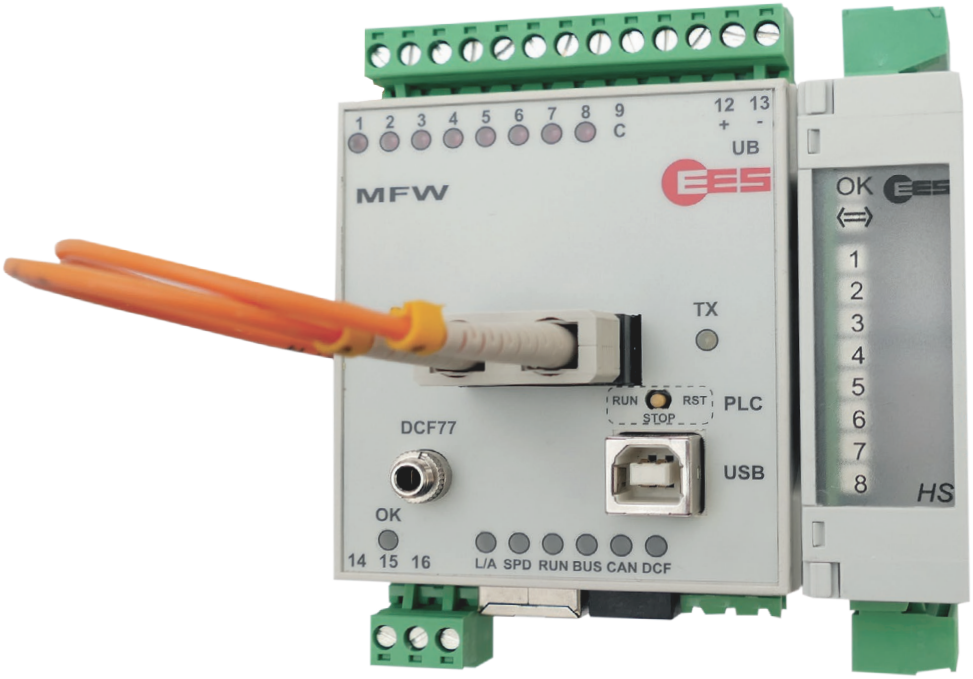
Modular optical fibre telecontrol system



Point to point data transmission via optical fibre

- Uni or bi-directional point to point data transmission
- Modular configuration for up to 32 I/O modules
- Distance up to 30 km dependent on optical fibre type
- Optical fibre (Multimode 50/125 µm) or Singlemode (9/125 µm)
- Extremely simple parameterization of the modules via DIP switches

Data sheet

26.04.2023

MFW-LWL-DB-UK-008

Functional description

The fibre optic variant of the MFW modular telecontrol system was developed for data transmission on fibre optic cables. The use of optical fibres as transmission medium ensures a robust interference-free transmission over long distances. A separate fibre optic cable is used for each transmission direction. Two versions are available for coupling the different fibre optic cable types:

1. Multimode fibres with 50/125 µm or 62,5/125 µm core/cladding diameter. Wavelength 1300 nm
2. Single mode fibres with 9/125 µm core/cladding diameter. Wavelength 1310 nm

The bridgeable distance depends on the used fibre type, connector and splice losses and can be up to 30 km. For the fibre optic coupling to the base modules, connectors of the type connector SC-duplex according to standard IEC 60874-13 are used in all versions.

The following table gives guide values based on typical values. The actual range needs to be determined based on the attenuation values of the used components (fibre optics, connector, number of splices, ...).

Optical fibre type Core/cladding diameter	Wavelength	Budget min. / typ.	Typical optical fibre attenuation	Connector/ splice reserve	Transmission range min./typ.
Single mode 9/125 µm	1310 nm	12 dB / 18 dB	0,4 dB / km	6 dB	15 km / 30 km
Multimode 50/125 µm	1300 nm	11 dB / 15 dB	0,5 dB / km	4 dB	14 km / 22 km

A basic module is required in each station. In the minimum configuration, the telecontrol system in each station consists of one of these basic modules. The basic module contains the following function groups, display and setting elements:

- Internal fiber optic modem (single or multimode)
- USB-B socket (service and diagnostic interface)
- I/O module with 8 relay outputs or 8 binary inputs
- RJ45 socket (not used in this version)
- RJ11 socket (system bus based on CAN bus) for connection of expansion modules
- LEDs and a relay contact for monitoring the device status
- DIP switches for setting module number etc.

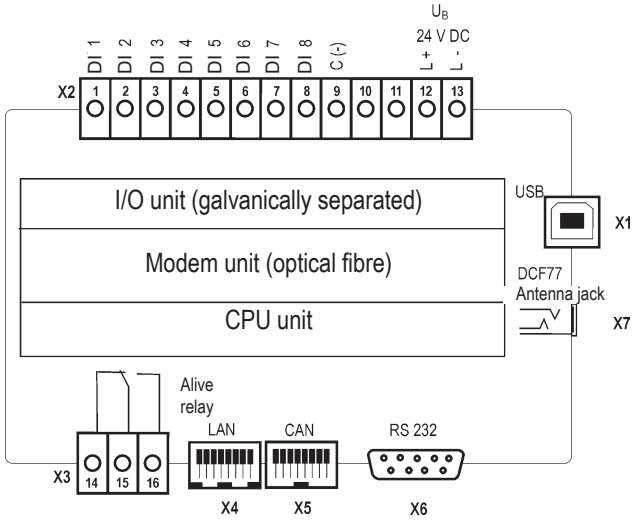
The data scope of the basic modules can be increased by expansion modules that can be connected to the system bus. How many expansion modules can be connected per station depends on the respective design variant.

The system constantly monitors the data connection. In the event of a fault, this is signaled in both stations via LED and relay contact. Via the service and diagnostic interface of the basic modules, additional diagnostic data (error codes) can be additional diagnostic data (error codes, transmission quality, etc.) can be queried via the terminal program.

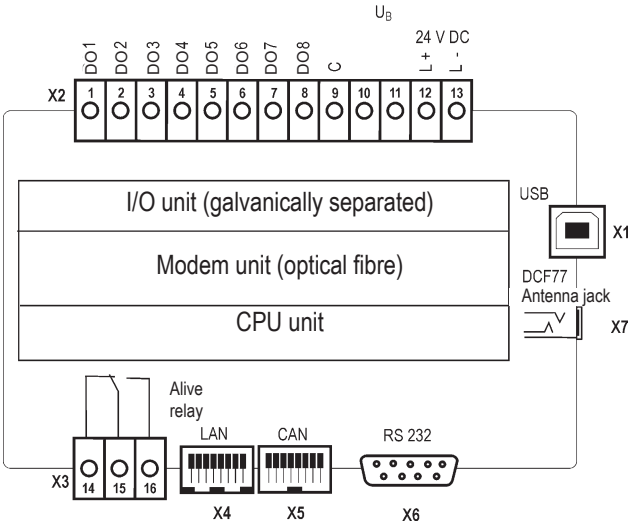
To extend the I/O range, each basic module can be upgraded with a maximum of 15 extension modules.
These modules are connected to the basic module using the system bus cable supplied. For further information can be found in the separate data sheet of the expansion modules.

For easier handling, the system is parameterized via DIP switches.

Terminal assignments

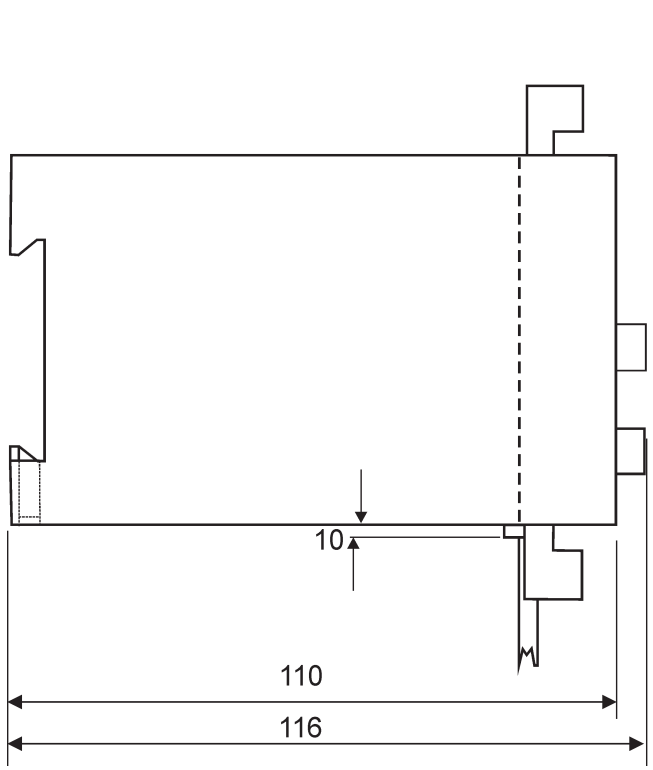


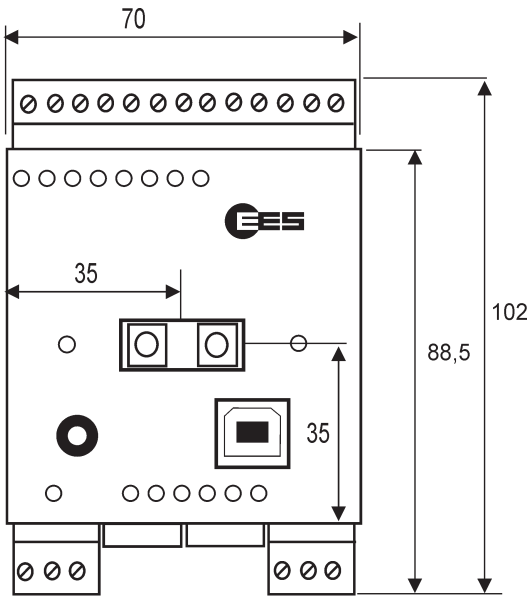
Basic module with 8 digital inputs



Basic module with 8 output relays

Dimensional drawing





Dimensions in mm
Basic module

Technical data

General data	
Mounting	on C DIN rail TS35 acc. to EN60715
Housing / protection class	ABS / IP 40
Connection terminals	pluggable
Conductor cross section rigid or flexible	
without wire end sleeves	0,2 ... 2,5 mm^2
with wire end sleeves	0,25 ... 2,5 mm^2
Operating and ambient temperature	-20 °C ... + 60 °C
Humidity	maximum 95 % non-condensing
Optical fibre	
Plugs	sockets type SC-duplex acc. to norm IEC 60874-13
Signal delay	< 100 ms
Budget minimal/typical	
Singlemode-OF @1310 nm with 9/125 µm-OF	12 dB / 18 dB
Multimode-OF @1300nm with 50/125 µm-OF	11 dB / 15 dB
Systembus	
Plug	RJ11 based on CAN-Bus
Distance	maximum 10 m
Operating voltage	
Rated operating voltage U_{Sup}	24 V DC
Operating voltage range	20 ... 32 V DC
Basic module with 8 DI	
Power consumption (only basic module)	approx. 2,5 W
Signal voltage U_S	
Rated voltage	24 V AC/DC
maximum voltage	48 V
minimum voltage for High state	14,5 V DC / 19,0 V AC
maximale voltage for Low state	9,5 V DC / 6,5 V AC
Input resistance	approx. 10 kΩ
maximum counter frequency	10 Hz *1
minimum pulse width	50 ms *1
Galvanic isolation between signal and supply voltage	4 kV_{eff}

Technical data

Basic modules with 8 relay outputs	
Power consumption (only basic module)	maximum 3,5 W
Contact rating of the relay outputs*2	
minimum	1,2 V / 1 mA (Suitable for controlling LEDs)
maximum	250 V AC / 400 mA 250 V AC / 2 A (pure resistive load) 30 V DC / 2 A 110 V DC / 0,2 A 220 V DC / 0,1 A
Total current 230 V AC	maximum 8 A (pure resistive load)
Counter frequency	12 Hz*2
Pulse width / Pause	40 ms*2
Galvanic isolation between output and supply voltage	4 kV_{eff}

Electromagnetic compatibility acc. to
EN 61000-6-2
EN 61000-6-4 + A1
EN 61000-4-2
EN 61000-4-3 + A1 + A2
EN 61000-4-4
EN 61000-4-5 + A1
EN 61000-4-6
EN 61000-4-29

*1 We recommend to not operate pulse inputs with AC voltage, but only with DC voltage.
*2 Other values on demand

Unless specified otherwise, the specifications for AC voltage refer to a sinusoidal AC voltage with a frequency of 50/60 Hz.

For the specification of the extension modules, see separate data sheet.

Technical changes reserved

Order identification

Multimode 50/125 µm-Optical fibre @1300 nm, plugs SC-duplex acc. to norm IEC 60874-13

Master modules / Substation modules

Article number	Type	Module type / Process interface
97BLEGANBBB3	MF-L1M1C-G8DEX-DIA-B-BB-3	Master / 8 digital inputs 24 V
97BLEGCNBBX3	MF-L1M1C-G8DAR-DIA-B-BX-3	Master / 8 relay outputs
97HLEGANBBB3	UF-L1M1C-G8DEX-DIA-B-BB-3	Substation / 8 digital inputs 24 V
97HLEGCNBBX3	UF-L1M1C-G8DAR-DIA-B-BX-3	Substation / 8 relay outputs

Singlemode 9/125 µm-Optical fibre @1310 nm, plug SC-duplex acc. to norm IEC 60874-13

Master modules / Substation modules

Article number	Type	Module type / Process interface
97BLDGANBBB3	MF-L1S0C-G8DEX-DIA-B-BB-3	Master / 8 digital inputs 24 V
97BLDGCNBBX3	MF-L1S0C-G8DAR-DIA-B-BX-3	Master / 8 relay outputs
97HLDGANBBB3	UF-L1S0C-G8DEX-DIA-B-BB-3	Substation / 8 digital inputs 24 V
97HLDGCNBBX3	UF-L1S0C-G8DAR-DIA-B-BX-3	Substation / 8 relay outputs

Extension modules

Article number	Type	Module type / Process interface
97AXXGAXBBB3	EM-G8DEX-B-BB-3	8 DI, signal voltage 24 V
97AXXGAXBBE3	EM-G8DEX-B-BE-3	8 DI, signal voltage 60V
97AXXGAXBBF3	EM-G8DEX-B-BF-3	8 DI, signal voltage 110V
97AXXGAXBBU3	EM-G8DEX-B-BU-3	8 DI, signal voltage 230V
97AXXGCXBBX3	EM-G8DAR-B-BX-3	8 relay outputs
97AXXGEXBBX3	EM-G4AE0-B-BX-3	4 analog inputs 0 ... 20 mA or 0...10 V
97AXXGIXBBX3	EM-G4AA0-B-BX-3	4 analog outputs 0 ... 20 mA or 0...10 V

Older MFW extension modules that do not have a "B" at position 10 and a "3" at position 15 in the type designation (EM-G8DEX-B-BB-3) cannot be operated on the MFW basic modules with optical fibre modem.

Accessories

Connection cables to PC or laptop, power supplies, buffer chargers incl. battery packs

Contact

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