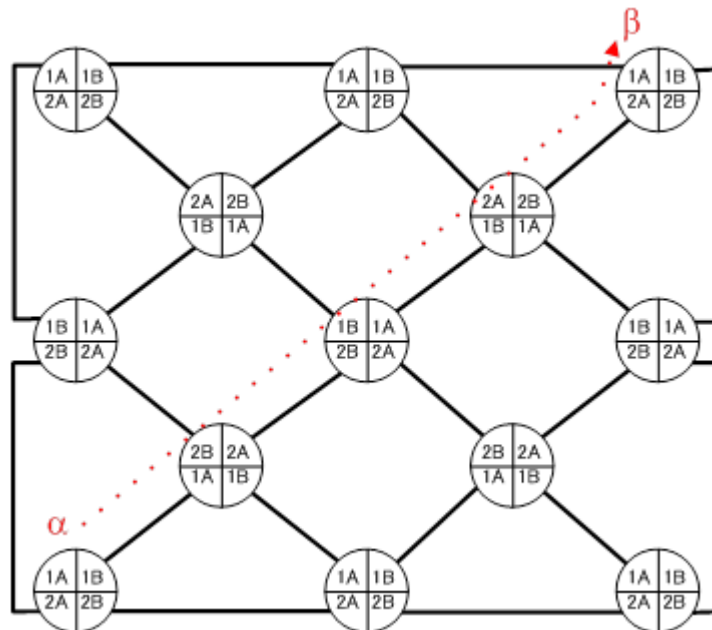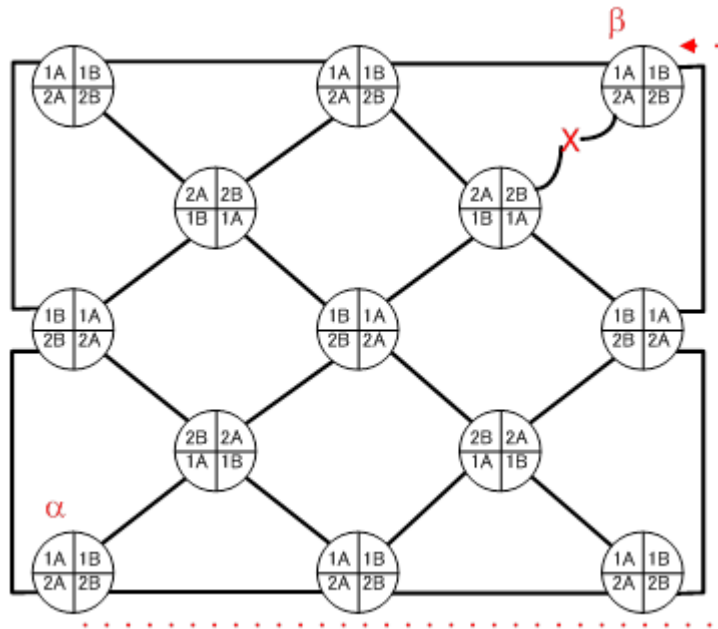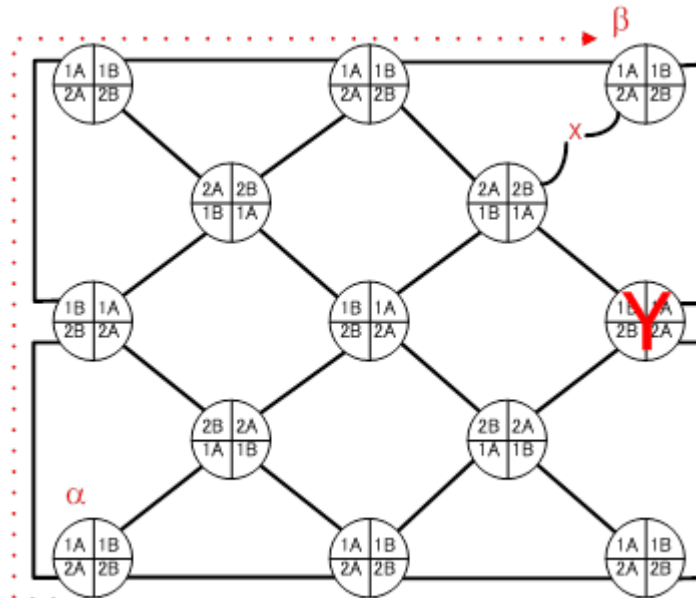# FIBERMESH

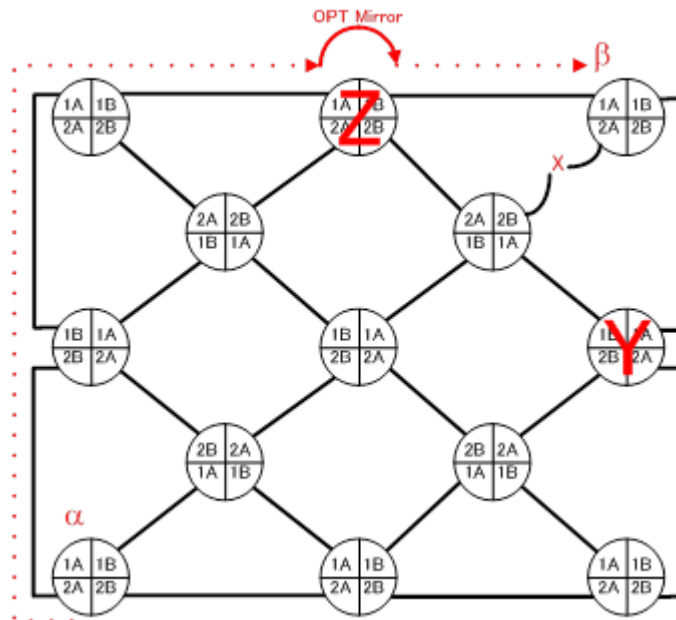|	
Product Type	FiberMesh Equipment
Application	This system provides high performance communication and availability for automation of MV / LV feeders in power distribution networks.
Features	The FiberMesh® system consists of a optical network design in a mesh topology, its installation cables and accessories and a communication equipment that, through an AODV multi-hop routing protocol, performs the routing of the data packets in up to 4 different optical paths, ensuring continuity of operation of the communication channel even in the event of multiple network failures.
Operation	When an automation device needs to transmit data to the "Beta" point from the "Alpha" point the optical routing protocol automatically creates an optimized route as follows:

If for some reason the optical fiber is damaged at the "X" point, the system detects the fault and automatically creates a new route as follows:

In case a new fault occurs, in this case considering a break of the FiberMesh router equipment at the "Y" point, the system will create another optimized route as follows:

Finally, if this route has a power failure from the source that feeds the FiberMesh router, and it is equipped with the optional optical bypass (OPT Mirror) as at the "Z" point, optical continuity between adjacent FiberMesh routers will be preserved and the data will be transferred as follow:

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Description

With data transmission capacity of 100 Mbps, this equipment connects automation device(s) to the mesh communication network via IP or serial RS-232 connection. Its multiple (4) Ethernet and (2) serial data ports, which can be used together, meets the current and future demand for automation communication. Furthermore, two optical ports are provided with an optical by-pass. This feature ensures continuity of communication between adjacent optical routers, in case of local power failure, by switching the optical signal from the input port directly to the output port. It is also possible to opt for a GPS receiver that can be used in future network applications such as time base synchronization and georeferencing for network management systems. In addition, FiberMesh was developed to operate under severe conditions of temperature and can be installed, when technically feasible, inside the RTU boxe. When that is not the case, the equipment may be installed inside a IP65 polycarbonate boxe on the same pole or on another structure next to the automation device. Moreover, due to its low power consumption (<10 W), FiberMesh can be connected to the power source in the RTU, without compromising the battery backup time. Finally, the files with database information for SNMP management (MIB) and local configuration application of the optical router executable in MSWindows 7 or higher are available.

Front View

Rear View

Functional Characteristics

Item	Specification	Notes
Optical Ports	4 optical ports with SC/UPC connector, two for A ports and tro for B ports	Connection is between A and B only, never A to A or B to B
Ethernet Ports	4 fast Ethernet ports for client's application	RJ-45 connector
Serial Ports	2 serial ports RS231 for client's application	DB9 connector (male)
USB Port	1 port for local configuration	B type connector (female)
GPS Port	1 port for GPS signal reception	SMA connector (female)
Reset Button	Re-initialize router	Acces through the hole in the front panel
Number of hops in series	Up to 32	Maximum hops for point-to-point communication between a FiberMesh device and its gateway
Time to discover route	Up to 0,4ms per hop	

Time to forward packet (*)	Up to 0,5ms (large packets at high throughput)	high throughput: 99 Mbps
		large packets: 1518 Bytes
		low throughput: 0,2 Mbps
	Up to 0,07ms (small packets at low throughput)	small packets: 128 Bytes

(*)Operation with small packets at high throughputs, or at maximum throughput (100 Mbps) with any packet size, causes packet drop or increases forwarding packet time to over 4 milliseconds.

Indicator LED's

Item	Specification	Note
Power	POW on: Green POW off: Off	
Optical Ports: LINK/ACT	Signal detected: Green Signal detected and communicating: Blinking Green	
Ethetnet: LINK/ACT	Link up: Orange Link up and communicating: Blinking Orange	
Ethernet: 10/100 Mbps	100 Mbps LINK: Green 10 Mbps LINK: Off	
System	Abnormal condition: Red Normal condition: Blinking Blue	
Error	Abnormal Condition: Red Normal Condition: Off	

Mechanical and Environmental Characteristics

MECHANICAL SPECIFICATION

Item	Specification	Note
Material	Aluminum with anodized frosted finishing	
Dimension	242 x 41 x 130 mm (W x H x D)	Excluding protrusions
Weight	1,05 kg	
Mount structure	In cabinet, rack or wall	Using mountable kit
Cooling	Natural cooling (no fan)	

ENVIRONMENTAL SPECIFICATION

Item	Specification	Note
ANATEL	Requisitos Técnicos e Procedimentos de Ensaios Aplicáveis à Certificação de Produtos para Telecomunicação de Categoria III – Equipamento de Rede de Dados	Classe A

	Item	Specification	Note
	Operational Temperature	-30 °C ~ +70 °C	
	Humidity	95%	Non-condensing

Supply

Item	Specification	Note
Power voltage	+9 V DC ~ +36 V DC	
Power consumption	7 W	

Optical Interface

Item	Specification	Note
Wavelength	Tx;1310 nm, Rx;1550 nm (A port) Tx;1550 nm, Rx;1310 nm (B port)	
Range Between FiberMesh Router	20 km (average)	20km point-to-point
Power budget (ports with optical switch)	Tx: -15,5 dBm ~ -9,5 dBm Rx: -30,5 dBm ~ -3 dBm	20 km point-to-point (Other ranges available on request)
Fiber interface	SC/UPC	
Number of ports	4	At least one must be connected

Ethernet and Serial Interfaces

Item	Specification	Note
Ethernet interface	10BASE-T/100BASE-TX, RJ45	IEEE802.3
Serial interface	RS-232, DB9	
Data speed	10/100Mbps(Ethernet)	Point-to-Point connection
Number of ports	Ethernet: 4 ports Serial: 2 ports	
Transmission SCADA	IEC60870-5-101/104, DNP3.0 or similar	

Management

Item	Specification	Note
Via USB	Firmware upgrade, device configuration	
Via Ethernet	SNMP.v2c management, Telnet device configuration	

By-Pass Óptico

Item	Specification	Note
Switching method	Mechanical relay using prism and mirror method: A1 fiber is connected to B1 fiber.	This condition works only when the power is off, when the energy is restored, the initial condition is recovered.

GPS (Optional)

Item	Specification	Note
Command protocol	NMEA0183	
Available information	Location and time.	
Frequency	1575.42 MHz	
ChipSet	MTK MT3339	External antenna required

Models

MODEL	FEATURE
FiberMesh OMH100S	With optical by-pass

Codification