Brief instruction *FLEXtra® FO 650*

Version

2en

Application and functional description

The FLEXtra® FO is primarily a normal PROFIBUS repeater with the capability of expansion by 2 (with FO-2) or 5 (with FO-5) additional optical MPI/PROFIBUS segments.
It translates an electrical MPI/PROFBUS interface into an optical MPI/PROFBUS interface and vice-versa.
It regenerates the edge steepness, level and duty cycle of signals. In addition it brings the advantages of optical signal transfer to the MPI/PROFIBUS network.

FLEXtra® FO 650-2:

Connector type BFOC, 650 nm, POF/PCF	700-996-2AA01
Connector type SMA, 650 nm, POF/PCF	700-996-2BA01
Connector type Versatile Link, 650 nm, POF/PCF	700-996-2CA01

FLEXtra® FO 650-5:

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Connector type BFOC, 650 nm, POF/PCF	700-996-5AA01
Connector type SMA, 650 nm, POF/PCF	700-996-5BA01
Connector type Versatile Link, 650 nm, POF/PCF	700-996-5CA01

1. The FLEXtra® FO is suitable for mounting on a DIN rail. It is engaged as shown in the picture.

2. A DIP switch is installed for deactivating the repeat function on the individual ports.
Furthermore, the DIP switch DIP 4 (FO-2) or DIP 7 (FO-5), can be used as the ON / OFF switch for all segments.

With optical ports, switching off a port does not mean that the send diode (Tx) is switched off, rather that the port can no longer receive data at the Rx input. Hence the repeater function of the port is deactivated.
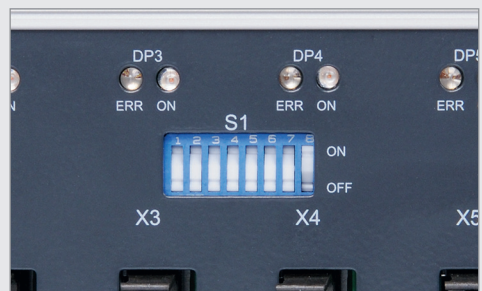
3. If port X1 of the FLEXtra® FO is at the start or end of a segment then termination on the POFIBUS connector must be switched on (ON).

If port X1 of the FLEXtra® FO is in the middle of a segment then termination on the PROFIBUS connector must be switched off (OFF).

The PROFIBUS is connected to the FLEXtra® FO via the SUB-D female connector. Connection of the optical segment is, dependent on type, via BFOC, SMA or Versatile Link connectors.

Termination is not required for the optical ports.

4. Connect the optical fibre cables to ports X2−X5 of the device. The following fibres can be used:

• **Polymeric Optical Fibre (POF):**
• 980/1000 µm
• Wavelength: 650 mm
• Loss approx 160 db/km

• **Polymer Cladded Fibre (PCF):**
• 200/230 µm
• Wavelength: 650 mm
• Loss approx 10 db/km

Note: If raw cable is to be used, please carry out steps A to C (PTO).

Connect the optical ports via a CROSS-OVER connection i.e. TxD fibre of the other end to the RxD connector of the FLEXtra® FO.
Connect RxD fibre of the other end to the TxD connector of the FLEXtra® FO.
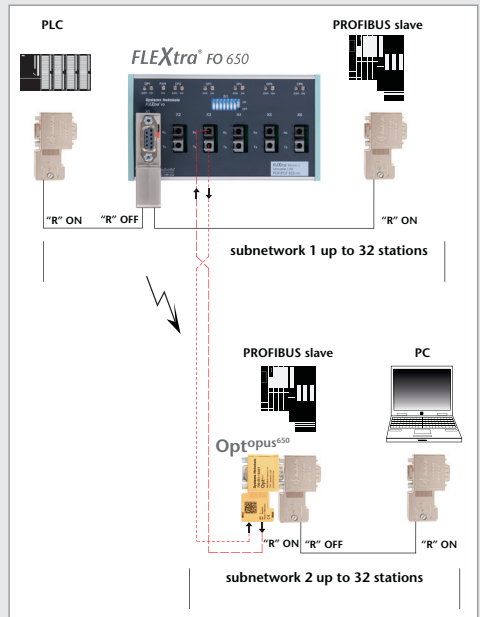
Technical Data FLEXtra® FO 650-2

Dimensions in mm (D x W x H)	35 x 70 x 72
Weight	approx. 125 g
Power supply	
• *Voltage*	+18 ... 30 V DC
• *Electrical isolation*	500 V
• *Current consumption*	
· *incl. 5V-consumer load*	max. 200 mA
· *incl. 24V-consumer load*	max. 400 mA

Technical Data FLEXtra® FO 650-5

Dimensions in mm (D x W x H)	35 x 137 x 72
Weight	ca. 250 g
Power supply	
• *Voltage*	+18 ... 30 V DC
• *Electrical isolation*	500 V
• *Current consumption*	
· *incl. 5V-consumer load*	max. 400 mA
· *incl. 24V-consumer load*	max. 600 mA

Technical Data both FLEXtra® FO

Output voltage port X1	
• *Voltage 1*	5 V, max. 150 mA
• *Voltage 2*	+18 ... 30 V DC, max. 200 mA (like supply voltage)
Permitted ambient conditions	
• *Ambient temperature in operation*	0°C ... +60°C
• *Transport and storage temperature*	-25°C ... +75°C
PROFIBUS interface	
Transmission rate	9.6 | 19.2 | 45.45 | 93.75 | 187.5 | 500 Kbps 1.5 | 3 | 6 and 12 Mbps automatic detection
Protocol PROFIBUS DP	according to EN 61 158-2:2011-09
Connection socket Port X1 Port X2–X5	SUB-D 9-pin BFOC, SMA, Versatile Link
Special features	Quality assurance according to ISO 9001:2008
Maintenance	maintenance-free, no battery
Optical interface	
Wavelength	650 nm
Numerical aperture transmit diode	0.50
Launchable optical output power / receiver sensitivity	
• *POF 980/1000 µm*	-7.5 dBm/-20 dBm
• *PCF 200/230 µm*	-18 dBm/-22 dBm
Over modulation limit receiver	-3 dBm
Bridgeable range	
• *POF 980/1000 µm (160 dB/km)*	up to 65 m
• *PCF 200/230 µm (10 dB/km)*	up to 250 m

A) Cutting the fibre

Slide the fibre into an opening of the cutting tool and press the blade down.

Note: each opening of the cutting tool may only be used for one cut of a cable.

B) Removing the Fibre Cladding

The length of fibre cladding to be removed is dependent on the type of fibre.

Versatile Link: approx. 3 mm
SMA: approx. 6 mm
BFOC: approx. 11 mm

Note: Only use the specially designed tool (not a copper cable stripper) as otherwise the cladding of the cable can be damaged leading to higher losses in the connector and thereby to reduced range of the cable.
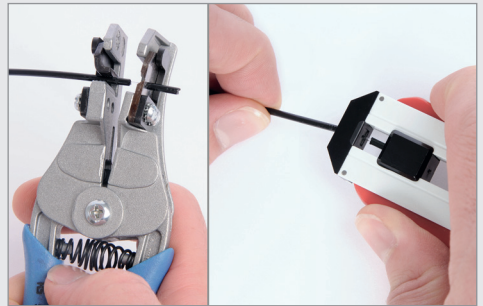
C) Connecting the connector to the fibre

BFOC/SMA connector:
Slide the connector over the fibre and screw the connector housing on with the lock nut.

Versatile Link connector:
Slide the connector onto the fibre and press the housing sides together until they lock.

Note: When attaching the connectors, make sure that the fiber ends flush with the connector at the front.
The transmit or receive diode may be damaged if the fiber protrudes.
Fixing the fiber too far inward can result in increased attenuation, shortening the transmission range of the system.


SMA connector

BFOC connector

Versatile Link connector

LED description

	LED			DIP switch	
	PWR	DP 1-6			
	-ON-	-ERR-	-ON-	1-3 (FO-2) 1-6 (FO-5)	deactivated 4 (FO-2) 7 (FO-5)
Baud rate is detected, the FLEXtra® FO is restarted	🟢	🟢	⚪	ON	ON
Automatic restart e.g. in the case of signal loss	⚪	🔴	⚪	ON	ON
FLEXtra® FO ready for operation, baud rate detected	🟢	🟢	🟡	ON	ON
Segment switched off	🟢	⚪	⚪	OFF	ON
Repeat function deactivated for all segments	🟢	🔴	⚪	ON	OFF
Repeat function deactivated for all segments + individual segments	🟢	⚪	⚪	OFF	OFF
Invalid telegrams are received	🟢	🔴	🟡	ON	ON
Port X1: there is a short circuit Port X2–X5: there is a continuous light signal (no data is being received)	🟢	🔴	⚪	ON	ON
Data is being received	🟢	🟢	🟡🟡	ON	ON

Legend

🟢 *LED flashes slowly*   🟢 *LED ON*

🟢 *LED flashes quickly*   ⚪ *LED OFF*

Note: if no baud rate is detected, the FLEXtra® FO restarts every 8 seconds. The restart takes approx. 2 seconds.

FLEXtra® FO 2: DIP switch 5 is for future features and is currently not used.
FLEXtra® FO 5: DIP switch 8 is for future features and is currently not used.