MEASUREMENT
EQUIPMENT

Light sources, power meters, and accessories

FIBRAIN®

FIBRAIN ®
Fiber Optic Solutions

Content

Video-inspection
MICROSCOPES

Video inspection microscope
ODM VIS300

The ODM VIS300 portable video inspection microscope is an indispensable tool for installers and technicians who work with optical networks. The microscope is used to check the cleanliness of fiber optic connectors, even in difficult to reach places, thus eliminates the most common causes of failures and problems in optical networks, which are dirty and poor quality connections. Its unique focus system eliminates the need for the user to adjust the focus by tuning the precision focus knob, as done in most other microscopes, which makes it much easier and intuitive to use. The inspection microscope includes interchangeable adapters to ensure inspection of wide range of fiber optic connectors. A large field of view and high resolution ensure that even dirt particles placed far from the core, which could then migrate toward the core of the fiber, will not be overlooked. Long battery life and 24-month warranty of the equipment are extra benefits to all users. The VIS 300 microscope is available with LCD display or as a standalone tool to connect to a computer.

Funcionalities:

- **Video inspection microscope** to be used with fiber optic connectors,
- **3.5" LCD** screen in a protective case,
- **Pass/Fail software** included, compliant with IEC 61300-3-35,
- Large 630x440 µm **field of view**,
- **Interchangeable adapters** for wide range of connectors**,**
- Bright and uniform illumination,
- **Built-in charger,**
- Up to **10 hours** of continuous use,
- Can be used during recharging,
- Unique focus system,
- 3 equipment packages available to choose from.
- **24-month warranty!**

Available packages:

- VIS300 - SND video inspection microscope with USB converter to connect to PC, 4 interchangeable adapters (2,5mm female universal, 1,25mm female universal, SC PC male and LC PC male),
- VIS300-KIT - with 3.5" LCD monitor, 4 interchangeable adapters (2,5mm female universal, 1,25mm female universal, SC PC male and LC PC male),
- VIS300-KIT-USB - with 3.5" LCD monitor and Pass/Fail software, 4 interchangeable adapters (2,5mm female universal, 1,25mm female universal, SC PC male and LC PC male).

Technical data	
Optical parameters	
Field of view [µm]	630x440
Display [µm]	0,75
Illumination	Blue LED, coaxial
Screen (only VIS300-KIT, VIS300-KIT-USB)	LCD 3.5"
Other functional parameters	
Power supply	Built-in batteries
Battery life	8-10 h
Battery charge time	3 h
Auto Off function	Yes
Iluminated display	Yes
Mechanical and environmental parameters	
Weight (only VIS300-KIT, VIS300-KIT-USB) [g]	540
Dimensions [mm]	180x25x19
Display [mm]	120x89x32
Working temperature [°C]	0 / +50
Storage temperature [°C]	-40 / +70

VIS 400-HDP video inspection scope
ODM VIS400-HDP

The digital high-resolution VIS 400-HDP video inspection probe allows test technicians to inspect and grade fiber endfaces by offering the most detailed image possible. The probe helps installers maintain clean connectors in the network, thus eliminating the most common root cause of failures.

The inspection scope is equipped with a flexible USB cable, thus it can be easily connected to any computer or tablet and by using an optional Wi-Fi interfacing device it can be also connected with smartphones with Android or Apple operational systems. Exchangeable adapters allow technicians to inspect a wide variety of connectors. A large field of view and high resolution (1600x1200 pixels live image) allow to see and identify contamination accurately, also outside the IEC specified zones, since even debris outside the standard specified zones should be removed to avoid possible migration during connector mating. Fully automatic Pass/Fail software (compliant with the IEC 61300-3-35 or using user-defined Pass/Fail criteria) allows users to analyse measurements, archive results and generate reports, which is absolutely necessary during network certification. High resolution and bright and uniform illumination ensure high quality images of APC connectors, even when using PC adapters (contrary to similar devices that are available in the market). 24-month warranty proves the highest quality of the product.

Funcionalities:

- **Video inspection probe** to inspect fiber optic connectors,
- 1600x1200 pixels live image,
- **Large** 860x640 µm **field of view,**
- **Pass/Fail software** included, compliant with IEC 61300-3-35,
- **Automatic measurement reports,**
- **Interchangeable adapters** for wide range of connectors,
- 4 adapters in a standard option (2.5 universal female, 1.25 universal female, SC PC male, LC PC male),
- **Bright and uniform illumination** – even when inspecting APC connectors using PC adapters,
- A unique focus system,
- Optional Wi-Fi interface device,
- **24-month warranty!**

Standard adapters

ODM-125-F   ODM-250-F   ODM-LC-M   ODM-SC-M

Extra adapters

ODM-SCA-M   ODM-LCA-M   ODM-E2A-M   ODM-E2-M   ODM-SC6-M

Extra adapters:

ODM-FC-M (FC, male)
ODM-FCA-M (FC APC, male)
ODM-FC6-M (FC, male, 60°)
ODM-LC6-M (LC, male, 60°)
ODM-MTA-M (MTP APC, male)
ODM-MT-M (MTP, male)

Technical data	
Optical parameters	
Field of view [µm]	860x640
Display [µm]	<1
Lighting Blue LED	Blue LED, coaxial
Camera	Digital CMOS of high resolution
Other functional parameters	
Pass/Fail software	Yes
"Finger free" unique contrast system	Yes
Mechanical and environmental parameters	
Dimensions [mm]	180x25x19
Working temperature [°C]	0 / +50
Storage temperature [°C]	-40 / +70

Light sources and
POWER METERS

Portable optical power meter
Fibrain FPPM-345

The portable Fibrain FPPM PON meter is used for optical power measurements in FTTx/PON optical networks with the GPON/GEPON transmission protocol and optionally with the CATV 1550 nm signal. In contrast to standard power meters, the Fibrain FPPM-345 PON meter has built-in 1310, 1490, and 1550 nm filters that allow simultaneous power measurements at three different wavelengths and operates in the transparent mode (i.e. does not block the optical transmission and is plugged into a link in series), which also enables measurements in both directions at the same time.

The FPPM-345 meter operates in a "burst mode", and as such it is able to measure short bit streams sent from GPON/GEPON network terminations in the assigned time slots. Apart from the "burst mode", the FPPM-345 meter can also operate in the standard CW (continuous wave) mode. The unique features of this device are user-friendly software, a possibility of setting alarm thresholds by the operator, and a large memory with a USB port.

Functionality:

- **Automatically identifies and measures** 1310, 1490, and 1550 nm wavelengths
- Built-in high isolation **optical filters**
- Transparent mode of operation – allows measurements in an operating network
- Burst mode of operation – allows accurate measurement of 1310 nm in PONs
- **Continuous wave (CW)** mode of operation
- **Bidirectional** measurements
- User-defined warning thresholds
- Large dynamic range
- USB interface for **transferring data to computer**
- Measurement results displayed in linear (mW) or logarithmic (dBm) scale
- **Built-in batteries,** battery recharger included
- Protective rubber cover
- Backlit LCD screen
- Low battery consumption, long battery life

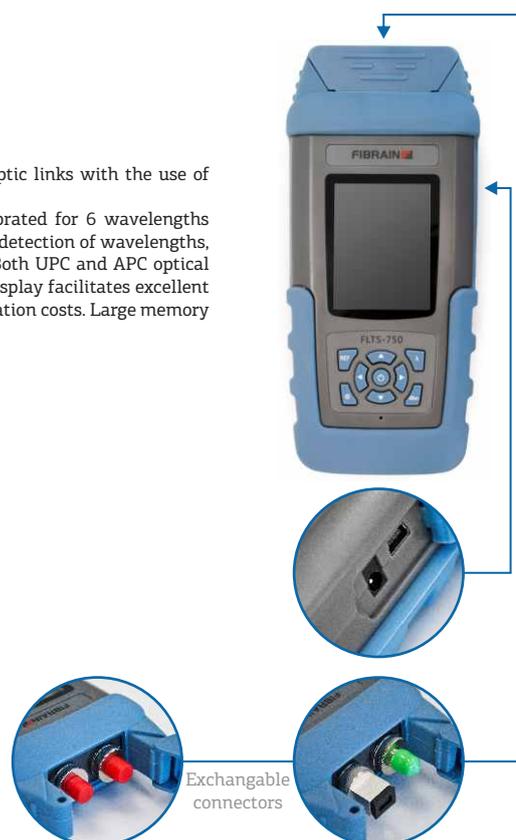| Technical data		
Optical parameters		
Measured wavelengths [nm]	1310	1490	1550
Passbands [nm]	1260-1360	1470-1505	1535-1570
Dynamic range [dBm]	+10/-40	+10/-45	+23/-45
Isolation relatively to other channels [dB]	min. 40	min. 40	min. 40
Insertion loss [dB]		max. 1.5	
Measurement accuracy [dB]		+/- 0.5	
Measuring units		dBm, mW	
Resolution [dB]		0.01	
PDL [dB]		max. 0.25	
Operation modes		Burst mode / CW	
Warning threshold setting		Yes	
Connector type		SC APC	
Other functional parameters		
Battery running time	1100 min		
Auto Off function	Yes		
Backlit display	Yes		
Data storage	Yes		
PC interface software	USB		
Memory	100 records		
Battery recharge interface	Power jack		
Mechanical and environmental parameters		
Weight [g]	450		
Dimensions [mm]	90x200x43		
Display	LCD, 2.8"		
Working temperature [°C]	-10 / +60		
Humidity	10% / 90%, no condensation		

Portable optical power meter
Fibrain FLTS-750

The FLTS-750 portable integrated light source and power meter is used to measure fiber optic links with the use of transmission method as recommended in IEC ISO 14763-3 and IEC 61280-4-2 norms.

FLTS-750 integrates singlemode 1310/1550nm light source and optical power meter calibrated for 6 wavelengths (singlemode 1310/1490/1550/1625 nm and multimode 850/1300 nm). It provides automatic detection of wavelengths, thus bidirectional measurements in both transmission windows are very fast and simple. Both UPC and APC optical connectors can be used and accurately measured due to large area detector. A large backlit display facilitates excellent visibility in all conditions. Built-in battery source guarantees long working time and low operation costs. Large memory and USB communication port allow data archiving and analysis.

Functionalities:

- Integrated power meter and light source,
- Wavelength **automatic detection,**
- Stable SM 1310/1550 nm light source,
- **Large-area detector** – compatible with APC connectors,
- Power meter calibrated for **6 wavelengths,**
- Measurements in absolute (dBm, mW) and relative (dB) scale,
- **Large** dynamic range,
- Various adapters included (FC, SC, ST, 2.5 mm universal),
- **Built-in batteries**, battery recharger,
- Protective rubber cover and a bag,
- USB interface for **transferring data to computer,**
- Backlit LCD 2.8 " screen,
- Automatic turn-off, low voltage indicator,
- **Low battery consumption**, long battery life.

Exchangable connectors

Technical data

Optical parameters

Calibrated wavelengths [nm]	MM: 850, 1300, SM: 1310, 1490, 1550, 1625
Dynamic range [dBm]	+3/-70 (optionally +26/-50)
Measurement accuracy [%]	+/-5
Measurement units	dBm, mW, dB
Resolution [dB]	0.01
Emitter type	Fabry-Perot LD (optionally DFB LD)
Transmitted wavelengths [nm]	SM: 1310, 1550
Lightsource output power [dBm]	min. -7
Lightsource stability (15 min) [dB]	≤ +/-0.05
Lightsource stability (5 h) [dB]	≤ +/-0.10
Operation mode	Continuous wave, 270 Hz, 330 Hz, 1 kHz, or 2 kHz modulation
Transmitter connector type	2.5 mm UPC

Other functional parameters

Battery running time	24 h (source and optical meter), 90 h (optical power meter)
Auto Off function	Yes
Backlit display	Yes
Data storage	Yes
PC interface software	USB
Memory	1000 records
Battery recharge interface	Power jack

Mechanical and environmental parameters

|	
Weight [g]	400
Dimensions [mm]	90x200x45
Display	LCD 2.8"
Working temperature [ºC]	0/+40
Humidity	10%/90% no condensation

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Portable optical power meter
Fibrain FOPM-250

The portable Fibrain FOPM-250 power meter is used to measure optical power in fiber-optic links. It is usually applied (together with a suitable light source) for measurements of fiber link attenuation using the transmission method according to IEC ISO 14763-3 and IEC 61280-4-2 norms. The FOPM-250 has a built-in large-area broadband detector. The large area of the detector guarantees stable and repeatable measurements, regardless of connector type (UPC or APC). The used photodiode of InGaAs type detects the power in the range of 800-1700 nm. The meter is calibrated for six wavelengths (SM 1310, 1490, 1550, 1625 nm and MM 850, 1300 nm). Automatic detection of the received wavelength (in cooperation with a compatible light source) makes the measurements much easier. A large backlit display ensures perfect visibility under any conditions. Built-in rechargeable batteries lower the operating costs and guarantee a long working time. An integrated visual fault locator (VFL) additionally increases device's functionality.

Functionalities:

- **Optical power meter** calibrated for six wavelengths,
- Wavelength automatic detection (requires compatible light source),
- **Large-area detector** – compatible with APC connectors,
- Measurement results displayed in linear (mW) or logarithmic (dBm) scale,
- Large dynamic range +10/-70 dBm,
- Various adapters included (FC, SC, ST, 2.5 mm universal),
- **Built-in** VFL 650 nm fault locator,
- **Built-in** batteries, battery recharger,
- Protective rubber cover and a bag,
- USB interface for transferring data to computer,
- **Backlit** LCD 2.8'' screen,
- **Automatic** turn-off, low voltage indicator,
- Low battery consumption, long battery life.

Exchangable connectors
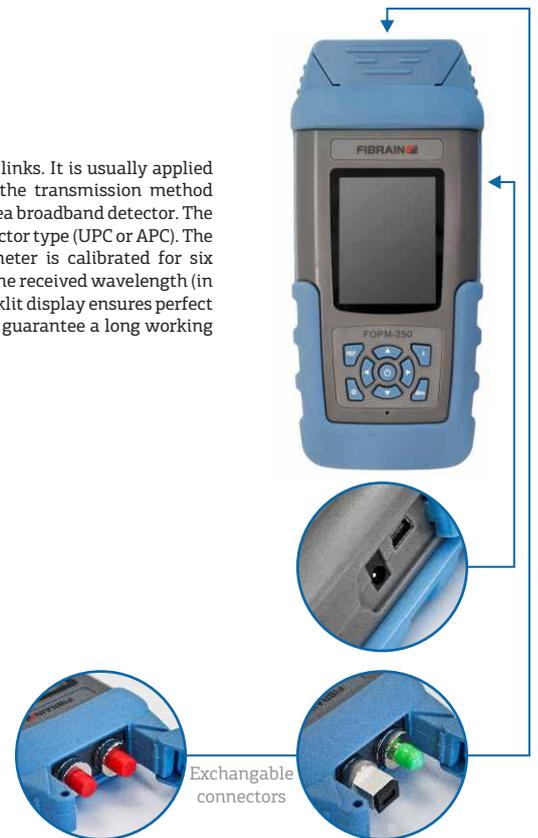
Technical data	
Optical parameters	
Detector wavelengths [nm]	800~1700
Calibrated wavelengths [nm]	MM: 850, 1300 nm, SM: 1310, 1490, 1550, 1625
Dynamic range [dBm]	+10/-70 (optionally +26/-50)
Measurement accuracy [%]	+/-5
Measuring units	dBm, mW, dB
Resolution [dB]	0.01
Emitter type	650 nm laser
Optical adapter type	Exchengable, 2.5 mm universal, SC, FC, ST
Other parameters	
Battery running time [h]	70
Auto Off function	Yes
Backlit display	Yes
Data storage	Yes
PC interface software	USB
Memory	1000 records
Battery recharge interface	Power jack
Mechanical and Environmental	
Weight [g]	390
Dimensions [mm]	90x200x45
Display	LCD 2.8", back-lit
Working temperature [ºC]	-10/+40
Humidity	10%/90% No condensation

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Portable optical power meter
Fibrain FCPM-18/1310

Fibrain FCMP-18/1310 portable power meter is used to measure CWDM channels. The automatic identification and simultaneous measurement of all 18 CWDM channels compliant with ITU-T G.694.2, no movable and scanning parts due to built-in CWDM filters (and thus significantly higher reliability) and power estimation for grey (non-CWDM) 1310 nm lasers are its unique features. By utilizing its settable offset function, the FCMP-18/1310 optical power meter can be used for power estimation of CWDM channels output from a monitoring port (often called also the testing port) that is built into CWDM multiplexers and demultiplexers.

Functionalities:

- Measurement of all **18 CWDM channels,**
- **Automatic identification** of CWDM channels,
- Very short measurement time, no movable parts,
- Power estimation of grey (Fabry-Perot) 1310 nm channels,
- USB interface for **transferring data to computer,**
- Measurement in dBm and dB, offset option (e.g. 20 dB for 1% port monitoring) and reference level in regard to any channel,
- Data presentation as a **table or chart,**
- **Built-in battery**, USB battery recharger,
- Protective rubber cover,
- Color backlit LCD 2.8"screen.

Technical data	
Optical parameters	
Wavelength range [nm]	1270-1610
Number of CWDM channels	18
Central CWDM wavelengths [nm]	1270/1290/1310/1330/1350/1370/1390/1410/1430/1450/1470/1490/1510/1530/1550/1570/1590/1610
CWDM channels measurement accuracy	+/-0.5 dB @-20 dBm
Dynamic range [dBm]	+10/-40
Resolution [dB]	0.01
Measuring units	dBm, dB
Modes of operation	Real Time (PM), Single Scan (CWDM)
Reference level options	offset, any CWDM channel
Warning threshold setting	Yes
Connector type	SC APC
Other functional parameters	
Battery running time	420 min
Auto Off function	Yes
Backlit display	Yes
Data storage	Yes
PC interface software	USB
Memory	1000 records
Battery recharge interface	USB
Mechanical and environmental parameters	
Weight [g]	260
Dimensions [mm]	87x173x40
Power consumption [A]	0.25
Display	color, LCD, 2.8''
Working temperature [°C]	-20/+55
Humidity	10%/90% no condensation

ACCESSORIES
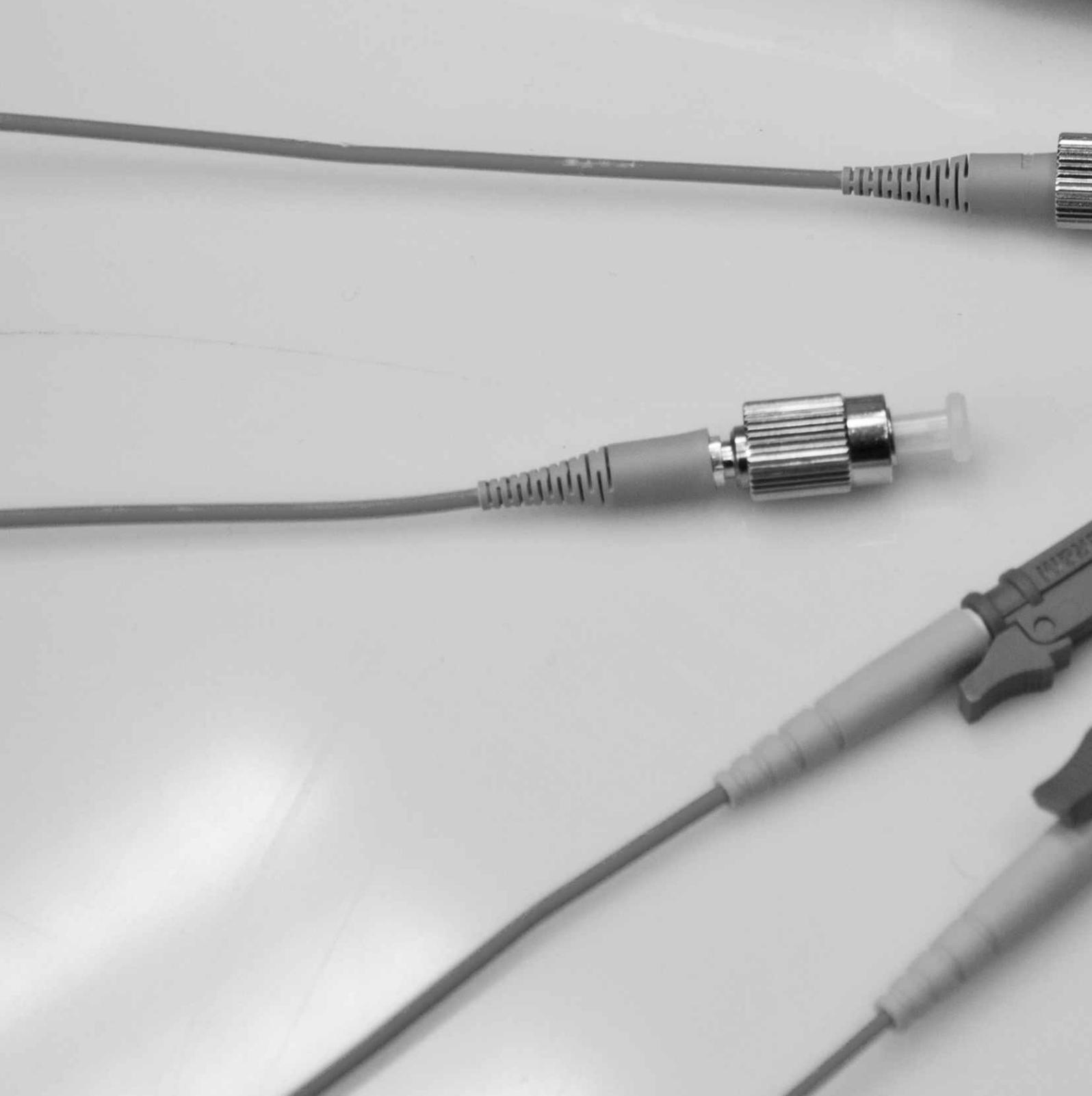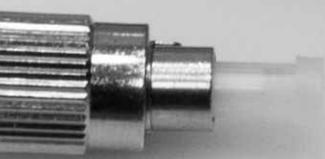
Visual Fault Locator
Fibrain FB9214

Fibrain FB9214 Visual Fault Locator (fiber continuity tester) is an indispensable tool for detecting discontinuities in fiber path and points of leakage of optical power such as macrobends, fiber or splice cracks, disconnected connectors etc. Fibrain FB9214 works with both singlemode and multimode fibers. The tester emits red light at a wavelength of 650 nm and can be operated in continuous mode or with two different modulation frequencies. By using the stabilized power supply, the optical power is constant regardless of the battery level. The use of original Japanese laser diodes guarantees a long life, no darkening with age and low power consumption, a long battery life, as well as high power coupling efficiency to the fiber and thus achieving long ranges, despite of utilizing optically safe laser power. A unique safe-storing mechanism with rotating ring prevents an accidental activation of the switch in the bag and a consequent battery discharge. FB9214 locator is supplied in a handy protective case.

Functionalities:

- **Japanese laser diodes** with long lifetime and low power consumption,
- 650 nm wavelength red laser,
- **5 mW** and **10 mW** versions, very good power coupling efficiency – **long ranges**,
- compatible with SM and MM fibers,
- continuous mode of operation and 3 Hz and 9 Hz modulation,
- continuous battery operation time ≥20 h,
- 2.5 mm universal optical adapter,
- rotating ring which prevents the device from accidentally turning on
- protective case included.

Offered versions:

- FB9214-5-25 – visual fault locator, 2.5 mm universal adapter, 5 mW optical power, 650 nm laser,
- FB9214-10-25 – visual fault locator, 2.5 mm universal adapter, 10 mW optical power, 650 nm laser.
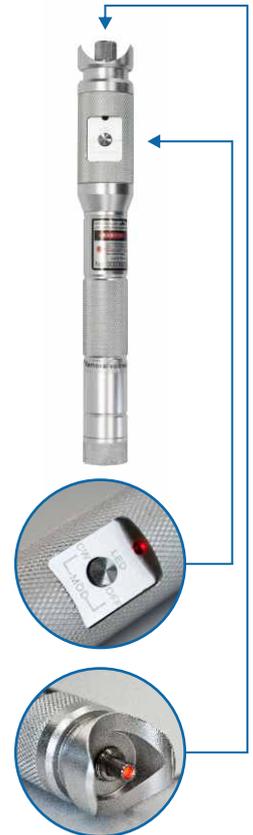
Technical data

Optical and functional parameters	
Laser wavelength [nm]	650 ±10
Emitted optical power [mW]	5 / 10
Approximate range [km]	5 / 10
Compatibility with fiber types	Singlemode / Multimode
Mode of operation	Continuous, 3 Hz, 9 Hz
Typical continuous battery life [h]	≥20
Battery type	2x AA
Optical adapter type	2.5 mm universal
Weight [g]	120
Dimensions [mm]	25x190
Temperature of operation [ºC]	-20/+60
Humidity	10%/90% No condensation

Master Class
Patchcords

Master Class fiber optic patchcords are specifically designed to measure and test telecommunication networks and optical elements. The Master Patchcord is equipped with the highest quality master connector of tightly controlled concentricity and bore angle as well as the end face geometric parameters, which determine very low Insertion Loss and high connection repeatability. Optical measurements, in accordance with PN-EN 61280-4-2/-4-1, PN-ISO/IEC 14763-3, ITU-T G.650.3 require the use of the Master Class patchcord.

Patchcords can be terminated with two connectors of Master Class or a mixed option: a connector of the Master Class and a standard connector, polished to the Gold Grade. Fibrain Master Class of fiber optic connectors can be characterized by very low Insertion Loss and increased control of the ferrule's endface geometry. The control over the endface geometry after polishing process of a fiber optic termination provides the following benefits: guarantees optical performance, minimizes IL, and minimizes back reflection.

Features:

- Comply with IEC, TIA/EIA requirements,
- High quality and repeatability of the transmission parameters,
- High quality ceramic ferrules with tightly controlled concentricity and bore angle,
- Very low IL value, $IL_{TYP} \leq 0.05$ dB,
- Connectors are constructed from high quality plastic, resistant to corrosion and high temperatures with UL94-V0 flammability index.

Applications:

- Measurements concerning telecommunication networks,
- Testing optical devices,
- Measuring equipment,
- CWDM networks,
- Local area network (LAN),
- FTTx, FTTD, FTTB, FTTH networks,
- CATV solutions.

Technical data

Parameters	SM PC connectors	SM APC connectors
Max. Insertion Loss [Acc. IEC 61300-3-34] [dB]	≤ 0.10	≤ 0.10
Insertion Loss 97% [Acc. IEC 61300-3-34] [dB]	≤ 0.07	≤ 0.07
Typical Insertion Loss [Acc. IEC 61300-3-34] [dB]	≤ 0.05	≤ 0.05
Return Loss [Acc. IEC 61300-3-6] [dB]	≥ 55	≥ 65
Concentricity [µm]	≤ 0.30	≤ 0.30
Bore angle [º]	≤ 0.20	≤ 0.20
Apex Offset (AO) [µm]	≤ 30	≤ 30
Radius of Curvature (ROC) [mm]	10 ≤ ROC ≤ 20	7 ≤ ROC ≤ 12
Fiber Height (FH) [nm]	-30.0 ≤ FH ≤ +30.0	-30.0 ≤ FH ≤ +30.0
Angle (AN) [º]	-	7.7 ≤ AN ≤8.3

Reference scheme

Series	Class A	Type A	Class B	Type B	Length [m]	Cable	Fiber	Diameter	Color	
MP	M - Master	SC SCA LC LCA FC FCA	M - Master G - Gold	SC SCA LC LCA FC FCA E2 E2A ST MU DIN	001.0	SX patchcord simplex	A G652D D G657A1	18 - 1.8 mm	Y	☐

Example: MP-MSCA-MSCA-002.0-SX-A-18-Y - Fibrain Master Patchcord terminated with two SC/APC Master Class connectors, simplex, 2 m length, G.652.D fiber, 1.8 mm cable diameter, yellow coating

FIBRAIN
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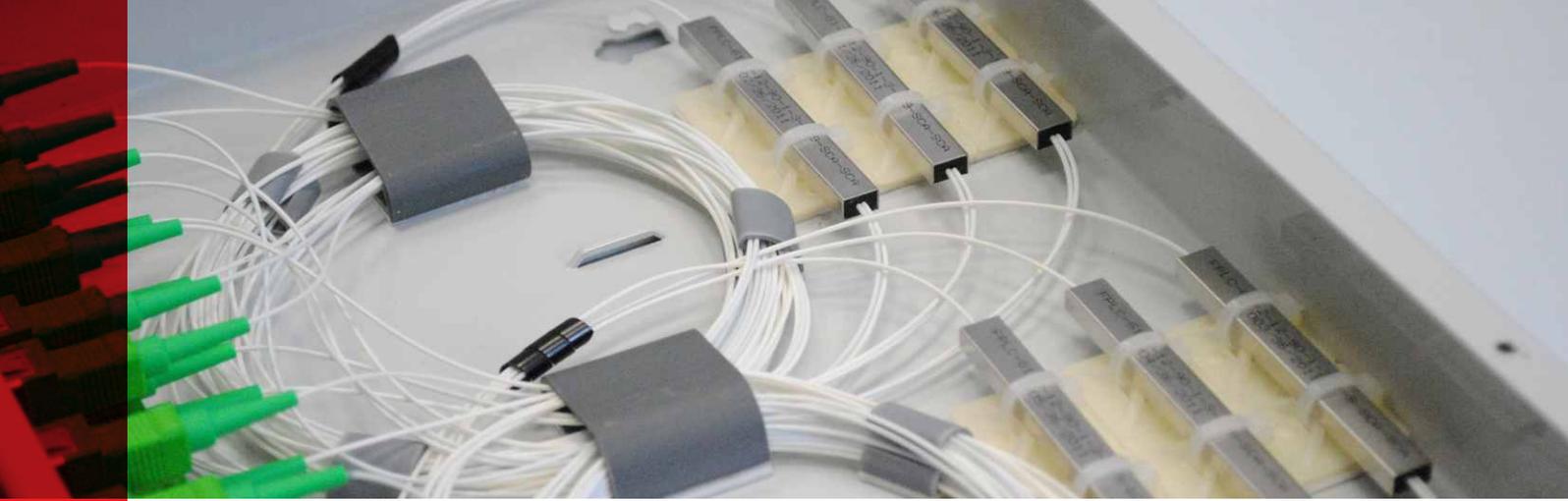
Coupling Filters for OTDR Monitoring
Fibrain FWDM Series

Coupling filters for OTDR monitoring (also known as FTTH/OTDR triplexers) allow reflectometer monitoring of a live fiber optic network. Each optical reflectometer stops working properly in the presence of external optical signals, when it receives optical power other than only the Rayleigh scattering noise from its own impulses. Therefore, reflectometer measurements in live networks require filtering of signals than disturb the reflectometer, but the filters used cannot block the transmission of these signals (which in the operating network are usually a production traffic) in the link. Coupling filters (triplexers) are fully passive optical devices having three ports: OTDR, line, and common. Fibrain triplexers allow using 1310, 1490, 1550, 1625, or 1650 nm reflectometers in live networks. Fibrain triplexers can be used as standalone devices or tools integrated in launch boxes.
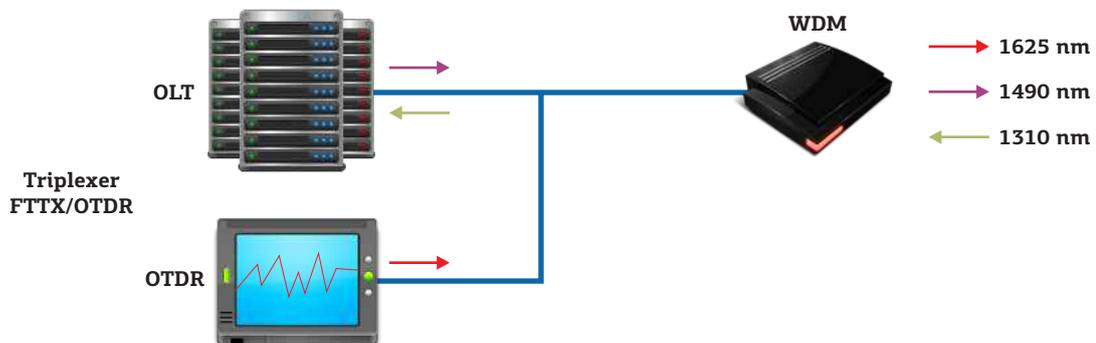
Technical specifications				
Type	**OTDR 1310**	**OTDR 1490**	**OTDR 1550**	**OTDR 1625/1650**
Transmission channel [nm]	1310	1490	1550	1625/1650
Reflection channel [nm]	1490/1550	1310/1550	1310/1490	1310/1490/1550
Transmission channel IL [dB]			<0.8	
Reflection channel IL [dB]			<0.7	
Transmission ch. isolation [dB]			>30	
Reflection channel isolation [dB]			>15	
PDL [dB]			<0.1	
PMD [ps]			0.1	
Directivity [dB]			>50	
RL [dB]			>50	
Thermal stability [dB/ºC]			0.005	
Storage temperature [ºC]			-40 / +85	
Operation temperature [ºC]			-20 / +70	
Max power [MW]			300	
Housings:				
Fiber type	250 µm	900 µm		900 µm, 2.0 mm or 3.0 mm
Dimensions [mm]	φ34*5.5	φ38*5.5		98x14x8.5

Reference scheme									
Series	Quality	Fiber	Type	Length	Wavelength	Fiber	Case	Conn. type	Conn. type
FWDM	G0/G1	1 - G652D	12 - 1x2	0 - 0.5 m 1 - 1 m 2 - 2 m	3145 – T 1310; R 1490/1550 4935 – T 1490; R 1310/1550 5538 - T 1550; R 1310/1490 6235 – T 1625/1650; R 1310/1490/1550	25 – 250 µm 90 – 900 µm 20 – 2.0 mm 30 – 3.0 mm	1 – pipe 5.5x34 mm 2 – pipe 5.5x38mm 4 – case 98x14x8.5 mm	ST SC SCA FC FCA LC LCA E20 E2A x - other	ST SC SCA FC FCA LC LCA E20 E2A x - other

Example: FWDM-G0-1-12-1-5538-20-4-SCA-SCA - Fibrain FTTH Triplexer, 1550 transmission channel, 1310 & 1480 reflection channel, 2.0 mm, 1 m, SC/APC.

FWDM passive solutions
OTDR Starter Cube

Fibrain OSC – OTRD Starter Cube – facilitates reflectometric tests with the use of OTRD (Optical Time Domain Reflectometer). The launch fiber eliminates the dead zone and guarantees secure measurement. Fibrain OSC OTRD Starter Cube has several advantages that make measurements fast and easy to perform. The housing is equipped with a magnet, thus the OSC can be easily mounted on a rack, and with a shoulder strap, which makes it easy to transport the OSC. The launch fiber is terminated with master class connectors, available in a variety of connector types. The compact housing can store up to 1000 m of SM or MM fiber.

Features and benefits:

- Compact housing and small weight,
- Connector polishing type colour code for clear identification,
- Fiber colour code for easy identification,
- Input and output fanout made of reinforced harsh tube with crush resistance 1000N,
- Magnet mounting allows for mounting OSC to the rack,
- Master class connector for accurate and reliable measurement,
- Shoulder strap for easy measurement and transport,
- Anti-vibes protection.

Application:

- SM and MM network measurement,
- Simulation of loss, length, delayed time and system's reflectanse.
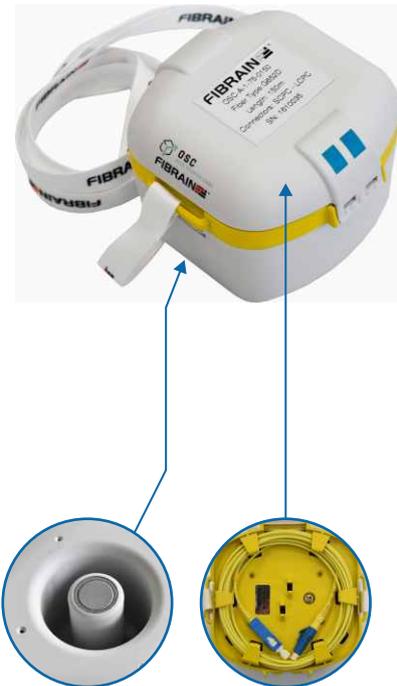
Technical specifications

Parameters	
Dimensions (w)x(h) [mm]	107x86
ILMAX @ 1310 nm (SM fiber) [dB/km]	≤ 0.35
ILMAX @ 1550 nm (SM fiber) [dB/km]	≤ 0.22
ILMAX @ 850 nm (MM fiber) [dB/km]	≤ 2.50
ILMAX @ 1300 nm (MM fiber) [dB/km]	≤ 0.70
SM Connector Insertion Loss (IEC 61300-3-4) [dB]	≤ 0.1
MM Connector Insertion Loss (IEC 61300-3-4) [dB]	≤ 0.15
Return Loss (IEC 61300-3-6) [dB]	RL ≥ 65 (APC); RL ≥ 55 (PC SM); RL ≥ 35 (PC MM)
Length of input and output fiber [m]	1.5
Operating temperature [ºC]	-40 to 55

Standard fiber lengths	
MM Fibers [m]	100, 150, 200, 250, 300, 500
SM Fibers [m]	100, 150, 200, 250, 300, 500, 1000

Reference scheme

Series	Fiber type	Fanout	Connector type Input	Output	Fiber length
OSC	A G.652D	1 - 1.8mm harsh	1 - E2	1 - E2	0100
	B SMF G655		2 - E2A	2 - E2A	
	D SMFG657A1		3 - FC	3 - FC	
	E SMF G657A2		4 - FCA	4 - FCA	
	H MMF OM1		5 - LC	5 - LC	
	I MMF OM2		6 - LCA	6 - LCA	
	K MMF OM3		7 - SC	7 - SC	
	L MMF OM4		8 - SCA	8 - SCA	
			9 - ST	9 - ST	

Example: OSC-A-1-88-0500 FIBRAIN OSC launch fiber, G.652D fiber, 1.8 mm reinforced harsh tube, SC APC connectors, length 500m.

FIBRAIN
Fiber Optic Solutions

FBG Filters for Active Network Monitoring
Fibrain FBG Series

FBG Filters are filters that reflect the 1625 nm wavelength and transmit other wavelengths (1310 nm, 1490 nm, 1550 nm), typically integrated in LC or SC attenuator-type adapters. They are used to enable monitoring of live networks with OTDR operating at 1625 nm. OTDR measurements of the whole optical link from the OLT to the ONT are difficult due to the presence of multiport splitters (which from the point of view of the OTDR are large point attenuation) and also because large spatial resolution is required. Using 1625 nm reflectors is a reliable and cost-effective way to decrease the required dynamic range of the used OTDR. The use of FBG 1625 nm reflectors a is basic method to implement optical layer monitoring in real time on the whole link length from OLT to ONT in FTTx networks.

Technical Specifications			
Parameters	Min.	Typ.	Max.
Transmitted band [nm]		1310 +/- 20	
		1490 +/- 20	
		1550 +/- 20	
Reflected band [nm]		1625 +/- 5	
Transmission band IL [dB]		≤0.7	≤1.0
Transmission band RL [dB]	≥25	≥30	
Reflected band IL [dB]	≥10	≥15	
Reflected band RL [dB]		≤2	≤5

Reference Scheme							
Series	Quality	Fiber type	Wavelength	Reflected band	Filter type	Connector type	Connector type
FBG	G1	1 - G652D	S538 - T 1550 1310/1490	62 – 1620 65 – 1650	A – adapter I – in-line	ST SC SCA FC FCA LC LCA E20 E2A x - other	ST SC SCA FC FCA LC LCA E20 E2A x - other

Example: FBG-G1-1-5538-62-A-SCA-SCA - Fibrain FBG adapter filter for OTDR 1625 nm monitoring in PONs; 1310, 1490 &1550 nm transmission channel, 1625 reflection channel, SC PC.

Patchcords

# Fibrain High Reflection Termination

Fibrain High Reflection Terminations are characterized by uniform high return loss in the whole CWDM wavelength range. Their function is to reflect as much optical power as possible, which is required for example for some PMD measurement schemes. They are polarization independent passive components. Each patchcord is delivered with a test report. The patchcords are based on various fiber types (G.652.D, G.657.A2, etc.) and their length and connectors are chosen based on customer's order. Detailed selection of the manufacturing components ensures the highest quality of the connectors.

Advantages and features:

- 1250 nm - 1650 nm operating range
- Available as a patchcord with any connector
- Return loss < 1 dB
- Each HRT is measured individually

Applications:

- Testing systems
- Polarization mode dispersion and chromatic dispersion measurements
- Measuring devices calibration
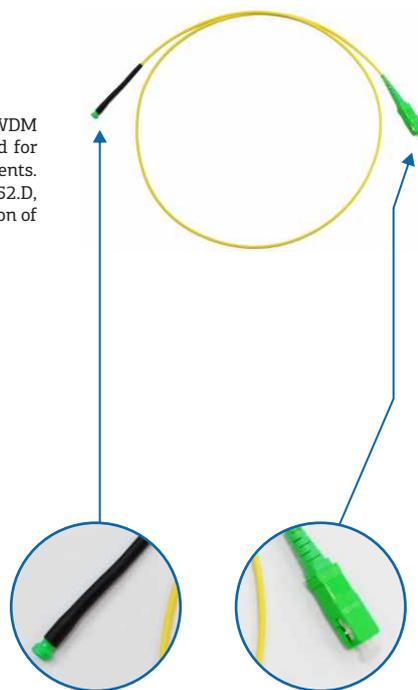
Technical specification	
Parameters	
Reflected wavelengths [nm]	1250-1650
Return loss [dB]	<1
PDL [dB]	<0.5
Operating temperature [°C]	0 to +45
Storage temperature [°C]	-40 to +85
Optical operating power [mW]	500
Fiber type	G.652.D, G.657.A1, G.657.A2, others

Reference Scheme						
Series	**Quality**	**Fiber type**	**Fiber length**	**Cable type**	**Connector type**	**Cable color**
HRT	G0	1-G.652.D	0 - 0.5 m	25 – 250 µm	XX - no connector	OR
		2-G.657.A1	1 - 1 m	90 – 900 µm	ST	Y
		3-G.657.A2	2 - 2 m	20 – 2.0 mm	SC	GR
		4-G.657.B1		30 – 3.0 mm	SCA	GY
		5-G.657.B2			FC	BL
		6-G.657.B3			FCA	BK
		X-other			LC	V
					LCA	R
					E20	W
					E2A	
					x-other	

Example: HRT-G0-1-1-20-SCA-Y – Fibrain High Reflection Termination based on G.652.D fiber, 1 m fiber length, 2.0 mm cable, SC APC, yellow cable.

Patchcords
# Fibrain No Reflection Termination

Fibrain No Reflection Terminations can be used when an extremely low reflection (a small percentage of returning signal) at the end of a fiber optic link is necessary, e.g. in specialty OTDR, BOTDR, and BOTDA (such as in structural health monitoring) measurements or in measuring devices calibration. The No Reflection Terminations are characterized by uniform return loss in the whole CWDM wavelength range. They are based on various fiber types (G.652.D, G.657.A2, etc.) and are available as a pigtail for splicing or as a patchcord on special request. Their length and connectors are chosen based on customer's order.

Advantages and features:

- 1250 nm - 1650 nm operating range
- Available as a pigtail or patchcord with any connector
- Return loss > 70 dB
- Each NRT is measured individually

Applications:

- Specialty OTDR, BOTDR, BOTDA measurements
- Measuring devices calibration
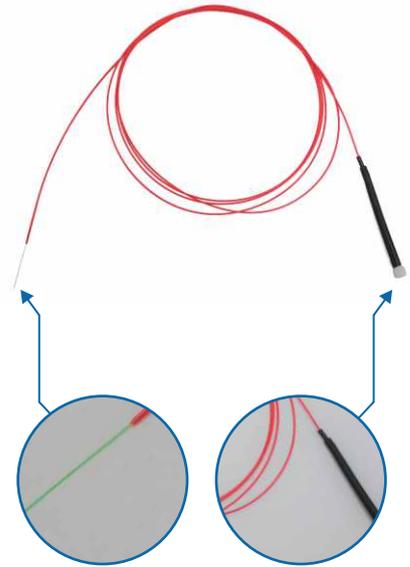
Technical specification	
Parameters	
Reflected wavelengths [nm]	1250-1650
Return loss [dB]	>70
PDL [dB]	<0.5
Operating temperature [°C]	0 to +45
Storage temperature [°C]	-40 to +85
Optical operating power [mW]	500 mW
Fiber type	G.652.D, G.657.A1, G.657.A2, others

Reference Scheme						
Series	**Quality**	**Fiber type**	**Fiber length**	**Cable type**	**Connector type**	**Cable color**
NRT	G0	1-G.652.D 2-G.657.A1 3-G.657.A2 4-G.657.B1 5-G.657.B2 6-G.657.B3 X-other	0 - 0.5 m 1 - 1 m 2 - 2 m	25 – 250 µm 90 – 900 µm 20 – 2.0 mm 30 – 3.0 mm	XX - no connector SC SCA FC FCA LC LCA E20 E2A x-other	OR Y GR GY BL BK V R W

Example: NRT-G0-1-1-20-SCA-Y – Fibrain No Reflection Termination based on G.652.D fiber, 1 m fiber length, 2.0 mm cable, SC APC connector, yellow cable.

Fibrain adapter attenuators
Fiber-Optic Adapter Zero Attenuators

Fibrain fiber optic adapter attenuators AOA are characterized by high stability and low deviation from nominal attenuation. The attenuators feature low ripple in the attenuation spectrum across the whole single mode region. A specific application of zero attenuators is to buffer valuable connectors for example in measuring equipment, where any physical damage or scratching would distort measurement accuracy and would require expensive repair.

Advantages and features:

- available in various versions,
- broadband attenuation characteristics,
- strong casing made of high quality materials,
- available in various versions.

Applications:

- measuring equipment,
- OTDR,
- light source,
- power meter,
- optical spectrum analyser.

Technical data	
Parameter	**Value**
Type **Wavelengths [nm]**	Singlemode Multimode 1270-1610 850/1300
Attenuation [dB] **Mating durability [dB]** **Attenuation uniformity [dB]** **Return loss RL [dB]**	Max 0.5 <0.5 for 1000 cycles ≤0.2 UPC > 50 APC > 65

Reference Scheme						
Series	**Quality**	**Connector type**	**Attenuation**	**Type**	**Wavelength**	**Casing**
AOA	G0/G1	ST – ST/UPC SC – SC/UPC SCA – SC/APC FC – FC/UPC FCA – FC/APC LC – LC/UPC LCA – LC/APC E2 – E2000/UPC E2A – E2000/APC	00 dB	SM – singlemode 09/125 M5 – multimode 50/125 M6 – multimode 62.5/125	AB – 1270-1610 nm (all band) 83 – 850/1300 nm	A – metal B – plastic

Example: AOA-G0-SC-00-SM-AB-A – Fibrain adapter attenuators, connector type SC, attenuation 0 dB, single mode, 1270-1610 nm, metal casing.

FIBRAIN®