitting module II	asymmetrical power splitting
WWDM module I	multiplexing and demultiplexing of 1310/1550nm signals
WWDM module II	multiplexing and demultiplexing of 1490/1550nm signals
CWDM module I	multiplexing and demultiplexing of CWDM signals
CWDM module II	add/drop multiplexing of CWDM signals
DWDM module I	add/drop multiplexing of CWDM signals
DWDM module II	add/drop multiplexing of DWDM signals

Dimensions



For a complete overview of Network Systems visit our website at **www.foc-fo.com**.

Network Systems ▶ Splice & Patch Modules ▶

Lightbox 19”/1HU

The 19”/1HU Lightbox is a 2-piece splice and patch box for accommodating up to 96 fibres in 2HU. The Lightbox has also been designed as a distributor for optical coupler and WDM modules.
Several front panels made of anodized aluminium are available for different connector standards. The optical cables can be entered variably into the rear cable entries on the left and right and be retained tightly using cable fasteners or metric threaded glands. The Lightbox ensures a secure installation and provides an optimum access to the pigtails for service purposes.

Features

- 19”/1HU distribution for accommodating up to 48 fibres or coupler/WDM modules.
- Front panel for LSH (Class A), SC and F-3000™/LC simplex and duplex connectors (other connector types on request).
- 19” mounting brackets can be adjusted continuously up to a depth of 35 mm.
- Slide-out drawer for storing buffer tubes and pigtails can be removed for installation.
- Including splice cassettes with cover, splice holder and mounting material.
- Ready for splicing, including lead-in connectors and pigtails (on request).

Material	body	steel, powder-coated
	front panel	aluminium anodized
	mounting brackets	aluminium anodized
Colour		RAL 7035

Options

- Patch cord tray, single-fibre management, lead-in connectors installed at 45°
- Retrofit kit for protection against rodents, EZ00-000-000M017

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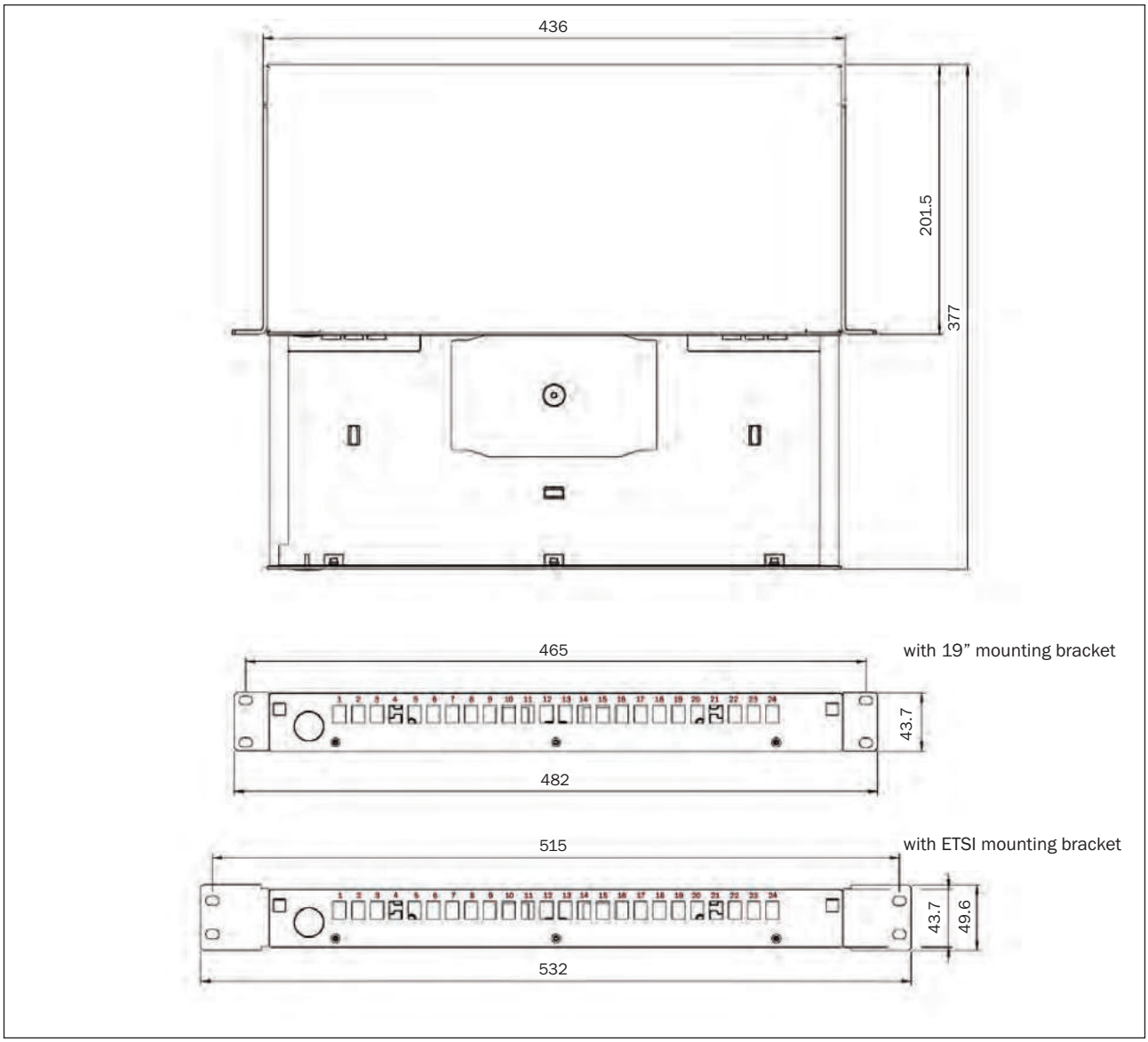
Release 22.04.2020
Subject to modifications
DBE-NWS-0034V008

Specifications

Modul type	Function
Monitoring module I	continuous signal monitoring
Service module	connection for continuous OTDR measurements
Isolator module	back reflection protection
Splitting module I	symmetrical power splitting (1xN or 2xN)
Splitting module II	asymmetrical power splitting
WWDM module I	multiplexing and demultiplexing of 1310/1550nm signals
WWDM module II	multiplexing and demultiplexing of 1490/1550nm signals
CWDM module I	multiplexing and demultiplexing of CWDM signals
CWDM module II	add/drop multiplexing of CWDM signals
DWDM module I	add/drop multiplexing of CWDM signals
DWDM module II	add/drop multiplexing of DWDM signals

Dimensions



For a complete overview of Network Systems visit our website at **www.foc-fo.com**.

Network Systems ▶ Splice & Patch Modules ▶

Lightbox 19”/2 HU

The 19”/2HU Lightbox is a 2-piece splice and patch box for accommodating up to 96 fibres in 2HU. The Lightbox has also been designed as a distributor for optical coupler and WDM modules.
Several front panels made of anodized aluminium are available for different connector standards. The optical cables can be entered variably into the rear cable entries on the left and right and be retained tightly using cable fasteners or metric threaded glands. The Lightbox ensures a secure installation and provides an optimum access to the pigtails for service purposes.

Features

- 19”/2 HU distribution box for accommodating up to 96 fibres or coupler/WDM modules.
- Front panel for LSH (Class A), SC and F-3000™/LC simplex and duplex connectors (other connector types on request).
- 19” mounting brackets can be adjusted continuously up to a depth of 35mm.
- Slide-out drawer for storing buffer tubes and pigtails can be removed for installation.
- Including splice cassettes with cover, splice holder and mounting material.
- Ready for splicing, including lead-in connectors and pigtails (on request).

Material	body	aluminium, powder-coated
	front panel	aluminium anodized
	mounting brackets	aluminium anodized
Colour		RAL 7035

Options

- Patch cord tray, single-fibre management, lead-in connectors installed at 45°
- Retrofit kit for protection against rodents, EZ00-000-000M017

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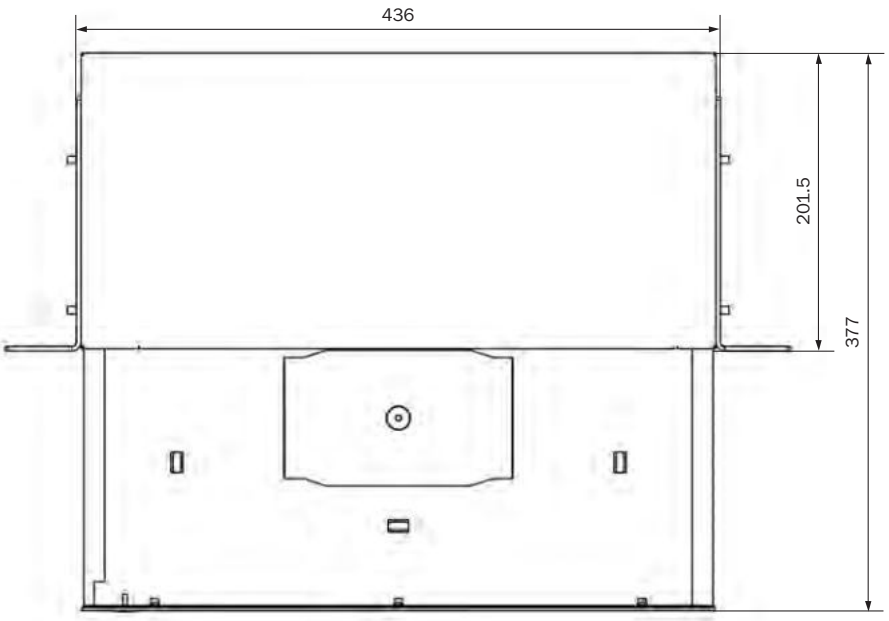
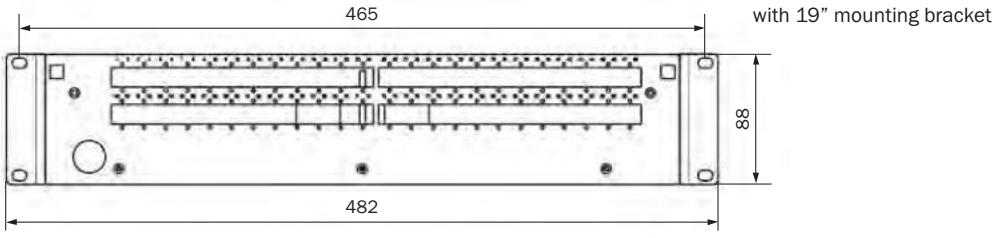
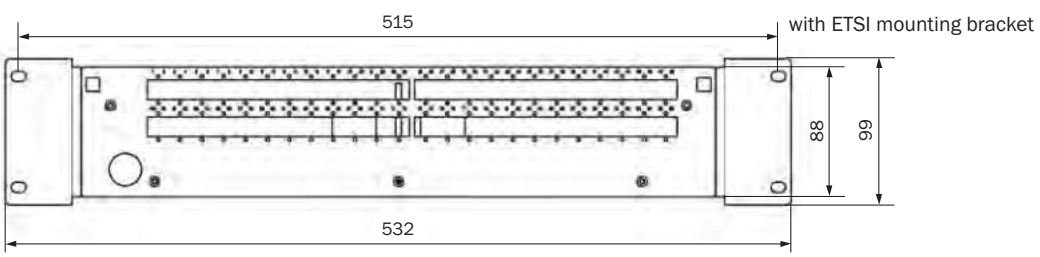
Specifications

Modul type	Function
Monitoring module I	continuous signal monitoring
Service module	connection for continuous OTDR measurements
Isolator module	back reflection protection
Splitting module I	symmetrical power splitting (1xN or 2xN)
Splitting module II	asymmetrical power splitting
WWDM module I	multiplexing and demultiplexing of 1310/1550nm signals
WWDM module II	multiplexing and demultiplexing of 1490/1550nm signals
CWDM module I	multiplexing and demultiplexing of CWDM signals
CWDM module II	add/drop multiplexing of CWDM signals
DWDM module I	add/drop multiplexing of CWDM signals
DWDM module II	add/drop multiplexing of DWDM signals







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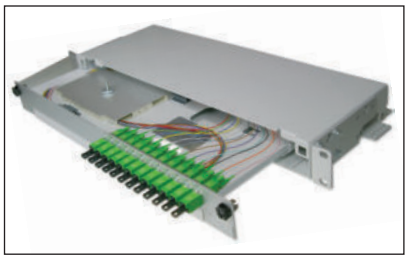
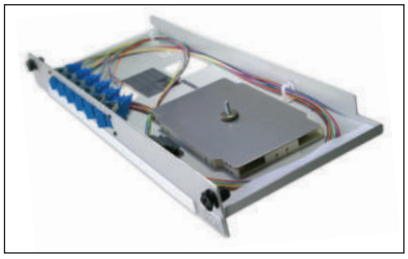
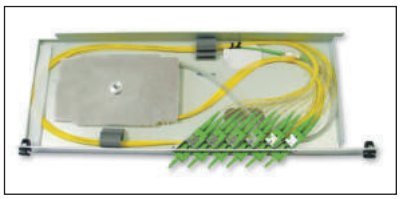
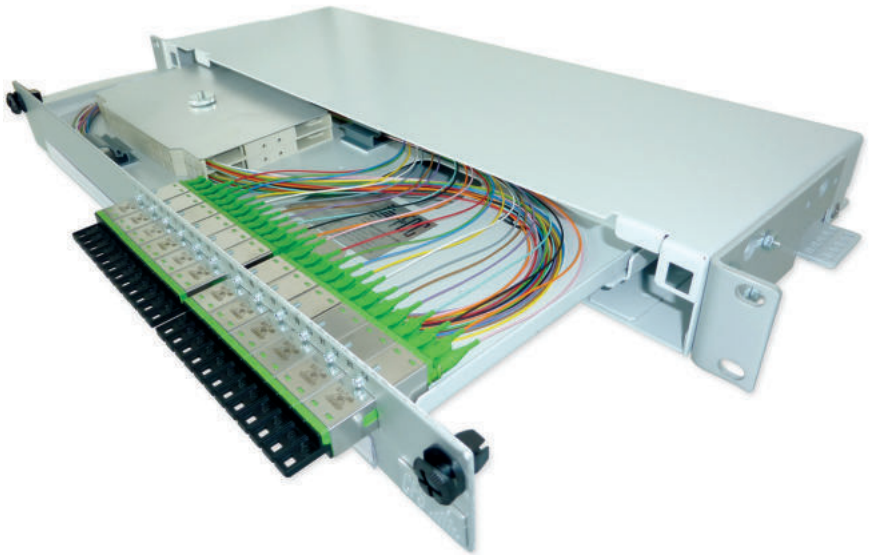
Network Systems ▶ Splice & Patch Modules ▶

Variobox 19”/1HU









The Variobox 1HU is a splice/patch box for connecting up to 24 optical fibres and has been developed for use in dry rooms, preferably according to climate category C. It has been designed as an FO distribution box for 19” and ETSI housing systems. The installation size is adapted by using appropriate mounting brackets, while the chassis will not be changed. The Variobox comes with different front panel types which can be used variably.
Different splice cassettes can be installed into the box.

Features

- Slide-out splice drawer running on rails, 2-chamber system for separated accommodation of buffer tubes and pigtails.
- Two openings for buffer tube or cable entry, large cable entry with cable mounting plate on the right at the rear, small buffer tube entry on the right at the side.
- Easy depth adjustment by approx. 70mm.
- High variability in racks by alternative use of 19” or ETSI mounting brackets.
- Ideal solution for WDM, CWDM or broadband cable splitter modules.
- Optionally for racks with low mounting depth, e.g. 300 mm racks or outside plant enclosures.
- Delivery also with single-fibre management.

Standard versions

- 12 x LSH (Class A) compact (Dx) adapters and 24 x LSH (Class A) pigtails
- 12 x LSH (Class A) simplex adapters and 12 x LSH (Class A) pigtails
- 6 x LSH (Class A) compact (Dx) adapters 45° and 12 x LSH (Class A) pigtails

Dimensions		19”/1HU o. ETSI/2SU
Material	enclosure	steel and aluminium
	body	steel, powder-coated
	front and mounting brackets	aluminium anodized
Colour		RAL 7035

Delivery complete with 1 or 2 splice cassette(s), including mounting hardware. The Varioboxes are delivered ready for splicing (lead-in connectors installed, pigtails stripped, inserted, marked in telecom standard colours).

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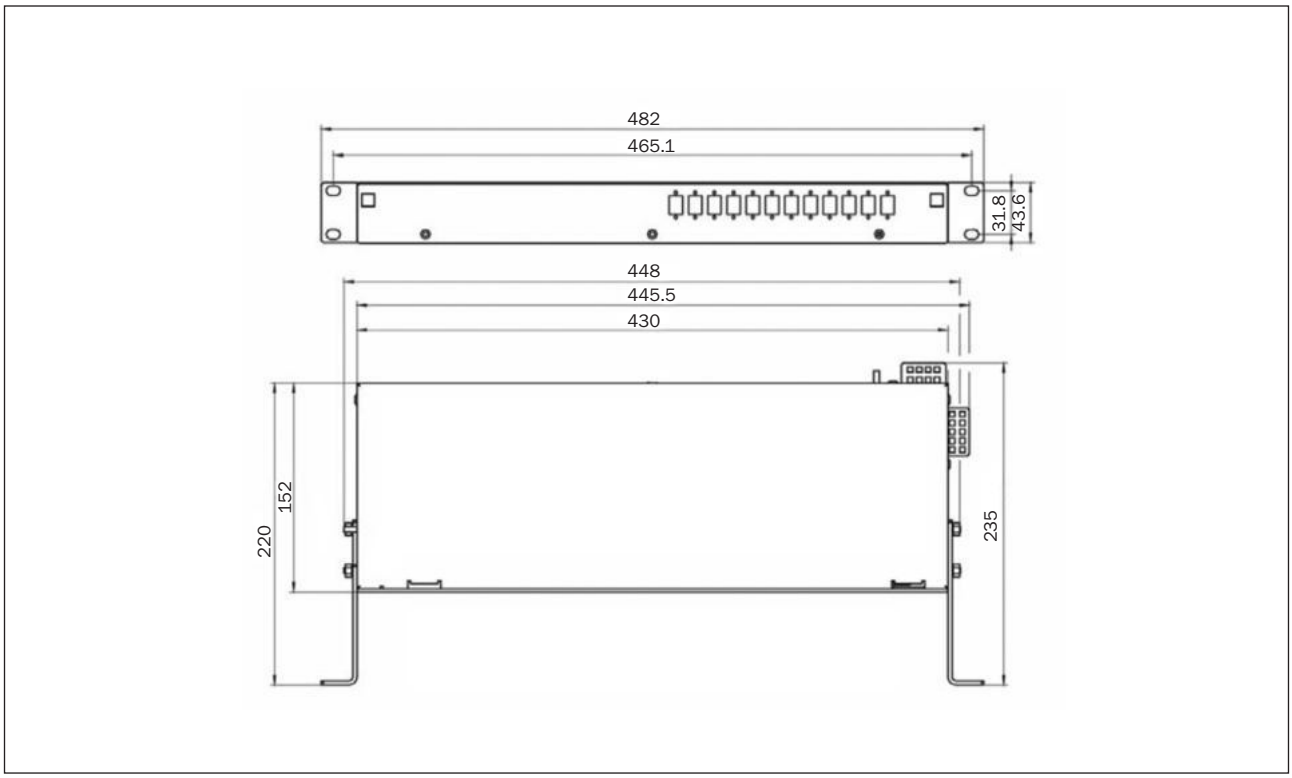
Specifications

Modul type	Function
Monitoring module I	continuous signal monitoring
Service module	connection for continuous OTDR measurements
Isolator module	back reflection protection
Splitting module I	symmetrical power splitting (1xN or 2xN)
Splitting module II	asymmetrical power splitting
WWDM module I	multiplexing and demultiplexing of 1310/1550nm signals
WWDM module II	multiplexing and demultiplexing of 1490/1550nm signals
CWDM module I	multiplexing and demultiplexing of CWDM signals
CWDM module II	add/drop multiplexing of CWDM signals
DWDM module I	add/drop multiplexing of CWDM signals
DWDM module II	add/drop multiplexing of DWDM signals

Dimensions



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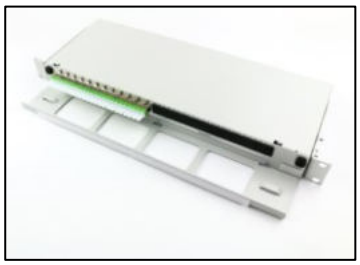
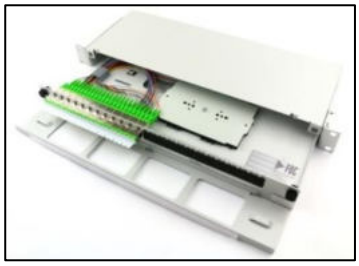
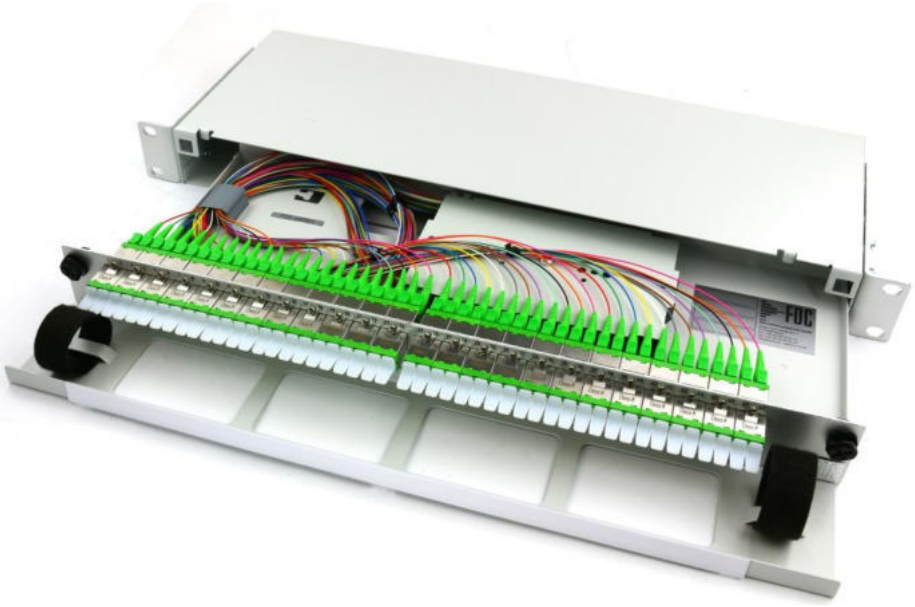
Network Systems ▶ Splice & Patch Modules ▶

Variobox HD 19”/ 1HU







General Information

The Variobox HD is a splice/patch box for connecting up to 48 optical fibres. The box was developed for use in dry rooms, preferably according to climate category C. It has been designed as an FO distribution box for 19” and ETSI housing systems. While the chassis will not be changed, the installation size is adapted by using appropriate mounting brackets. The Variobox HD is available with different front panel types. Different splice cassettes can be installed into the box.
The cable entry is on the right at the rear or on the left at the rear. For an optimal cable routing without requiring additional height space a cable management tray in front of the box is available. Therefore a transverse connection panel above or below the box is not necessary.

Features

- Slide-out splice drawer, 2-chamber system for separated accommodation of buffered tubes and pigtails
- 2 openings for buffered tubes or cable entry, large cable entry on the right at the rear or on the left at the rear, optional with cable fixing plate, small buffer tube entry on the right at the side or on the left at the side
- Easy depth adjustment of approx. 70 mm in 3 possible positions
- High variability in racks by alternative use of 19” or ETSI mounting brackets
- Ideal solution for WDM, CWDM or broadband cable splitter modules
- Suitable for racks with low mounting depth, e.g. 300 mm racks or outside plant enclosures

Standard Versions

- 12 x LSH (Class A) compact (Dx) adapters and 24 x LSH (Class A) pigtails, cable entry on the left
- 24 x LSH (Class A) compact (Dx) adapters and 48 x LSH (Class A) pigtails, cable entry on the left
- 12 x LSH (Class A) compact (Dx) adapters and 24 x LSH (Class A) pigtails, cable entry on the right
- 24 x LSH (Class A) compact (Dx) adapters and 48 x LSH (Class A) pigtails, cable entry on the right

Dimensions

- 19”/1HU or ETSI/2SU

Colour

- RAL 7035

Material

- Enclosure: steel and aluminium
- Body: steel, powder-coated
- Front and mounting brackets: aluminium anodized

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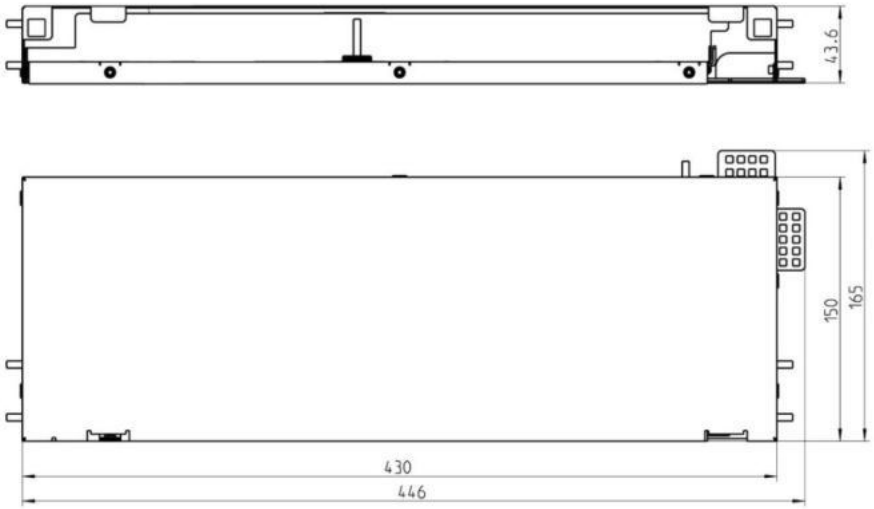
Optional

- Cable management tray, depth 70 mm
- Extension set for an additional assembly of 24 ports
- Cable fixing plate e.g. for the lead-in of outdoor cables

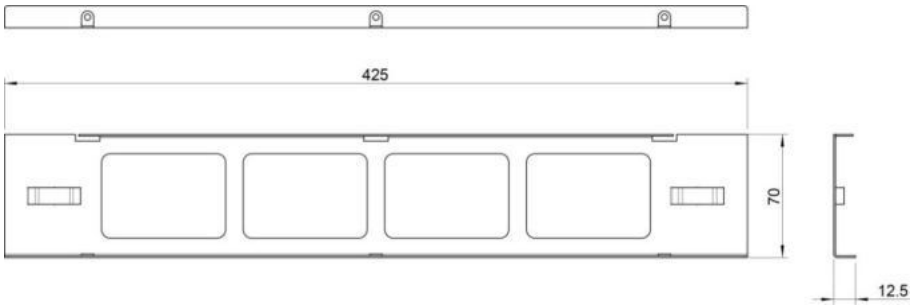
Delivery

- Delivery complete with 1 or 2 splice cassette(s), including mounting hardware
- The Varioboxes HD are delivered ready for splicing (lead-in connectors installed, pigtails stripped, inserted, marked in telecom standard colours)

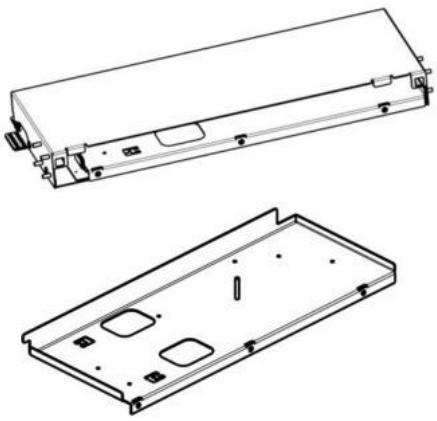
Dimensions



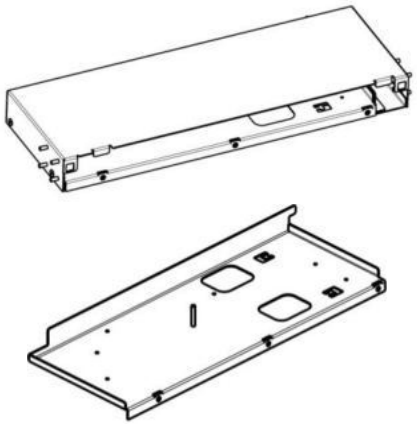
Cable Management Tray



Version Cable Entry Left



Version Cable Entry Right



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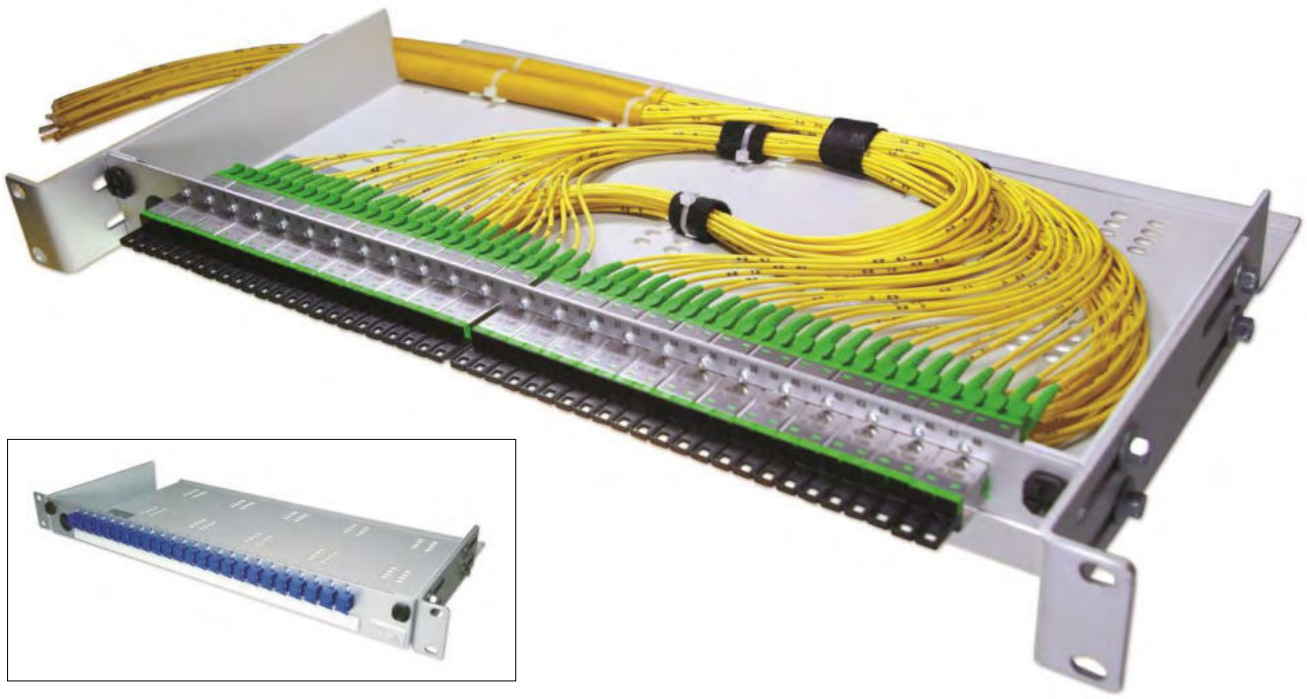
Network Systems ▶ Splice & Patch Modules ▶

Jumperbox 19”/ 1HU



General Information

The Jumperbox 19”/1HU is a patch box for holding up to 48 fibres. The incoming/outgoing jumper cables can be inserted variably from the left, the right and the rear, and be supported using cable clamps without any strain on the cables. The Jumperbox ensures a secure installation and provides an optimum access to the jumper cables for service purposes.

Features

- Universal jumper box for FOC® installation cables
- Same front panel design as Light-, Fiber- and Variobox
- Variable front panel insert
- Suitable for breakout cables, minibreakout cables, microbreakout cables and loose tube cables with distribution head
- Adjustable depth
- ETSI or 19” mounting
- Suitable for 300mm cabinet systems
- Variable cable entry from left, right or rear

Material

- Enclosure: Aluminium, powder-coated
- Side brackets: Aluminium anodized

Colour

- RAL 7035

Optional

- ETSI mounting brackets
- Patch cord tray

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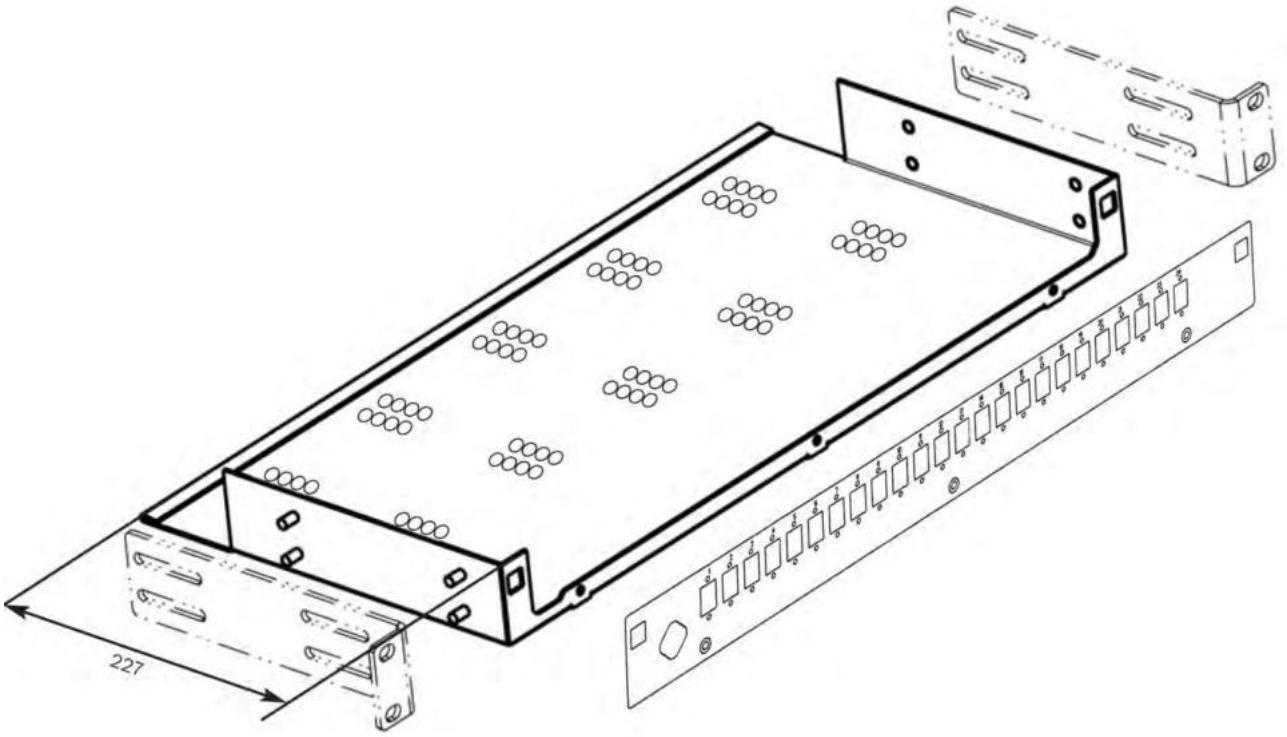
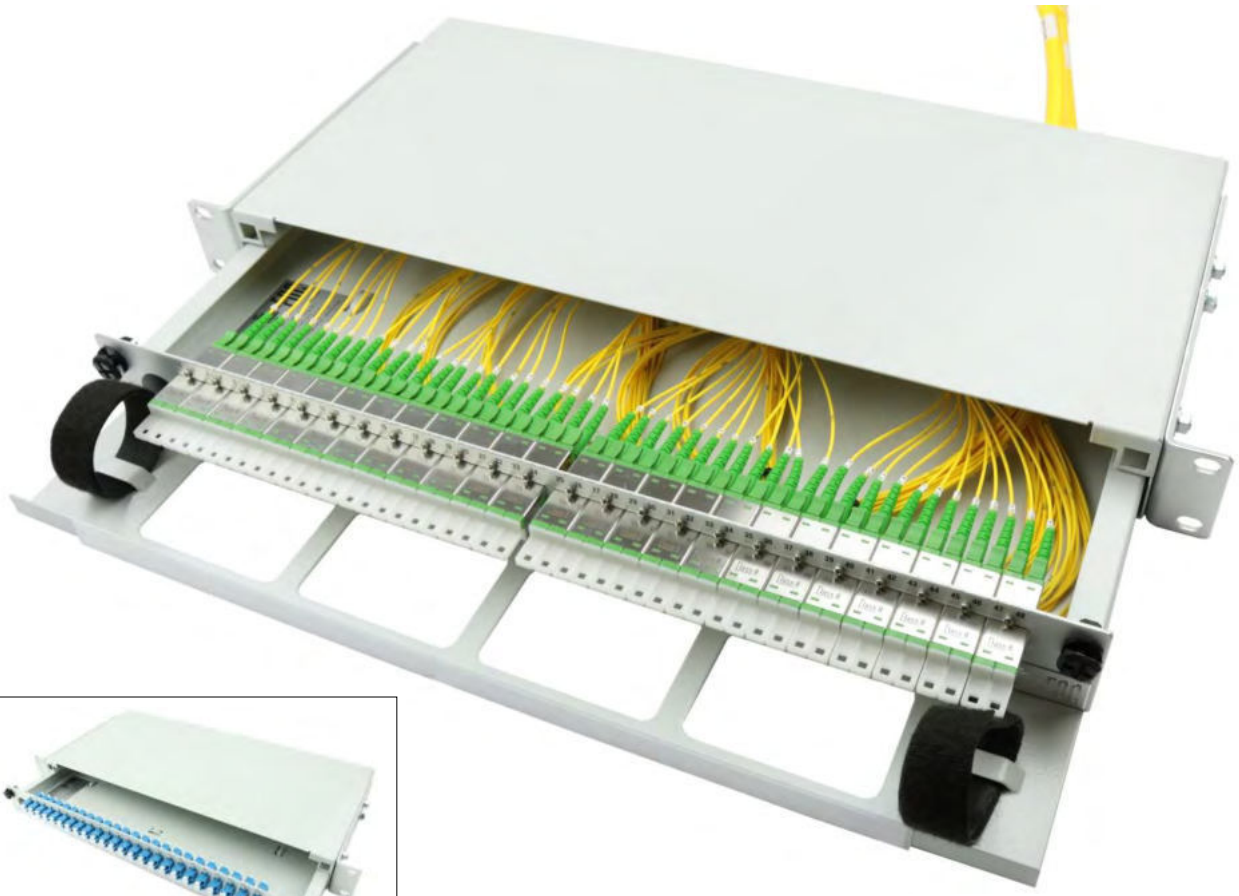
Dimensions



Network Systems ▶ Splice & Patch Modules ▶

Jumperbox Extendable 19”/ 1HU



General Information

The Jumperbox Extendable 19”/1HU is a patch box for holding up to 48 fibres. The incoming/outgoing jumper cables can be inserted variably from the rear and be supported using cable clamps without any strain on the cables. The Jumperbox Extendable 19”/1HU ensures a secure installation and provides an even better access to the jumper cables for service purposes.

Features

- Universal jumperbox for FOC® installation cables
- Same front panel design as Lightbox, Fiberbox and Variobox
- Variable front panel insert
- Suited for breakout cables, mini breakout cables, micro breakout cables and multifibre loose buffer cables with distribution head
- Adjustable depth
- ETSI or 19” mounting
- Suited for 300mm cabinet systems
- Extendable drawer for even easier access for service purposes

Material

- Enclosure: aluminium, powder-coated
- Front panel, mounting brackets: aluminium anodized

Colour

- RAL 7035

Optional

- ETSI mounting brackets
- Patch cord tray

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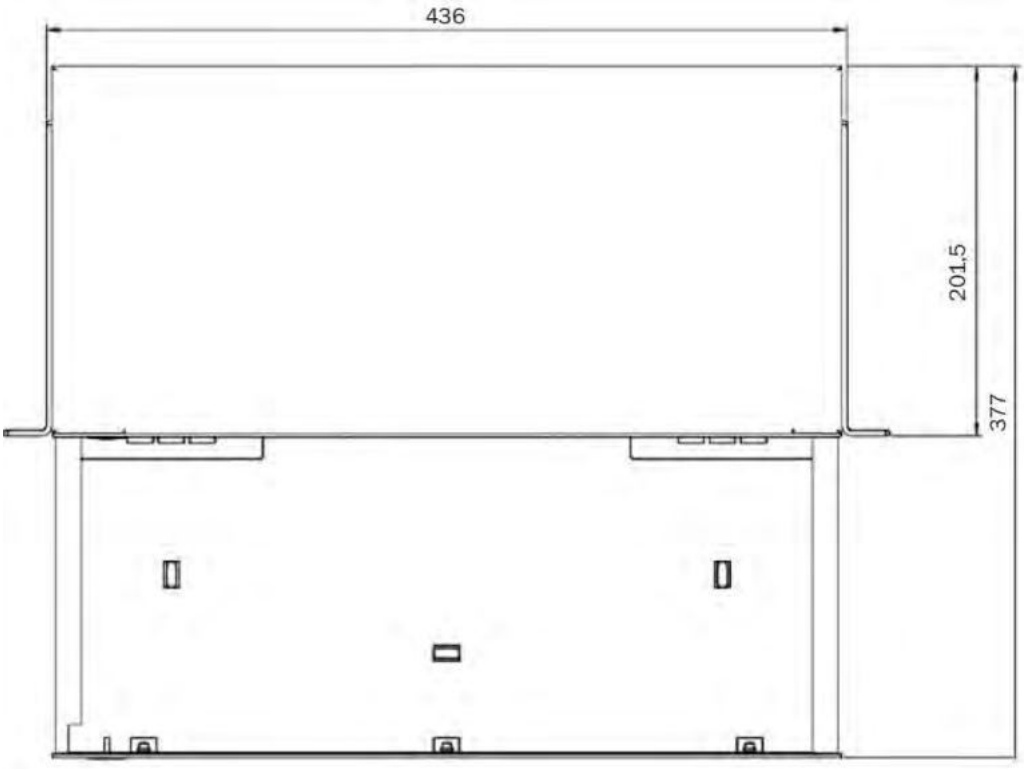
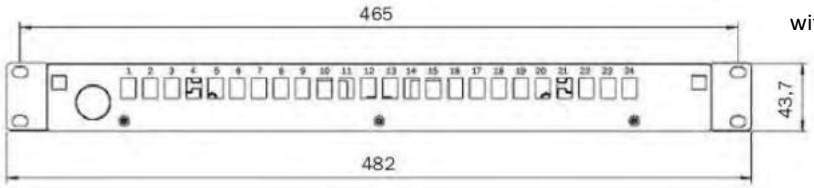
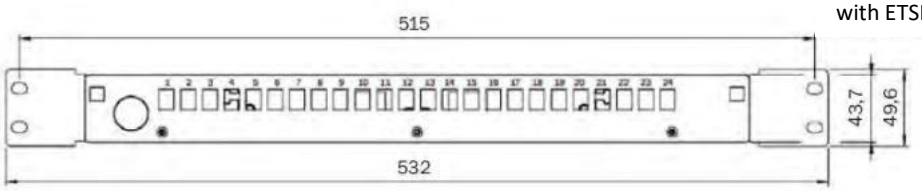
Dimensions



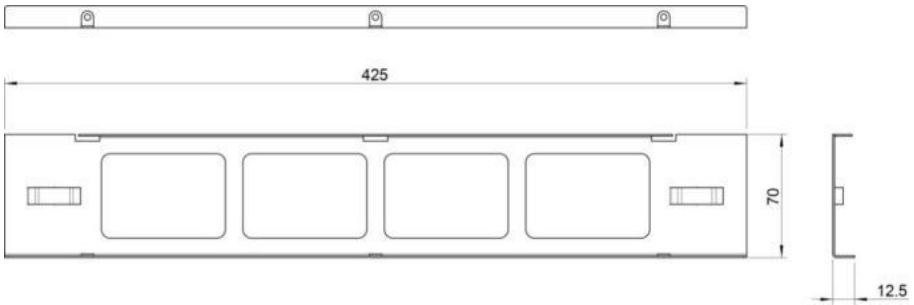


with 19“ mounting brackets



with ETSI mounting brackets

Cable Management Tray



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Network Systems ▶ Splice & Patch Modules ▶

DIN Rail Mounting Module

General Information

The DIN Rail Mounting Module is a robust and compact housing accepting 12 fibres for the usage in industrial environments. The module is suitable for mounting on a 35 mm DIN rail.

Via metric threaded glands the FO cables can be variably inserted and retained tightly. The module is delivered completely equipped with adapters, splice holder and Telekom color-coded, stripped and inserted pigtails.

Features

- Accommodation of up to 12 x 9/125/250/900 fibres
- Secondary coating (900 µm) and primary coating (250 µm) of the pigtails are color-coded according to DIN VDE 0888
- Two snap-on blocks for mounting on a 35 mm DIN rail
- Front panel for 12 x LSH (Class A) or SC simplex connectors
- 3 cable entries (1 at the rear, 1 at the top, 1 at the bottom side)
- Caps for unused cable entries
- Including splice holder and metric threaded glands

Material

- Powder-coated aluminum

Dimensions

- 139 x 125,5 x 34,5 mm

Color

- RAL 7035

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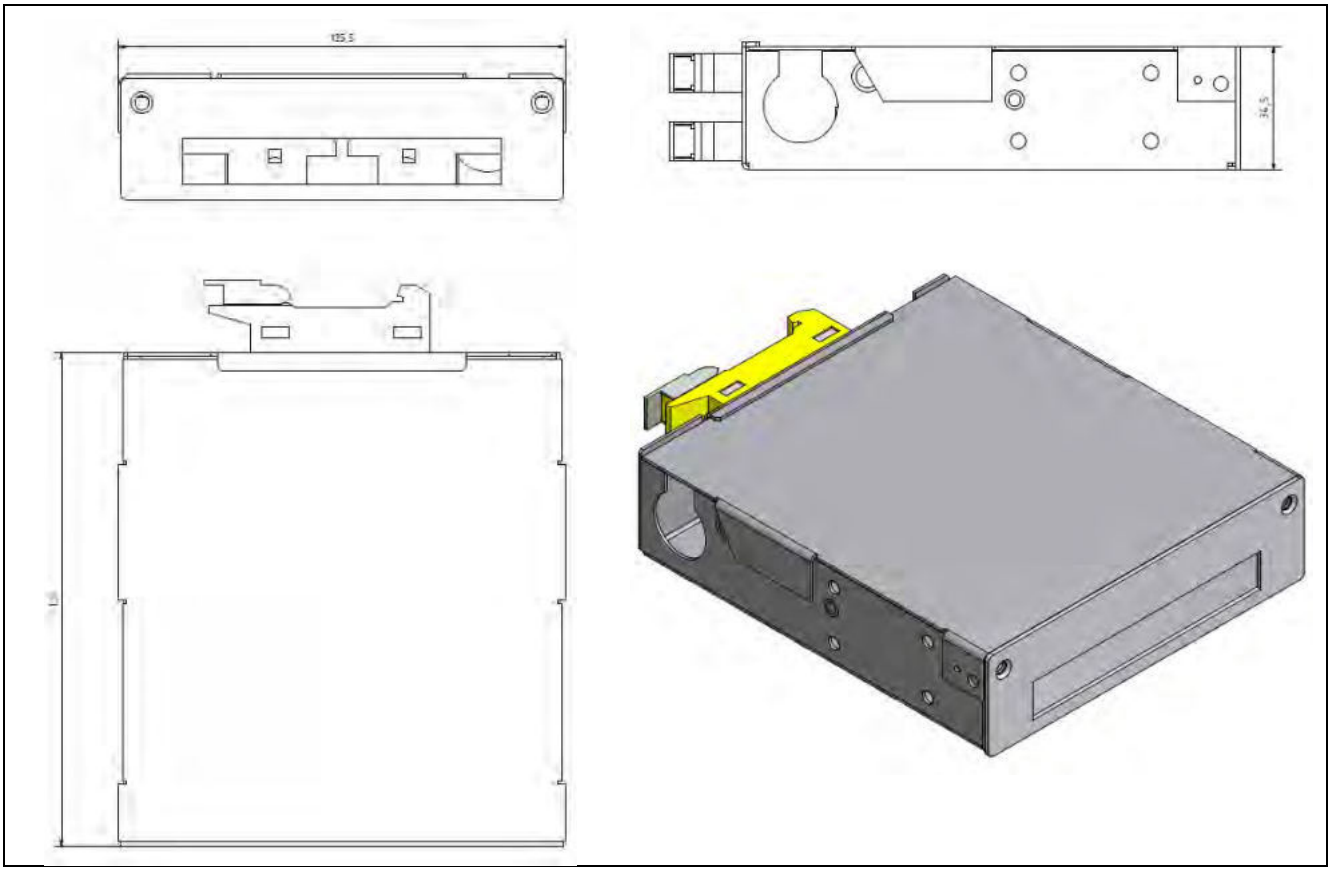
Dimensions



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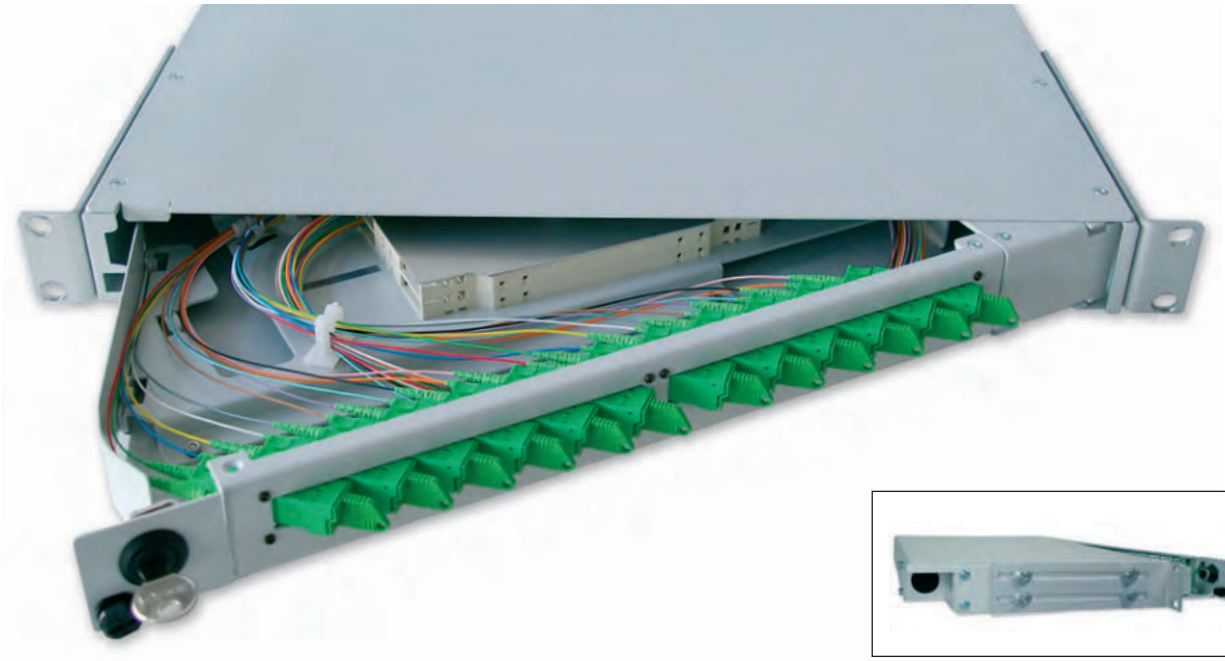
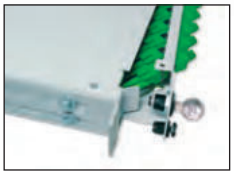
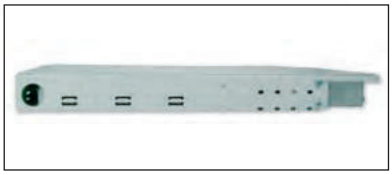
Network Systems ▶ Splice & Patch Modules ▶

Swivel box 19”/1HU







The 19”/1HU Swivel Box is an innovative splice and patch box for holding up to 48 or 96 fibres (LC connector system).
The front panels are available for all connector standards.
A lock on the front panel prevents any unauthorised access.
The optical cables can be entered variably into the rear and lateral cable entries and be retained tightly using cable fasteners or metric threaded glands.
The Swivel Box provides a two-chamber system for separately storing loose tubes and pigtails. This concept ensures a secure installation and allows easy access for later additions or for service needs.

Features

- 19”/1HU cross-connect distribution box completely made of aluminium for holding up to 48 or 96 fibres
- 19” side brackets can be adjusted continuously up to a depth of 35mm
- Opens to the left (standard) or to the right (option)
- Front panel for LSH (Class A), SC, LC simplex and duplex connectors (other connector types on request)
- Cable entries (1 x on the rear and 1 x on the sides)
- Including splice cassettes with cover, splice holder and mounting material

Material	enclosure front panel, side brackets	aluminium, powder-coated aluminium, powder-coated
Colour		RAL 7035

Options

- ETSI mounting bracket, patch cord tray, single-fibre management, adapter installed at 45°, access protection
- Delivery complete with splice cassettes, including mounting hardware
- The Swivel Boxes are delivered ready for splicing (adapters installed, pigtails stripped, inserted, marked in telecom standard colours for SM).

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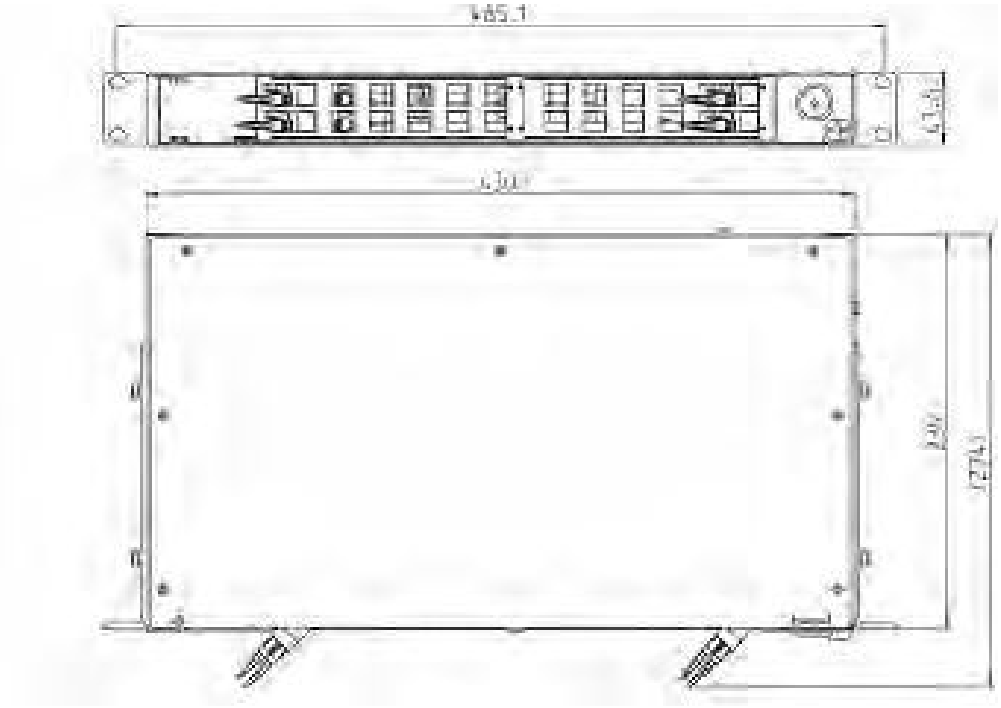
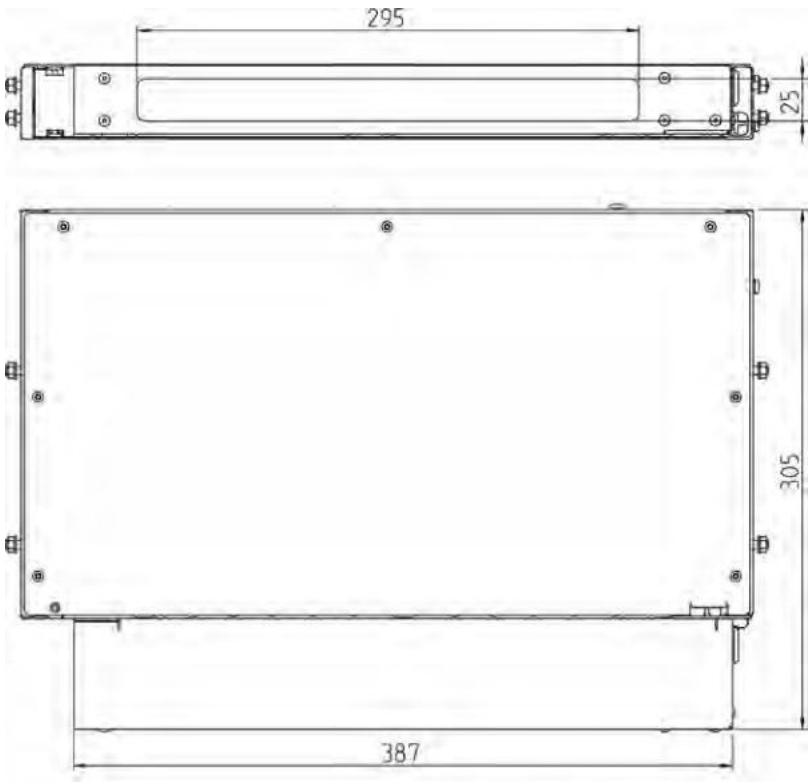


Standard version (45° left)



Version with access protection

Network Systems ► Splice & Patch Modules

Swivel Box 19”/ 2 HU lockable

General Information

The Swivel Box 19”/2HU lockable is an innovative splice and patch box for holding up to 24 or 48 fibres (LC connector system).
The optical cables can be entered variably into the rear entries and be retained tightly using cable fasteners or metric threaded glands. The installation of a safety lock half length is possible, to protect against unauthorized access.

Features

- 19”/ 2HU splice and patch box, holding up to 48 or 96 fibres
- 19” mounting brackets depth adjustable up to 35 mm
- Front panel for LSH (Class A), SC (Class A), LC (Class A) simplex or duplex connectors (other connector types on request)
- Left (standard) or right opening (optional)
- Cable entries (2 x on the rear)
- Including splice cassettes with cover, splice holder and mounting material
- Swivel Boxes are delivered ready for splicing (adapters installed, pigtails stripped, inserted, marked in telecom standard colours for SM)

Material

- Enclosure: Aluminium, powder-coated
- Front panel, mounting brackets: Aluminium, anodized

Colour

- RAL 7035

Optional

- ETSI mounting brackets

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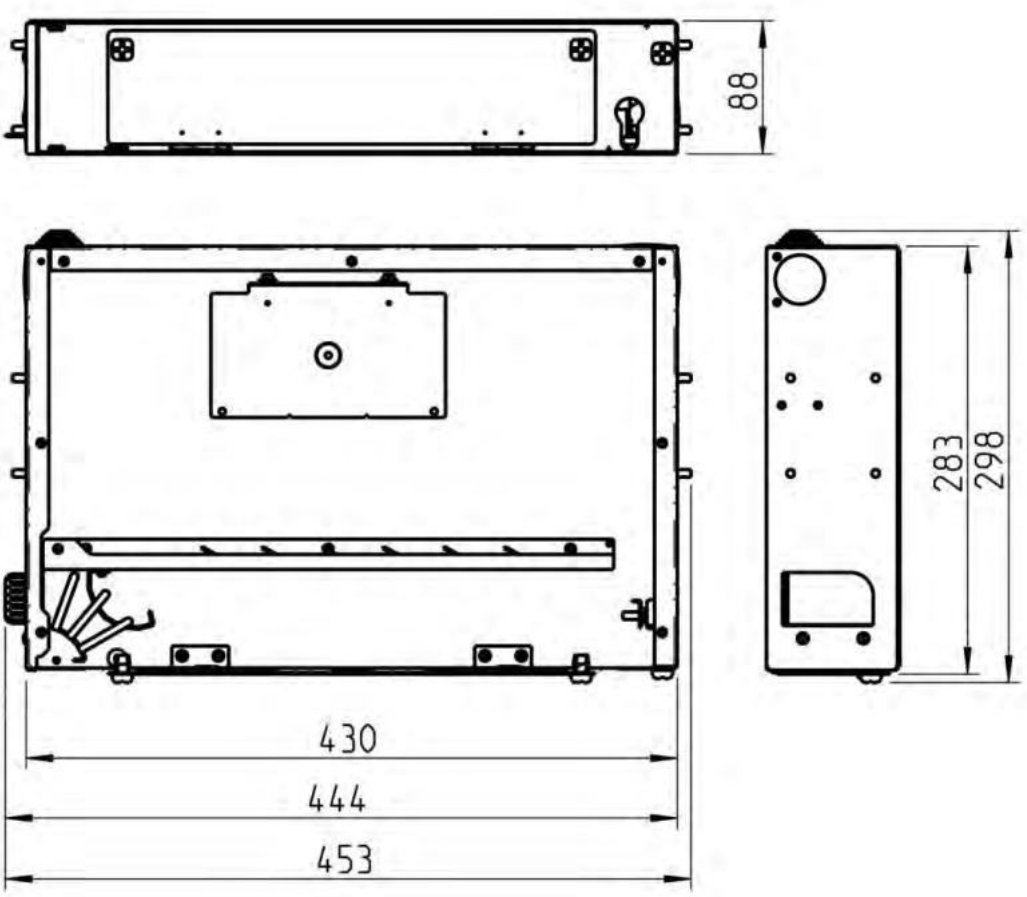
Standard Version

Picture 1: Standard Version (45° left) closed

Picture 2: Standard Version (45° left) open

Dimensions



Network Systems ▶ Accessories ▶

Patchcord Storage Box

General Information

The Patchcord Storage Box has been designed for the separate storage of patchcord overlength in 19” and ETSI housing systems. While the chassis will not be changed, the installation size can be adapted by using appropriate mounting brackets.

Features

- Separate and protected storage of the patchcord overlength
- 2 cable entries at the rear
- 6 excavations in the front panel to lead out the cables
- High variability in racks by alternative use of 19” or ETSI mounting brackets

Dimensions

- 19”/1HU or ETSI/2SU

Material

- Body: steel, powder-coated
- Front panel: aluminium anodized
- Mounting brackets: aluminium anodized

Colour

- RAL 7035

Standard Shippment

- Storage box 1HU
- Front panel
- 19” mounting brackets (optional ETSI mounting brackets)

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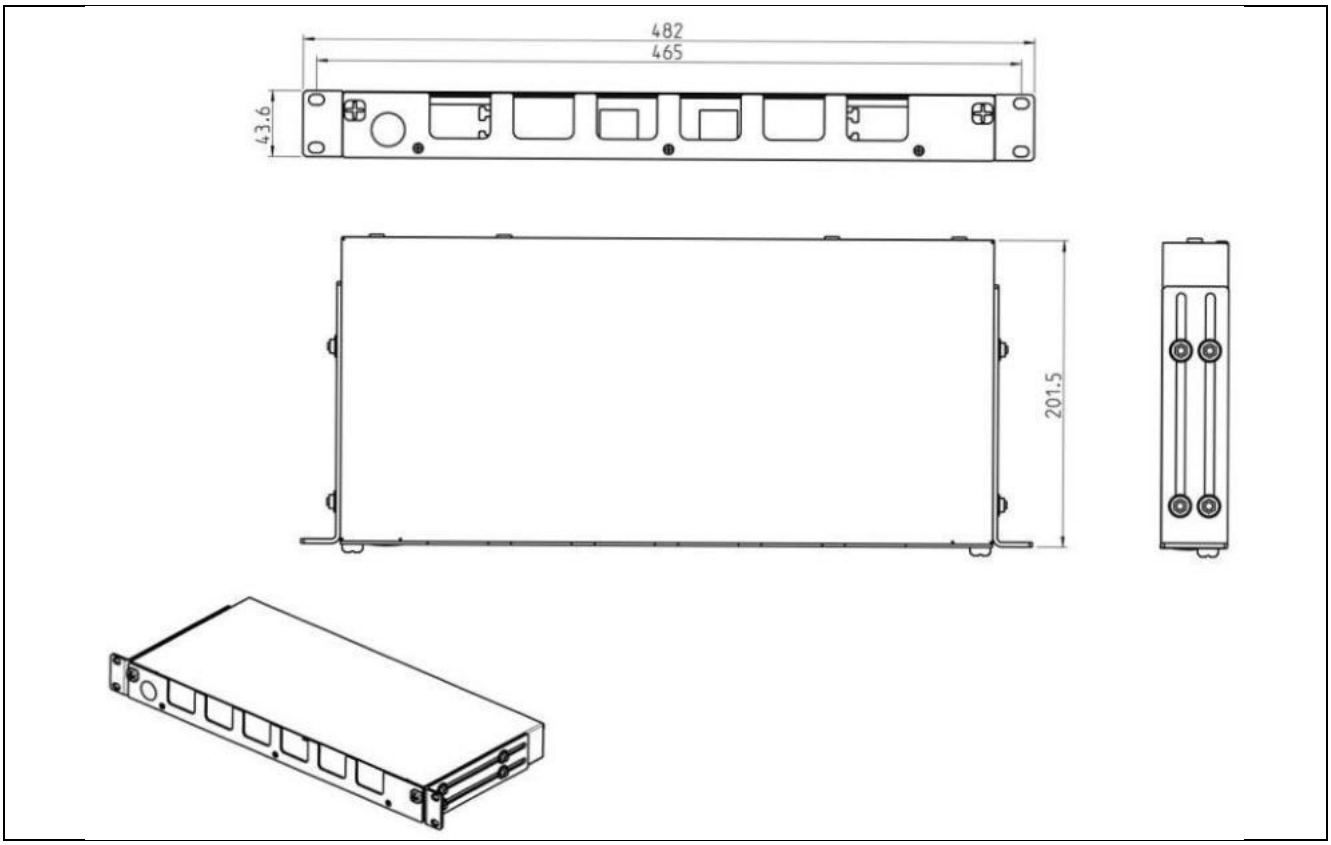
Dimensions



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Network Systems ▶ Splice & Patch Modules ▶

HDR/192 - BGT 19”/3HU

The HDR/192 with linecard modules is used whenever a high number of fibres needs to be arranged in a tight space in a compact, but installation- and service-friendly way. It is the optimum solution for FTTx, metro networks and LAN.

Features

- 19“, 3 HU subrack for accommodating up to 192 fibres and 48 linecard modules
- Linecard module for 4 x LSH (Class A) or 4 x SC
- Each linecard module contains a splice cassette for storing fibre excess lengths or accommodating up to 12 splice connections
- Fibres can be led to the line card module via multifibre loose buffers or tubes which are safely fixed to the module using cable clamps
- In the rear area a special fibre management prevents the fibres from being kinked and ensures that the modules can be pulled out to the front
- For easy installation the line card modules are removed from the rear and pulled out to the front for cleaning and servicing
- Locking mechanisms hold the modules in place and accommodate the labels
- Suited for accommodating optical couplers and wavelength multiplexers

Options

Depending on the demands put on the cable plant appropriate multifibre loose buffer separations as well as patch cord guides are available.

Other connectors types available on request.

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Network Systems ▶ Splice & Patch Modules ▶

Subrack System HD 3HU and 4HU/84WU

General Information

The new modular subrack system HD perfects cable management and provides the prerequisite to achieve maximum port density. In conjunction with the HD compact modules, a port density of 288 x LSH/SC ports or 576 x LC ports can be achieved. The subrack system HD is available as a 3HU version and, including the extendable overlength box, as a 4HU version (3+1) and is suitable for installation in a 19" rack. The intelligent cable management ensures the use of all types of cables as well as the preferred strain relief. The overlength box, which can be inserted on both sides, allows the interception to be realised by means of cable ties, metric glands (for loose tube cables) as well as separable metric glands (for breakout or trunk cables). A wide range of accessories is available for dividing the bundles and fibres as well as for safe and permanent feeding to the compact modules.

Features

- 3HU or 4HU / 84WU for the accommodation of up to 12 compact modules 7WU/3HU
- Accommodation of up to 576 LC-ports or 288 LSH/SC-ports
- Overlength box extendable in both directions and completely removable to the front and rear for accommodating loose tube overlengths and for storing unused cable reserves
- The overlength box offers different cable inlets depending on the desired rear panel side:
  Side A: Up to 12 glands (4 x M25 and 8 x M20) for strain relief of loose tube cables and for cables as well as for breakout or trunk cables (when using of divisible metric glands)
  Side B: 2 pre-punched cable inlets (left and right) are preferably suitable for cable ties. For heavy cables, support plates are available as accessories.
- There are many bridge embossments on both sides inside the excess length compartment for intercepting the bundle wires or protective tubes by means of cable ties
- The slightly recessed overlength box allows the selection of manufacturer-independent 1HU cross-connection panels for patch cord routing
- Removable lid, rear panel and base (for 3HU without overlength box).
  The optional rear panel avoids protrusion of the bundle wires when they are completely routed inside the subrack.

Technical Data

- Corpus: anodised aluminium
- Front and side panels: color light grey, RAL 7035
- Weight: 2.85 kg (4HU, incl. back wall)
- Dimensions: 482,7 x 283,5 mm (Wide x Depth),
  132,5 mm (Height for 3HU),
  176,9 mm (Height for 4HU)

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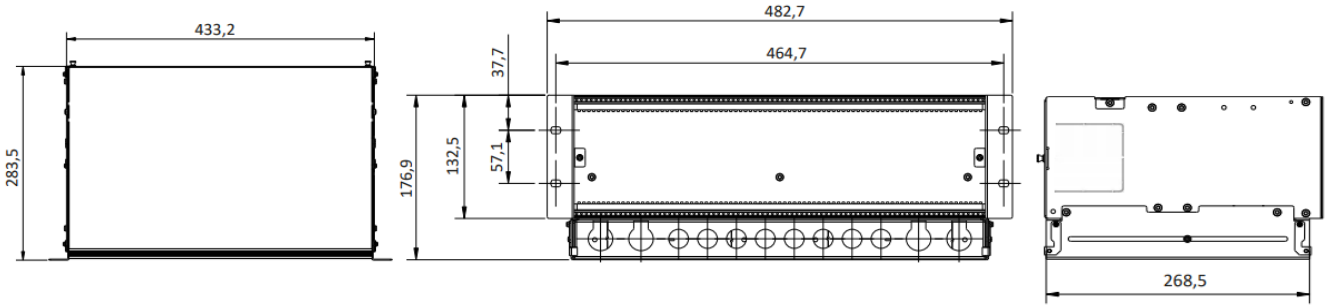

Components and Accessories

Article number:

B000-00X-00XZ001 **B000-00X-00XZ002**	**Subrack system HD 19“/3HU** (see picture) without top cover, without floor plate, without rear panel **Subrack system HD 19“/3HU** with top cover and with floor plate	
B000-00X-00XZ003 **B000-00X-00XZ004** **DBD-MON-BGTHD**	**Subrack system HD 19“/4HU** with top cover, without rear panel (see picture) **Subrack system HD 19“/4HU** with top cover and rear panel **Assembly instructions (German**) for subrack system HD: Link	
EBAU-000-00XZ007	**Cable fixing plate** for the back side of the overlength box, depth at subrack increases by 54 mm	
EZ00-000-PGXO001-001 **EZ00-000-PGXO002-001**	**Cable gland M20** Clamping range Ø 10 mm - 14 mm **Cable gland M25** Clamping range Ø 13 mm - 18 mm	
Z000-00X-000F032	**Tube set** 5 m flexible protective tube Ø5 / Ø3.2 mm 1 set is required for a tube guide inside the subrack or 2 sets for outside the subrack (see assembly instructions)	
ZXXX-00X-00XM929	**Cable devider set** Cable devider for protected feeding of several loose tubes by means of corrugated tube to splice boxes or subracks. Consisting of: 1 x cable catch rail, 6 m corrugated hose, 6 pieces PG16 gland	
EBAU-000-00XZ004	**Horizontal cable tray manager 19“/1HU with front cover** with 6 plastic brackets and radii limiter, Height 114 mm	
ZXXX-00X-00XZ001	**Horizontal cable manager 19“/1HU** with 5 plastic brackets, Height 75 mm	

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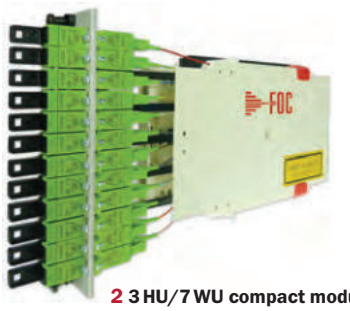
Network Systems ▶ Splice & Patch Modules ▶

Subrack System - 3 HU/84 WU

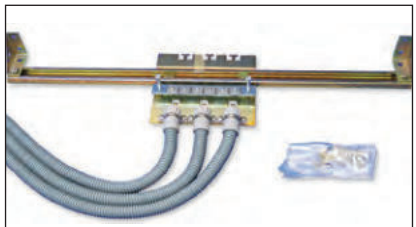
1 19", 3 HU, 84WU subrack



2 3 HU/7 WU compact module

3 19", 1 HU excess length drawer

4 19", 1 HU excess length drawer "Light"



5 Cable spreader set

The modular subrack system accommodates multifibre loose buffer cables containing up to 144 fibres. Using the modular components it is possible to tailor the distribution system to suit the requirements of the cabling plant and of the system manager. The individual components ensure an easy installation as well the service-friendly operation of the cabling plant observing the fibre-optical parameters.

Components of the subrack system

1 **Subrack –** 19" 3 HU/84 WU for the accommodation of up to 144 fibres in 12 compact modules, incl. 24 module guide rails, anodized enclosure

2 **Compact module – 3 HU with 7 WU**/10.5 WU for accommodating and splicing of up to 12 fibres

3 **Excess length drawer – 19", 1 HU,** for accommodating fibre-optic cables, storing of excess fibre lengths as well as the secure routing of the loose buffers to the compact modules using drag chains, incl. 12 pcs. of drag chains, length: 0.5m

4 **Excess length drawer "Light" – 19", 1 HU,** for accommodating fibre-optic cables, the storing of excess fibre lengths as well as the systematic routing of the loose buffers to the compact modules; available with splice cassettes (option)

5 **Cable spreader set –** for separating the multifibre loose buffer cables to the excess length drawers, incl. 6m of loose buffer protection hose, 6 pcs. of cable glands

The **compact modules** have been designed for accommodating 12 x LSH (Class A)/SC. Each compact module contains an excess length cassette for storing fibre excess lengths, and a splice cassette for accommodating up to 12 splice connections. Fibres can be routed to the compact module via multifibre loose buffers or hoses which are securely fixed to the module using cable clamps. In the rear area a special fibre management system prevents the fibres from being kinked and ensures that the modules can be pulled out to the front. In addition, the modules are suited for accommodating optical couplers and wavelength multiplexers.

Options

Depending on the demands put on the cable plant appropriate multifibre loose buffer separations as well as patch cord guides are available.
Delivery with other connector standards on request.

Accessories

- Subrack cover panels
- Subrack blind front panels

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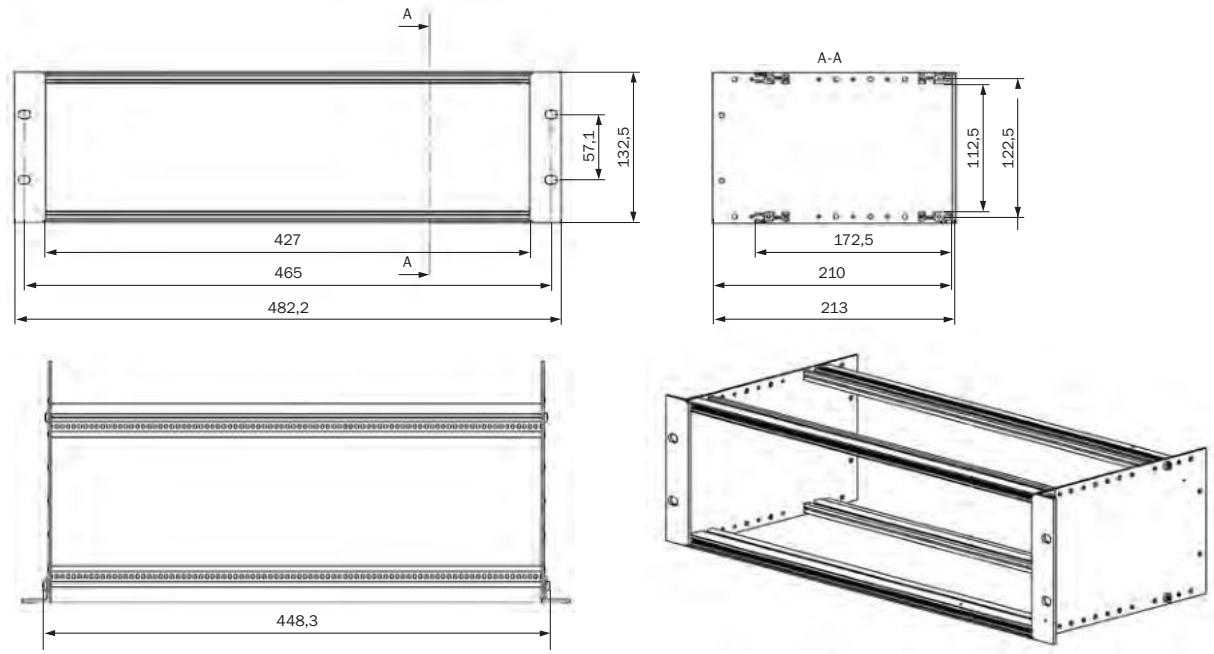
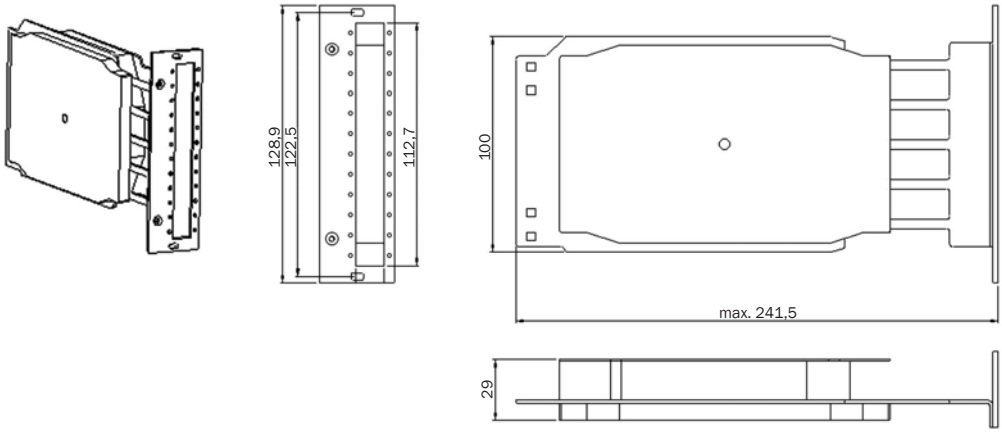
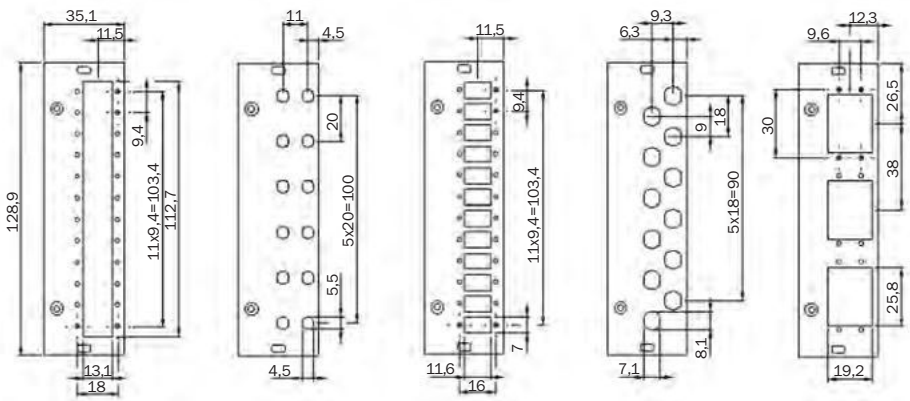
Subrack dimensions



3 HU/7 WU compact module dimensions



Front panel designs



12 x LSH (Class A)/SC Simplex | 12 x DIN | 12 x F-3000 | 12 x FC | 6 x SC Duplex

Network Systems ▶ Wall-mounted Distributer ▶

Wall-mounted Distributer ODB/3

General Information

The wall-mounted mini-distributor ODB/3 is an extremely small and compact wall-mounted distributor which is ideally suited for indoor applications. In the elegant enclosure the fibres are routed in a special fibre management system ensuring a bending radius of more than 30mm and allowing easy installation and service. Thus the future-proof operation of the cabling plant is ensured.
Additionally, it is possible to accommodate optical power splitters and/or WDM in the enclosure.

Features

- Wall-mounted distributor for indoor applications
- Robust 2-piece enclosure consisting of chassis and cover
- Adapter plate for 2 x LC duplex, 2 x SC simplex, 2 x LSH (Class A) connectors or 2 x MPO (8-12Port)
- Storage system for up to 8 splices or optical couplers
- Separate cable entries for up to 3 cables of a maximum diameter of 14 mm; tight fixing via cable fasteners and rubber sealing strip
- Available also with installed lead-in connectors and pigtails, ready for splicing (on request)

Dimensions

- 203,5 x 113 x 35 mm

Weight

- 0,22 kg

Material

- PVC

Colour

- RAL 7035

Degree of Protection

- IP 20

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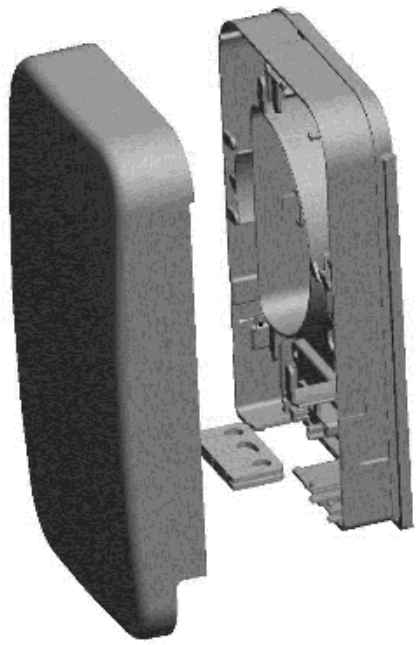
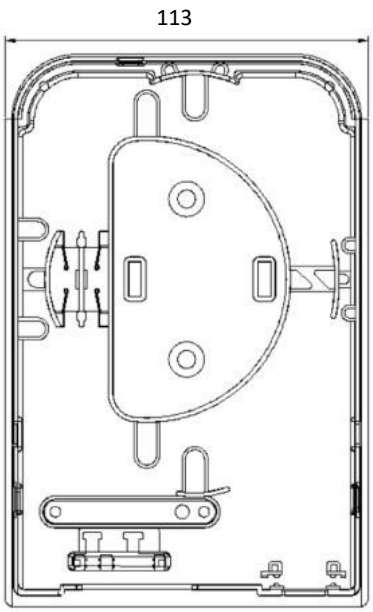
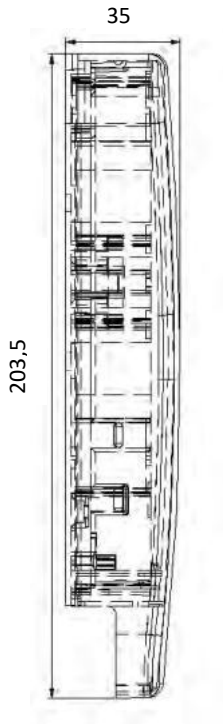
Dimensions

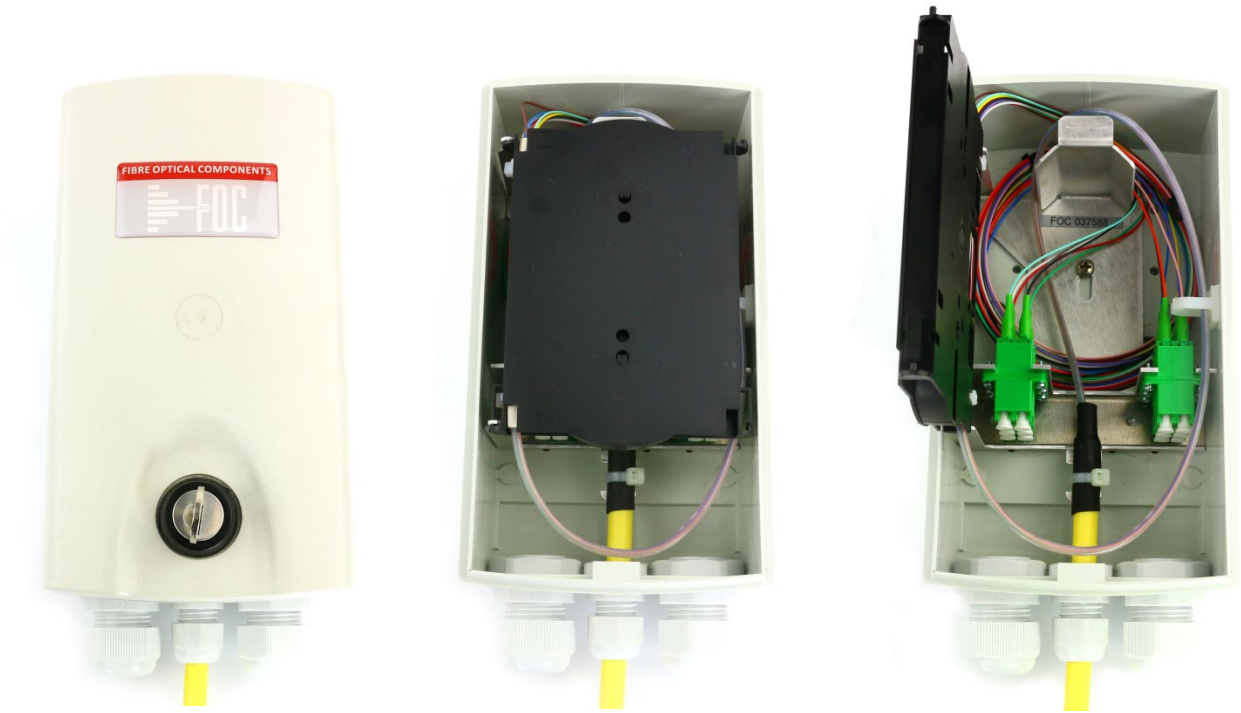






Network Systems ▶ Wall-mounted Distributer ▶

Wall-mounted Distributer ODB/4



General Information

The ODB/4 is a small and compact wall-mounted distributor for indoor and outdoor applications. It can hold up to 6 adapters with connectors and up to 12 splices in a hinged cassette.
Moreover it is possible to accommodate power splitters and wavelength division multiplexers for WWDM-, CWDM- or DWDM-solutions for FTTH (Fibre-To-The-Home). The modular design allows an easy and quick installation. A lock prevents any unauthorised access.

Features

- Wall-mounted distributor for indoor/outdoor applications
- Robust 3-piece enclosure consisting of chassis, cover with lock, cable entry protection
- Adapter plate for 6 adapters of the types LSH (Class A) simplex, SC simplex (Class A) and LC (Class A) duplex (other connector types on request)
- Splice storage system for up to 12 splices or couplers/filters
- Cable entry via a PG13,5 high-strength cable gland, cable exit 2 x PG16, gland for 2 patch cords each (diameter 2.4 to 3 mm)
- Available also with installed lead-in connectors and pigtails, ready for splicing (on request)
- Available also with monitoring function through the integration of lilix® FTTx reflectors
- Integration of a gas stopper is possible

Dimensions

- 185 x 103 x 78 mm

Weight

- 0.4 kg

Material

- PCV / ABS

Colour

- RAL 7035

IP Rating

- IP 54

Fire Behaviour

- V0 / UL94

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Subject to modifications
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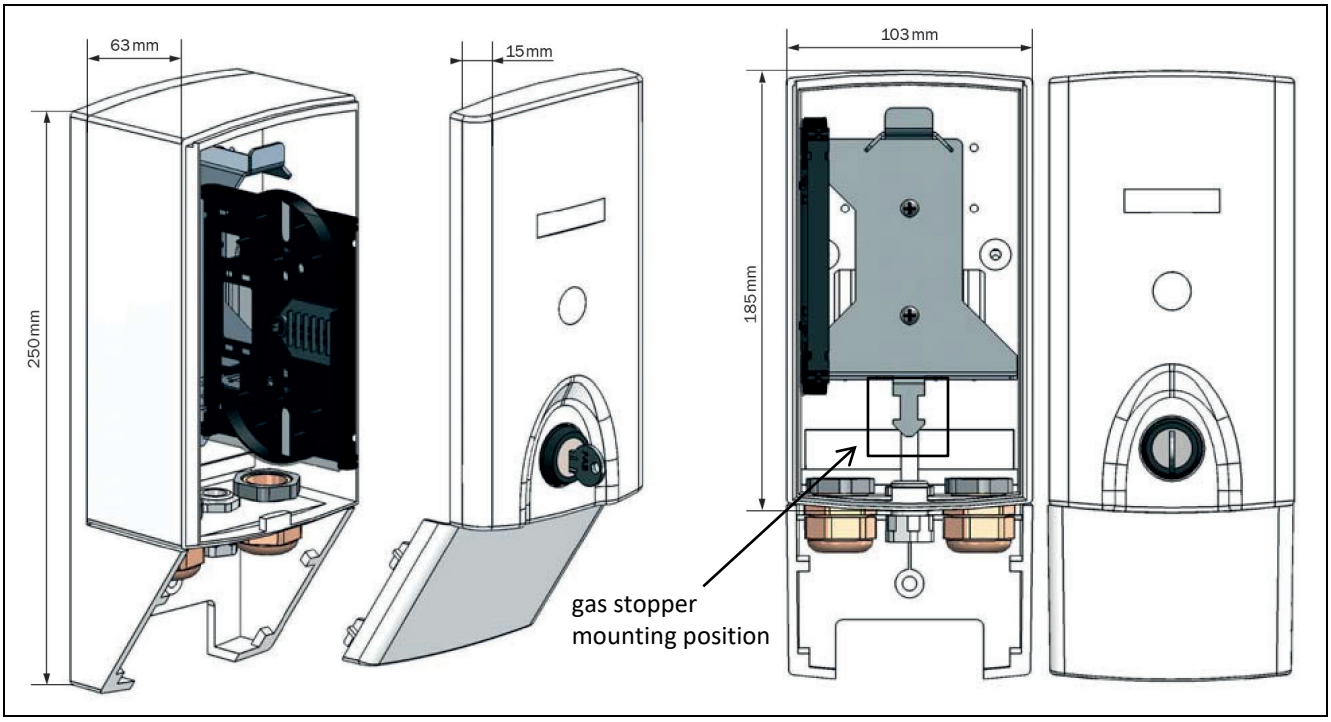
Standard Versions

- ODB/4 with 6 x LSH-PC/APC (Class A) adapter simplex, 6 x LSH-PC/APC (Class A) pigtail 9/125/900
- ODB/4 with 6 x SC- PC/APC (Class A) adapter simplex, 6 x SC- PC/APC (Class A) pigtail 9/125/900
- ODB/4 with 6 x LC- PC/APC (Class A) adapter duplex, 12 x LC- PC/APC (Class A) pigtail 9/125/900
- ODB/4 with 6 x LSH-PC/APC (Class A) adapter simplex, 6 x LSH-PC/APC (Class A) pigtail 9/125/900, with monitoring function
- ODB/4 with 6 x SC- PC/APC (Class A) adapter simplex, 6 x SC- PC/APC (Class A) pigtail 9/125/900, with monitoring function
- ODB/4 with 6 x LC- PC/APC (Class A) adapter duplex, 12 x LC- PC/APC (Class A) pigtail 9/125/900, with monitoring function

Dimensions



Network Systems ▶ Wall-mounted Distributer ▶

Wall-mounted Distributer ODB/5

General Information

The ODB/5 is a small and compact wall-mounted distributor for indoor and outdoor application. It can hold up to 12 ports and up to 12 splices in a hinged cassette.
Moreover it is possible to accommodate power splitters and wavelength division multiplexers for WWDM-, CWDM- or DWDM-solutions for FTTH. The modular design allows an easy and quick installation. An optional lock prevents any unauthorized access.

Features

- Wall-mounted distributor for indoor/outdoor application
- Robust enclosure consisting of chassis and hinged cover (optional with lock)
- Adapter plate for up to 6 ports of the type LSH (Class A) and SC (Class A) or 12 ports of the type LC (Class A)
- Splice storage system with additional cover for up to 12 splices or up to 6 couplers/filters
- Patch and OSP cable routing via separable rubber gaskets (or optional metric glands)
- Separate cable entries for cables with max. outer diameter of 10 mm (standard) or 14 mm (option)
- Integration of a gas stopper is possible
- Available also with installed lead-in connectors and pigtails, ready for splicing (on request)

Dimensions

- 235 × 156 × 45 mm

Weight

- 0.5 kg

Material

- PC / ABS

Colour

- RAL 7035

IP Rating

- IP 65 (for cable routing via metric glands)
- IP 54 (for cable routing via rubber gaskets)

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Subject to modifications
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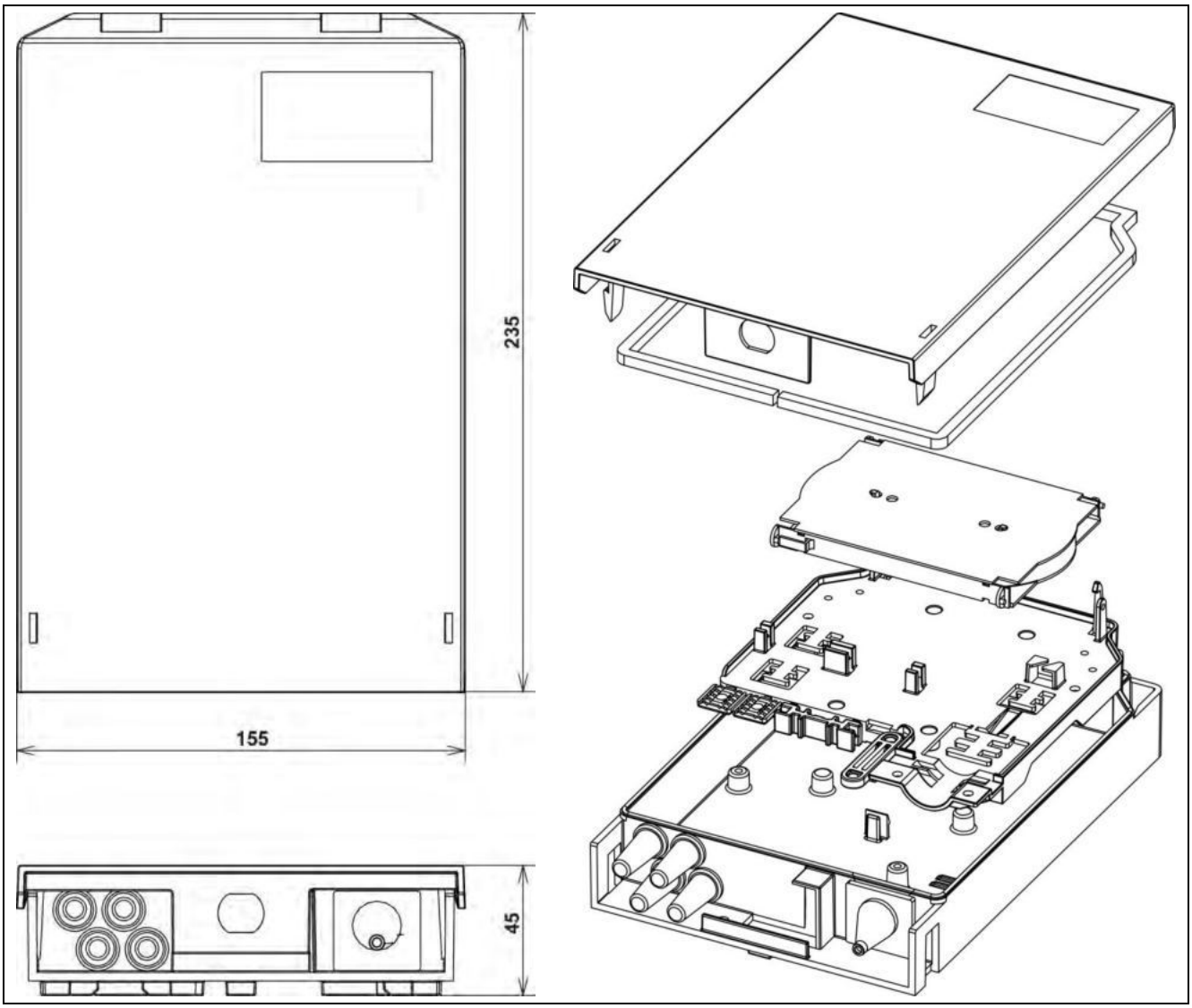
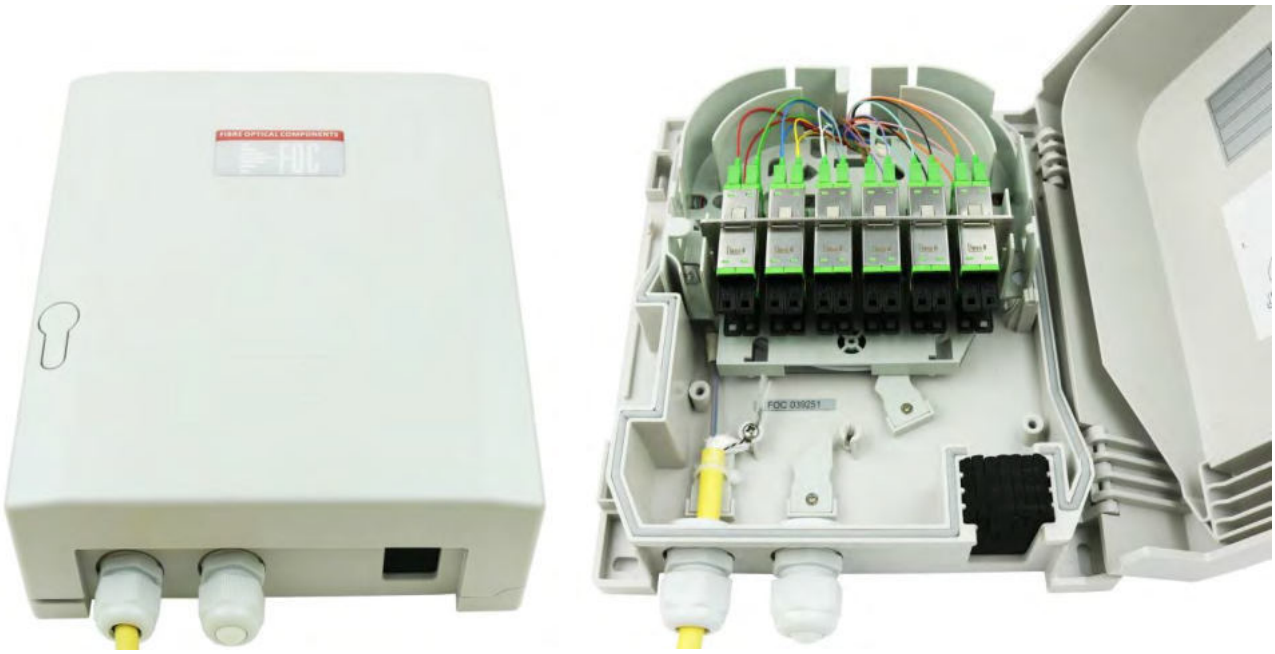
Dimensions



Network Systems ► Wall-mounted Distributor ►

Wall-mounted Distributor ODB/24-C



General Information

The ODB/24-C is a compact wall-mounted distributor for outdoor applications. It can hold up to 24 ports and up to 24 splices in a hinged cassette.
Moreover it is possible to accommodate power splitters and wavelength division multiplexers for WWDM-, CWDM- or DWDM-solutions for FTTH. The housing enables an easy and quick installation as well as the installation of a safety lock half length.

Features

- Wall-mounted distributor for outdoor applications
- Robust and high-quality plastic housing
- Adapter plate for up to 24 ports of the type LSH (Class A), SC (Class A) or LC (Class A) (other connector standards on request)
- Splice storage system for the accommodation of up to 24 splices or couplers/filters
- Integrated patch cable entry for a large number of cords
- Patch cable output with flexible slat seal
- Integration of a gas stopper is possible
- Available also with installed lead-in connectors and pigtails, ready for splicing (on request)
- Possibility to install a safety lock half length
- Standard M20 cable glands (up to max. 11 mm cable diameter)
- Optional M25 cable glands (up to max. 17 mm cable diameter)

Dimensions

- 200 x 235 x 67 mm

Material

- ASA, structured

Colour

- RAL 7035

IP Rating

- IP 54

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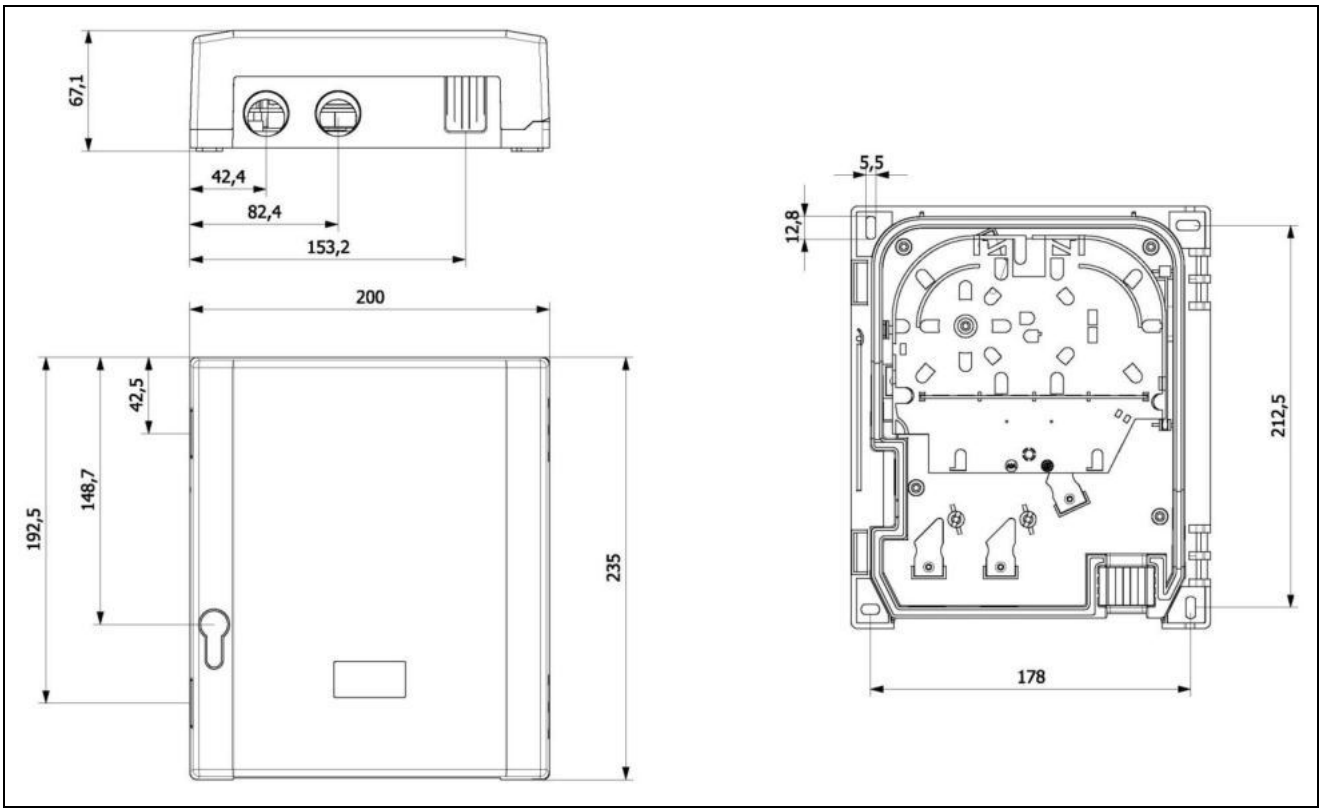
Dimensions



Network Systems ▶ Wall-Mounted Distributor ▶

ODB/48 Wall-Mounted Distributor New

General Information

The ODB/48-IP65 is an easy-to-handle and universally usable wall-mounted distributor for indoor and outdoor application holding up to 48 Simplex adapters or Duplex adapters with optical connectors and up to 96 splices in splice cassettes.
Furthermore it is also possible to integrate optical couplers, filters and other components into the enclosure in line with the requirements of the specific application. The splice storage area is separately protected. The patching and splicing areas with the loose buffer fibre storage have been separated, in order to minimize disruptions of the spliced installation when changing patched connections.
The secure entry of cables is ensured via metric threaded glands on the bottom side.

Features

- Wall-mounted distributor for indoor/outdoor applications
- Robust enclosure consisting of: chassis, cover with holder for up to 48 adapters / 96 connectors, separate splice tray (max. 144 splice connections)
- Adapter plate for up to 48 LSH, SC and LC (duplex) adapters (other connector types on request)
- Separate, protected storage of splices and patch cords
- Holds up to 4 standard splice cassettes and/or 4 BG10 optical coupler cassettes
- Cable entry via individually usable rubber gasket or metric threaded glands (on request)
- Available also with installed lead-in connectors and pigtails, ready for splicing (on request)

Dimensions

- 350 x 334 x 110 mm

Weight

- 4.3 kg

Material

- PVC/ABS

Colour

- RAL 9003

IP Rating

- IP 65

Fire Behaviour

- V0/UL94

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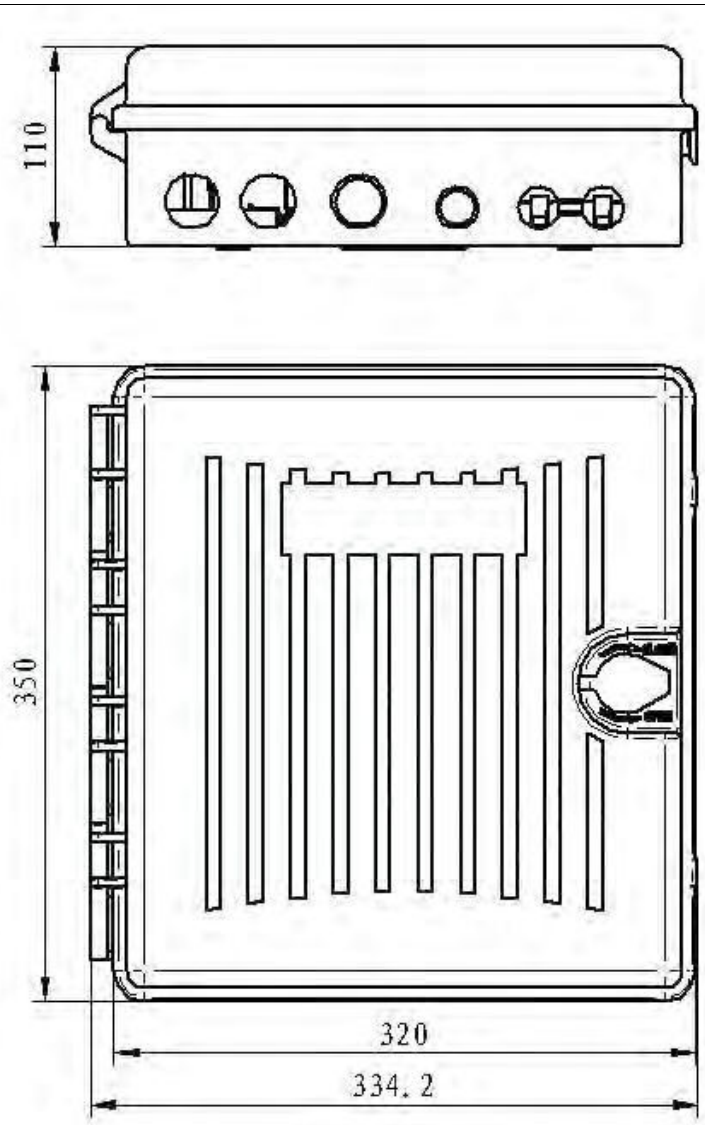
Dimensions



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Network Systems ▶ Wall-mounted Distributer ▶

Wall-mounted Distributer ODB/96

The ODB/96 is a comfortable and universally employable wall-mounted distributor for indoor and outdoor applications, which holds up to 96 adapters with optical connectors and up to 96 splices in 8 splice cassettes. Furthermore it is possible to integrate optical couplers and other system elements/modules into the enclosure in line with the requirements of the specific application.
The splice area is separately protected and tamper-proof. To facilitate installation and service the up to 8 patch panels can easily be taken out. An extra area facilitates the organised storage of patch cords and loose tubes.
The secure entry of cables is ensured via metric threaded glands on the top and/or bottom sides.

Features

- Wall-mounted distributor for indoor/outdoor applications.
- Robust enclosure consisting of chassis, cover with lock (profile locking cylinder) and three-point locking mechanism, separate splice storage tray, patch panel.
- Separate and protected storage of splices and patch cords.
- Adapter plates for up to 96 LSH (Class A) adapters or 48 SC adapters (other connector types on request).
- Holds up to 8 splice cassettes and/or BG10 optical coupler cassettes.
- Cable entry via metric threaded glands (on request).
- Standard delivery with installed lead-in connectors and pig-tails, ready for splicing.

Dimensions	585 x 390 x 173 mm
Weight	15 kg
Material	PVC/ABS
Colour	RAL 7035
Degree of Protection	IP 54
Fire behaviour	V0/UL94

Accessory
Please see our Accessory Data Sheet for Box Systems.

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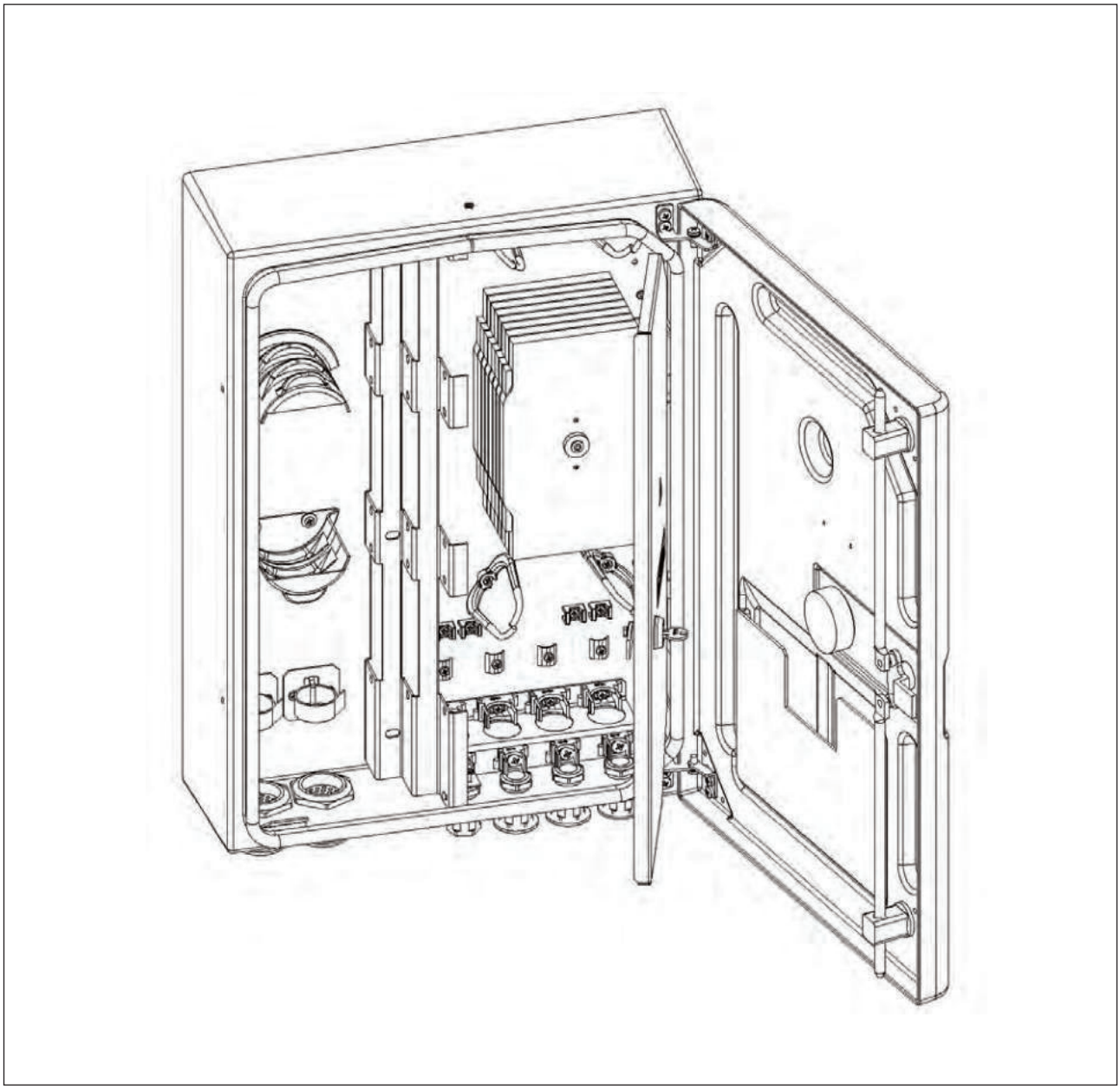
Specifications

Modul type	Function
Monitoring module I	continuous signal monitoring
Service module	connection for continuous OTDR measurements
Isolator module	back reflection protection
Splitting module I	symmetrical power splitting (1xN or 2xN)
Splitting module II	asymmetrical power splitting
WWDM module I	multiplexing and demultiplexing of 1310/1550nm signals
WWDM module II	multiplexing and demultiplexing of 1490/1550nm signals
CWDM module I	multiplexing and demultiplexing of CWDM signals
CWDM module II	add/drop multiplexing of CWDM signals
DWDM module I	add/drop multiplexing of CWDM signals
DWDM module II	add/drop multiplexing of DWDM signals



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Network Systems ▶ Installation Cables ▶

Breakout Cables

Breakout cable with light connector & pigtail protection

Breakout cable with reinforced protection & retraction support

Detail Pigtails with protection & retraction support

General Information

FOC® installation cables have been designed to support alternative cabling technologies for optical network nodes. Pre-assembled breakout cables gain more and more in importance, in particular as solutions in the industrial and FTTX fields. With a single installation the FOC® breakout cable provides a maximum of 24 point-to-point connections. Other advantages over conventional patch cords are lower prices, a better mechanical stability, a larger possible overall length and shorter installation time. FOC® breakout cables are available with up to 24 subunits and different lengths. All common connector standards can be provided, on request also with staggered subunit lengths or pigtail protection or retraction support.

Features

- High mechanical stability
- Big overall possible length
- Shorter installation times
- Cost-efficient
- Individual configuration possible

Standard Variants

- Breakout cable singlemode:
  4E9/125/900/2000x7000
  12E9/125/900/2000x11600
  24E9/125/900/2000x13900
- Breakout cable multimode:
  12G50/125/900/2000x11600 OM4
  24G50/125/900/2000x13900 OM3

Options

- Staggered cable subunit lengths
- Cable subunits with 1.4 or 2.8 mm outer diameter
- Flexible tube (light protection)
- Reinforced protection with retraction support (on one or both ends)

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DBE-NWS-0134V002

Specifications Breakout Cable Singlemode[1]

Fibre number	max. 4	max. 12	max. 24
Fibre category	E9/125 (OS2)	E9/125 (OS2)	E9/125 (OS2)
Outer cable diameter	7,0 mm	11,6 mm	13,9 mm
Cable whip diameter	2,0 mm	2,0 mm	2,0 mm
Weight	45 kg/km	135 kg/km	170 kg/km
Crush resistance	1000 N/10cm	1500 N/10cm	1500 N/10cm
Min. bending radius (operation)	105 mm	175 mm	210 mm
Max. tensile strength (installation)	800 N	2000 N	2000 N
Temperature range (operation)	- 5°C to 70°C	-20 °C to 60 °C	-20 °C to 60 °C
Fire behaviour	IEC 60332-1-2, IEC 60332-3-22, IEC 60754-1, IEC 60754-2, IEC 61034,	LSZH, IEC 60332-3C, IEC 60754-2, IEC 61034	LSZH, IEC 60332-3C, IEC 60754-2, IEC 61034
Fire load	1,10 MJ/m	2,48 MJ/m	3,21 MJ/m

Specifications Breakout Cable Multimode[1]

Fibre number	max. 12	max. 24
Fibre category	50 µm MM (OM4)	50 µm MM (OM3)
Outer cable diameter	11,6 mm	13,9 mm
Cable whip diameter	2 mm	2 mm
Weight	135 kg/km	170 kg/km
Crush resistance	1500 N/10 cm	1500 N/10 cm
Min. bending radius (operation)	175 mm	210 mm
Max. tensile strength (installation)	2000 N	2000 N
Temperature range (operation)	-20 °C to 60 °C	-20 °C to 60 °C
Fire behaviour	IEC 60332-1-2, IEC 60332-3-24, IEC 60754-1, IEC 60754-2, IEC 61034	IEC 60332-1-2, IEC 60332-3-24, IEC 60754-1, IEC 60754-2, IEC 61034
Fire load	2,48 MJ/m	3,21 MJ/m

[1] Alternatively other cable geometries/types can be used.

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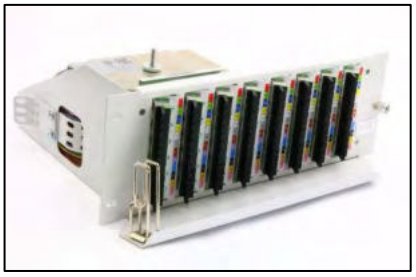
Network Systems ▶ Distribution Rack ▶

Sub-Distribution Rack SDR/288

Distribution panel 144 LC-PC



Distribution panel 96 LSH-HRL

General Information

The SDR/288 is a compact mini-rack for the convenient accommodation of up to 576 optical connectors and splices. It is specially designed for the accommodation and distribution of high fibre-count cable for customer access networks (FTTX).
The loose tubes or breakout cables are split up and terminated onto 6 individual distribution panels. An alternative configuration using optical couplers and multiplexers is possible depending on the respective application. The SDR/288 can be setup as a standalone unit (with side, front and rear panels) or integrated into existing floor-mounted distribution frames.

Features

- Mini-rack for floor- or wall-mounted installation in buildings or for installation into 19”/ETSI floor-mounted distribution frames
- Robust metal housing consisting of 6 distribution panels, horizontal/vertical patch cord management, side and rear panels, front door with acrylic glass insert (optional)
- Separate and protected storage of splices and patch cords
- Protected horizontal and vertical routing of patch cord slacks observing the required minimum bending radius in dedicated compartments and trays
- One adapter plate for up to 96 ports of LSH (Class A), SC (Class A) or up to 144 ports of LC (Class A) (other connector types on request)
- 6 distribution panels for up to 144 splices in standard splice cassettes
- Distribution panels are pivotable for installation and servicing
- Cable entry/routing in the rear area

Dimensions

- Version ETSI Installation 948x533x240 mm
- Version 19‘‘ Installation 948x483x240 mm
- Version Wall-mounted Distributer 1075x550x325 mm

Weight

- Version Installation approx. 48 kg
- Version Wall-mounted Distributer approx. 59 kg

Material

- Sheet steel, powder-coated

Color

- RAL 7035

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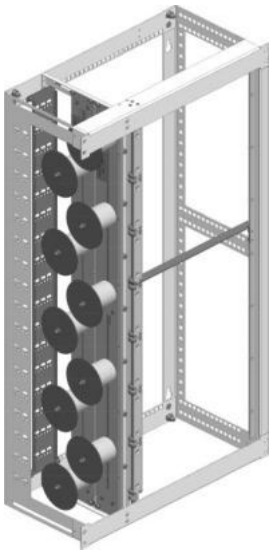
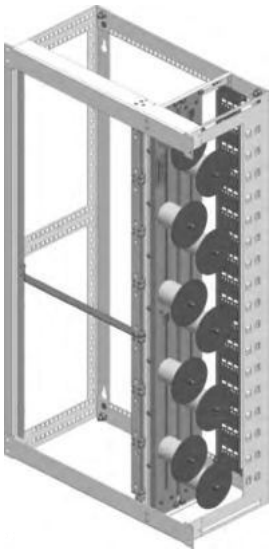
Dimensions

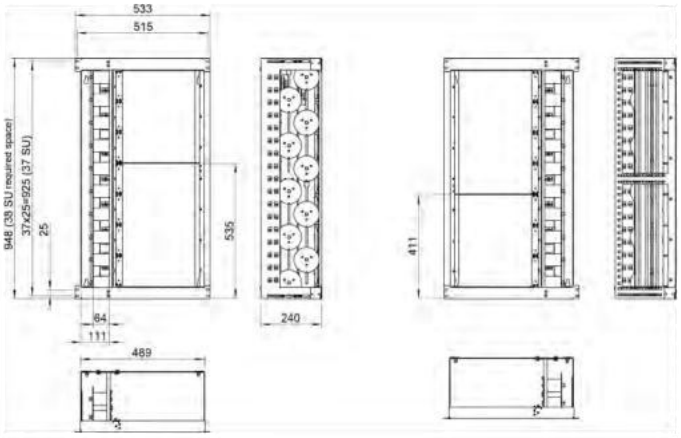
Version ETSI Installation



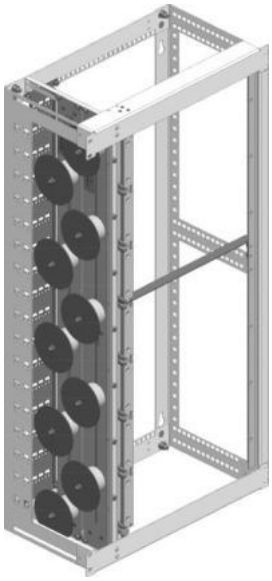
ETSI – opening left



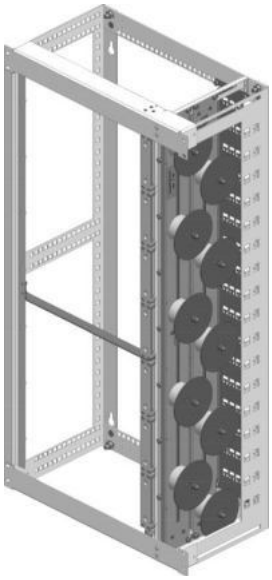
ETSI – opening right



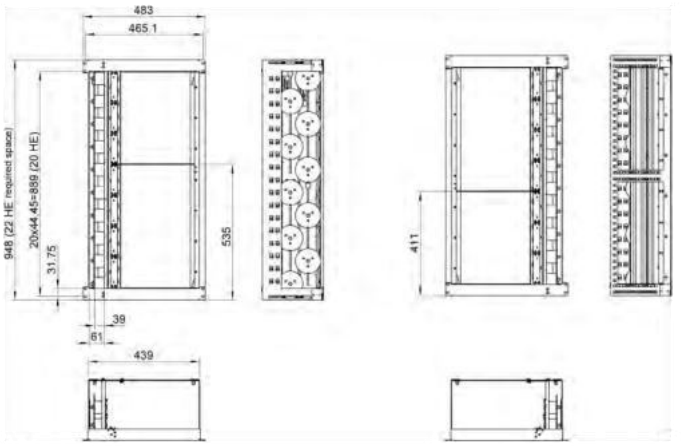
Version 19“ Installation



19“ – opening left



19“ – opening right



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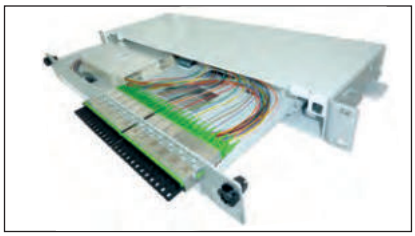
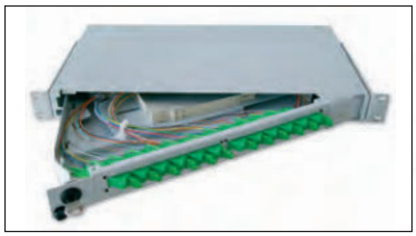
Network Systems ▶ Distribution Rack ▶

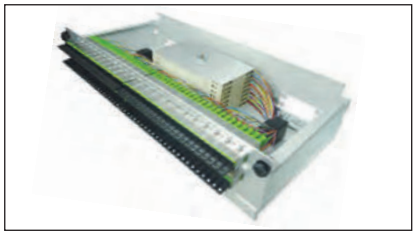
Main Distribution Rack MDR/300



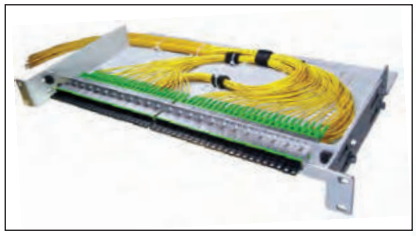
Splice module (Variobox 1HU)



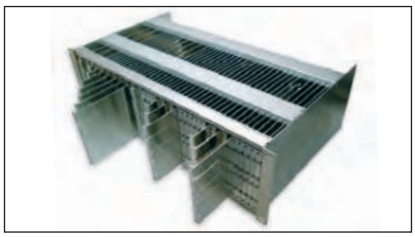
Splice module (Swivel Box 1HU)



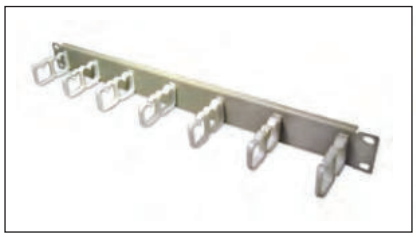
Splice module (Lightbox 2HU)



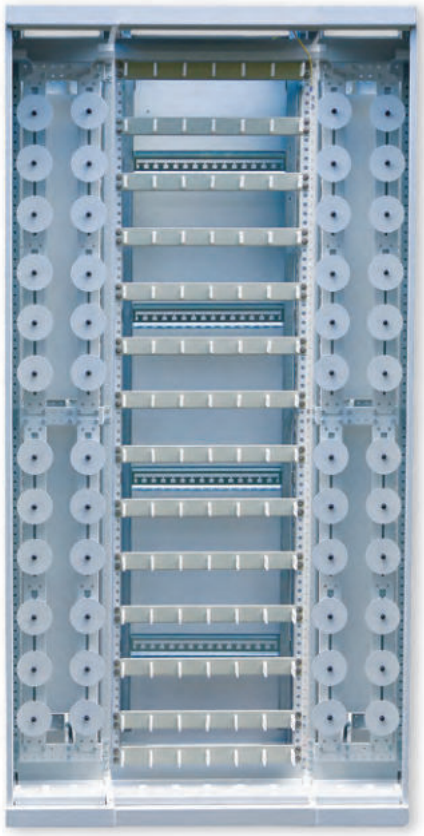
Patch module (Jumperbox)



HDR/192 - BGT 19”/3HU



Transverse connection panels



The distributing rack MDR/300 is designed for use in larger network nodes equipped with a high number of active network components. Its low mounting depth and the possibility of flexibly forming rows via lateral and rear extensions ensure an optimum configuration in line with customer requirements and its integration into existing customer environments.
The distribution rack complies with the housing system standards (19“ or ETSI).

Advantages

- Mounting depth of 300 mm complies with requirements of modern network nodes both in the telecommunications and in the in-house network areas
- Possibility of forming rows via lateral and rear extensions and a high packing density in combination with flexible cable routing ensure an optimum handling
- Configurable and easily extendable patch cord management system which grows with your needs
- Modular system for optimum configuration according to customer requirements, from open distribution racks to fully-fledged cabinet systems with various locking options
- Standardized system technology (19“ or ETSI)

The MDR can accommodate other network components:

- splice modules
- patch modules
- transverse connection panels

Design	ETS rack equipment practice according to IEC 60917-2-1 and IEC 60917-2-2 for accepting system components according to 19“ or ETSI standards, open or closed (depending on configuration)
Dimensions	WHD 600/900/1200 x 2200 x 300 mm
Weight	about 120 kg/233 kg (depending on configuration and equipment)
Materials	sectional steels as well as sheet steel of different thickness
Surface	powder-coated similar to RAL 7035 sheet steel of different sizes, zinc plated, blue chromatized

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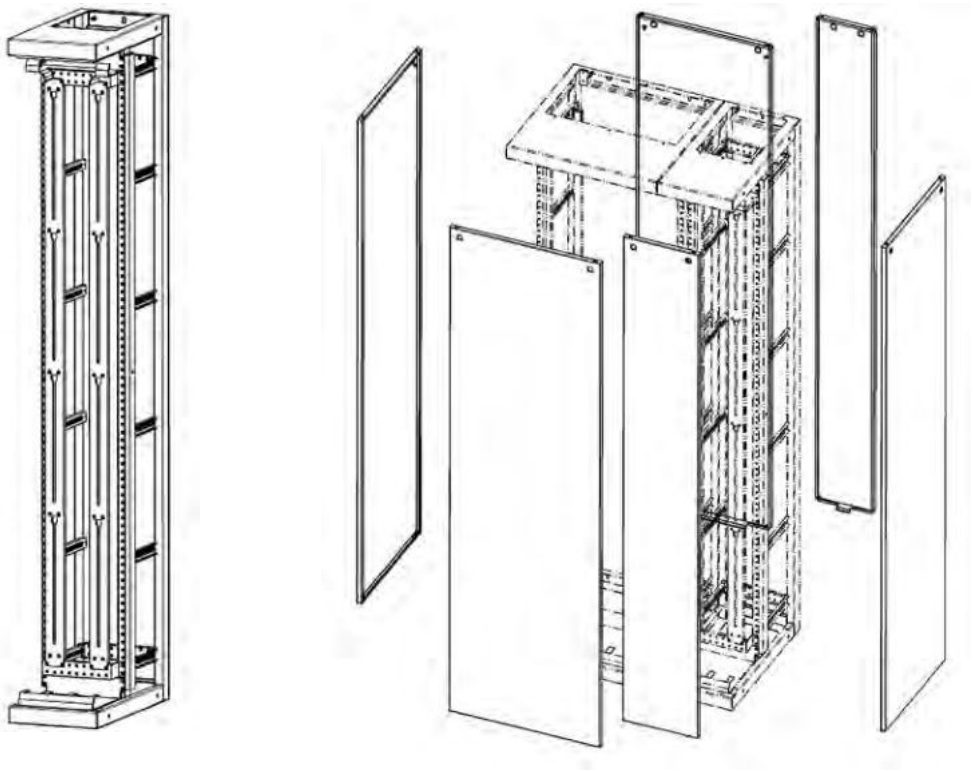
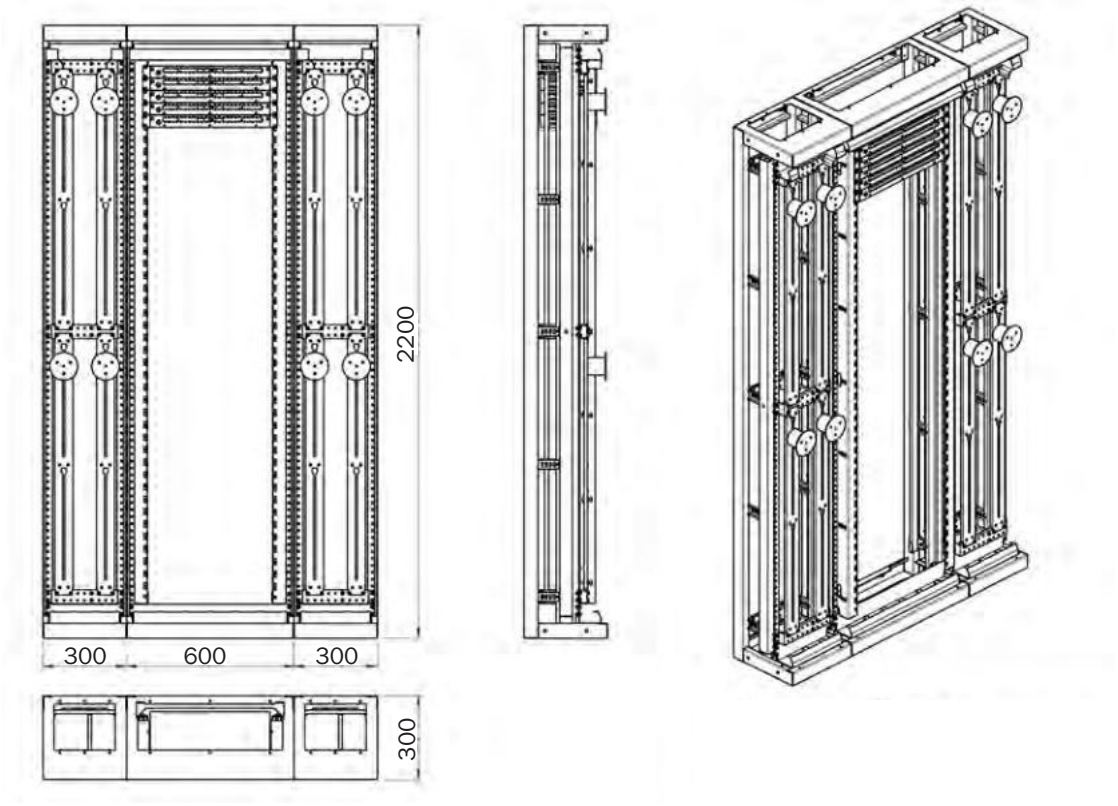
Dimensions



300 mm base frame



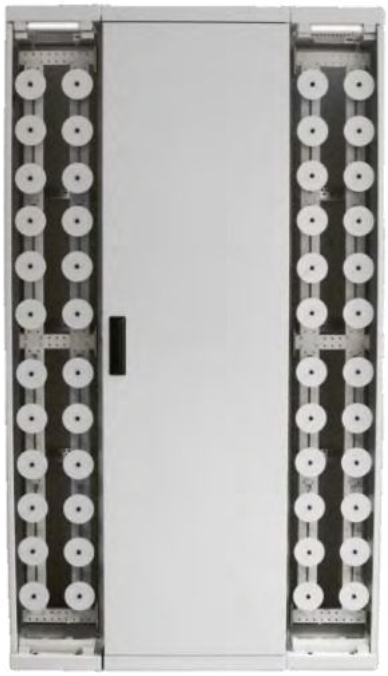
Network Systems ▶ Distribution Rack ▶

Main Distribution Rack MDR/400

Splice/Patch module (Variobox 1HU)

Splice/Patch module (Lightbox 2HU)

Patch module (Jumperbox)



MDR/400 base frame with annex frames left and right

General Information

The distributing rack MDR/400 is designed for use in larger network nodes equipped with a high number of network components.
Its low mounting depth and the possibility of flexibly creating rack rows via lateral and rear extension ensures an optimum configuration in line with customer requirements and allows integration into existing customer environment.
The distribution rack complies with the housing system standards 19“ or ETSI.

Features

- Mounting depth of 400mm complies with requirements of modern network nodes both in the telecommunications and in the in-house network areas
- Maximized patch cord capacity in the annex frames by flexible redirection elements
- Very fast installation by pre-assembled frames (base frame and annex frames)
- Possibility of creating rows via lateral and rear extension and the high packing density in combination with flexible cable routing ensures an optimum handling
- Flexible cable routing and storage for an optimal system connection
- Configurable and easily expandable patch cord management system
- High storage capacity for breakout and jumper cables in the rear part of the annex frames
- Cable entries at the top, at the bottom; additional via openings between the frames
- Modular system for optimum configuration according to customer requirements, starting from open distribution racks to fully closed cabinet systems with various locking options
- Standardized system technology (19“ or ETSI)

Material

- Frame, door, rear panel: Sectional steels as well as sheet steel of different thickness

Surface

- Powder-coated similar to RAL 7035, sheet steel of different sizes, zinc plated, blue chromatized

Dimensions

- Configuration annex frame – base frame – annex frame (WHD): 1200 x 2200 x 400mm

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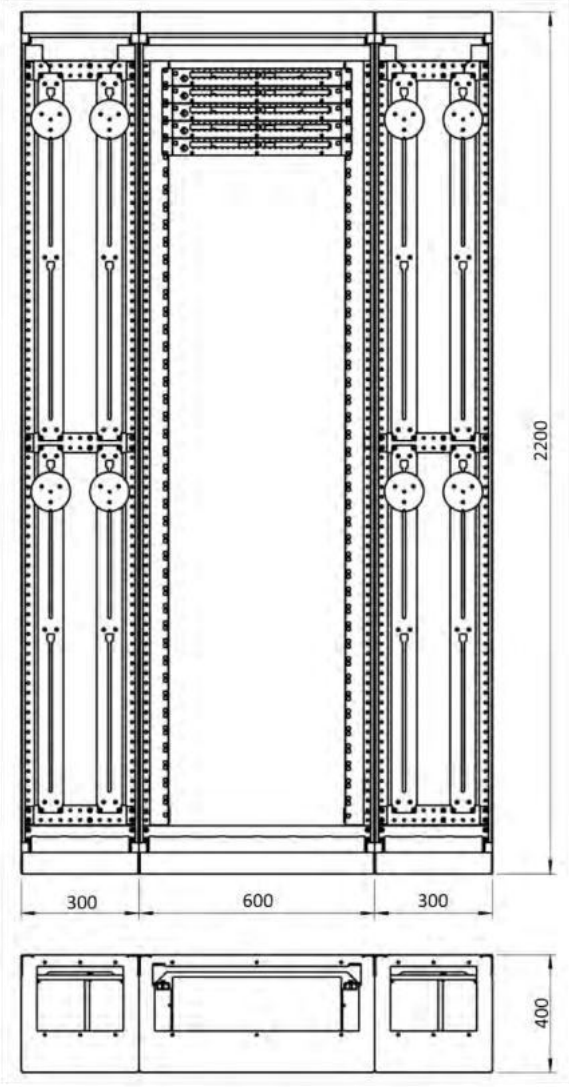
Design

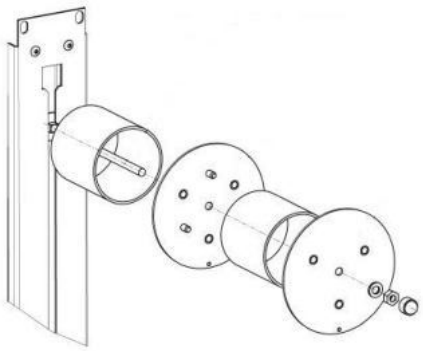
- ETS rack equipment practice according to IEC 60917-2-1 & IEC 60917-2-2 for accepting system components according to 19‘‘ or ETSI standards, open or closed (depending on configuration)

The MDR/400 can acommodate

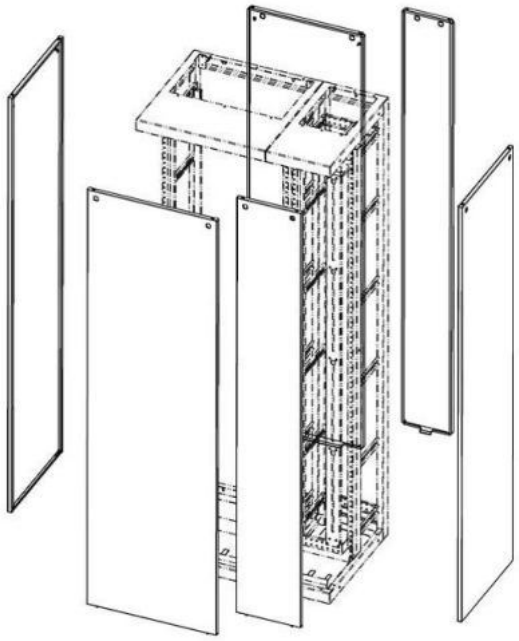
- Splice/Patch modules, patch modules, transverse connection panels, active components



Configuration annex frame – base frame – annex frame



redirection element



Housing example base frame with annex frame right

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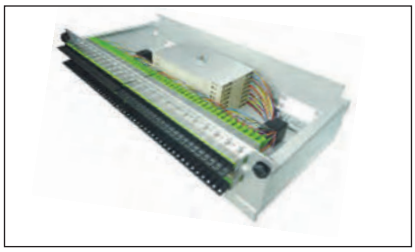
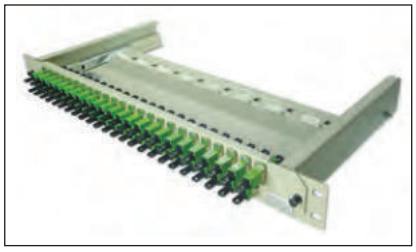
Network Systems ▶ Distribution Rack ▶

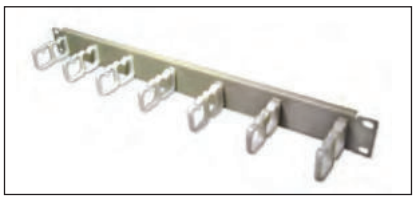
Main Distribution Rack MDR/600



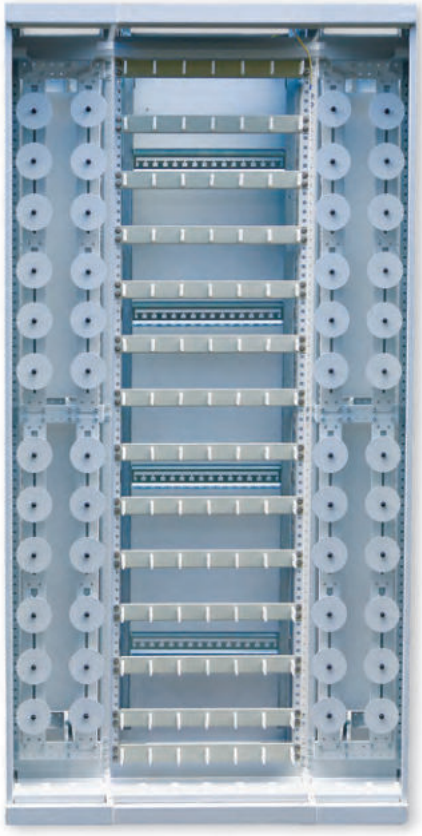
Splice module (Lightbox 2HU)



Patch module (example)



Transverse connection panels



The distributing rack is designed for use in larger network nodes equipped with a high number of active network components. In such a complex system the connections between the individual network components may soon become confusing. Possible re-distributions and the integration of new components are often quite work-intensive. With the MDR/600, however, the mostly decentrally arranged network components are routed to a central distribution point.

Advantages

- The required circuit connections between the individual network components are centrally arranged in the MDR. Thus confusing connections distributed across all rooms are a thing of the past.
- The central circuit connection management ensures systematic labelling and documentation. This provides the necessary clarity.
- Redistributions between the network components can be realised with much less effort.
- New network components can easily be integrated into the network node.
- Less hardware and staff is needed for implementing redistributions and/or interconnections. This leads to a much higher flexibility.

The MDR/600 can be equipped with

- splice modules
- patch modules
- transverse connection panels

Design	ETS rack according to IEC 60917-2-1 and IEC 60917-2-2
Dimensions	WHD 1200 x 2200 x 600 mm
Weight	total of 233 kg
Materials	rack parts, doors, rear panels: sectional steels as well as sheet steel of different thickness
Surface	patch panels powder-coated similar to RAL 7035 cable-strain relief bars and diverse installation material: sheet steel of different sizes, zinc plated, blue chromatized fibre-optic cable routing rings and fibre-optic guiding elements: sheet steel/plastic

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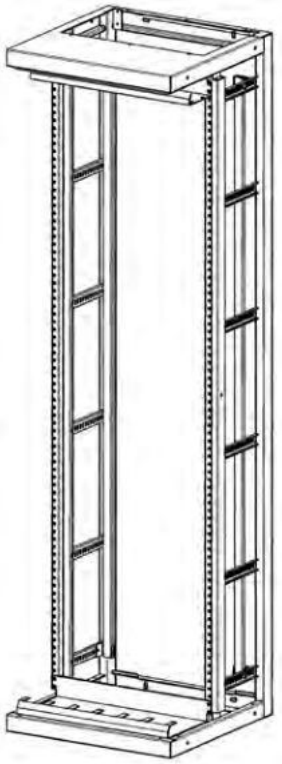
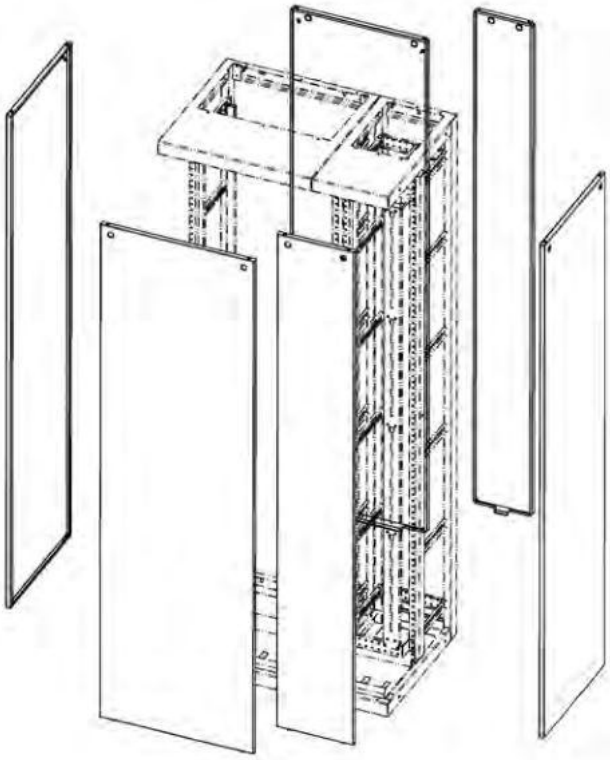
Dimensions

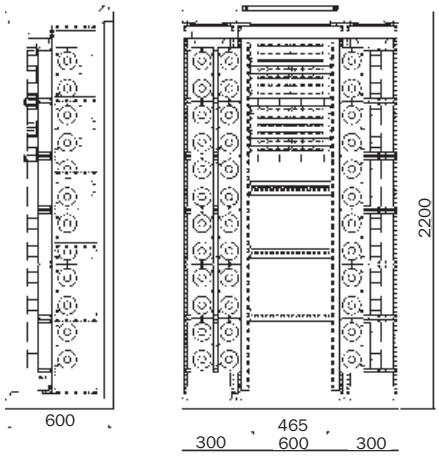


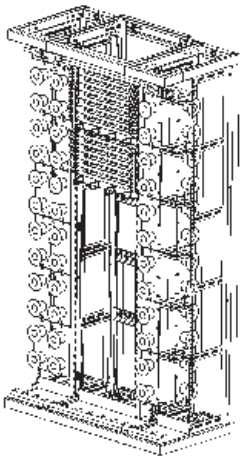
600 mm base frame

300 mm base frame



housing (example)





configuration (example)

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Network Systems ▶ Distribution Rack ▶

ETSI-64U Distribution System

The ETS Distribution System has been designed to implement a sufficiently large number of fibre terminations on the smallest possible footprint. The rack height of 64SU enables the termination of up to 768 fibres. The splice/patching drawers are available in different variants.

- 12 x LSH (Class A) simplex with single-fibre management
- 12 x LSH (Class A) simplex with standard splice cassette
- 24 x LSH (Class A) simplex with standard splice cassettes

An excess length drawer and a coupler box complete the system.
The ETS data cabinet is delivered completely pre-assembled, i. e. no additional cost for the assembly and configuration of the data cabinet will occur.

Performance specifications of the cabinet system

- accommodation of 32 pieces ETS splice / patching drawers 2SU
- hinged mounting frame
- dust-protected closed cabinet system based on IP54
- cable routings alternatively from the top or the bottom possible, each in 3 different chambers
- cable support rails made of fibre-glass reinforced plastics
- multifibre loose buffer slacks can be fixed on the rear wall using clamps
- protected routing of multifibre loose buffers to the splice drawers using protection tubes
- separated routing of the multifibre loose buffers and patch cords in the hinged frame using a 3-chamber routing system
- only one patch cord standard length of 2m required in the rack
- completely grounded, including magnetic lighting module and document pockets

Dimensions	2100 x 800 x 400 mm H x W x D
Material	sheet steel, powder-coated
Color	RAL 7032

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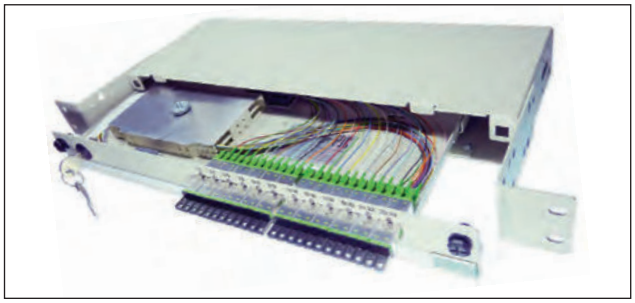
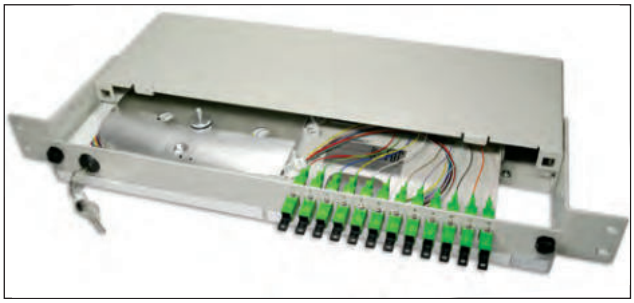
Splice/patching box ETSI 2SU slide-out, lockable, depth-adjustable



Variant ETSI 2SU for 12 x LSH (Class A) compact duplex



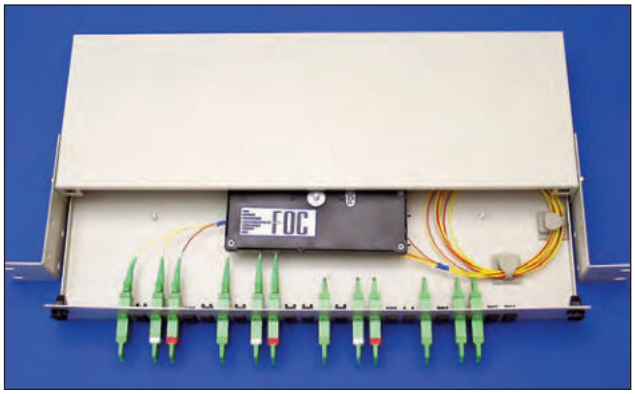
Variant ETSI 2SU für 12 x LSH (Class A) simplex

Features

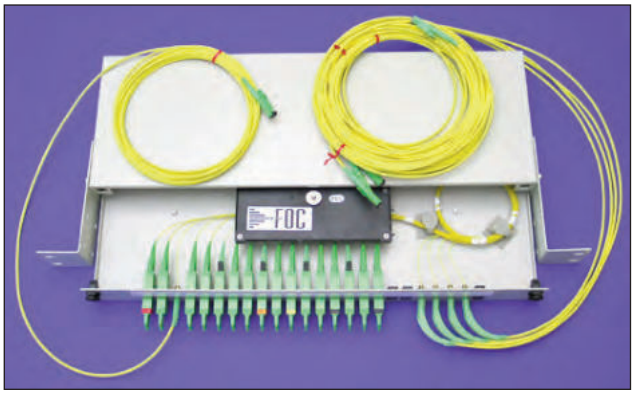
- accommodation of up to 12 x LSH (Class A) (simplex) and 12 x LSH (Class A) COMPACT adapters and of up to 24 x LSH (Class A) pigtails, prepared for storing different splice cassettes and splitter modules, 1-12 or 1-24 front panel marking
- Delivery complete with 1 or 2 splice cassette(s), including mounting hardware
- The ETSI boxes are delivered ready for splicing (lead-in connectors installed, pigtails stripped, inserted, marked in telecom standard colours)

Material	casing made of aluminium, powder-coated
Color	RAL 7032

Coupler box ETSI 2SU slide-out, lockable, depth-adjustable



Coupler Box WDM MUX/DEMUX configuration 2 x 1x2



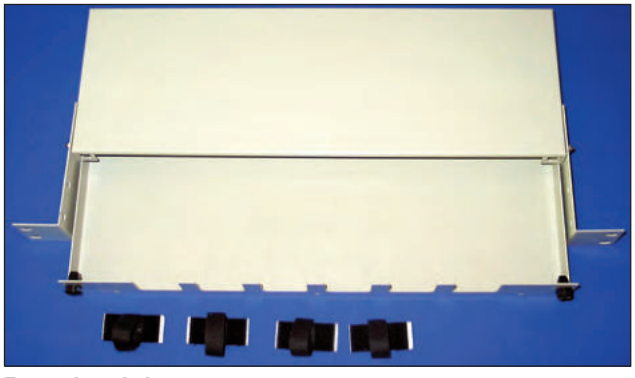
Coupler box configuration 1x4 x16

Features

accommodation of coupler modules in the configurations:

- maximal configuration of 24 ports for WWDM/CWDM or DWDM functions (MUX/DEMUX/add drop)
- maximal configuration of 1 x 32 for power splitters
- maximal configuration of 16 x (1x2) for monitor couplers

Material	casing made of aluminium, powder-coated
Color	RAL 7032



Excess length drawer

Features

- accommodation of patch cord slacks
- Velcro strips for organised storage of cable slacks

Material	casing made of aluminium, powder-coated
Color	RAL 7032

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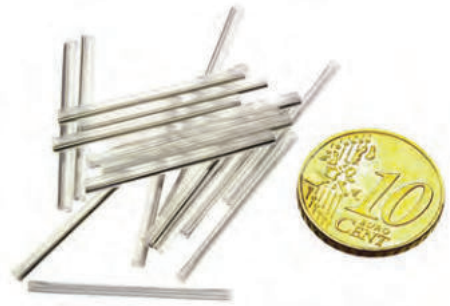
Network Systems ▶ Accessory ▶

Splice Protection



Thermal splices are the standard technology for the permanent connection of optical fibers. They are reliable and cost-efficient for single connections and thus widely used. A safe protection of the splice location from mechanic and climatic strain guarantees – in addition to quality – a long service life of the splice connection.
Splice protection is particularly challenging:
- for isolating the splice location from tensile stress,
- for protecting stripped areas from penetrating liquids, and
- for large temperature ranges, in particular in the field.

FOC offers a broad range of different fusion splice protections.

Features

- high mechanical stability through the use of high-quality steel pins as stabilizing elements
- transparent protective layers simplify the centrical positioning of the splice positions
- optimized size for highest possible packaging density
- compatible with all standardized splice holders and heating equipment for heat-shrink type splice protections
- no absorption of humidity
- high operating temperature range: -55 °C to +85 °C

Applications
- closures and distributors in the outside plant
- connections in telecom and date networks
- Metro networks

Models
- different models for protecting 250µm, 900µm and mixed splices
- different models for standard splice holders, e. g. for 6 splice protections 3 mm or 12 crimp splice protections
- micro splice protection is a direct substitute for crimp splice protections

Length (mm)	ø (mm) shrinked	Pigtail ø
60	2,8 ±0,2	900 µm 250 µm
35	2,8 ±0,2	900 µm 250 µm
25	1,6 ±0,1	250 µm
25	1,3 (micro splice protection)	250 µm

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Components

Contents

Components – Couplers

General

Singlemode Couplers 9/125 and 9/80

Power-spiltting Singlemode Couplers	Wavelengths [nm]	Contents
SSC Standard-Singlemode Coupler	1310±5, 1550±5, 1625±5	1x2/2x2/1x3/1x4
WFC Wavelength Flattened Coupler	1310±40, 1550±40, 1625±40	1x2/2x2/1x3/1x4
WIC Wavelength Independent Coupler	1310±40, 1550±40	1x2/2x2/1x3/1x4
EIC Extended Wavelength Independent Coupler	1310±50, 1550+50/-100	1x2/2x2/1x3/1x4
FIC Full Range Wavelength Independent Coupler	1310±50, 1550±100	1x2/2x2/1x3/1x4
SBC S-Band-Singlemode Coupler	1460-1530	1x2/2x2/1x3/1x4
CBC C-Band-Singlemode Coupler	1530-1565	1x2/2x2/1x3/1x4
LBC L-Band-Singlemode Coupler	1565-1625	1x2/2x2/1x3/1x4
CLC C&L-Band-Singlemode Coupler	1530-1625	1x2/2x2/1x3/1x4
SCL S&C&L-Band-Singlemode Coupler	1460-1625	1x2/2x2/1x3/1x4
SSC, WFC, WIC, EIC, FIC Singlemode Coupler Modules	diverse	Modules
Wavelength-selektive Couplers (WDM)		
WDM Standard WDM 1310/1550	1310±20, 1550±20 1310±40, 1550±40	1x2/2x2 and High Isolation (Modules)
WDM Standard WDM 1310/1625	1310±20, 1625±20 1310±40, 1625±40	1x2/2x2 and High Isolation (Modules)
Singlemode Couplers for Special Wavelengths		
SWC Short Wavelength-Coupler	488, 535, 650, 760, 850	1x2/2x2/1x3/1x4
MWC Medium Wavelength-Coupler	980, 1080	1x2/2x2/1x3/1x4

Multimode Couplers

MMC **Multimode Couplers**	820±40, 1300±40, 780-1340	1x2/2x2
MMC **Multimode Coupler Modules**	820±40, 1300±40, 780-1340	Modules
Multimodecouplers/-modules - Parameter		

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Contents
Components – Filter

General

CWDM

	Wavelengths [nm]	Contents
CWDM - Filter/Modules	ITU-T G. 694.2	1 CH, 2 CH, 4 CH, 8 CH, 16 CH
Mini-CWDM Module	ITU-T G. 694.2	

Triple-Play-WDM

Triple-Play-WDM	1310, 1490, 1550	Triple-Play 1 Single fibre solution

FWDM

FWDM 1310/1550	1260-1420, 1460-1620	Bandpass filters ≤ 25 dB, optimized for CWDM
HIFWDM 1310/1550	1280-1340, 1460-1620	Bandpass filters 45 dB, optimized for 1310 nm and CWDM up 1470 nm

Components Filter

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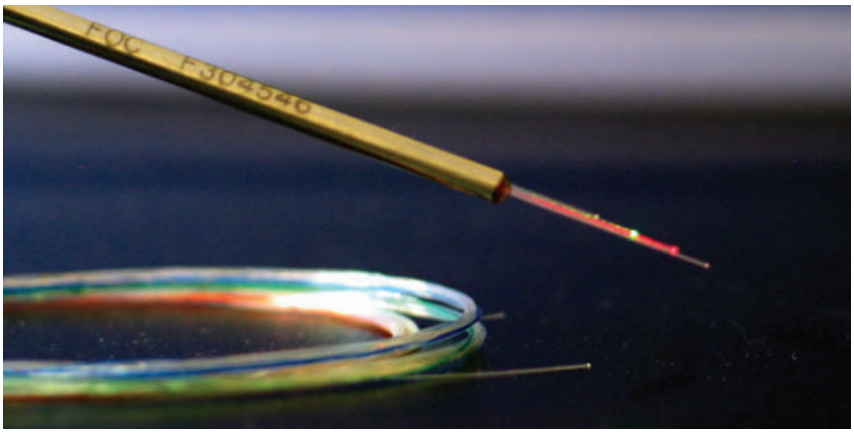
Basic Information
Singlemode Couplers



General

Optical couplers are used for branching or combining optical signals. They are used in public and private optical fibre networks to serve as passive distribution and collection points for optical data transmission (telephone, cable TV etc.). Other applications for optical couplers are measuring equipment, measuring instruments and sensor technology.

Properties

Fusion couplers are characterized by the following properties:

- All-fibre components with low insertion loss
- High return loss and directivity
- Wavelength-selective or broadband behavior
- High thermal and mechanical stability
- Free choice of coupling ratio (1 % ... 50 %) and splitting level
- Manufacturing to meet customer specifications

Manufacturing procedures

Fusion couplers are manufactured by the so-called FBT method (Fused Biconical Taper), in which coupling zones are created by simultaneous fusion and pulling (tapering) of optical fibres (fig. **1**). The basic material is a single mode fibre with a protective acrylate coating (primary coating, typ. Ø 250 µm). To produce a coupler with two outlets, first of all

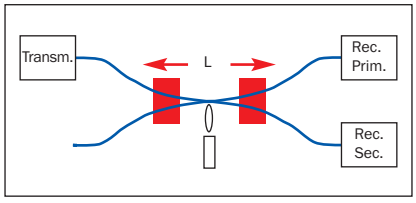


Figure **1** Manufacturing principie

a short section of this primary coating is removed in the middle of two optical fibres. The stripped sections are carefully cleaned, aligned parallel to each other and fixed in place. The subsequent process of fusing and simultaneous tapering allows the light to pass, or be coupled, from one core into the other. Thus, the two fibres form a pure glass connection which is not interrupted by a joint, as it would be with an adhesive joint or filter. The fusing and tapering process is controlled by a complicated measuring device which permits simultaneous measurement, enabling the traction process to be interrupted at any point, and thus enabling the degree of coupling of the input signal into the second fibre, or the coupling ratio, to be controlled (fig.**2**).

After the tapering process the coupler is bonded to a quartz substrate using a special adhesive (fig. **3**). The substrate with the coupler is inserted into a metall tube and the ends of the tube are closed with silicone. After encapsulation, the descriped coupler has two input fibres and two output fibres (= 2x2 coupler). By means of a non-reflecting terminati-

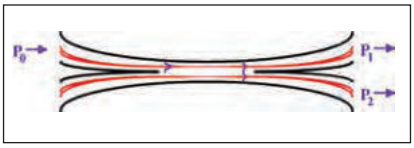


Figure **2** Functional principie

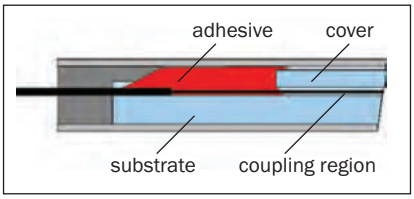


Figure **3** Structure of coupler housing

on of the second input fibre, a coupler with the configuration 1x2 is created.

Fused couplers and coupler modules with a higher number of ports are produced as truely fused couplers or coupler modules. Truely fused couplers are produced by simultaneous fusion and tapering of up to four optical fibres (= 1x4 coupler). Coupler modules consist of a higher number of single couplers. By using these single couplers and specially developed housings, a cascade structure can be created which provides coupling modules with up to 132 ports (fig. **4**).

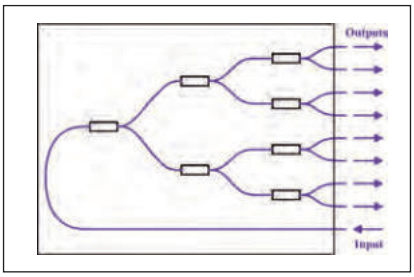


Figure **4** Basic structure of 1x8 coupler module

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Coupler types

By manipulating the tapering process and by special pretreatment of the optical fibres to be fused, couplers with differing transmission and coupling properties can be made. The coupling properties of the different types in relation to the wavelength are shown in figures **5** to **10**.

There are couplers for applications in the telecom wavelength range of 1200nm to 1700nm as well as couplers for shorter wavelengths, e.g. in the visuable range (fig. **11**).

Powersplitting Singlemode Couplers

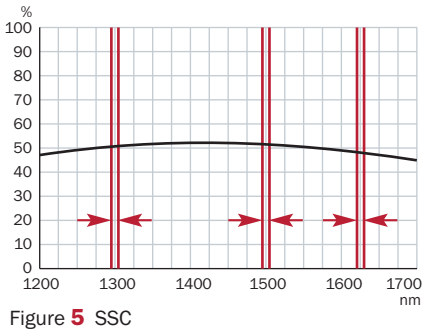


Figure **5** SSC

Standard Singlemode Couplers – SSC
for a wavelength with minimal deviations, e.g. 1310 ± 5 nm.

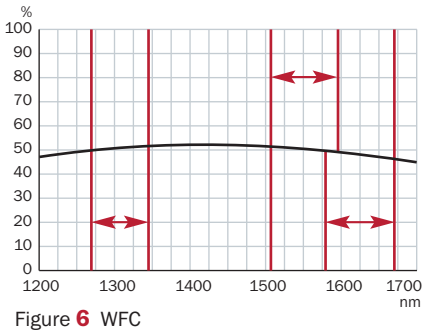


Figure **6** WFC

Wavelength Flattened Couplers – WFC
WFC are single window couplers which are optimised for a single wavelength range and guarantee constant power splitting across a broad bandwidth, e.g. 1310 ± 40 nm.

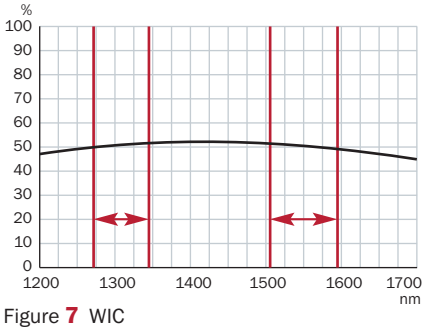


Figure **7** WIC

Wavelength Independent Couplers – WIC
WIC are dual window couplers which guarantee a constant power splitting in the second and third optical window (1310 ± 40 and 1550 ± 40 nm).

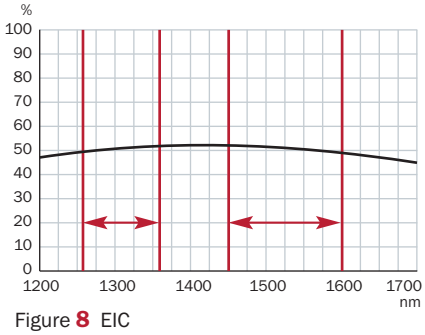


Figure **8** EIC

Extended Wavelength Independent Couplers – EIC
EIC are dual window couplers which guarantee a constant power splitting in the extended second and third optical window (1310 ± 50 and 1525 ± 75 nm).

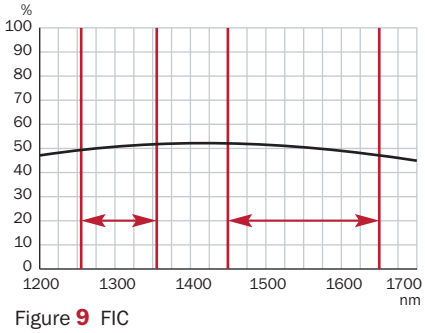


Figure **9** FIC

Full Range Wavelength Independent Couplers – FIC
FIC are three window couplers which guarantee a constant power splitting in the second, third and fourth optical window (1310 ± 50 and 1550 ± 100 nm).

Wavelength multiplexer

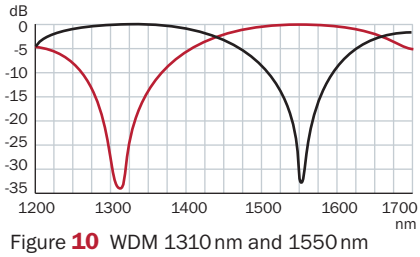


Figure **10** WDM 1310 nm and 1550 nm

Wavelength Devision Multiplexer – WDM
WDM are used for separating or combining two or more wavelengths.

Singlemode Short Wavelength Couplers

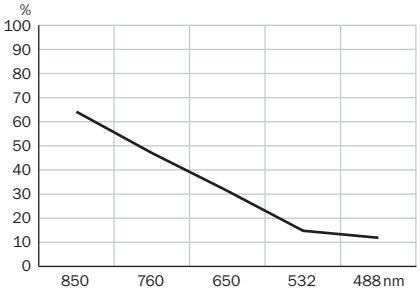


Figure **11** SWC

Short Wavelength Coupler – SWC
SWC are passive optical devices which allow the distribution and combination of optical signals of wavelength lower than the common telecommunication wavelength range, e.g. 532 ± 5 nm.

Technology basics

As can be seen in fig. **12**, the coupling ratio depends both on the taperlength and on the working wavelength. If the tapering process is stopped at a specific point, a specific coupling ratio is achieved for one wavelength.

Point A marks a standard coupler with a coupling ratio of 50 % at 1550 nm. If this coupler is operated with a wavelength of 1310 nm, the coupling ratio is approx. 20 %.

Point B marks a standard coupler with a symmetrical coupling ratio at 1310 nm.

Point C marks a single window coupler for 1550 nm. At this turning point, the coupler is highly insensitive to wavelength changes. However, this characteristic is not required to occur at 100 % coupling, so one of the two fibres is pretreated by etching or pretapering. This enables the turning point to be reduced to 50 % (fig. **12**, point C).

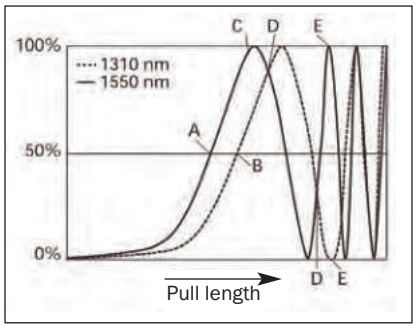


Figure **12** Coupling in a fusion coupling made of identical fibres

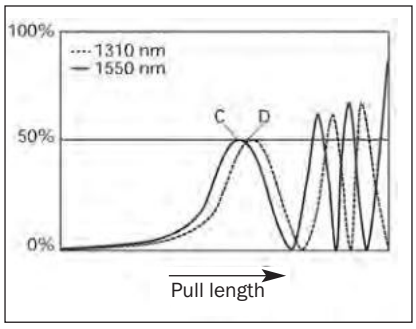


Figure **13** Coupling in a fusion coupling made of different fibres

Point D marks a dual window coupler. At this intersection, the coupling ratio is the same for two wavelengths, but asymmetrical (approx. 10 %). Here, too, an intersection with a symmetrical coupling ratio is achieved by fusing two fibres that are pre-treated differently (fig. **12**, point D).

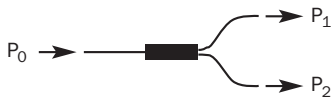
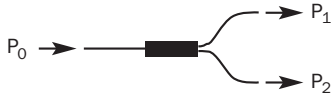
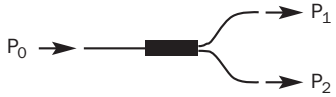
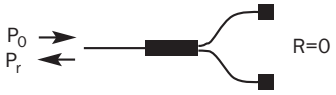
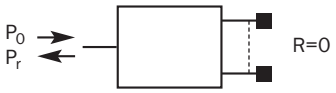
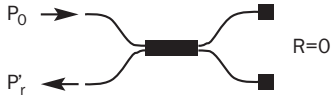
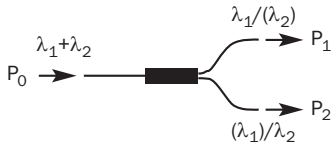
Point E marks a specific coupler, the so-called wavelength multiplexer. At this point, 100 % of the signal at 1550 nm and 0 % of the signal at 1310 nm is coupled. This means that a WDM, like a filter, can separate two wavelengths so that each output carries only one wavelength.

Quality assurance

Every coupler can be identified by a serial number, i.e. it is possible at any time to identify the manufacturing parameters, the workplace and the material used for any coupler. Each component is subjected to a burn-in test to ensure long-term stability. At the same time, long-term tests based on Bellcore, such as storage in moist and dry heat, temperature cycles and mechanical strain were successfully passed.

All couplers are designed to meet the requirements of Telcordia GR-1209-CORE and GR-1221-CORE and IEC-specifications.

Definitions of the parameters for couplers (C), coupler modules (CM) and wavelength division multiplexers (WDM)

Term	Definition	Component	Calculation		Explation
Insertion Loss	Sum of coupling loss and excess los	C	-10 log ($P_{1/2}$ / P_0)	[dB]	
		CM	-10 log (P_i / P_0) (i = 1...n)	[dB]	
Coupling Ratio	Percentage division ratio of the optical signals to the outputs points	C	[P_2 / (P_1+P_2)] x 100 -10 log [P_2 / (P_1+P_2)]	[%] [dB]	
Splitting ratio	Percentage division ratio of the optical signals to the outputs points	CM	[P_i / Σ P_n] x 100 -10 log [P_i / Σ P_n] (i = 1...n)	[%] [dB]	
Exess Loss	Propotion of the signal that is present at the in-put but none of the out-puts points	C	-10 log [(P_1 + P_2) / P_0]	[dB]	
		CM	-10 log [Σ P_n / P_0]	[dB]	
Return Loss	Ratio of transmitted signal to reflected signal at one input or output	C	-10 log (P_r / P_0)	[dB]	
		CM	-10 log (P_r / P_0)	[dB]	
Directivity	Proportion of transmitted signal which is reflected to the parallel fibre on the same side	C	-10 log (P'_r / P_0)	[dB]	
		CM	-10 log (P'_r / P_0)	[dB]	
Isolation	Power ratio of the undesirable wavelength to the desirable wavelength. The isolation is dependent on the working wavelength range.	WDM	-10 log [$P_{1/\lambda1}$ / $P_{2/\lambda1}$] -10 log [$P_{2/\lambda2}$ / $P_{1/\lambda2}$]	[dB]	

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Customer Information

Couplers/Coupler Modules

Why Couplers Made by FOC?

1. In-house technological development and manufacture

FOC couplers are manufactured based on the Fused Biconical Taper technology. The beginnings of the FOC manufacturing technology date back to the year 1985. Thus FOC is one of the few companies to possess an internally developed manufacturing technology. The development of this manufacturing technology, of the manufacturing tools, of the automation and measuring facilities was seen as an integrated whole from the very beginning. Thus FOC owns all of the know-how and is able to continually develop its technology further in line with the demands of the market.

In recent years quite a number of new components were created. FOC was the first company to present some of them on the market and to offer them to the customer. Production at FOC is computer-controlled and highly automated. On the one hand, this allows us to manufacture highly repeatable top-quality standard products. On the other hand, the technological experience of FOC enables the company to manufacture customized components and thus to organize production to meet the specific requirements of our customers.

2. Long-term experience and customer acceptance

Since 1991 large numbers of fusion couplers have been produced in an industrial environment on the basis of the virtually unchanged technology. Over more than 10 years of use the manufacturing technology has impressively demonstrated its long-term stability in a multitude of customer projects. Among others the majority of couplers, which were installed within the framework of the OPAL projects of Deutsche Telekom in the years from 1993 to 1995, was manufactured using the FOC technology (at that time as coupler production of KRONE AG).

Couplers based on the FOC technology have proved successful on 4 continents under the most diverse operating conditions. Network operators and other customers from more than 20 countries are using couplers made by FOC.

This excellent record is based on the fulfilment of the criteria specified in Bellcore/Telcordia GR-1221-CORE and Bellcore/Telcordia GR-1209-CORE. These criteria are always given top priority in development and production at FOC.

3. Quality and test data

From the beginning till today comprehensive tests for quality monitoring and quality certification are performed parallel to manufacture. FOC has a number of individual tests and customer releases available. The first performance and reliability tests which were performed on our couplers date back to the year 1992. The latest published test data are from 2006. They also contain an extract of the test results summarized in a detailed Qualification and Test Report (QTR). FOC makes this QTR available to all its customers.

Over the past 10 years the requirements as to the products and the tests have evolved. In order to fulfil these requirements we have designed the tests to comply with the internationally recognised IEC standards right from the beginning. This allows the customer to draw simple and logical comparisons.

Today manufacture at FOC is based on a consistent ISO certified quality management system which originates from the time production was still under the roof of Diamond GmbH. Thus FOC is able to comply with the high quality standards and to trace the manufacturing parameters, materials and production data back over a period of 10 years.

4. Products and highlights

FOC offers a very wide range of products. Almost all coupler types are available from one source:

- singlemode and multimode couplers
- wavelength-independent and wavelength-dependent couplers
- power-splitting couplers and multiplexers (WDM)
- symmetrical and unsymmetrical couplers (tap couplers)
- directly fused couplers with 2, 3 or 4 fibres and coupler modules
- couplers for telecom wavelengths and couplers for special wavelengths (short wavelength couplers)
- attennators
- couplers for signal transmission and couplers for power transmission

However, the FOC range of products is not limited to components based on coupler technology. FOC also assembles connectors in line with all international standards required on the market, and manufactures and sells enclosures and distributing equipment. So the customers have one source in FOC to provide all their passive line, transmission and system equipment.

The components made by FOC show additional features setting them apart from our competitors:

- Lowest dependence of components' insertion loss by optimum adjustment of the coefficient of thermal expansion of all materials used to the coefficient of thermal expansion of the optical fibre.

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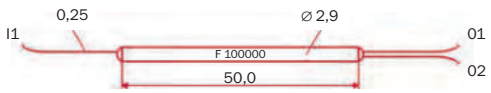
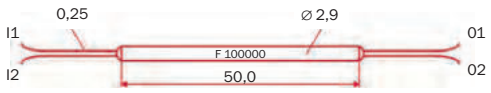
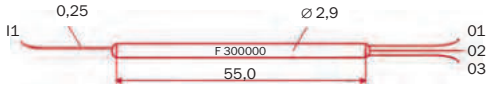
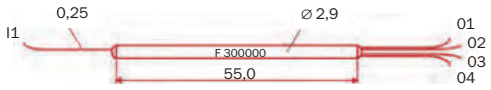
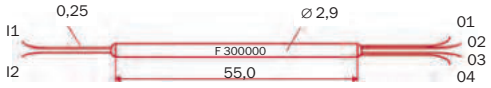
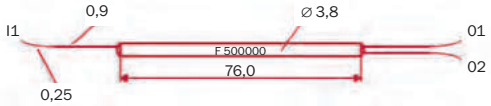
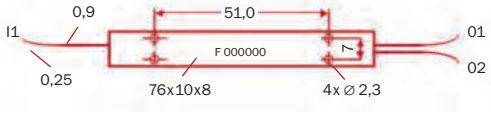
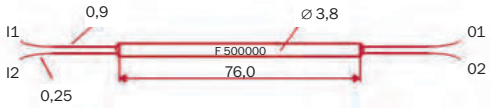
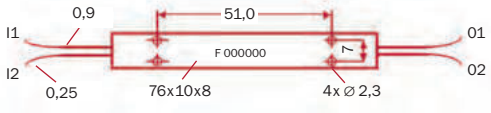
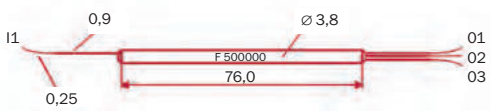
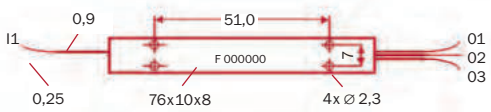
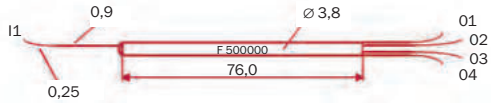
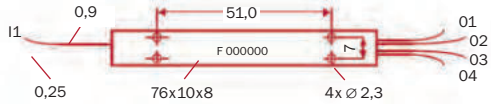
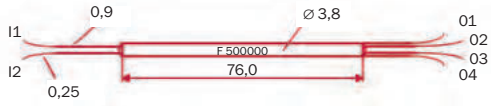
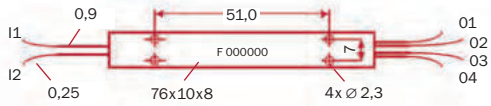
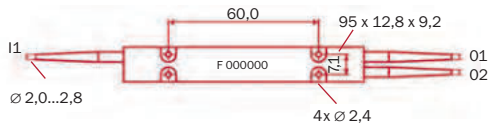
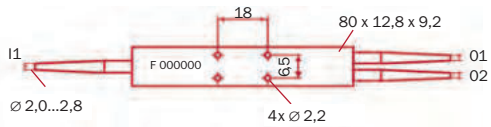
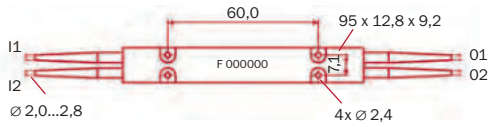
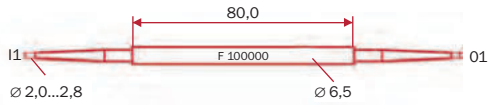
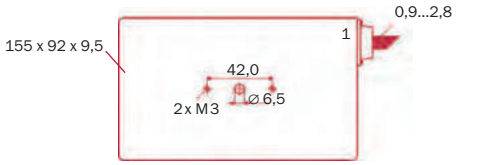
- Prevention of early failures by exposing all components to a 24h thermal shock stress (burn-in) prior to check measurement
- Check measurement and guarantee of the optical characteristics over the complete customer-specified wavelength range
- High mechanical strength and thermal capacity by strict avoidance of predetermined rupture points, achieved by using manufacturing processes adapted to the fibre and by manufacture as 'inline components', i.e. no coupling spots, intermediate media or similar.

In the unlikely event of a defect FOC additionally guarantees immediate service and fast replacement of parts under guarantee through customer-focussed manufacture, and offers short delivery periods, both for volume and customized production.

Overview Standard-Version

Couplerhousing

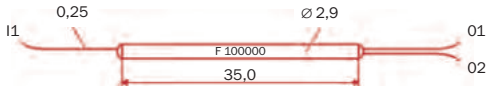
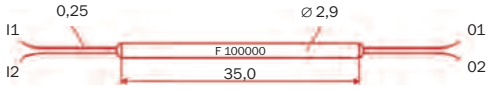
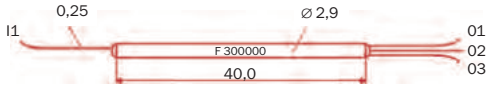
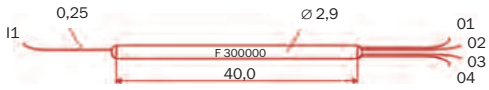
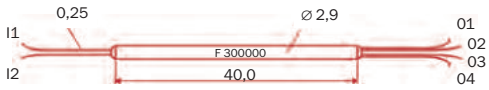
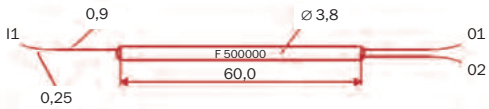
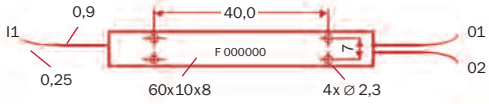
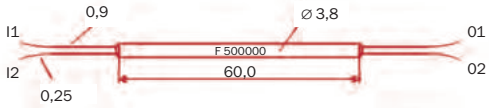
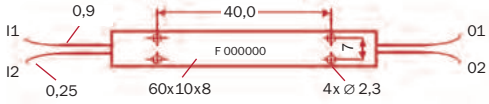
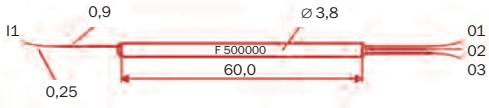
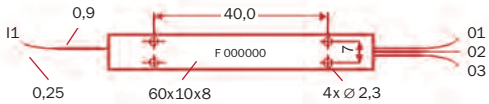
Fiber type	Pigtail type	Config.	Size	Drawing
9/125, 50/125, 62.5/125	9/125/250, 50/125/250, 62.5/125/250	1 x 2	Size 01	
		2 x 2	Size 01	
		1 x 3	Size 04	
		1 x 4	Size 04	
		2 x 4	Size 04	
	9/125/250/900, 50/125/250/900, 62.5/125/250/900	1 x 2	Size 02	
			Size 05	
		2 x 2	Size 02	
			Size 05	
		1 x 3	Size 02	
			Size 05	

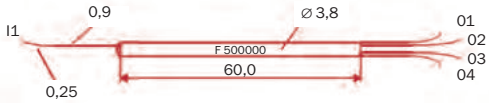
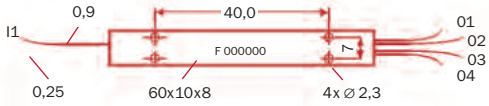
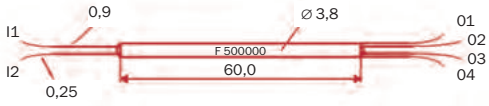
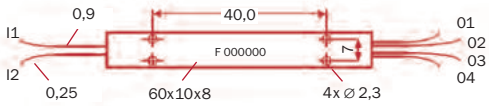
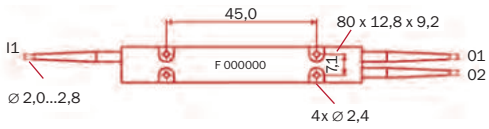
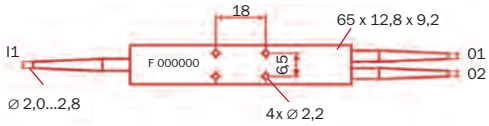
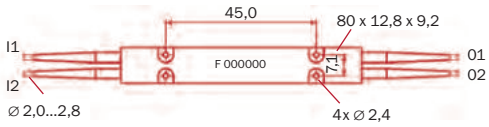
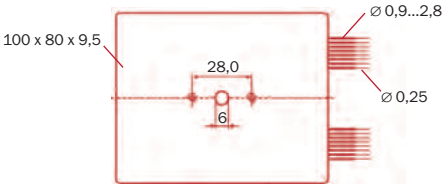
Fiber type	Pigtail type	Config.	Size	Drawing
9/125, 50/125, 62.5/125	9/125/250/900, 50/125/250/900, 62.5/125/250/900	1 x 4	Size 02	
			Size 05	
		2 x 4	Size 02	
			Size 05	
	9/125/250/900/2100...3000, 50/125/250/900/2100...3000, 62.5/125/250/900/2100...3000	1 x 2	Size 03	
			Size 06	
		2 x 2	Size 03	
		1 x 1	Size 09	
	9/125/250/xxx/yyy, 50/125/250//xxx/yyy, 62.5/125/250//xxx/yyy	several	Size 10	

Drawings and detail informations for other housings on request.
Other housings are available.

Overview Short-Version

Couplerhousing

Fiber type	Pigtail type	Config.	Size	Drawing
9/80	9/80/165	1 x 2	Size 01s	
		2 x 2	Size 01s	
		1 x 3	Size 04s	
		1 x 4	Size 04s	
		2 x 4	Size 04s	
	9/80 / 165 / 900	1 x 2	Size 02s	
			Size 05s	
		2 x 2	Size 02s	
			Size 05s	
		1 x 3	Size 02s	
			Size 05s	

Fiber type	Pigtail type	Config.	Size	Drawing
9/80	9/80 / 165 / 900	1 x 4	Size 02s	
			Size 05s	
		2 x 4	Size 02s	
			Size 05s	
	9/80 / 165 / 900/1200...3000	1 x 2	Size 03s	
			Size 06s	
		2 x 2	Size 03s	
	9/80 / 165 /xxx/yyyy	several	SV	

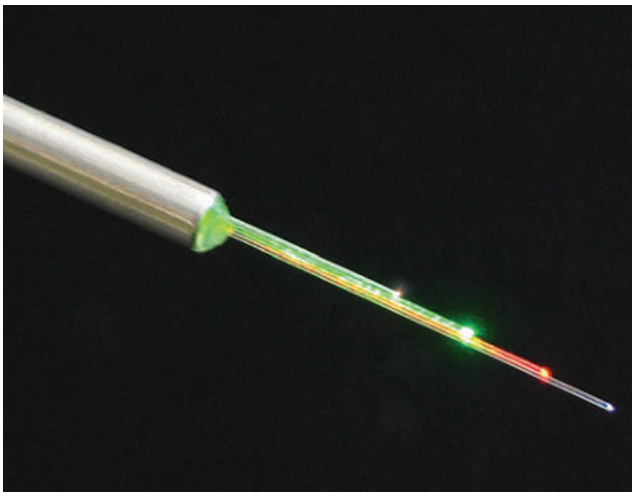
Drawings and detail informations for other housings on request.
Other housings are available.

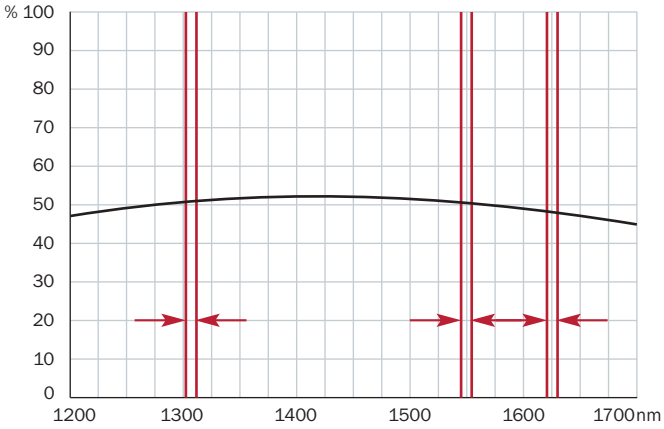
For a complete overview of components visit our website at **www.foc-fo.com**.

Components ▶ Couplers ▶ Singlemode Couplers ▶ SM Power Splitters ▶

Standard-Singlemode Coupler (SSC)

For the wavelength range 1310 nm, 1550 nm or 1625 nm





Wavelength dependence of Coupling Ratio of symmetrical SSCs at 1310 nm, 1550 nm and 1625 nm

Standard Singlemode Couplers (SSC) are passive optical devices which allow the distribution and combination of optical signals of wavelength 1310 nm, 1550 nm or 1625 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50%.
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems.
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
For check lists and additional ordering information for our products visit our website or see separate data sheets.

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Release 22.04.2020
Subject to modifications
DBE-COM-0046V004

Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1310 ± 5, 1550 ± 5 or 1625 ± 5	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,4	3,4
	60/40 %	2,5	4,3
	67/33 %	2,0	5,2
	70/30 %	1,8	5,6
	80/20 %	1,1	7,4
	90/10 %	0,6	10,6
	95/05 %	0,4	13,8
	99/01 %	0,2	22,9
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0,05	

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for port O 2, for symmetrical coupler (2) measured at central wavelength of wavelength range

Optical parameter for 1x3 configurations

Wavelength [nm]		1310 ± 5, 1550 ± 5 or 1625 ± 5		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,1	10,0	10,0
	60/20/20 %	2,8	8,3	8,3
	50/25/25 %	3,7	7,1	7,1
	40/30/30 %	4,7	6,2	6,2
	33/33/33 %	5,6	5,6	5,6
	30/35/35 %	6,2	5,4	5,4
	20/40/40 %	8,3	4,7	4,7
	10/45/45 %	12,8	4,2	4,2
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0,05		

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for ports O 2 and O 3, for symmetrical couplers
(2) measured at central wavelength of wavelength range

Optical parameter for 1x4 configurations

Wavelength [nm]	1310 ± 5, 1550 ± 5 or 1625 ± 5			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,1	7,1	7,1	7,1
Min. Directivity [dB]	55			
Min. Return Loss [dB]]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0,25			

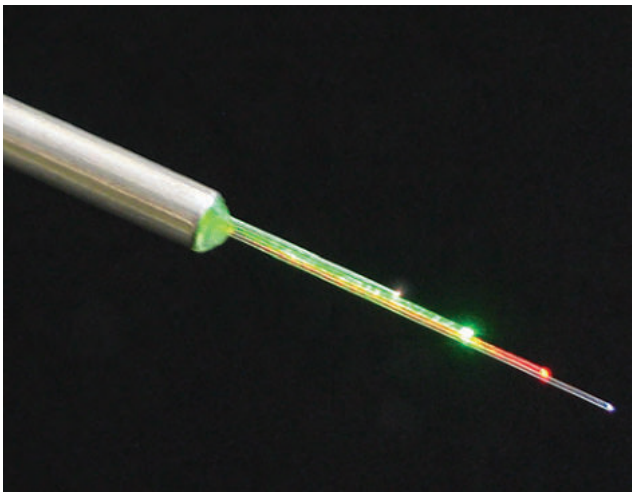
(1) maximum 0.5 dB (2) measured at central wavelength of wavelength range

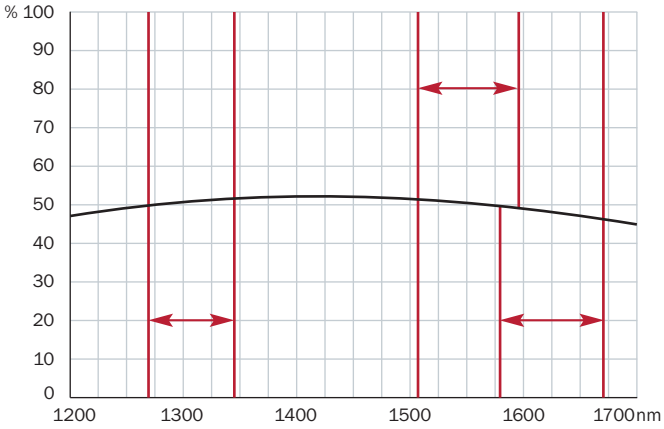
For a complete overview of components visit our website at **www.foc-fo.com**.

Components ▶ Couplers ▶ Singlemode Couplers ▶ SM Power Splitters ▶

Wavelength Flattened Coupler (WFC)

For application at 1310 ±40nm, 1550 ±40nm or 1625 ±40nm





Wavelength dependence of Coupling Ratio of symmetrical WFC at 1310 nm, 1550 nm and 1625 nm

Wavelength Flattened Couplers (WFC) are passive optical devices which allow the distribution and combination of optical signals of a broad wavelength range inside one optical window, e.g. 1550 ± 40 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50%
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR1221
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmission and monitoring systems

Designs

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules
- All connector standard types are available

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
For check lists and additional ordering information for our products visit our website or see separate data sheets.

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Release 22.04.2020
Subject to modifications
DBE-COM-0042V005

Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1310 ±40 o. 1550 ±40 & 1625 ±40	
Output port		O 1	O 2
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,4	3,4
	60/40 %	2,5	4,3
	67/33 %	2,0	5,2
	70/30 %	1,8	5,6
	80/20 %	1,1	7,4
	90/10 %	0,6	10,6
	95/05 %	0,4	13,8
	99/01 %	0,2	22,0
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 fo r 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0,05	

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2, for symmetrical couplers (2) measured at central wavelength of wavelength range

Optical parameter for 1x3 configurations

Wavelength [nm]		1310 ±40 or 1550 ±40 & 1625 ±40		
Output port		O 1	O 2	O 3
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,1	10,0	10,0
	60/20/20 %	2,8	8,3	8,3
	50/25/25 %	3,7	7,1	7,1
	40/30/30 %	4,7	6,2	6,2
	33/33/33 %	5,6	5,6	5,6
	30/35/35 %	6,2	5,4	5,4
	20/40/40 %	8,3	4,7	4,7
	10/45/45 %	12,8	4,2	4,2
Min. Directivity [dB]				55
Min. Return Loss [dB]				55
Polarisation Dependent Loss (1,2) [dB]				typical 0,05

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2 and for Port O 3, for symmetrical couplers
(2) measured at central wavelength of wavelength range

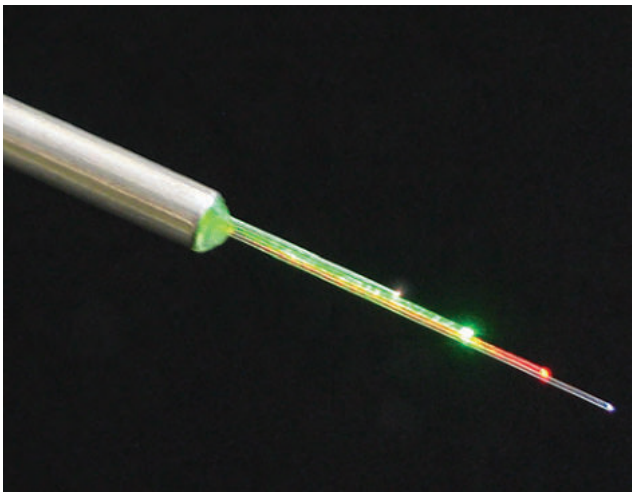
Optical parameter for 1x4 configurations

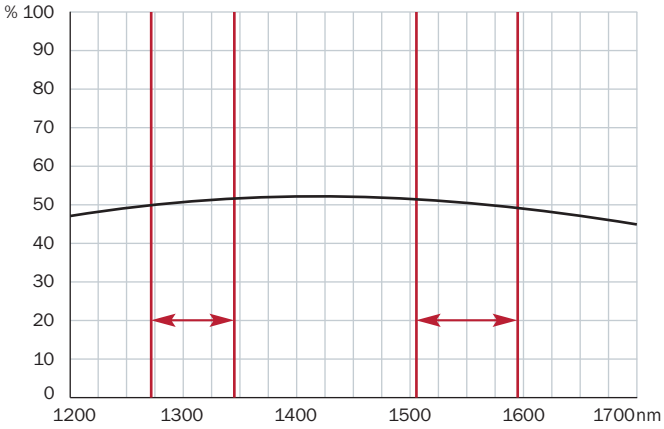
Wavelength [nm]	1310 ±40 or 1550 ±40 & 1625 ±40			
Output port	O 1	O 2	O 3	O 4
Max. Insertion Loss [dB] with equal power splitting	7,1	7,1	7,1	7,1
Min. Directivity [dB]			55	
Min. Return Loss [dB]			55	
Polarisation Dependent Loss (1,2) [dB]			typical 0,25	

(1) maximum 0,5 dB (2) measured at central wavelength of wavelength range

Wavelength Independent Coupler (WIC)

For application at 1310 ±40nm and 1550 ±40nm





Wavelength dependence of Coupling Ratio of symmetrical WICs at 1310 nm and 1550 nm

Wavelength Independent Couplers (WIC) are passive optical devices which allow the distribution and combination of optical signals of a broad wavelength range in the second and third optical window (1310 ± 40 and 1550 ± 40 nm).
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50%
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmission and monitoring systems

Designs

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules
- All connector standard types are available

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1310 ±40 and 1550 ±40	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,6	3,6
	60/40 %	2,7	4,7
	67/33 %	2,2	5,6
	70/30 %	2,0	6,1
	80/20 %	1,4	8,4
	90/10 %	0,8	11,7
	95/05 %	0,5	15,3
	99/01 %	0,2	23,1
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0,05	

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2, for symmetrical couplers (2) measured at central wavelength of wavelength range

Optical parameter for 1x3 configurations

Wavelength [nm]		1310 ±40 and 1550 ±40		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,2	10,7	10,7
	60/20/20 %	3,0	8,9	8,9
	50/25/25 %	3,9	7,6	7,6
	40/30/30 %	5,0	6,5	6,5
	33/33/33 %	6,0	6,0	6,0
	30/35/35 %	6,5	5,7	5,7
	20/40/40 %	8,9	5,0	5,0
	10/45/45 %	14,8	4,4	4,4
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0,05		

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2 and for port O 3, for symmetrical couplers
(2) measured at central wavelength of wavelength range

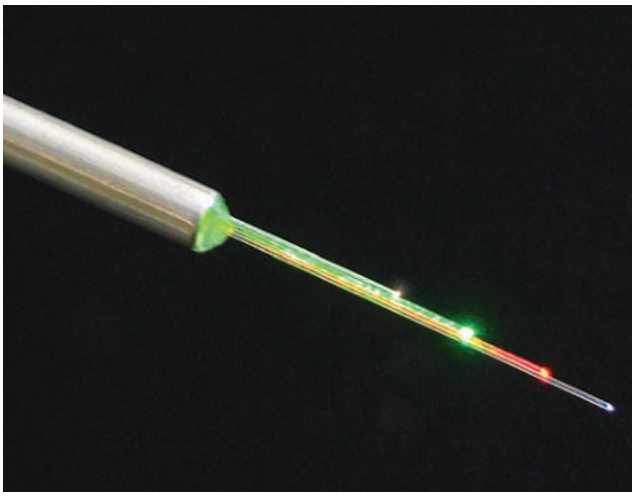
Optical parameter for 1x4 configurations

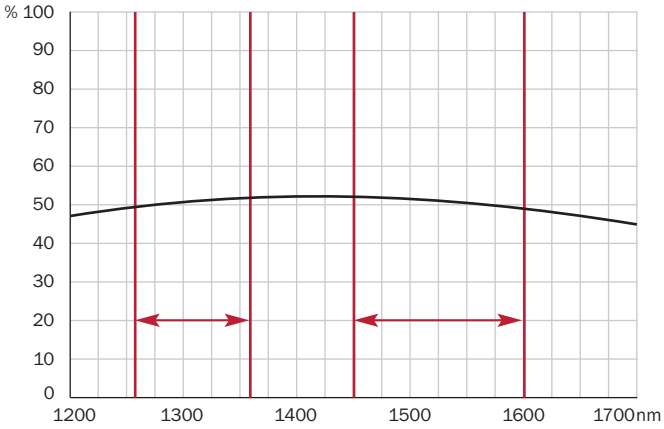
Wavelength [nm]	1310 ±40 and 1550 ±40			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,4	7,4	7,4	7,4
Min. Directivty [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0,25			

(1) maximum 0,5 dB (2) measured at central wavelength of wavelength range

Extended Wavelength Independent Coupler (EIC)

For the extended wavelength range 1310 ± 50 nm and 1550 +50/-100 nm





Wavelength dependence from Coupling Ratio of a symmetrical coupler EIC

Extended Wavelength Independent Couplers (EIC) are passive optical devices which allow the distribution and combination of optical signals of a broad wavelength range. In difference to the established couplers of the WIC type EIC are designed for using additional wavelengths in the third optical window.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50%
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR1221
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmission and monitoring systems

Designs

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules
- All connector standard types are available

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1310 ±50 and 1550 +50/-100	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	4,0	4,0
	60/40 %	3,0	5,2
	67/33 %	2,5	6,2
	70/30 %	2,2	6,8
	80/20 %	1,5	9,0
	90/10 %	0,9	12,8
	95/05 %	0,6	16,6
	99/01 %	0,4	24,5
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0,05	

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2, for symmetrical couplers (2) measured at 1310 nm and 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1310 ±50 and 1550 +50/-100		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,9	17,4	17,4
	80/10/10 %	1,6	13,0	13,0
	70/15/15 %	2,3	10,9	10,9
	60/20/20 %	3,0	9,1	9,1
	50/25/25 %	4,0	7,8	7,8
	40/30/30 %	5,1	6,7	6,7
	33/33/33 %	6,2	6,2	6,2
	30/35/35 %	6,7	5,8	5,8
	20/40/40 %	9,1	5,1	5,1
	10/45/45 %	15,0	4,5	4,5
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0,05		

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2 and for port O 3, for symmetrical couplers
(2) measured at 1310 nm and 1550 nm

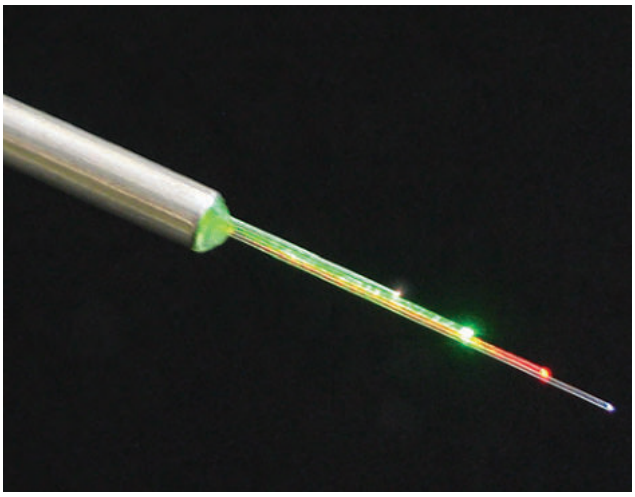
Optical parameter for 1x4 configurations

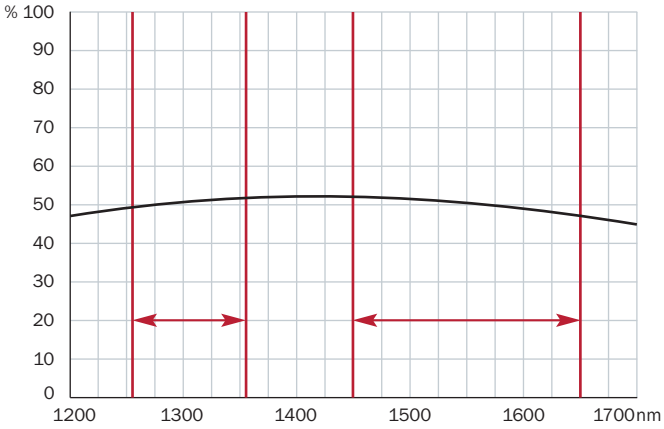
Wavelength [nm]	1310 ±50 and 1550 +50/-100			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,6	7,6	7,6	7,6
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0,25			

(1) maximum 0,5 dB (2) measured at 1310 nm and 1550 nm

Full Range Wavelength Independent Coupler (FIC)

For application at 1310 ±50 nm and 1550 ±100 nm





Wavelength dependence of Coupling Ratio of a symmetrical FIC

Full Range Wavelength Independent Couplers (FIC) are passive optical devices which allow the distribution and combination of optical signals of the full telecommunication wavelength range. In addition to the EIC with the use of the FIC the useable wavelength range is increased to the so called fourth optical window.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50%
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmission and monitoring systems

Designs

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules
- All connector standard types are available

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1310 ±50 and 1550 ±100	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	4,2	4,2
	60/40 %	3,2	5,4
	67/33 %	2,7	6,4
	70/30 %	2,4	7,0
	80/20 %	1,7	9,2
	90/10 %	1,1	13,0
	95/05 %	0,8	16,8
	99/01 %	0,1	24,7
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0,05	

(1) maximum 0,1 dB for port O 1, maximum 0,2 dB for port O 2, for symmetrical couplers (2) measured at 1310 nm and 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1310 ±50 and 1550 ±100		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	1,0	17,6	17,6
	80/10/10 %	1,7	13,2	13,2
	70/15/15 %	2,4	11,1	11,1
	60/20/20 %	3,1	9,3	9,3
	50/25/25 %	4,1	8,0	8,0
	40/30/30 %	5,2	6,9	6,9
	33/33/33 %	6,4	6,4	6,4
	30/35/35 %	6,9	5,9	5,9
	20/40/40 %	9,3	5,2	5,2
	10/45/45 %	15,2	4,6	4,6
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0,05		

(1) maximum 0,1 dB for port 01, maximum 0,2 dB for port O 2 and for port O 3, for symmetrical couplers (2) measured at 1310 nm and 1550 nm

Optical parameter for 1x4 configurations

Wavelength [nm]	1310 ±50 and 1550 ±100			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,8	7,8	7,8	7,8
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0,25			

(1) maximum 0,5 dB (2) measured at 1310 nm and 1550 nm

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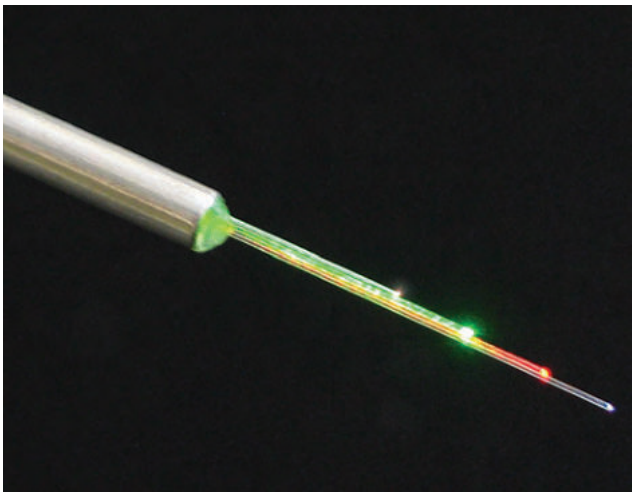
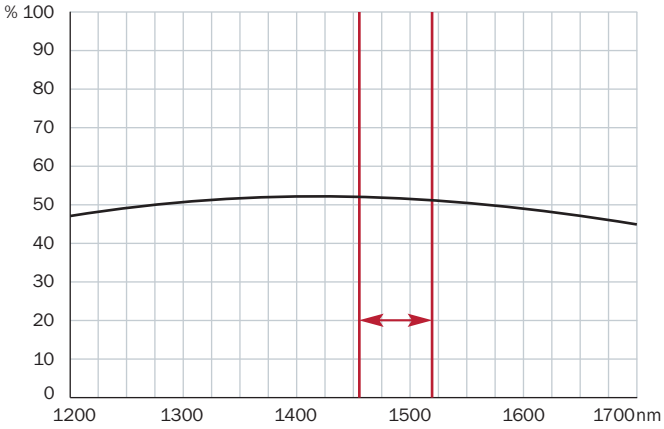
S-Band Singlemode Coupler (SBC)

For the wavelength range from 1460 nm to 1530 nm





Wavelength dependence of Coupling Ratio of symmetrical S-Band Coupler

S-Band Couplers (SBC) are passive optical singlemode devices which allow the distribution and combination of optical signals of wavelength 1460 nm to 1530 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50% .
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems.
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1460 to 1530	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,4	3,4
	60/40 %	2,5	4,3
	67/33 %	2,0	5,2
	70/30 %	1,8	5,6
	80/20 %	1,1	7,4
	90/10 %	0,6	10,6
	95/05 %	0,4	13,8
	99/01 %	0,2	22,0
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0.05	

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for port O 2, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1460 to 1530		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,1	10,0	10,0
	60/20/20 %	2,8	8,3	8,3
	50/25/25 %	3,7	7,1	7,1
	40/30/30 %	4,7	6,2	6,2
	33/33/33 %	5,6	5,6	5,6
	30/35/35 %	6,2	5,4	5,4
	20/40/40 %	8,3	4,7	4,7
	10/45/45 %	12,8	4,2	4,2
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0.05		

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for ports O 2 and O 3, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x4 configurations

Wavelength [nm]	1460 to 1530			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,1	7,1	7,1	7,1
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0.25			

(1) maximum 0,5 dB (2) measured at 1550 nm

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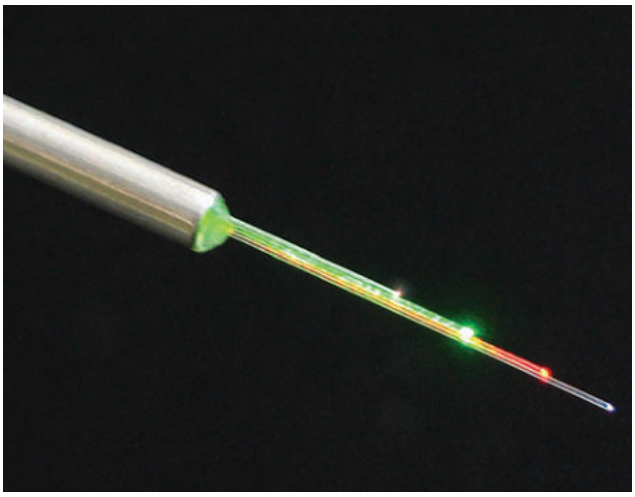
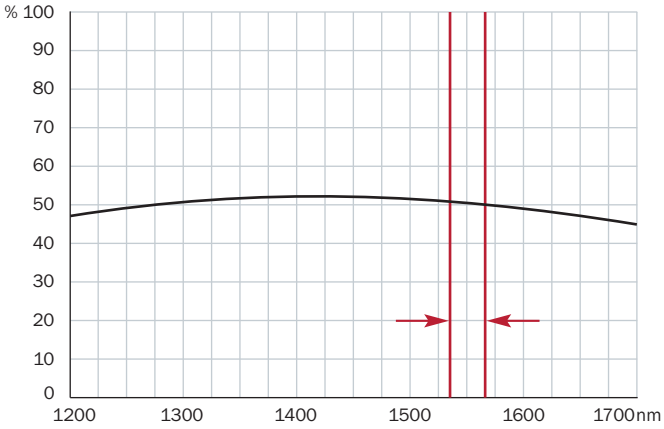
C-Band Singlemode Coupler (CBC)

For the wavelength range from 1530 nm to 1565 nm





Wavelength dependence of Coupling Ratio of symmetrical C-Band Coupler

C-Band Couplers (CBC) are passive optical singlemode devices which allow the distribution and combination of optical signals of wavelength 1530 nm to 1565 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50% .
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems.
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1530 to 1565	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,3	3,3
	60/40 %	2,4	4,3
	67/33 %	2,0	5,2
	70/30 %	1,7	5,6
	80/20 %	1,1	7,4
	90/10 %	0,6	10,5
	95/05 %	0,4	13,5
	99/01 %	0,2	21,5
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0.05	

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for port O 2, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1530 to 1565		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,1	10,0	10,0
	60/20/20 %	2,8	8,3	8,3
	50/25/25 %	3,7	7,1	7,1
	40/30/30 %	4,7	6,2	6,2
	33/33/33 %	5,6	5,6	5,6
	30/35/35 %	6,2	5,4	5,4
	20/40/40 %	8,3	4,7	4,7
	10/45/45 %	12,8	4,2	4,2
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0.05		

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for ports O 2 and O 3, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x4 configurations

Wavelength [nm]	1530 to 1565			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,0	7,0	7,0	7,0
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0.25			

(1) maximum 0,5 dB (2) measured at 1550 nm

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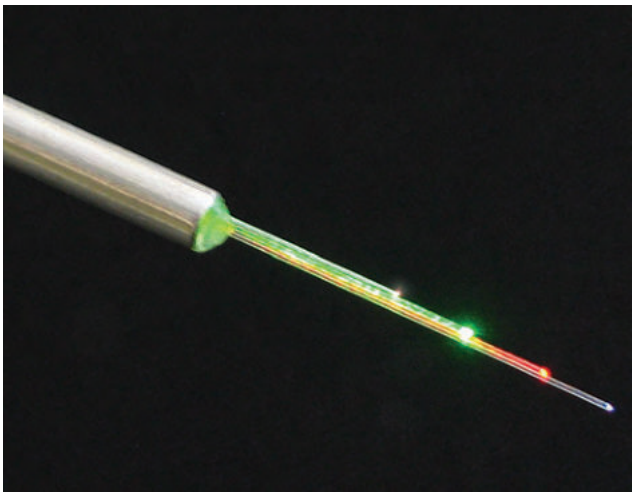
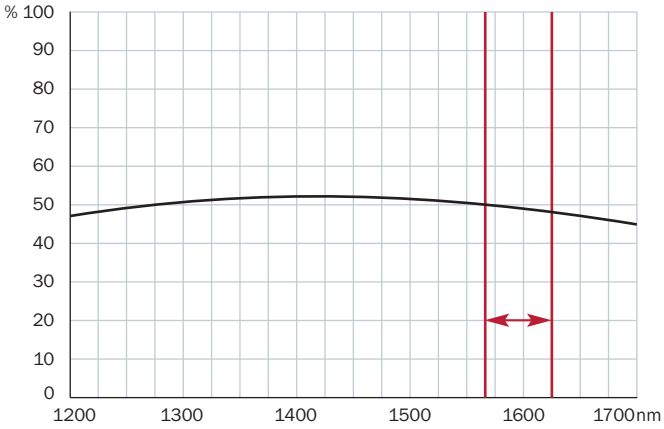
Components ▶ Couplers ▶ Singlemode Couplers ▶ SM Power Splitters ▶

L-Band Singlemode Coupler (LBC)

For the wavelength range from 1565 nm to 1625 nm





Wavelength dependence of Coupling Ratio of symmetrical L-Band Coupler

L-Band Couplers (LBC) are passive optical singlemode devices which allow the distribution and combination of optical signals of wavelength 1565 nm to 1625 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50% .
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems.
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1565 to 1625	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,3	3,3
	60/40 %	2,4	4,3
	67/33 %	2,0	5,2
	70/30 %	1,7	5,6
	80/20 %	1,1	7,4
	90/10 %	0,6	10,5
	95/05 %	0,4	13,5
	99/01 %	0,2	21,5
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0.05	

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for port O 2, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1565 to 1625		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,1	10,0	10,0
	60/20/20 %	2,8	8,3	8,3
	50/25/25 %	3,7	7,1	7,1
	40/30/30 %	4,7	6,2	6,2
	33/33/33 %	5,6	5,6	5,6
	30/35/35 %	6,2	5,4	5,4
	20/40/40 %	8,3	4,7	4,7
	10/45/45 %	12,8	4,2	4,2
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0.05		

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for ports O 2 and O 3, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x4 configurations

Wavelength [nm]	1565 to 1625			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,0	7,0	7,0	7,0
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0.25			

(1) maximum 0,5 dB (2) measured at 1550 nm

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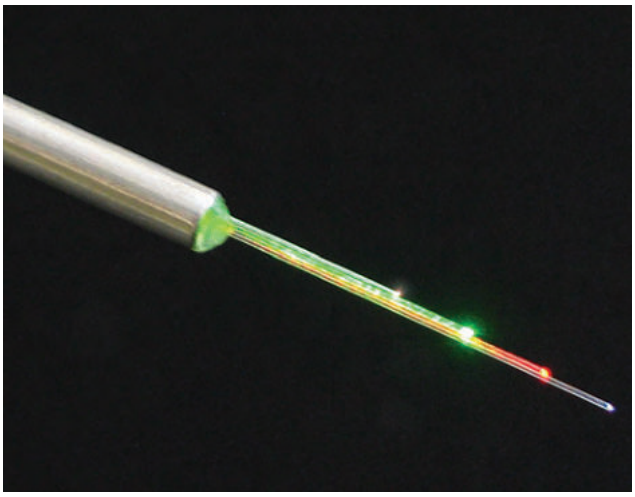
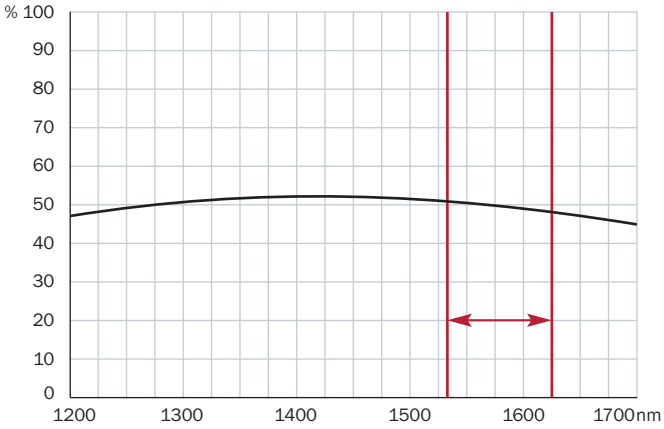
Components ▶ Couplers ▶ Singlemode Couplers ▶ SM Power Splitters ▶

Singlemode Coupler for C- & L-Band (CLC)

For the wavelength range from 1530 nm to 1625 nm





Wavelength dependence of Coupling Ratio of symmetrical C- & L-Band Coupler

Couplers for C- and L-Band (CLC) are passive optical singlemode devices which allow the distribution and combination of optical signals of wavelength in the range between 1530 nm and 1625 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technologie to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50%.
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems.
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
For check lists and additional ordering information for our products visit our website or see separate data sheets.

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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1530 to 1625	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,4	3,4
	60/40 %	2,5	4,3
	67/33 %	2,0	5,2
	70/30 %	1,8	5,6
	80/20 %	1,1	7,4
	90/10 %	0,6	10,6
	95/05 %	0,4	13,8
	99/01 %	0,2	22,0
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0.05	

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for port O 2, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1530 to 1625		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,1	10,0	10,0
	60/20/20 %	2,8	8,3	8,3
	50/25/25 %	3,7	7,1	7,1
	40/30/30 %	4,7	6,2	6,2
	33/33/33 %	5,6	5,6	5,6
	30/35/35 %	6,2	5,4	5,4
	20/40/40 %	8,3	4,7	4,7
	10/45/45 %	12,8	4,2	4,2
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0.05		

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for ports O 2 and O 3, for symmetrical couplers (2) measured at 1550 nm

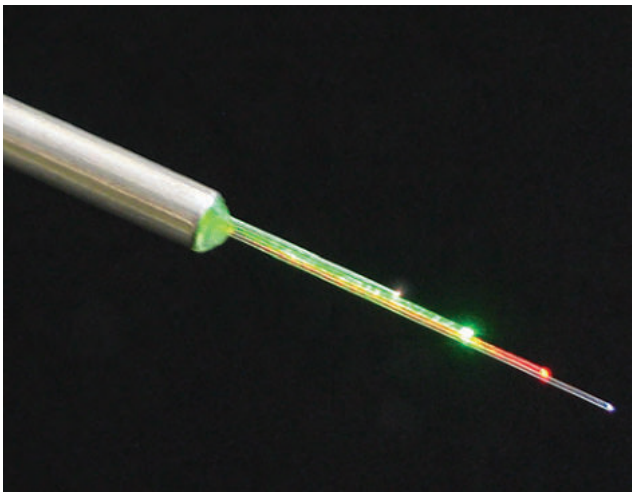
Optical parameter for 1x4 configurations

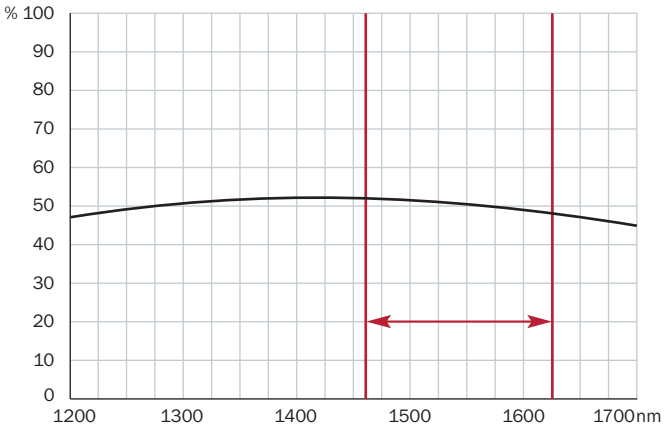
Wavelength [nm]	1530 to 1625			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,1	7,1	7,1	7,0
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0.05			

(1) maximum 0,5 dB (2) measured at 1550 nm

Singlemode Coupler for S-, C- and L-Band (SCL)

For the wavelength range from 1460 nm to 1625 nm





Wavelength dependence of Coupling Ratio of symmetrical S-, C- and L-Band Coupler

Couplers for S-, C-and L-Band (SLC) are passive optical singlemode devices which allow the distribution and combination of optical signals of wavelength 1460 nm to 1625 nm.
The couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50% .
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems.
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter for 1x2 and 2x2 configurations

Wavelength [nm]		1460 to 1625	
Output port		**O 1**	**O 2**
Max. Insertion Loss [dB] with Coupling Ratio	50/50 %	3,6	3,6
	60/40 %	2,7	4,7
	67/33 %	2,2	5,6
	70/30 %	2,0	6,1
	80/20 %	1,4	8,4
	90/10 %	0,8	11,7
	95/05 %	0,5	15,3
	99/01 %	0,2	23,1
Min. Directivity [dB]		55 for 1x2, 60 for 2x2	
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2	
Polarisation Dependent Loss (1,2) [dB]		typical 0.05	

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for port O 2, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x3 configurations

Wavelength [nm]		1460 to 1625		
Output port		**O 1**	**O 2**	**O 3**
Max. Insertion Loss [dB] with power splitting	90/05/05 %	0,8	17,2	17,2
	80/10/10 %	1,5	12,8	12,8
	70/15/15 %	2,2	10,7	10,7
	60/20/20 %	3,0	8,9	8,9
	50/25/25 %	3,9	7,6	7,6
	40/30/30 %	5,0	6,5	6,5
	33/33/33 %	6,0	6,0	6,0
	30/35/35 %	6,5	5,7	5,7
	20/40/40 %	8,9	5,0	5,0
	10/45/45 %	14,8	4,4	4,4
Min. Directivity [dB]		55		
Min. Return Loss [dB]		55		
Polarisation Dependent Loss (1,2) [dB]		typical 0.05		

(1) maximum 0.1 dB for port O 1; maximum 0.2 dB for ports O 2 and O 3, for symmetrical couplers (2) measured at 1550 nm

Optical parameter for 1x4 configurations

Wavelength [nm]	1460 to 1625			
Output port	**O 1**	**O 2**	**O 3**	**O 4**
Max. Insertion Loss [dB] with equal power splitting	7,4	7,4	7,4	7,4
Min. Directivity [dB]	55			
Min. Return Loss [dB]	55			
Polarisation Dependent Loss (1,2) [dB]	typical 0.05			

(1) maximum 0,5 dB (2) measured at 1550 nm

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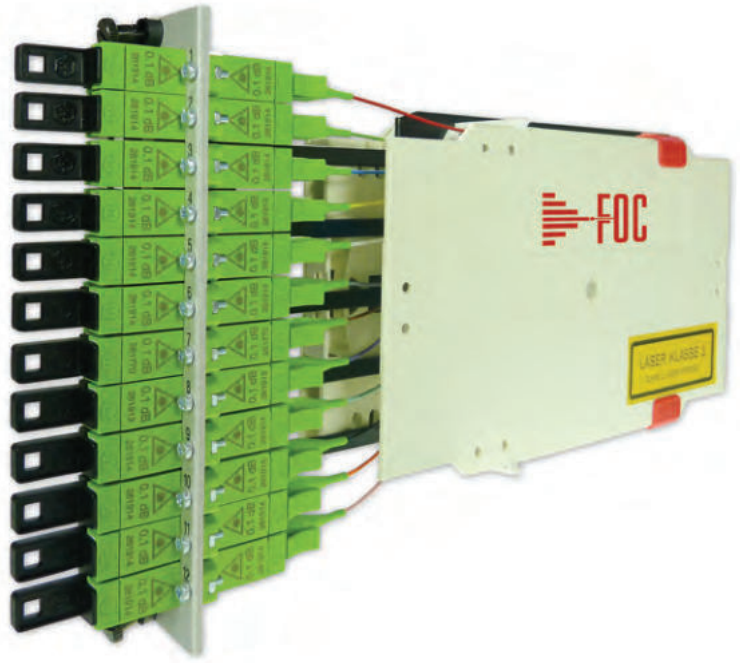
Components ▶ Couplers ▶ Singlemode Couplers (SM) ▶ SM Power Splitters ▶

Singlemode-Coupler-Modules



Optical coupler modules are passive optical devices which allow the distribution and combination of optical signals. They are used in public and private fibre-optic networks as nodes for data transmission (telephone, cable TV etc.); further fields of application are in measurement set-ups, measuring instruments, and sensor technology.
The basic couplers are manufactured on the basis of an advanced Fused Biconcal Taper (FBT) technology to provide optimum performance and longtime stability. The coupler modules consist of a set of different or identical fusion couplers.

Features

- Low insertion loss and extremely low excess loss
- Different modul configurations: For standard configurations see table “Optical parameter“. Other configurations, e.g. 1x7 or 1x11, are available on request.
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR-1221.
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmission and monitoring systems

Module types

Coupler Modules come in distinct types, wavelength selective or with broadband properties:
They are classified just like SM-Couplers (see basic information Singlemode couplers):

- Standard Singlemode Coupler Modules
- Wavelength Flattened Coupler Modules
- Wavelength Independent Coupler Modules
- Extended Wavelength Independent Coupler Modules
- Full RangeWavelength Independent Coupler Modules

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Optical parameter

Configuration [1]			1x2 2x2	1x4 2x4	1x6 2x6	1x8 2x8	1x12 2x12	1x16 2x16	1x24 2x24	1x32 2x32	1x64 2x64
Insertion Loss [dB] [2,3]	**SSC-Modules** 1310 ±5 nm, 1550 ±5 nm or 1625 ±5 nm	min.	2,8	5,6	7,1	8,4	10,0	11,2	12,5	14,0	16,8
		max.	3,5	7,0	10,1	10,5	13,3	13,6	16,5	16,8	20,4
	WFC-Modules 1310 ±40 nm, 1550 ±40 nm or 1625 ±40 nm	min.	2,8	5,6	7,1	8,4	10,0	11,2	12,5	14,0	16,8
		max.	3,5	7,0	10,1	10,5	13,3	13,6	16,5	16,8	20,4
	WIC-Modules 1310 ±40 nm and 1550 ±40 nm	min.	2,7	5,4	6,8	8,1	9,6	10,8	12,0	13,5	16,2
		max.	3,6	7,2	10,2	10,6	13,5	13,8	16,7	17,0	20,6
	EIC-Modules 1310 ±50 nm and 1550 +50 nm/-100 nm	min.	2,6	5,2	6,5	7,8	9,2	10,4	11,6	13,0	15,6
		max.	3,7	7,4	10,3	10,7	13,7	14,0	16,5	17,2	20,8
	FIC-Modules 1310 ±50 nm and 1550 ±100 nm	min.	2,5	5,0	6,2	7,5	8,8	10,0	11,2	12,5	15,0
		max.	3,8	7,6	10,4	10,8	13,8	14,1	16,7	17,4	21,0
Thermal stability (-25 °C to +70 °C)		[dB]	±0,3	±0,4	±0,4	±0,5	±0,5	±0,5	±0,5	±0,5	±0,5
Min. Directivity [3]		[dB]	55								
Min. Return Loss [3]		[dB]	55								
Max. Polarization Dependent Loss [4]		[dB]	0,3								

[1] For other configurations please ask. [2] incl. wavelength, temperature and polarization dependence
[3] without connectors , [4] measured at central wavelengths of wavelength ranges

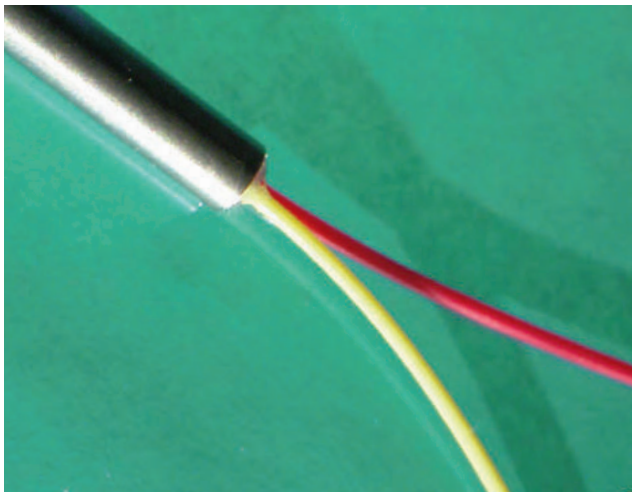
Standard housing options

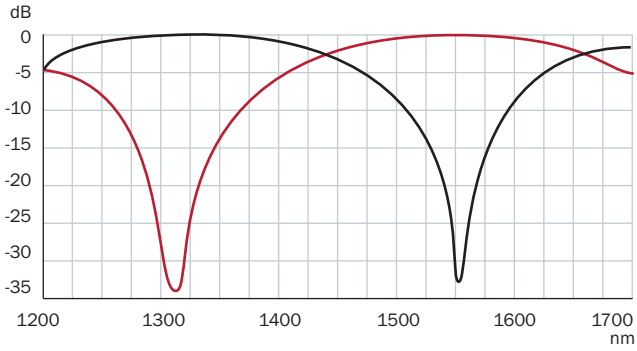
Size	Description	Dimensions [mm]	Configurations	Interface type
10	Standard modul	92 x 9,5[1] x 155	up to 66 ports	tube or cable
19	19“ 1 HU Fiberbox	483 x 44 x 262	up to 33 ports	mating adapters at front
30	19“ 3 HE 7 DU closed	35,6 x 128,5 x 160	up to 9 ports	mating adapters at front
31	19“ 3 HE 7 DU compact	35,1 x 128,9 x 224	up to 12 ports	mating adapters at front
40	smal table top size	135 x 40 x 185	up to 6 ports	mating adapters at front
41	large tabel top size	135 x 80 x 185	up to 10 ports	mating adapters at front
50	ETS 2 SU Variobox	533 x 50 x 152	up to 25 ports	mating adapters at front

[1] Height depends on configuration and pigtail type.

Singlemode Coupler WWDM

For application at 1310 nm and 1550 nm





Wavelength dependence of WWDM with central wavelengths 1310 nm and 1550 nm

Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation.
WWDMs are manufactured using the Fused Biconical Taper technology (FTB) and are pure fiber-optic components.
WWDMs are multiplexers or demultiplexers for separating or combining signals whose wavelengths are in different optical windows.

Features

- Low insertion loss and low excess loss
- Multiplexing and demultiplexing of 1310 nm and 1550 nm
- High return loss, i.e. no reflection-related interference with the transmitter for analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmissions and monitoring systems

Designs

- Supplied in various housing sizes with primary coated fibres, with buffered tube pigtails or reinforced cable pigtails
- WWDMs are also available as coupling modules with different isolation levels
- All connector standard types are available

For check lists and additional ordering information for our products visit our website or see separate data sheets.

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Optical parameter

Type	Narrowband-WDM				Wideband-WDM			
Standard WWDM 1310/1550								
Wavelength Range [nm]	1310/1550 ±20				1310/1550 ±40			
Possible form factors	size 02, size 03, size 04, size 05, size 06							
Min. Isolation [dB]	15				10			
Max. Insertion Loss [dB]	0,7				0,8			
Min. Directivity [dB]	55 for 1x2, 60 for 2x2							
Min. Return Loss [dB]	55 for 1x2, 60 for 2x2							
Polarisation Dependent Loss (1,2) [dB]	typical 0,1							
WWDM 1310/1550 modules								
Wavelength Range [nm]	1310/1550 ±20				1310/1550 ±40			
Possible form factors	size 10 and above							
Min. Isolation [dB]	15	30	40	50	10	18	25	30
Max. Insertion Loss [dB]	0,8	1,5	2,0	2,5	1,0	1,7	2,4	3,1
Min. Directivity [dB]	55							
Min. Return Loss [dB]	55							
Polarisation Dependent Loss (1,2) [dB]	typical 0,1							

(1) of Insertion Loss, max. 0,2 dB (2) measured at 1310 nm and 1550 nm

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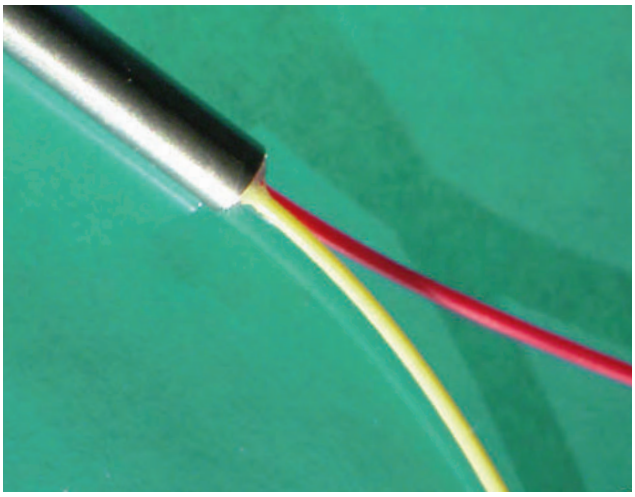
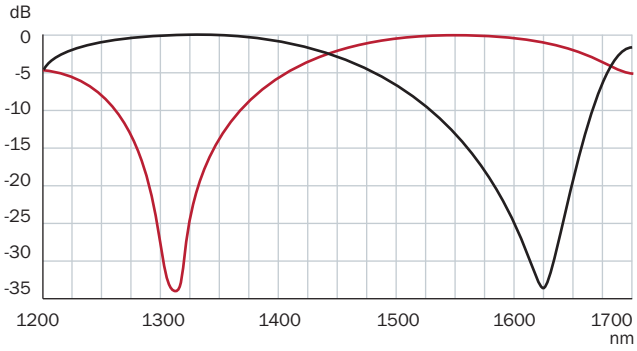
Components ▶ Couplers ▶ Singlemode Couplers ▶ Wavelength-selective Couplers (WWDM) ▶

Singlemode Coupler WWDM

For application at 1310 nm and 1625 nm





Wavelength dependence of WWDM with central wavelengths 1310 nm and 1625 nm

Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation.
WWDMs are manufactured using the Fused Biconical Taper technology (FTB) and are pure fiber-optic components.
WWDMs are multiplexers or demultiplexers for separating or combining signals whose wavelengths are in different optical windows.

Features

- Low insertion loss and low excess loss
- Multiplexing and demultiplexing of 1310 nm and 1625 nm
- High return loss, i.e. no reflection-related interference with the transmitter for analogue systems
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications

Applications

- Public and private fibre-optic networks
- Measurement systems and test equipment
- Optical transmissions and monitoring systems

Designs

- Supplied in various housing sizes with primary coated fibres, with buffered tube pigtails or reinforced cable pigtails
- WWDMs are also available as coupling modules with different isolation levels
- All connector standard types are available

For check lists and additional ordering information for our products visit our website or see separate data sheets.

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DBE-COM-0088V003

Optical parameter

Type	Narrowband-WDM			Wideband-WDM		
Standard WWDM 1310/1625						
Wavelength Range [nm]	1310/1625 ±20			1310/1625 ±40		
Possible form factors	size 02, size 03, size 04, size 05, size 06					
Min. Isolation [dB]	16			12		
Max. Insertion Loss [dB]	0,7			0,8		
Min. Directivity [dB]	55 for 1x2, 60 for 2x2					
Min. Return Loss [dB]	55 for 1x2, 60 for 2x2					
Polarisation Dependent Loss (1,2) [dB]	typical 0,1					
WWDM 1310/1625 modules						
Wavelength Range [nm]	1310/1625 ±20			1310/1625 ±40		
Possible form factors	size 10 and above					
Min. Isolation [dB]	16	28	40	12	20	30
Max. Insertion Loss [dB]	0,8	1,5	2,0	1,0	1,7	2,4
Min. Directivity [dB]	55					
Min. Return Loss [dB]	55					
Polarisation Dependent Loss (1,2) [dB]	typical 0,1					

(1) of Insertion Loss, max. 0,2 dB (2) measured at 1310 nm and 1625 nm

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Components ▶ Couplers ▶ Singlemode Couplers ▶ SM for Special Wavelengths ▶

SM Short Wavelength Coupler (SWC)

For the wavelength range from 460 nm to 1060nm

Singlemode Short Wavelength Couplers (SWC) are passive optical devices which allow the distribution and combination of signals of wavelength below classical wavelengths of telecommunication.
The couplers are manufactured on the basis of an advanced Fused Biconal Taper (FBT) technology for a wavelength range from 400 nm to 1100 nm to provide optimum performance.

Features

- Low insertion loss and extremely low excess loss.
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 1% or as symmetrical coupler with coupling ratio of 50% .
- High thermal, mechanical and enviromental stability to meet the requirements of Telcordia GR-1209 / GR-1221.
- Option of manufacture to customer specifications.

Applications

- Public and private fibre-optic networks.
- Measurement systems and test equipment.
- Optical transmission and monitoring systems.

Models

- Supplied in various housing sizes with bare fibre pigtails, loose buffered tube pigtails or reinforced cable pigtails.
- Couplers with more than two outlets are available as truely fused components with up to four fibres or as coupler modules.
- All connector standard types are available.

For a list of all models including dimensional specifications see the data sheets Coupler Models; Overview of Short and Standard Versions.
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Optical parameter without connectors for 1x2 and 2x2 configurations

Wavelength[3] [nm]		488		533, 650, 760		850, 980, 1060	
Output port		O 1	O 2	O 1	O 2	O 1	O 2
Max. Insertion Loss [1,2][dB] with Coupling Ratio	50/50 %	3,9	3,9	3,8	3,8	4,0	4,0
	60/40 %	3,0	5,0	2,9	4,9	3,1	5,1
	67/33 %	2,5	5,9	2,4	5,8	2,6	6,0
	70/30 %	2,3	6,5	2,2	6,4	2,4	6,6
	80/20 %	1,6	8,4	1,5	8,3	1,7	8,5
	90/10 %	1,1	12,0	1,0	11,9	1,2	12,1
	95/05 %	0,8	16,5	0,7	16,4	0,9	16,6
	99/01 %	0,5	23,5	0,4	23,4	0,6	23,6
Min. Directivitiy [dB]		55 for 1x2, 60 for 2x2 [4]					
Min. Return Loss [dB]		55 for 1x2, 60 for 2x2 [4]					

[1] includes fiber attenuation for pigtail lengths up to 1m
[2] attenuation increases by 0.2dB for 2x2 configuration
[3] couplers for other wavelengths on request
[4] measured at 1310 nm

Optical parameter without connectors for 1x3, 2x3 and 3x3 configurations

Wavelength[3] [nm]		488			533, 650, 760			850, 980, 1060		
Output port		O 1	O 2	O 3	O 1	O 2	O 3	O 1	O 2	O 3
Max. Insertion Loss [1,2][dB] with power splitting	90/05/05 %	1,1	17,5	17,5	1,0	17,4	17,4	1,2	17,6	17,6
	80/10/10 %	1,8	13,1	13,1	1,7	13,0	13,0	1,9	13,2	13,2
	70/15/15 %	2,4	10,3	10,3	2,3	10,2	10,2	2,5	10,4	10,4
	60/20/20 %	3,1	8,6	8,6	3,0	8,5	8,5	3,2	8,7	8,7
	50/25/25 %	4,0	7,4	7,4	3,9	7,3	7,3	4,1	7,5	7,5
	40/30/30 %	5,0	6,5	6,5	4,9	6,4	6,4	5,1	6,6	6,6
	33/33/33 %	5,9	5,9	5,9	5,8	5,8	5,8	6,0	6,0	6,0
	30/35/35 %	6,5	5,7	5,7	6,4	5,6	5,6	6,6	5,8	5,8
	20/40/40 %	8,6	5,0	5,0	8,5	4,9	4,9	8,7	5,1	5,1
	10/45/45 %	13,1	4,5	4,5	13,0	4,4	4,4	13,2	4,6	4,6
Min. Directivity [dB]		55 for 1x3 and 2x3, 60 for 3x3 [4]								
Min. Return Loss [dB]		55 for 1x3 and 2x3, 60 for 3x3 [4]								

[1] includes fiber attenuation for pigtail lengths up to 1m
[2] attenuation increases by 0.3dB for 2x3 and 3x3 configurations
[3] couplers for other wavelengths on request
[4] measured at 1310 nm

Optical parameter without connectors for 1x4, 2x4, 3x4 and 4x4 configurations

Wavelength[3] [nm]	488				533, 650, 760				850, 980, 1060			
Output port	O 1	O 2	O 3	O 4	O 1	O 2	O 3	O 4	O 1	O 2	O 3	O 4
Max. Insertion Loss [1,2][dB] with equal power splitting	7,1	7,1	7,1	7,1	7,0	7,0	7,0	7,0	7,2	7,2	7,2	7,2
Min. Directivity [dB]	55 for 1x4 and 2x4 and 3x4, 60 for 4x4 [4]											
Min. Return Loss [dB]	55 for 1x4 and 2x4 and 3x4, 60 for 4x4 [4]											

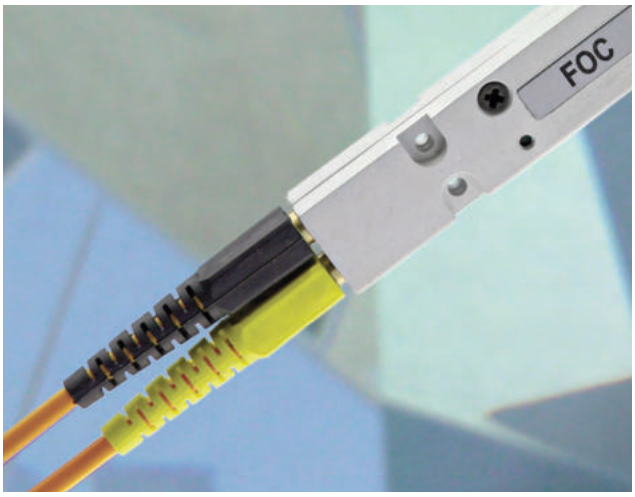
[1] includes fiber attenuation for pigtail lengths up to 1m
[2] attenuation increases by 0.2dB for 2x4, 3x4 and 4x4 configurations
[3] couplers for other wavelengths on request
[4] measured at 1310 nm

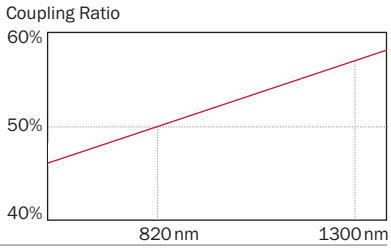
For a complete overview of components visit our website at **www.foc-fo.com**.

Components ► Couplers ►

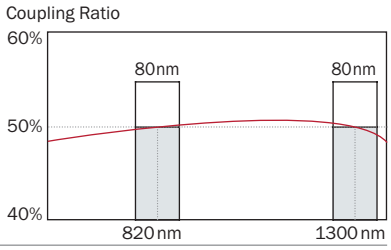
Multimode Couplers (MMC)

For the wavelength range 820 ±40 nm, 1300 ±40 nm, 780-1340 nm





Wavelength dependence of coupling ratio of a symmetrical multimode coupler for the first optical window



Wavelength dependence of coupling ratio of a symmetrical wavelength independent multimode coupler

Multimode couplers are passive optical devices which allow the distribution and combination of optical signals. They are used in private fibre-optic networks as nodes in data transmission networks. Further fields of application are measurement set-ups, measuring instruments, sensor- and automation systems.
The couplers are manufactured on the basis of a combination of etching technology and the Fused Biconical Taper (FBT) principle. They are pure fibre-optic components featuring.

Features

- Low insertion loss and excess loss, i.e. extremely low loss within the established fibre-optic network
- Free choice of coupling ratio, e.g. as tap coupler with a coupling ratio of 5% or as symmetrical coupler with 50%
- Extremly low wavelength dependence of the coupling ratio
- High thermal and mechanical stability
- Optimal solution for each individual application with respect to optical and mechanical characteristics
- Option of manufacture to customer specifications

Designs

- The couplers are supplied in various sizes with fibres, loose buffered fibres or cables.
- The standard fibre length is 2 m each side.
- All versions are available in 1x2 or 2x2 configuration.
- Couplers with more than two outlets are available as coupler modules.
- Standard fibre types are graded-index fibres with core diameters of 50µm or 62.5µm.
- On request couplers with different fibres, e.g. step index fibres or large core fibres, are available.

Multimode coupler types

Multimode couplers for the first optical window
These couplers are optimised for the first optical window and guarantee constant optical parameters for 820 ±40 nm.

Multimode couplers for the second optical window
These couplers are optimised for the second optical window andguarantee constant coupling ratio and insertion loss acrossthe wavelength range from 1260 nm to 1340 nm.

Wavelength Independent Multimode Couplers
Wavelength independent multimode couplers are optimized for the first and the second optical window. They guarantee constant optical parameters and are suitable to work over the full wavelength range from 780 nm to 1340 nm.

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Specifications

Wavelength range		820 ± 40 nm / 1300 ± 40 nm / 820 - 40 nm to 1300 + 40 nm	
Class		1	
Output		Out 1	Out 2
Maximum insertion loss (dB) with coupling ratio	50/50 %	4,0	4,0
	55/45 %	3,6	4,5
	60/40 %	3,1	5,1
	65/35 %	2,8	5,8
	67/33 %	2,6	6,0
	70/30 %	2,4	6,6
	75/25 %	2,1	7,5
	80/20 %	1,8	8,8
	85/15 %	1,5	10,5
	90/10 %	1,3	13,6
	95/05 %	0,9	16,6

Designs

Size	Description	Fibre type	Dimensions [mm]	Configurations	Pigtail
02	⌀ 0,9mm tube size	all	3,8 (⌀) x 76	1x2, 2x2	⌀ 0,9mm loose tube
03	3mm standard size	all	13 x 9,5 x 95	1x2, 2x2	reinforced cable
04	Standard size	all	2,9 (⌀) x 55	1x2, 2x2	Primary coated fibre
05	⌀ 0,9mm block size	all	10 x 6 x 76	1x2, 2x2	⌀ 0,9mm loose tube
06	3mm compact size	all	12,8 x 9,2 x 80	1x2	reinforced cable
10	Standard module	all	92 x 9,5[1] x 155	up to 66 ports	tube or cable

[1] High depends on configuration

Parameters for couplers from other fibres on request.

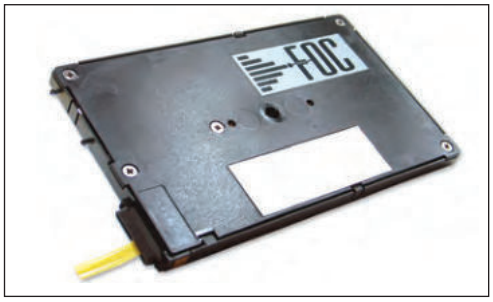
For couplers with connectors the above insertion loss values must be increased (see separate data sheet).

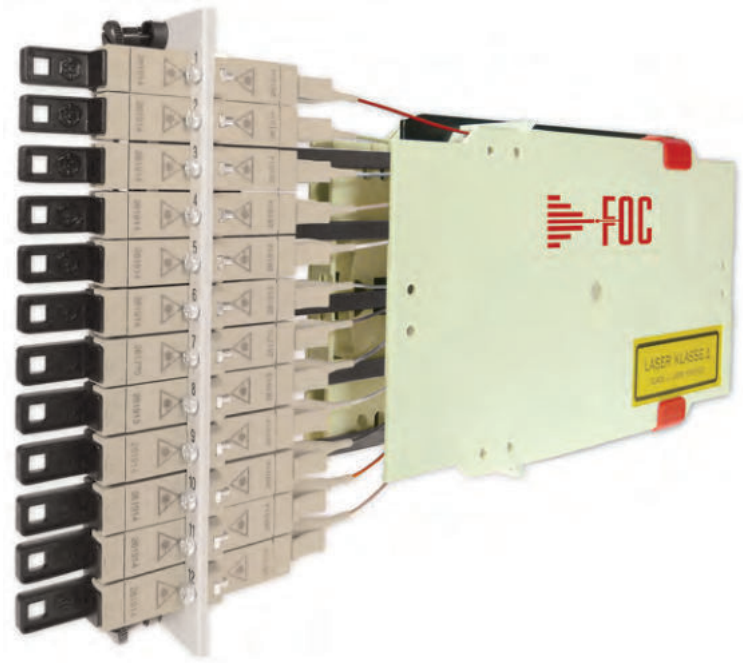
For a complete overview of components visit our website at **www.foc-fo.com**.

Components ▶ Couplers ▶ Multimode Couplers ▶

Multimode Coupler Modules

For the wavelength range 820 ± 40 nm, 1300 ± 40 nm, 780 - 1340 nm





Optical couplers modules are passive optical devices which allow the distribution and combination of optical signals. They are used in private fibre-optic networks as nodes for data transmission. Further fields of application are in measurement set-ups, sensor and automation systems.
Coupler modules consist of a set of different or identical fusion couplers which are manufactured on the basis of a combination of etching technology and the Fused Biconical Taper (FBT) principle.
Coupler modules are specially designed for installation into racks and distribution frames, but also for measurement setups in laboratories. They can be used in all places where extreme mechanical and climatic stability with ease of operation are required.

Features

- Low insertion loss and excess loss, i.e. extremely low loss within the established fibre-optic network
- High return loss, i.e. no reflections interfering with the transmitter in analogue systems
- High thermal and mechanical stability
- Available in various designs, i.e. optimal solutions for each individual application with respect to optical and mechanical characteristics (s. table “Designs“)
- Free choice of configurations: The common configurations are described in the “Optical Specifications“ chart. Additional configurations (e.g. 1 x 7 or 1 x 11) can be provided on customer demand.
- Coupler Modules come in distinct types, wavelength selective or with broadband properties:

Multimode coupler modules types

Multimode coupler modules for the first optical window
These couplers are optimised for the first optical window and guarantee constant optical parameters for 820 ± 40 nm.

Multimode coupler modules for the second optical window
These couplers are optimised for the second optical window and guarantee constant power splitting and insertion loss across the wavelength range from 1260 nm to 1340 nm.

Wavelength independent multimode coupler modules
Wavelength independent modules are optimized for the first and second optical window. They guarantee constant optical parameters and are suitable to work over the full range from 780 nm to 1340 nm.

For check lists and additional ordering information for our products visit our website or see separate data sheets.

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Optical Specifications

Wavelength range: 820 ± 40nm, 1300 ± 40nm or 820 -40 nm to 13040 + 40 nm

Insertion loss Tree coupler modules (1 x N; 2 x N)	
Configuration	**Maximum insertion loss [dB]**
1 x 2	4,0
1 x 4, 2 x 4	8,0
1 x 6	11,0
1 x 8, 2 x 8	12,0
1 x 12	15,0
1 x 16, 2 x 16	16,0
1 x 32, 2 x 32	20,0

Insertion loss Star coupler modules (N x N)	
Configuration	**Maximum insertion loss [dB]**
2 x 2	4,0
4 x 4	8,5
8 x 8	12,5
16 x 16	16,5
32 x 32	20,5

For coupler modules with connectors or adapters the above insertion loss values must be increased. (see separate data sheet)

Parameters for coupler modules from other fibres or with other power distribution on request.

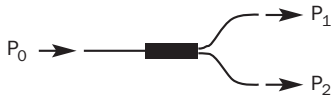
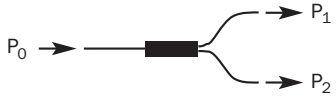
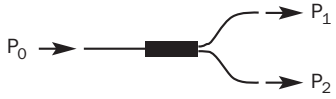
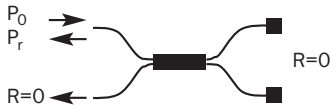
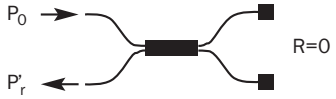
Designs

Size	Description	Dimensions [mm]	Configurations	Interface type
10	Standard modul	92 x 9,5[1] x 155	up to 66 ports	tube or cable
19	19“ 1 HU Fiberbox	483 x 44 x 262	up to 33 ports	mating adapters at front
30	19“ 3 HU 7 DU closed	35,6 x 128, 5 x 160	up to 9 ports	mating adapters at front
31	19“ 3 HU 7DU compact	35,1 x 128, 9 x 224	up to 12 ports	mating adapters at front
40	small table top size	135 x 40 x 185	up to 6 ports	mating adapters at front
41	large table top size	135 x 80 x 185	up to 10 ports	mating adapters at front
50	ETSI 2 SU Variobox	533 x 50 x 152	up to 25 ports	mating adapters at front

[1]High depends on configuration

Parameter
Multimode-Couplers

Definition of parameters for Multimode-Couplers and Multimode-Coupler-Modules

Term	Definition	Component	Calculation		Explation
Insertion Loss	Sum of coupling loss and excess loss	**MMC**	-10 log (P_1 / P_0) -10 log (P_2 / P_0)	[dB]	
		MMC-Modules	-10 log (P_i / P_0) (i = 1...n)	[dB]	
Coupling Ratio	Percentage division ratio of the optical performance at them outlets	**MMC**	[P_2 / (P_1+P_2)] x 100	[%]	
Splitting Ratio	Percentage division ratio of the optical signals to the outputs points	**MMC-Modules**	[P_i / Σ P_n] x 100	[%]	
Excess Loss	Power lost in the coupler	**MMC**	-10 log [(P_1 + P_2) / P_0]	[dB]	
Return Loss	Ratio of transmitted signal to reflected signal at one input or output	**MMC**	-10 log (P_r / P_0)	[dB]	
		MMC-Modules	-10 log (P_r / P_0)	[dB]	
Directivity	Proportion of transmitted signal which is reflected to the parallel fibre on the same side	**MMC**	-10 log (P'_r / P_0)	[dB]	
		MMC-Modules	-10 log (P'_r / P_0)	[dB]	

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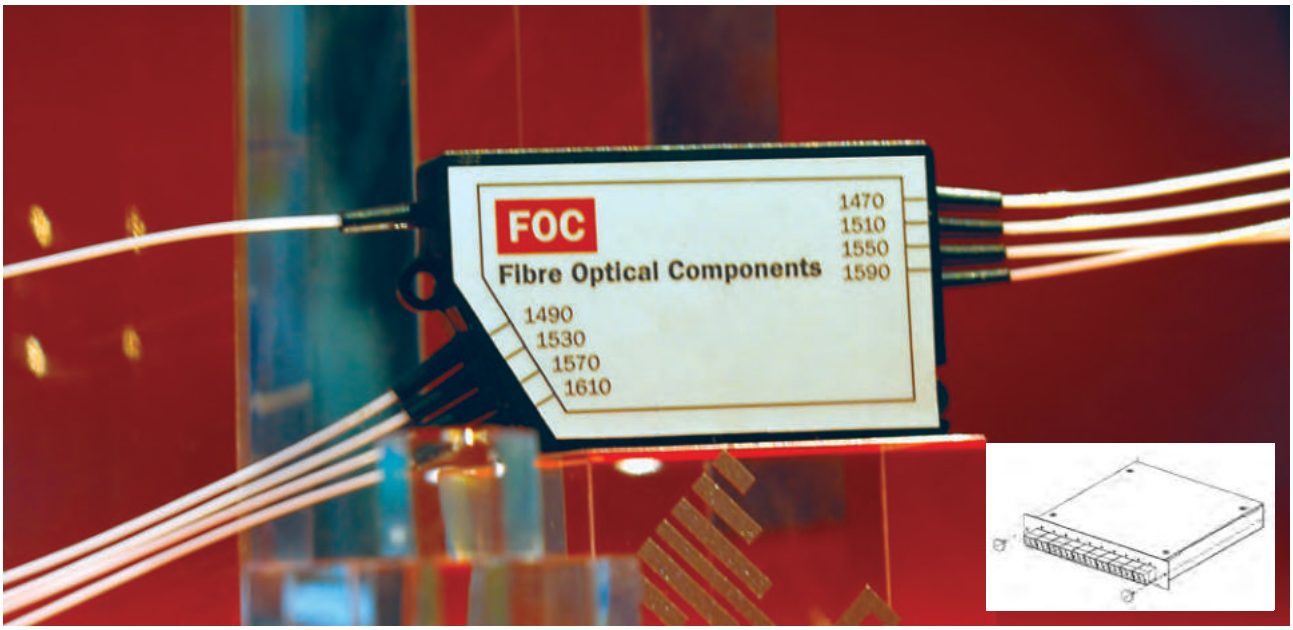
Components ▶ Filter ▶ CWDM ▶

Mini-CWDM Module



Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation.
The FOC Mini CWDM modules are based on the TFF technology. They integrate up to 8 CWDM channels and one optional extension port. The modules are based on a complex and stable internal structure drastically reducing their footprint in comparison with other solutions. They combine excellent climatic stability, low attenuation and high long-term reliability in line with TELCORDIA requirements.

Features

- Low Insertion Loss and high channel isolation
- Compact basic design for optimum system integration
- High Return Loss
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications

Applications

- CWDM transmission systems
- Link monitoring
- Add-Drop-Multiplexing
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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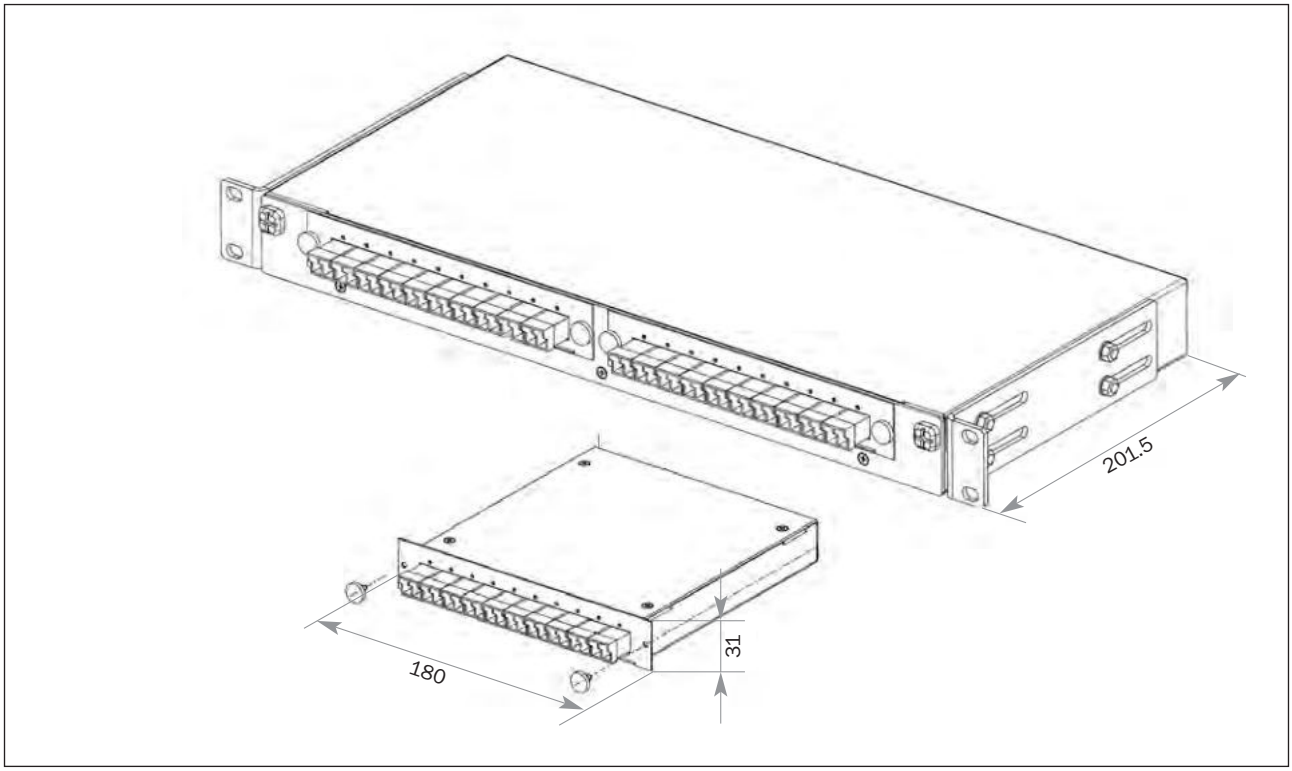
Optical parameter

	4-channel CWDM	4+1-channel CWDM	8-channel CWDM	8+1-channel CWDM
Parameter	**Value**		**Value**	
Center wavelength CWDM channels[1] [nm]	custom-made		custom-made	
Channel spacing CWDM channels [nm]	20		20	
Bandwidth CWDM channels [nm]	≥13		≥13	
Max. Insertion Loss CWDM channels[2,4] [dB]	1,0		1,5	
Max. Insertion Loss Upgrade channel[4] [dB]	-	1,0	-	1,5
Min. Isolation CWDM channels [dB]	30		30	
Min. Isolation Upgrade channel [dB]	-	30	-	30
Max. Ripple CWDM channels [dB]	0,3		0,3	
Min. Return Loss [dB]	45		45	
Max. Polarisation Dependent Loss (PDL) [dB]	0,2		0,2	
Max. Input Power [mW]	500		500	
Temperature Range [°C] Operation[3] Storage/Transportation	-20 to +70 -40 to +85		-20 to +70 -40 to +85	
Temperature Dependent Loss (TDL) [dB/°C]	≤0,005		≤0,005	
Thermal wavelength change [nm/°C]	≤0,003		≤0,003	

(1) All center wavelengths according to ITU-T G.694.2 (CWDM grid) available
(2) Typical 0.8dB for 4- and 4+1-channel CWDM / typical 1dB for 8 and 8+1-channel CWDM
(3) For 900µm solid core optical fiber pigtails, value depending on pigtail design
(4) Without connectors

Dimensions



Components ▶ Filters

CWDM

General Information

Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation. CWDM are multiplexer and/or demultiplexer which are used to combine or separate signals with a center wavelength spacing of 20nm. By using up to 18 separate transmission channels CWDMs support the cost-efficient multiplication of the transmission capacity over an optical fiber.

Features

- Low insertion loss and high isolation
- High return loss
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications

Applications

- CWDM transmission systems
- Link monitoring
- Add-Drop-Multiplexing
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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Optical parameters for standard CWDM filters[1]		1- channel CWDM	4- channel CWDM	8- channel CWDM	16- channel CWDM	18- channel CWDM
Parameters		**Value**				
Center wavelength[2] [nm]		ITU -T G.694.2				
Channel spacing [nm]		20				
Bandwidth [nm]		≥13				
Max. Insertion Loss[3, 4] [dB]		0,6	3,0	3,8	5,3	6,0
Min. Isolation [dB]		30				
Max. Ripple [dB]		0,3				
Min. Return Loss [dB]		45				
Polarisation Dependent Loss (PDL) [dB]		0,1	0,2	0,2	0,2	0,2
Temperature Range [°C]	Operation[5]	-20 to +70				
	Storage/Transportation	-40 to +85				
Temperature Dependent Loss (TDL) [dB/°C]		≤0,005	≤0,005	≤0,01	≤0,01	≤0,01
Thermal wavelength change [nm/°C]		≤0,003	≤0,003	≤0,005	≤0,005	≤0,005
Max. Input Power [mW]		500				

[1] Configurations with additional upgrade channel available

[2] All center wavelengths according to ITU-T G.694.2 (CWDM Grid) available

[3] Lower values for selected wavelength configurations available

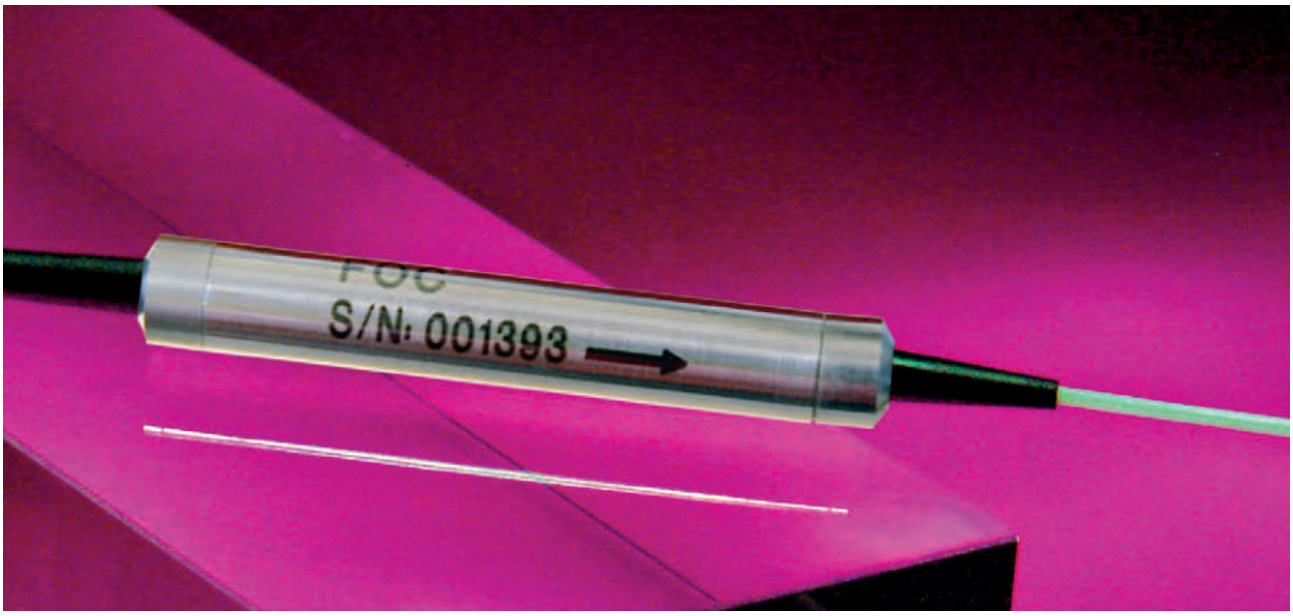
[4] Lower values at room temperature, exact values at room temperature on request

[5] Depending on pigtail type, values apply to pigtails in fibre and tide buffered type

For a complete overview of components visit our website at **www.foc-fo.com**.

Components ▶ Filter ▶

Triple-Play-WDM



Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bi-directional operation.
TriplePlay WDM are multiplexer or demultiplexer which are used to combine or seperate wavelengths which are standardized for the common transmission of data, voice and analogue CATV over one single fibre. The TriplePlay WDM are produced with an improved filter technology.

Features

- Low insertion loss and high channel isolation
- High return loss
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Compact design for easy system and customer modul integration

Applications

- Singlefibre PON systems
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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Subject to modifications
DBE-COM-0114V006

Optical Parameter

Parameter		Value
Wavelength Pass Band [nm] (1)		1550-1560
Wavelength Reflected Band [nm] (2)		1260-1360 & 1480-1500 & 1585-1660
Max. Insertion Loss Pass Band [dB] (3)		0,8
Min. Isolation Pass Channel [dB]		30
Typ. Isolation Pass Channel [dB]		35
Max. Ripple Pass Channel [dB]		0,3
Max. Insertion Loss Reflected Band [dB] (3)		0,8
Min. Isolation Reflected Channel [dB]		20
Typ. Isolation Reflected Channel [dB]		25
Min. Return Loss [dB]		55
Min. Power Stability [mW]		500
Temperature Range [°C]	Operation (4) Storage	-25/+70 -40/+85
Temperature Dependent Loss [dB/°C]		≤0,01
Thermal Wavelength Drift [nm/°C]		≤0,005

(1) 1550 nm - 1560 nm for CATV Downstream
(2) 1260 nm - 1360 nm for Data/Voice Upstream, 1480 nm - 1500 nm for Data/Voice Downstream
(3) without connector loss
(4) depending from pigtail type, values for tight buffered fibre

Components ▶ Filter ▶ OTDRWDM

OTDRWDM 1625

General Information

Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation. Bidirectional OTDR monitoring WWDM devices are used inside the network for combining and separating the traffic signals and the OTDR signals near the OTDR measuring location, e.g. in the central office. They can also be used inside the network for combining and separating the traffic signals and the OTDR signals at the premises near the optical network unit at the customer side.

Features

- Low insertion loss and high isolation
- High return loss
- High power resistance
- Option of manufacture to customer specifications
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Multiplexing and Demultiplexing of wavelength ranges lower than 1590 nm and higher than 1615 nm
- Fully comply with standard IEC 61753-089-2

Applications

- Uni- and bidirectional WDM transmission systems
- Public and private fibre-optic networks
- OTDR monitoring
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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DBE-COM-0203V002

Optical parameter

Parameter		Value
Wavelength Range 1 [nm]		1615 - 1635
Wavelength Range 2 [nm]		1260 - 1590
Max. Insertion Loss(1) [dB]		1,0
Min. Isolation [dB]		25
Max. Ripple [dB]		0,5
Min. Return Loss [dB]		50
Polarisation Dependent Loss (PDL) [dB]		0,1
Temperature Range [°C]	Operation(2)	- 20 to +70
	Storage/Transportation	- 40 to +85
Temperature Dependent Loss (TDL) [dB/°C]		≤ 0,0025
Max. Input Power [mW]		500

(1) Lower values at room temperature are available on request
(2) Depending from pigtail type, specified temperature range for tide buffered pigtails

Components ▶ Filter ▶ OTDRWDM

OTDRWDM 1650

General Information

Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation. Bidirectional OTDR monitoring WWDM devices are used inside the network for combining and separating the traffic signals and the OTDR signals near the OTDR measuring location, e.g. in the central office. They can also be used inside the network for combining and separating the traffic signals and the OTDR signals at the premises near the optical network unit at the customer side.

Features

- Low insertion loss and high isolation
- High return loss
- High power resistance
- Option of manufacture to customer specifications
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Multiplexing and Demultiplexing of wavelength ranges lower than 1620 nm and higher than 1645 nm
- Fully comply with standard IEC 61753-089-2

Applications

- Uni- and bidirectional WDM transmission systems
- Public and private fibre-optic networks
- OTDR monitoring
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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DBE-COM-0200V003

Optical parameter

Parameter		Value
Wavelength Range 1 [nm]		1280 - 1620
Wavelength Range 2 [nm]		1645 - 1655
Max. Insertion Loss(1) [dB]		1,0
Min. Isolation [dB]		25
Max. Ripple [dB]		0,5
Min. Return Loss [dB]		50
Polarisation Dependent Loss (PDL) [dB]		0,1
Temperature Range [°C]	Operation(2)	- 20 to +70
	Storage/Transportation	- 40 to +85
Temperature Dependent Loss (TDL) [dB/°C]		≤ 0,0025
Max. Input Power [mW]		500

(1) Lower values at room temperature are available on request
(2) Depending from pigtail type, specified temperature range for tide buffered pigtails

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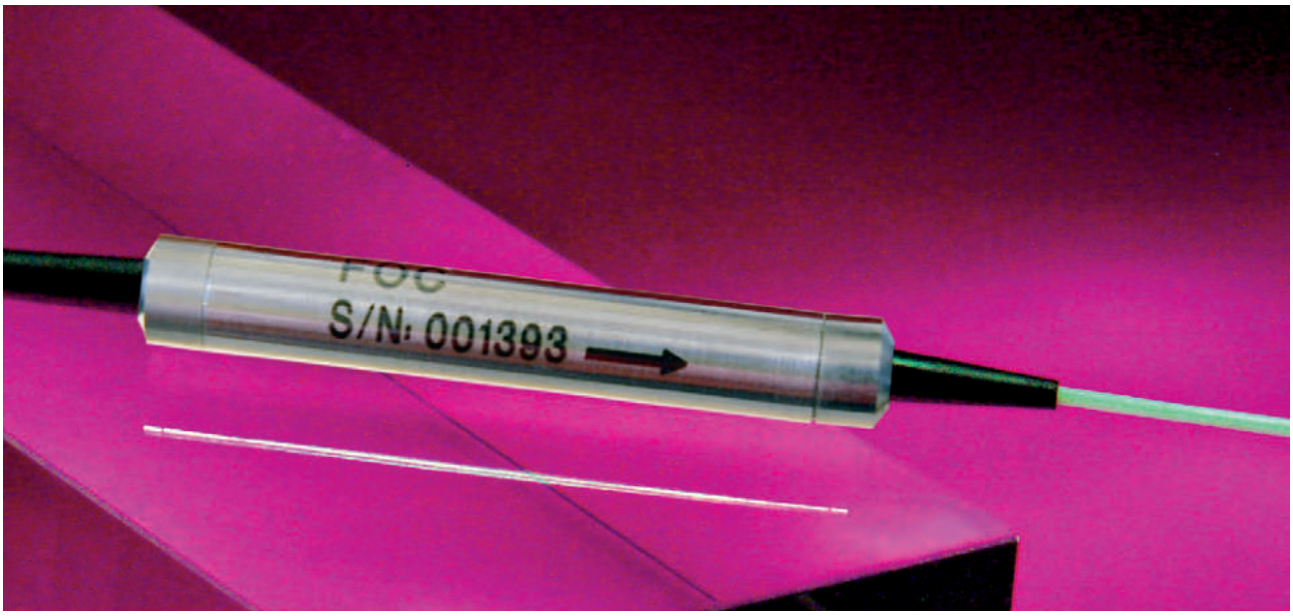
Components ▶ Filter ▶

FWDM



Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation.
FWDM are multiplexer or demultiplexer which are used to combine or seperate signals with wavelength from neighbouring optical windows. They are used as band-pass filters for CWDM systems and instead of fused WDM modules if high isolation and small dimensions are required.

Features

- Low insertion loss and high isolation
- High return loss
- High power resistance
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications
- Multiplexing and Demultiplexing of CWDM channels 1 to 8 and 11 to 18 and / or wavelength ranges around 1310 nm and 1550 nm.

Applications

- CWDM transmission systems
- Public and private fibre-optic networks
- Add-Drop-Multiplexing
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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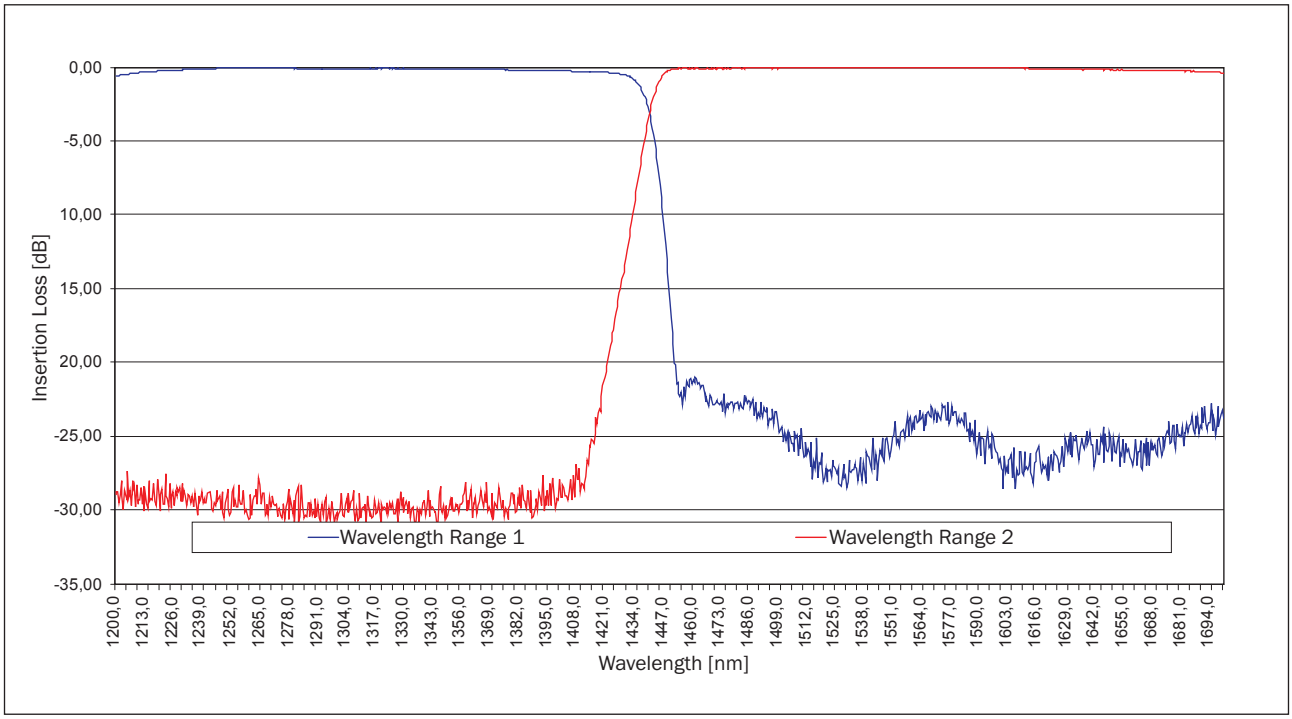
DBE-COM-0108V005

Optical parameter

Parameter	Value		
	Type A	Type E	Type F
Wavelength Range 1 (Pass) [nm]	1264.5 - 1417.5 (1)	1264.5 - 1417.5 (1)	1264.5 - 1380
Wavelength Range 2 (Refl) [nm]	1464.5 - 1617.5 (2)	1464.5 - 1617.5 (2)	1464.5 - 1617.5 (2)
Max. Insertion Loss (3) [dB]	1.0		
Min. Isolation Pass/Refl [dB]	25/20	20/25	25/25
Max. Ripple [dB]	0.3		
Min. Return Loss [dB]	55		
Polarisation Dependent Loss (PDL) [dB]	0.1		
Temperature Range [°C] Operation (4) Storage/Transportation	-20 to +70 -40 to +85		
Temperature Dependent Loss (TDL) [dB/°C]	≤0.0025		
Max. Input Power [mW]	500		

(1) ITU-T G.694.2 channels 1 to 8
(2) ITU-T G.694.2 channels 11 bis 18
(3) Lower values at room temperature are available on request
(4) Depending from pigtail type, specified temperature range for tide buffered pigtails

Insertion Loss/Isolation



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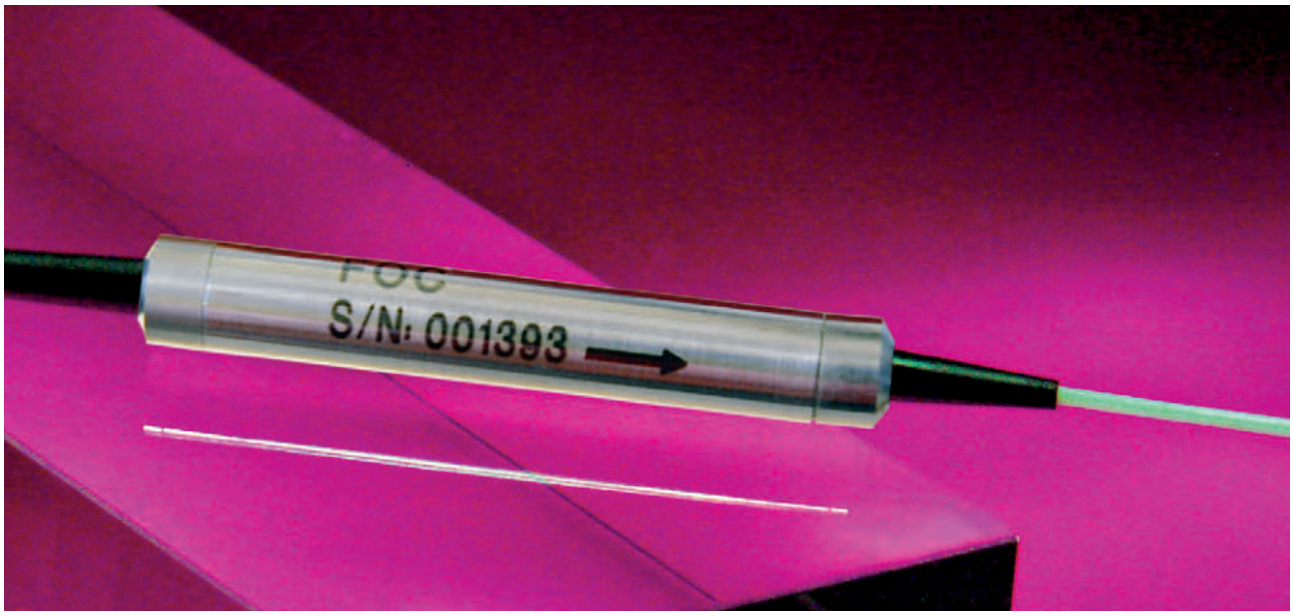
Components ▶ Filter ▶ HI FWDM ▶

HI FWDM 1310/1550



Wavelength Division Multiplexers or Demultiplexers (WDM) combine or separate optical signals with different wavelengths. They are passive optical components for uni- or bidirectional operation.
High Isolation Filter WWDM are multiplexer or demultiplexer which are used to combine or seperate signals with wavelength from neighbouring optical windows. They are used as band-pass filters and in high isolation WDM modules.

Features

- Low insertion loss and high isolation
- High return loss
- High power resistance
- High thermal, mechanical and environmental stability to meet the requirements of Telcordia GR-1209 and GR-1221
- Option of manufacture to customer specifications
- Multiplexing and Demultiplexing of CWDM channels and/or wavelength ranges around 1310 nm and 1550 nm.

Applications

- Uni- and bidirectional WDM transmission systems
- Public and private fibre-optic networks
- Add-Drop-Multiplexing
- Metropolitan networks
- CATV systems

Designs

- Supplied in various housing sizes with buffered tube pigtails or reinforced cable pigtails
- All connector standard types are available

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Optical parameter

Parameter		Value
Wavelength Range 1 [nm]		1280 - 1340
Wavelength Range 2 [nm]		1460 - 1620
Max. Insertion Loss (1) [dB]		1,0
Min. Isolation [dB]		45
Max. Ripple [dB]		0,5
Min. Return Loss [dB]		50
Polarisation Dependent Loss (PDL) [dB]		0,1
Temperature Range [°C]	Operation (2) Storage/Transportation	-20 to +70 -40 to +85
Temperature Dependent Loss (TDL) [dB/°C]		≤0,0025
Max. Input Power [mW]		500

(1) Lower values at room temperature are available on request
(2) Depending from pigtail type, specified temperature range for tide buffered pigtails

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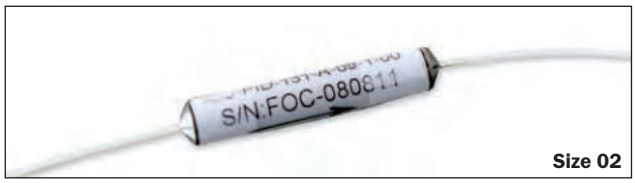
Components ▶ Filter ▶ Isolators ▶

Single- & Dual Stage Isolators

Size 09



Size 02

Isolators are direction-dependent passive optical components. They are used in fibre-optic transmission modules, transmission systems and other high-performance laser-based systems for protecting the lasers from backreflections.

Features

- High Isolation
- Low Insertion loss
- High Return Loss
- Epoxy-free optical path

Types

Isolators are available in single stage and dual stage versions.

Applications

- Fiber amplifier
- Public and private networks
- Measurement systems test equipment
- Optical transmission and monitoring systems

Models

- Different models are available with primary-coated fibres, with 900µm pigtails and cable pigtails
- Available without connectors or terminated with optical connectors

Size 02

Description	basic size
Type of fibre	SMF 28 E
Dimension	5,5 (⌀) x 30 mm
Pigtail	primary-coated fibre 900µm

Size 09

Description	3 mm standard
Type of fibre	SMF 28 E
Dimension	9,0 (⌀) x 80 mm
Pigtail	cable

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Parameters of Single Stage Isolators

Parameter		Premium	Standard
Wavelength (1) [nm]		1310 or 1550 or 1625	1310 or 1550 or 1625
Bandwidth (1) [nm]		± 15	± 15
Max. Insertion Loss (2) [dB]		0,5	0,7
Min. Isolation [dB]		32	30
Min. Return Loss (In/Out) [dB]		65/60	60/55
Max. Polarization Dependent Loss [dB]		0,05	0,1
Max. Polarization Mode Dispersion [ps]		0,2	0,25
Temperature Range [°C]	Operation Storage	-20 to + 70 -40 to + 85	-20 to + 70 -40 to + 85
Power resistance [mW]		500	500

(1) Other wavelengths and/or bandwidths on request
(2) Without connector loss, includes polarization, temperature and wavelength dependence

Parameters of Dual Stage Isolators

Parameter		Premium	Standard
Wavelength (1) [nm]		1310 or 1550 or 1625	1310 or 1550 or 1625
Bandwidth (1) [nm]		± 15	± 15
Max. Insertion Loss (2) [dB]		0,6	0,8
Min. Isolation [dB]		50	45
Min. Return Loss (In/Out) [dB]		65/60	60/55
Max. Polarization Dependent Loss [dB]		0,1	0,15
Max. Polarization Mode Dispersion [ps]		0,1	0,15
Temperature Range [°C]	Operation Storage	-20 to + 70 -40 to + 85	-20 to + 70 -40 to + 85
Power resistance [mW]		500	500

(1) Other wavelengths and/or bandwidths on request
(2) Without connector loss, includes polarization, temperature and wavelength dependence

For a complete overview of components visit our website at **www.foc-fo.com**.

Components ▶ Filter ▶

In-Line Attenuator

In-line attenuators are used for reducing the optical power in fiber-optic networks. On the one hand, this is necessary for many test setups, on the other hand some transmission systems require an adjustment of the fiber-optic attenuation to the system's dynamic. In-line attenuators are passive components which can be operated in both directions.
In many applications in-line attenuators present an optimum, cost-efficient alternative to the combined use of intermediate attenuation connectors and normal patchcords, and simultaneously reduce the number of required coupling locations.
The in-line attenuators are manufactured using an optimized Fused Biconical Taper (FBT) technology ensuring optimum performance parameters and high long-term stability.

Types

- **Single-Window In-Line Attenuators**
  are optimized for a defined wavelength, e. g. 1310 nm or a wavelength range within an optical window.
- **Dual-Window In-Line Attenuators**
  are optimized for predefined wavelength ranges in the second and third optical windows and guarantee a uniform attenuation there.
- **Triple-Window In-Line Attenuators**
  guarantee a uniform attenuation across several optical windows, e. g. for 1310 ± 50nm and 1550 ± 100nm.

Alternatively in-line attenuators are available for any wavelengths and wavelength ranges.

Applications

- telecom and data networks
- measuring units and systems and testing facilities
- transmit, receive and monitoring facilities of optical transmission systems

Models

- different models available with primary-coated fibers, with pigtails in fiber and cable designs
- available without connectors or terminated with optical connectors

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Optical parameter

		Single-Window Attenuator (ASW)	Dual-Window Attenuator (ADW)	Triple-Window Attenuator (ATW)
Wavelength (nm)		1310 ± 40 or 1550 ± 40	1310/1550 ± 40	1310 ± 50 and 1550 ± 100
Attenuation (1)	1 dB, 2 dB, 3 dB	± 0,30 dB	± 0,50 dB	± 0,70 dB
	4 dB, 5 dB	± 0,50 dB	± 0,70 dB	± 0,90 dB
	6 dB, 7 dB, 8 dB, 9 dB	± 0,70 dB	± 0,90 dB	± 1,10 dB
	10 dB	± 0,90 dB	± 1,10 dB	± 1,30 dB
	15 dB, 20 dB, 25 dB	± 1,00 dB	± 1,30 dB	± 1,50 dB
Temperature Dependent Loss (2)		± 0,1dB		
Polarisation Dependent Loss		on request, depending on attenuation value		
Return Loss (3)		> 55 dB		

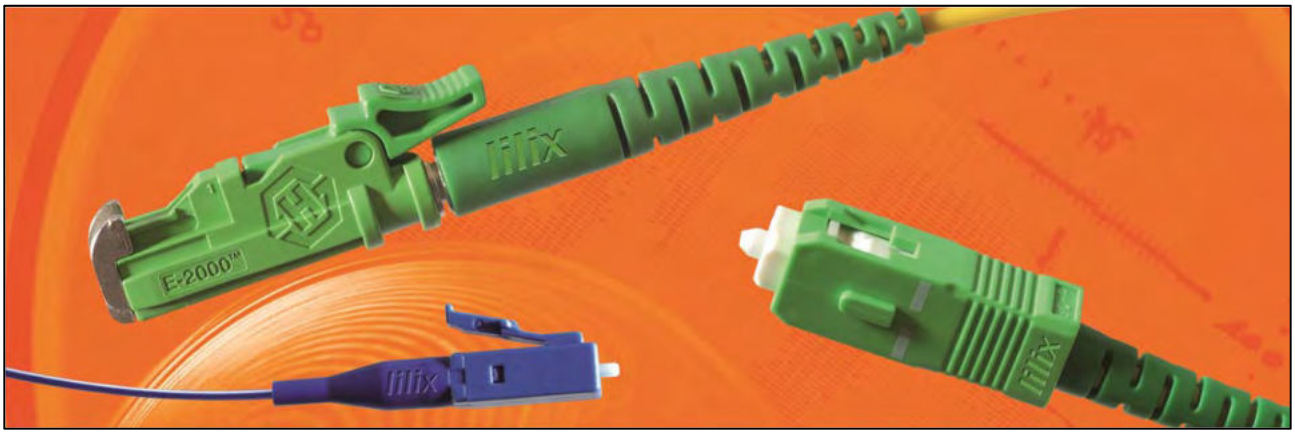
(1) incl. wavelength, temperature and polarization dependence, without connectors
(2) from -40 °C to +85 °C for Size 01, otherwise from -5 °C to +70 °C
(3) without connectors, measured at the window's central wavelength(s)

Reflectors

For a complete overview of components visit our website at www.foc-fo.de.

Components ► Reflecting devices ►

FTTx-Reflector 1625 nm



The lilix FTTx reflector for 1625 nm reflects all wavelengths from 1620 nm to 1700 nm. With its low insertion loss at the transmission wavelength range and high reflectance at the reflected wavelength range it is the ideal optical termination for link monitoring of FTTx networks via OTDR (optical time domain reflectometer) measurements at 1625 nm. FTTx reflectors are suitable for both point to point (PTP) and point to multipoint (PTMP) networks. They are preferably installed at the subscriber's homes in order to highlight these positions in the OTDR trace by distinct reflexions of the test signal.

Features
- High and homogenous reflectivity over the whole reflected wavelength range
- Low insertion loss and high return loss over the whole transmission wavelength range
- High power resistance

Applications
- Public and private fibre optic networks
- Termination of fibre optic lines

Styles
- Terminating connector (only for SC, LC or LSH connector standard)
- Pigtail or patchcord with integrated reflector
- Attenuator style (only for SC standard)
- Tube style

Optische Parameters

Parameter	Value		
	min.	typ.	max.
Transmission wavelength range [nm]		1260 - 1590	
Reflected wavelength range [nm]		1620 - 1700	
Insertion loss transmission wavelength range [dB](1)			0,5
Reflectivity for reflected wavelength range [%]	90	95	
Return loss for transmission wavelength range [dB]		26	30
Polarisation Dependent Loss (PDL) [dB]			0,15
Power stability [mW]	300	500	
Working temperature range [°C](2)	–25		85

(1) without connectors (2) depending from pigtail type and style

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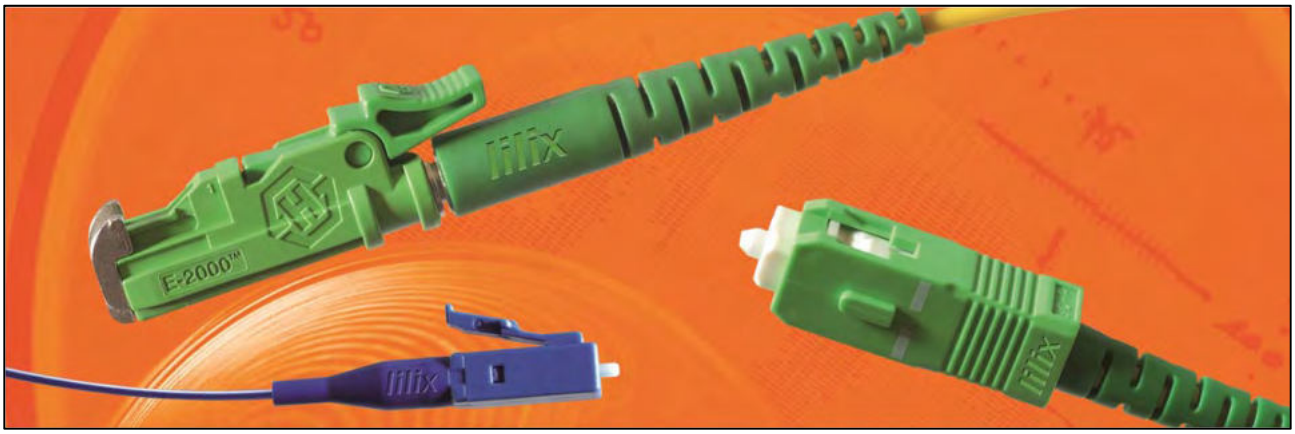
FTTx-Reflector 1650 nm



The lilix FTTx reflector for 1650 nm reflects all wavelengths from 1645 nm to 1700 nm. With its low insertion loss at the transmission wavelength range and high reflectance at the reflected wavelength range it is the ideal optical termination for link monitoring of FTTx networks via OTDR (optical time domain reflectometer) measurements at 1650 nm. FTTx reflectors are suitable for both point to point (PTP) and point to multipoint (PTMP) networks. They are preferably installed at the subscriber's homes in order to highlight these positions in the OTDR trace by distinct reflexions of the test signal.

Features
- High and homogenous reflectivity over the whole reflected wavelength range
- Low insertion loss and high return loss over the whole transmission wavelength range
- High power resistance

Applications
- Public and private fibre optic networks
- Termination of fibre optic lines

Styles
- Terminating connector (only for SC, LC or LSH connector standard)
- Pigtail or patchcord with integrated reflector
- Attenuator style (only for SC standard)
- Tube style

Optische Parameters

Parameter	Value		
	min.	typ.	max.
Transmission wavelength range [nm]	1260 - 1618		
Reflected wavelength range [nm]	1645 - 1700		
Insertion loss transmission wavelength range [dB](1)			0,5
Reflectivity for reflected wavelength range [%]	90	95	
Return loss for transmission wavelength range [dB]		26	30
Polarisation Dependent Loss (PDL) [dB]			0,15
Power stability [mW]	300	500	
Working temperature range [°C](2)	–25		85

(1) without connectors (2) depending from pigtail type and style

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OTDR-Reflector

The lilix OTDR reflector reflects the whole wavelength range from 1260 nm to 1700 nm with a reflectivity > 90 %. It was designed as a device for OTDR measurement and may be deployed at any point where the reflection of any signal within the wavelength range from 1260 nm to 1700 nm is (temporarily) required.

Features
- High and homogenous reflectivity over the whole wavelength range
- High power resistance

Applications
- Public and private fibre optic networks
- Termination of fibre optic lines
- Calibration standard

Styles
- Terminating connector (only for SC, LC or LSH connector standard)
- Terminating pigtail

Optical Parameters

Parameter	Wert		
	min.	typ.	max.
Wavelength Range [nm](1)		1260..1700	
Reflectivity [%]		90	
Reflectivity [dB]		0.2	0.5
Power stability [mW]	300	500	
Polarisation Dependent Loss (PDL) [dB]			0.15
Temperature Range during Operation [°C]	–5		60

(1) Other wavelengths on request.

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Accessories

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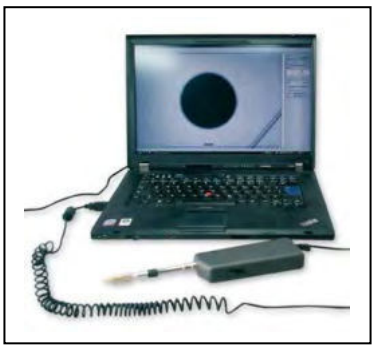
Accessories ▶ Measuring Tools ▶

Video Inspection Microscope



General Information

Damaged or contaminated connector end faces are the main cause for defects and faults in fiber-optic networks. Moreover, inspecting internal connectors in patch panels and active modules with conventional microscopes can be a very laborious work.
For the first time this video inspection microscope enables the inspection of single-and multi-fibre connectors. Power supply and image transfer are ensured via connection to the USB 2.0 interface of the PC or laptop, which runs the software for viewing the images and for automatic analysis of the connector end face quality according to IEC 61300-3-35.
Alternatively, the video inspection microscope is available with a portable handheld monitor so that it can also be used without a USB connection and power supply.

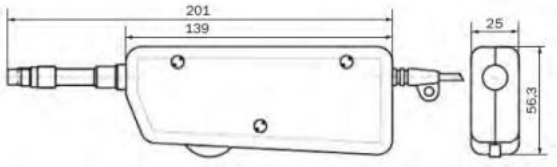
Features

- Suited for monoblock, compound and multi-fibre ferrules
- Compact handheld probe with focusing feature for optimum adjustment to different connectors and ferrule lengths
- Including software for viewing and capturing the images of the connector end face
- Software for automatic analysis of the surface quality according to IEC 61300-3-35 included in standard shipment, custom inspection criteria can be implemented
- Cost-effective solution for inspecting connectors with the help of universal adapter instead of connector specific adapter
- Portable handheld monitor available
- Universal adapter for 2.5mm (PC), 2.5mm (APC) and 1.25mm (PC) as well as other ferrule or polishing angles available
- Connector specific adapter for inspecting internal connectors in patch panels and active modules available

Standard Shipment

- Video microscope with USB cable
- Capture software and inspection software

Dimensions



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DBE-SER-0226V004

Specifications

General	
Camera Type	USB2.0 Monochrome
Sensor Type	1280 x 1024 Monochrome 1/2'' CMOS
Live Image	800 x 800, 28 fps default, 1280 x 1024, 14 fps full resolution
Field of View	0.4 x 0.4 mm; Resolution 1 micron
Optical Zoom	12.5 x
Light Source	Blue LED, wavelength 470 nm
Power Source	USB 2.0 port of a PC / with portable handheld monitor via integrated battery
Cable	USB 2.0
Temperature Range	+ 5 to + 35 °C
Housing material	aluminium
Nose material	stainless steel
Weight	330 g (0.73 lbs)
System Requirements	
Operating System	Windows 7, Windows 10
Processor	Pentium 4; 3 GHz or higher; HT or dual-core recommended
RAM	256 MB, recommended 384 MB
Hard Disk Space	5 MB for installation plus additional space for captured images
Video	24 bit True Color, 8 MB video memory
Hardware Interface	USB 2.0 Host Controller, recommended Intel integrated host controller, (VIA-based) USB controller is not recommended) at least one USB 2.0 port for connection

Uni-Adapter							
Scopio-SC/FC/ST-PC for SC, FC and ST connectors with a 2.5mm ferrule and PC end face		**Scopio-SC/FC/ST-APC** for SC, FC and ST connectors with a 2.5mm ferrule and APC end face		**Scopio-LC/MU-PC** for LC and MU connectors with a 1.25mm ferrule and PC end face		**Scopio-LC/MU-APC** for LC and MU connectors with a 1.25mm ferrule and APC end face	
Connector Specific Adapter							
Scopio-SC-APC-Adapter for SC/APC connectors with mating adapter		**Scopio-SC-PC-Adapter** for SC/PC connectors with mating adapter		**Scopio-FC-PC-Adapter** for FC/PC connectors with mating adapter		**Scopio-LC-PC-Adapter** for LC/PC connectors with a 1.25mm ferrule and mating adapter	
Scopio-LSH-Adapter for LSH connectors with mating adapter		**Scopio-LSH-HRL-Adapter** for LSH-HRL connectors with mating adapter		**Scopio-SMA2-Adapter** for SMA connectors with a 3.2mm ferrule		**Scopio-MPO-PC-Adapter** for MPO/PC connectors with mating adapter	
Scopio- MPO-APC-Adapter for MPO/APC connectors with mating adapter							

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Accessories ▶ Inspection & Cleaning ▶

Service and Cleaning Kit

Cleanliness is a basic precondition for a flawless operation of optical transmission systems. An optimum inspection of the fibre end-face is the best way to identify the causes of performance degradation. Fibre-optic connectors are carefully cleaned prior to shipment. However, after several matching cycles or in case of malfunctions re-cleaning might become necessary. The FOC Service and Cleaning Kit contains everything you need for a professional cleaning of connector end-faces and coupling sleeves.

Contents

- 1x plastic hardcase with document pockets in the cover
- Cleaning brush
- Adapter cleaning brushes
- Container for cleaning liquid (alcohol)
- Cleaning tools for connector surfaces, including second cleaning tape
- Kimwipe cleaning cloths
- Compressed air, CFC-free
- Cleaning adapter LSH (Class A)
- Connector body LSH (Class A)
- Connector cleaning instructions

Options

- FOC Fiberchecker, incl. special cable for non-contact signal injection
- FOC universal handheld microscope (magnification: 200x), incl. universal connector socket for 1.25 mm and 2.5 mm ferrules

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Accessories ▶ Measuring Tools ▶

Launch Cord Kit

General Information

When performing device-independent OTDR measurements for checking fibre-optic links, launch cords and/or tail cords are required to bridge the device's dead zones and to comply with IEC measurement specifications. For most OTDRs a launch cord is the only possibility to include the first connector in the measurement. By connecting a tail cord the connector at the end of the link under test is additionally included. Tester manufacturers recommend different lengths for launch and tail cords in order to avoid ghost reflections.

Features

- Compact rigid two-piece PVC carrying case, blue colour (275 x 225 x 80 mm)
- Can accommodate up to 3 fibres
- The desired fibres are rolled-up stress-free, tied and stored slip-proof in one half of the case with a strain-relieving cable clamp
- The impact-resistant cover of the case half is screwed on and labelled with the respective fibre type
- The led-out fibre end is 2,5 m long and protected using a hollow cable
- A lateral flexible cable feedthrough allows closing the Launch Cord Kit while performing the measurement on site
- A closeable plastic box in the second half of the case accommodates small parts (adapters, etc.)
- Connectorized fibre ends can be neatly stored
- The scope of delivery includes a measurement report with graphical chart: Singlemode fibres measured from both ends and at 2 wave lengths (1310 nm and 1550 nm), Multimode fibres measured from one end and at 2 wavelengths (850 nm and 1310 nm)
- Additional customized measurements available, cleaning instructions for connectors and connector end-faces as well as an adjustable carrying strap for the Launch Cord Kit

Available Connector Systems

- LSH - HRL/LSH (Class A)
- LC - PC/APC (Class A)
- SC - PC/APC (Class A)
- DIN - (LSA) - PC/APC
- FC - PC/APC
- ST, MTRJ or FSMA

Fibre Types

- E9/125 G.652.D/G.657.A1 1000 m standard length
- G50/125 Multimode OM3 100 m standard length
- G50/125 Multimode OM4 100 m standard length
- G62,5/125 Multimode OM1 100 m standard length
- Other fibre types and lengths on request

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Singlemode Fibre

Specification		Fibre Type E9/125 (Singlemode)
Fibre Category		G.652.D/G.657.A1
Attenuation	1300 nm	≤ 0,36 dB/km
	1550 nm	≤ 0,22 dB/km
Dispersion	1285 – 1330 nm	< 3,5 ps/(nm x km)
	1550 nm	< 19 ps/(nm x km)
Cladding Diameter		125 ± 1 µm
Coating Diameter		245 ± 10 µm
Cutoff Wavelength		< 1260 nm
Core-Cladding Offset		≤ 0,8 µm
Cladding Eccentricity		< 1,0 %

Graded-Index Fibres

Specification		Fibre Type 50/125	Fibre Type 62,5/125
Fibre Category		OM3	OM1
Core Diameter		50 ± 2 µm	62,5 ± 2 µm
Numerical Aperture		0,200 ± 0,02	0,275 ± 0,015
Typ. Attenuation	850 nm	2,8 dB/km	3,0 dB/km
	1300 nm	0,7 dB/km	1,0 dB/km
Min. Bandwidth	850 nm	500 MHz x km	200 MHz x km
	1300 nm	800 MHz x km	500 MHz x km
Cladding Diameter		125 ± 1 µm	
Coating Diameter		245 ± 10 µm	
Core Eccentricity		< 5 %	
Core-Cladding Offset		< 3,0 µm	
Cladding Eccentricity		< 2,0 %	

Specification		Fibre Type 50/125
Fibre Category		OM4
Core Diameter		50 ± 2 µm
Numerical Aperture		0,200 ± 0,02
Typ. Attenuation	850 nm	2,5 dB/km
	1300 nm	0,5 dB/km
Min. Bandwidth	850 nm	1500 MHz x km
	1300 nm	500 MHz x km
Cladding Diameter		125 ± 1µm
Coating Diameter		245 ± 10µm
Core Eccentricity		< 5 %
Core-Cladding Offset		< 3,0 µm
Cladding Eccentricity		< 2,0 %

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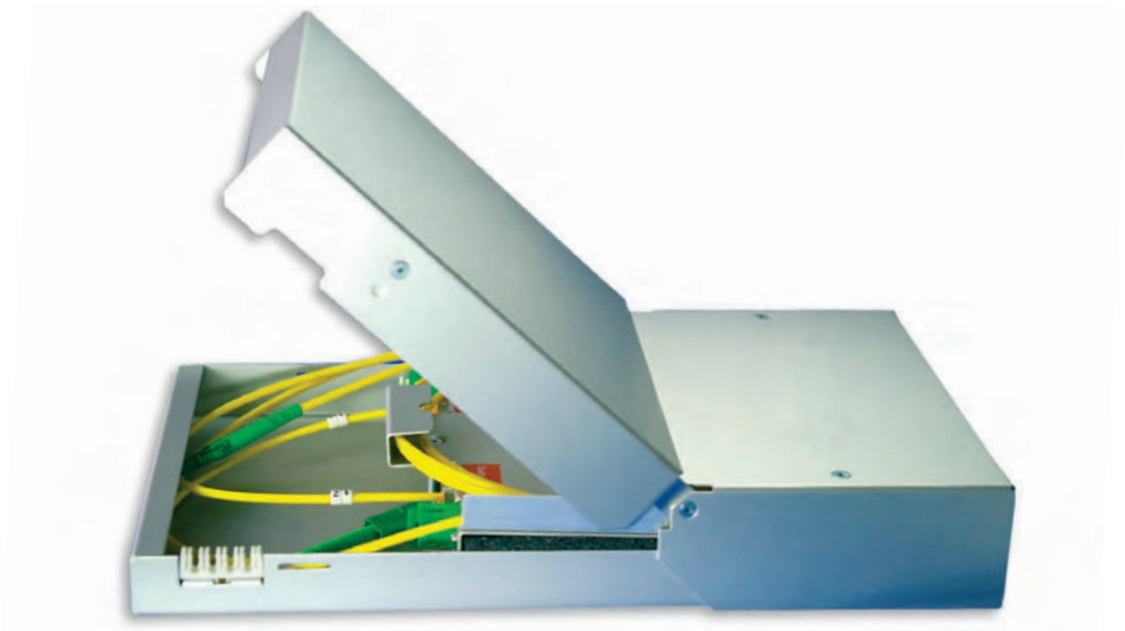
Accessories ▶ Measuring tools ▶

Launch Fibre Box Light



When performing device-independent OTDR measurements for checking fibre-optic links, launch fibres and/or receive fibres are required to bridge the device's dead zones and to comply with IEC measurement specifications. For most OTDRs a launch fibre is the only possibility to include the first connector on the link in the measurement. By connecting a receive fibre the connector at the end of the link under test is additionally included. Tester manufacturers recommend different lengths for launch and receive fibres in order to avoid ghost reflections.

Features

- Compact two-piece aluminium case (257 x 156 x 40 mm)
- Hinged cover with self-locking mechanism to protect the cable splitter and connectors
- Accommodates up to two fibres (max. 1200 m fibre storage)
- Fibres are wound strain-free, consolidated and stored slip-proof in the lower part of the casing with strain-relieving cable clamp
- Fibre inlet protected against access and damage
- Standard: with breakout cable,
  Optional: connectors discarded on adapters
- A lateral flexible cable feedthrough allows closing the casing on site while performing the measurement
- Connectorized fibre ends can be neatly stored

Included in the delivery is a measurement report with graphical representation of:

- Singlemode fibres, measured from both ends and at 2 wavelengths (1310 nm and 1550 nm)
- Multimode fibres, measured from one end and at 2 wavelengths (850 nm and 1310 nm)
- Additional customized measurements available

Usable Connector systems	LSH-HRL (Class A) LSH (Class A) LC - PC/APC SC - PC/APC DIN - (LSA) - PC/APC FC - PC/APC ST, MTRJ oder FSMA
Fibre types	E9/125 Singlemode G.652.D/G.657.A1 1000 m standard length G50/125 Multimode OM3 100 m standard length G62,5/125 Multimode OM1 100 m standard length Other Fibre types and lengths on request.

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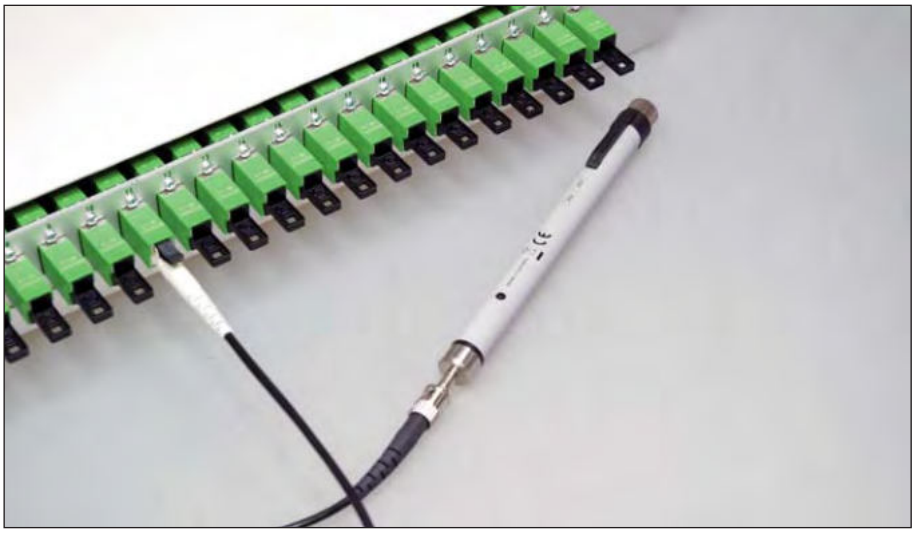
Accessories ▶ Inspection & Cleaning ▶

Fiberchecker



Wherever fiber breaks, microbendings or bad splices occure in fiber-optical links, the focussed laser light is scattered. These faults can be seen through the outer fiber cladding or the cable jacket.
The FOC Fiberchecker is an easy-to-use and ideal tool to locate these faults, e. g. in cable terminating racks. Unlike conventional solutions the special patchcord included in the scope of delivery ensures the non-contact injection of light. This will prevent the surface of the integrated pigtail from being contaminated through dirt particles during the mating procedure and thus ensure reliable OTDR readings.

Scope of delivery
In addition to the standard design with special LSH (Class A) patchcord the Fiberchecker is also available with special patchcords for other connector standards (SC, ST, LC, FC, MTRJ-Duplex, DIN).

Laser specifications

Wavelength	650 - 660nm
Power	< 1mW
Band width	< 10 nm
Transmission	CW or 2-3Hz pulses
Power supply	2 x AAA alkaline batteries
Temperature range: operation	-10 to +45 °C
Temperature range: storage	-40 to +70 °C
Length	151mm
Diameter	12,1mm
Laser class	1

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Accessories ► Measuring Tools ►

Fiber Diameter Converter (FDC)

from 62.5/125 µm to 50/125 µm

Fiber Diameter Converters (FDCs) are special multimode patch cords which enable, for instance,transmission elements with a 62.5 µm fibre pigtail output to be used without reflection with 50 µm fibre-optical networks.
FDCs are therefore used in particular when a new future-proof backbone network has to be set up with an OM3 fibre, but for cost reasons the old system technology with 62.5µm pigtail outputs is still to be used at the start.

Primary requirements like
- Telcordia GR-1209-CORE (Performance)
- Telcordia GR-1221-CORE (Reliability)

Dimensions (base size)

Enclosure length	50 mm
Enclosure diameter	min. 2,8, typ. 2,9 max. 3 mm
Fibre type	GI50/125 // GI62/125)
Pigtail design	250 µm
Patch cord length (standard)	2000 mm

Options
- Other pigtail and enclosure designs

Port designation

Port	Colour code	Port number
62.5/125	red	1
50/125	colourless	2

Product identification
Each FDC bears a serial number (to be read from the 62.5 µm side to the 50 µm side).

Qualification and measurement values
The measurement report includes the following information:
- Insertion loss 62.5/125 → 50/125 @ 1300 nm
- Insertion loss 50/125 → 62.5/125 @ 1300 nm
- Serial number
- Colour code of the ports

Connectors
FDCs can be delivered with different connectors on request.

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Optical parameters

Parameter	min.	typ.	max.	unit
Wavelength 1 (λ_1)	780	820	860	nm
Wavelength 2 (λ_2)	1260	1300	1340	nm
Insertion Loss 62.5/125 → 50/125 (1,2)			0,2	dB
Insertion Loss 50/125 → 62.5/125 (1,2)			0,1	dB
Return Loss 62.5/125 → 50/125 (2,3)		40		dB
Return Loss 50/125 → 62.5/125 (2,3)		40		dB
Temperature range (operation and storage) (4)	-40		+85	°C

(1) Measurement according to 61300-3-4, Item 5.4.3, insertion loss technique (A), 70% excitation
(2) without connectors
(3) Measurement according to IEC 61300-3-6, Item 4.5, method 2 (OTDR)
(4) For primary coated fibres, Temperature range depending on cable/pigtail design

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Accessories ▶ Measuring Tools ▶

Mode Conditioning Cable (MCC)

Design A

Mode conditioning cables are employed to prevent problems arising from the use of singlemode lasers for transmissions over multimode fibres. They induce higher modes thus limiting differential mode delay. This is done by injecting the single-mode laser systematically outside the centre of the MM fibre's core.

Applications

MCCs are mainly used for Gigabit Ethernet 1000BASE-LX at 1300 nm, when high-speed routers and switches shall be used together with optical multimode networks

The MCCs from FOC fulfil the requirements of IEEE 802.3 and can be delivered with all connector types.

Dimensions

Enclosure length	max. 75 mm
Enclosure diameter	max. ⌀ 10 mm
Fibre type SM	Corning SMF 28 e (9/125)
Fibre type MM	Corning GI 50 / 125 Corning GI 62.5/ 125
Pigtail design	⌀ 2,8 mm
Patch cord length (standard)	2000 mm

Options

- other pigtail and enclosure designs

Port designation

Port	Colour code	Port number
SM 9/125	yellow	1
MM	orange	2

Product identification

Each MCC bears a serial number (to be read from the single-mode to the multimode side).

Qualification and measurement values

The measurement report includes the following information:

- Insertion loss 9/125 → 50/125 @ 1300 nm or 9/125 → 62.5/125 @ 1300 nm
- Serial number
- Colour code of the ports

Connectors

MCCs can be delivered with different connectors. Different combinations of connector standards and polishing types on the input and output sides are possible.

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Optical parameters

Parameter	min.	typ.	max.	unit
Wavelength 1 (λ_1)	1260	1300	1340	nm
Insertion Loss 9/125 → 50/125 (1)		0,3		dB
Return Loss 9/125 → 50/125 (1)	50	50		dB
Temperature range (operation and storage) (2)	-25		+70	°C

(1) without connectors
(2) Temperature range depending on cable/pigtail design

Functional principle