



### MM/SM optical security signal converter

- Low-Rate optical signal converter dedicated to converting security interfaces
- Selecting the local interface mode for the 820/850nm version using a micro switch.
  - IEC103 standard operation
  - operation in non-standard mode
- Application:
  - conversion from multimode fiber (820nm or 1310nm signal) to single-mode fiber (1310nm)
  - conversion of 820/850/1310nm signal to CWDM/DWDM wavelengths (for SFP version)
  - signal regeneration
- Optical interfaces:
  - local interface: 820/850nm ST or 1310 connector, SC connector speed up to 2 Mbps
  - line interface: exchangeable SFP module or built-in (MM/SM) with SC connector
- Indication of port status and device status via LEDs
- Standard 12-60V DC redundant power supply

### Description of the device

#### Functionality

The **BS-MC-5X** device is an optical interface converter dedicated to converting signals of protections (distance and line differential, overcurrent, overvoltage, transformer differential) or controllers equipped with 820nm, 850nm or 1300nm multimode optical interfaces. The converter on the local side is equipped with a fiber-optic interface dedicated to the transmission of low-speed signals, allowing seamless data transmission between a pair of protections installed in remote power substations.

**BS-MC-5X** can be used for:

- Signal conversion when transitioning between multimode and single-mode fiber,
- Signal regeneration, the ability to increase the range of fiber-optic transmission between a pair of security.

The device is powered by DC voltage from 12 to 60V, or by an external power supply attached to the device in the case of AC voltage. The total power consumption of the device does not exceed 4 Watts. The device comes standard with an auxiliary power connector to provide power redundancy.

A typical application is shown in the figure below.

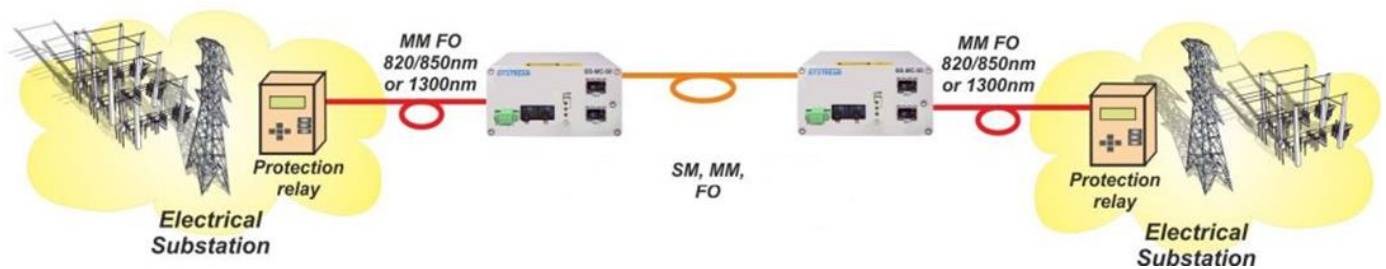


Fig. 1. Example point-to-point application. Provide security connectivity between electrical substations.

On the line side, the BS-MC-5X converter has the ability to work with the RSMUX3-FO multiplexer (using the first RS-232/485/422 interface of the multiplexer). In this configuration, the devices can provide a fiber-optic connection between a pair of security/controllers, one of which uses the RS232/422/485 fiber-optic interface, while the other uses the electrical interface.



Fig. 2. Example application of cooperation with RSMUX3-FO multiplexer.

## Technical specifications

### Supported standards, recommendations and directives EMC, safety\*

- EN 55022:2010/AC:2011 - Electromagnetic compatibility (EMC) - Information technology equipment. Radio disturbance characteristics. Methods of measurement and permissible levels,
- PN-EN 55024:2011/A1:2015-08 - Electromagnetic compatibility (EMC) - Information technology equipment Immunity characteristics - Limits and methods of measurement.
- PN-EN 60950-1:2007/A2:2014-05 - Information technology equipment - Safety - Part 1: Basic requirements.
- EN 55011:2012 - Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement,
- PN-EN 60825-1:2014-11 - Safety of laser equipment - Part 1: Equipment classification and requirements.
- EMC 2014/30/EU - Electromagnetic Compatibility Directive.
- LVD 2014/35/EU - Low Voltage Directive.
- IEC 61000-4-2 Electromagnetic compatibility (EMC)- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
- IEC 61000-4-3 Electromagnetic compatibility (EMC)- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
- IEC 61000-4-4 Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
- IEC 61000-4-5 Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
- IEC 61000-4-6 Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
- IEC 61000-4-8 Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
- IEC 61000-4-11 Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity test

\* - The scope and list of supported standards may change as the device evolves.

### Local optical ports:

#### BS-MC-51 version:

- Selecting the local interface mode with a micro switch.
  - IEC103 standard operation
  - operation in non-standard mode
- Wavelength 820/850nm, MM, ST connector
- Transmission speed 0 - 2Mbit/s
- Approximate transmission range (for 62.5µm): 1500m
- Sensitivity: -25.4 dBm
- Optical power: -18.8dBm (50µm), -16dBm (62.5µm), -12dBm (100µm), -7dBm (200µm)

#### BS-MC-52 version:

- Wavelength 1310nm, MM, SC connector
- Transmission speed 0 - 2 Mbit/s
- Approximate transmission range (for 62.5µm): 2000m
- Sensitivity: -18 dBm
- Average optical power: -7.0 dBm

### Environmental operating parameters:

- Operating temperature: +5C +40C
- Humidity: 80% at +20°C

### Linear optical ports:

- Built-in optical port with SC connector or SFP slot
- Transmission speed of 155Mbit/s
- Optional additional optical port for connection protection
- SM, MM, Ranges depending on the type of optical port: 15km, 50km
- For SFP version, optical parameters depending on the transceiver model (MM/SM/CWDM/DWDM)

### Power parameters:

- Supply voltage range: 12-60V DC, with galvanic isolation,
- External 230V AC power supply included (optional)
- Power consumption up to 4W
- Redundant power supply as standard
- Connector: terminal block, screw 2x2, angled for 2.5 mm cable<sup>2</sup>

### Mechanical parameters:

- Dimensions 103x77x53mm
- Weight up to 0.3 kg

Code

### BS-MC-5X-S

Line interface type with SC connector:  
S - 1310 nm SM/MM - range 15/5 km\*.  
M - 1310 nm SM - range up to 50 km  
SFP - interface realized by the SFP module

Local interface type:  
1 - 820/850nm MM - range up to 1.5 km, ST/PC connector - IEC103 standard support  
2 - 1310nm MM - range up to 2 km, SC/PC connector

#### Example designations:

**BS-MC-52-SFP** - Fiber optic security signal converter with local MM optical interface with 1310nm wavelength, SC connector and linear optical interface realized by SFP module. Power supply 10-36V DC.