



Modular optical fiber telecontrol system Point-to-multipoint



➔ Point-to-multipoint data transmission via fiber optic cables

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1 Validity

This description applies to the following MFW modules:

Item number	Type	Version
97BLGGDNBBB4	MF-L1S0L-G4E4R-DIA-B-BB-4	19AC0081.000.2.0
97BLGGDNBBE4		19AC0081.000.2.0
97BLGGDNBBF4		19AC0081.000.2.0
97BLGGDNBBJ4		19AC0081.000.2.0
97HLGGDNBBB4	UF- L1S0L-G4E4R-DIA-B-BB-4	19AC0083.000.2.0
97HLGGDNBBE4	UF- L1S0L-G4E4R-DIA-B-BE-4	19AC0083.000.2.0
97HLGGDNBBF4	UF- L1S0L-G4E4R-DIA-B-BF-4	19AC0083.000.2.0
97HLGGDNBBJ4	UF- L1S0L-G4E4R-DIA-B-BJ-4	19AC0083.000.2.0

The description of the parameterization software refers to version 2.3.22 or higher.

2 General information

2.1 Additional instructions



Note

These instructions enable safe and efficient handling of the modular remote control system (hereinafter referred to as "MFW", "device" or "module"). The instructions are part of the devices and must be kept in the immediate vicinity of the devices so that they are accessible to personnel at all times.

Personnel must have carefully read and understood these instructions before starting any work. Compliance with all safety instructions and operating instructions in these instructions is a basic prerequisite for safe working. In addition, the local accident prevention regulations and general safety regulations for the area of application of the device apply.

Illustrations in these instructions are for basic understanding and may differ from the actual design.

2.2 Use

These instructions are a prerequisite for the safe installation and operation of the product and must be read and understood before installation.

2.3 Target group

This manual is written for qualified specialists (electricians) who, due to their professional training, knowledge, and experience, as well as their knowledge of the relevant standards and regulations, are able to carry out work on electrical systems and independently recognize and avoid potential hazards.

The qualified electrician is specially trained for the working environment in which they operate and is familiar with the relevant standards and regulations.

2.4 Explanation of symbols

Safety instructions are indicated by symbols in these instructions. The safety instructions are preceded by signal words that express the extent of the hazard.



Warning!

This combination of symbol and signal word indicates an immediately dangerous situation that will result in death or serious injury if not avoided.

**Note**

This combination of symbol and signal word indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

**ENVIRONMENTAL PROTECTION!**

This combination of symbol and signal word indicates potential hazards to the environment.

Tips and recommendations



This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Additional markings

The following symbols are used in this manual to highlight instructions, results, lists, references, and other elements:

Symbol	Explanation
	Step-by-step instructions
	Results of action steps
	References to sections of this manual and to other applicable documents
	Lists in no particular order
[Buttons]	Control elements (e.g., buttons, switches), Display elements (e.g., signal lights)
"Display"	Screen elements (e.g., buttons, function key assignments)

Important passage



This symbol indicates particularly important information.

Cross-reference



This symbol refers to illustrations and other sections of this documentation or to further reading.

2.5 Safety instructions

2.5.1 Intended use

The telecontrol devices are intended exclusively for the applications described in this manual and may only be used under the conditions described in the Technical Data chapter. Any use beyond the intended use or any other use is considered misuse.



WARNING!
Danger in case of misuse!
Misuse of the telecontrol devices can lead to dangerous situations.

- Never use the devices in hazardous areas.
- Never use devices in areas with equipment that is susceptible to interference without observing the special regulations for this.
- The devices must not be opened or modified improperly.

2.5.2 Storage of the manual



The instructions must be stored within easy reach of the device and be accessible to personnel.

2.6 Customer service

Our customer service is available for technical information:

Address	Elektra Elektronik GmbH & Co Störcontroller KG Hummelbühl 7-7/1 71522 Backnang
Phone	+ 49 (0) 7191/182-0
Fax	+49 (0) 7191/182-200
Email	info@ees-online.de
Website	www.ees-online.de

We are also always interested in information and experiences resulting from the use of our products that could be valuable for improving them.

2.7 Copyright, trademark rights

Copyright protection

This manual is protected by copyright.

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3 Functional description

3.1 System descriptions

The multipoint version of the MFW modular remote control system based on fiber optics was developed for the fast transmission of switching commands and messages. Typical applications include, for example, rapid shutdowns of power generation plants and drive circuits at railway substations.

This variant of the MFW can be used both as point-to-point transmission between the master and substation and as a point-to-multipoint connection between a control center (master) and up to 31 substations. In point-to-point transmission, a direct fiber optic connection is established between the two devices. For multipoint transmission, an additional fiber optic splitter is required at the master for the incoming and outgoing transmission directions.

Bidirectional transmission

The system consists of a control center (master) and 1 to 31 substations. The 4 inputs of the control center are transmitted and output in parallel to the outputs of all substations within less than 10 ms. This value applies when using output relays. By using the transistor output option, this time can be reduced to 5 ms. The 4 inputs of the connected substations are transmitted to the control center as feedback and output there as an "AND" or "OR" link of all stations. This means that the inputs E1 of all substations are linked to output A1 at the control center. The inputs E2 to E4 of all substations are each linked to outputs A2 to A4. The runtime of the feedback from the substations to the control center depends on the configuration of the system. Each substation requires 10 ms. This means that with a full configuration of 31 substations, the maximum runtime for the feedback from all substations is 310 ms.

In the event of a fault, the system detects the faulty communication and reports it via the OK LED and the fault signal contact both in the control center and in the affected substations. Once the cause of the fault has been rectified, normal operation is automatically resumed.

Unidirectional transmission

In unidirectional transmission, only one fiber optic cable is used to send commands to the substations. This type of transmission is used when feedback from the substations is not required or is provided via an alternative signal path. In this case, the expansion is not limited to 31 substations. The limit is determined solely by the number of transmission paths available in the fiber optic system used (e.g., the splitters used) and the attenuation resulting from all components.

In the case of unidirectional transmission, a communication fault (interruption of the fiber optic connection) is only monitored and detected in the substations and reported via the OK LED and fault signal contact.

Configuration and parameterization

The devices are easily configured using the DIP switches on the underside of the modules. If necessary, advanced system diagnostics can be performed via laptop or PC using the existing USB interface or network connection.

For most applications, the basic configuration of the system via DIP switches is completely sufficient. Only for special functions is parameterization carried out using a Windows-based PC program via the network or USB interface. Advanced system diagnostics can also be performed via these interfaces.

3.2 Transmission medium: fiber optic cable

The use of fiber optic cables as the transmission medium ensures robust, interference-free transmission over long distances. A separate fiber optic cable is used for each transmission direction. Two versions are available for connecting the different types of fiber optic cables:

1. Single-mode glass fibers with 9/125 µm core-cladding diameter. Wavelength 1310 nm
2. Multimode fibers with 50/125 µm core-cladding diameter. Wavelength 1310 nm

For fiber optic coupling to the modules, LC duplex connectors are used in all versions. LC duplex connectors are used for fiber optic coupling to the modules.

The bridgeable distance is determined by the transmission power, the sensitivity of the receiver, and the losses of the entire transmission path. Particular attention must be paid to the attenuation of the fiber optic splitters used. The difference between the transmission power and the receiver sensitivity is referred to as the budget. The budget corresponds to the maximum permissible losses on the transmission path with which data transmission is still possible without reserves.

The possible range is calculated as follows:

$$\text{Range [km]} = (\text{budget [dB]} - \text{reserve [dB]}) / \text{fiber optic attenuation [dB/km]}$$

When designing a transmission path, the budget can never be fully utilized; reserves must be maintained for additional splices required for repairs, for example. The following table provides guidelines for the range based on typical values. The actual range must be determined based on the attenuation values of the components used (splitters, fiber optics, connectors, number of splices, any splitters used, etc.)!

Optical fiber type Core/cladding diameter	Wavelength	Budget min. / max.	Typical optical fiber attenuation	Connector/splice reserve	Maximum range
Single mode 9/125 µm	1310 nm	30 dB / 35 dB	0.4 dB/km	6 dB	60 km
Multimode 50/125 µm	1310 nm	10 dB / 18 dB	0.5 dB / km	4 dB	2 km

Table 3-1: Maximum range values for a fiber optic connection based on typical values

Transmission can take place both as point-to-point transmission between the master and substation and as point-to-multipoint connection between a central station (master) and up to 31 substations.



Figure 3-1: Principle of bidirectional point-to-point transmission as a direct fiber optic connection

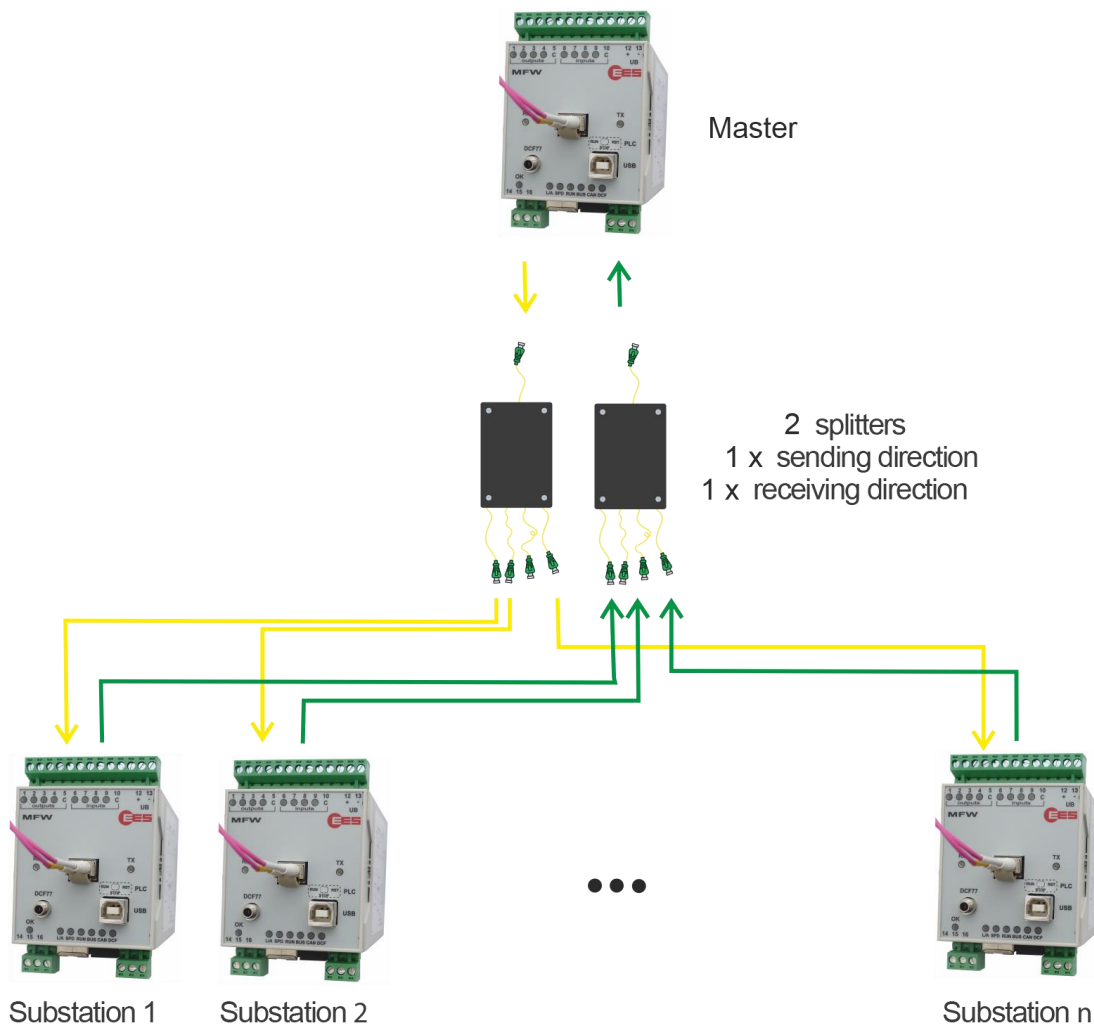


Figure: 3-2: Principle of bidirectional point-to-multipoint transmission using 2 fiber optic splitters

The image above shows the principle of bidirectional fiber optic transmission between a master and up to 31 substations. The following criteria must be taken into account when selecting splitters:

1. Optical fiber type
2. Total attenuation of the splitter, the connecting elements, and the optical fiber for the selected fiber optic type
3. Connector type
4. The number of connected substations

3.3 Inputs and outputs

3.3.1 Digital inputs

Each module has 4 binary inputs. The current status of the input is recorded during each transmission. To ensure that a status change is transmitted reliably, the status must be present for longer than the cycle time.

3.3.2 Binary outputs

The modules can have 4 relay outputs or, optionally, 4 transistor outputs.

In the factory setting, the states of the outputs remain at the last valid value when transmission is interrupted. Alternatively, the outputs can be configured via DIP switches so that they assume the intrinsically safe state "0" (relay contact open or transistor output at potential "C_(A)") when transmission is interrupted.

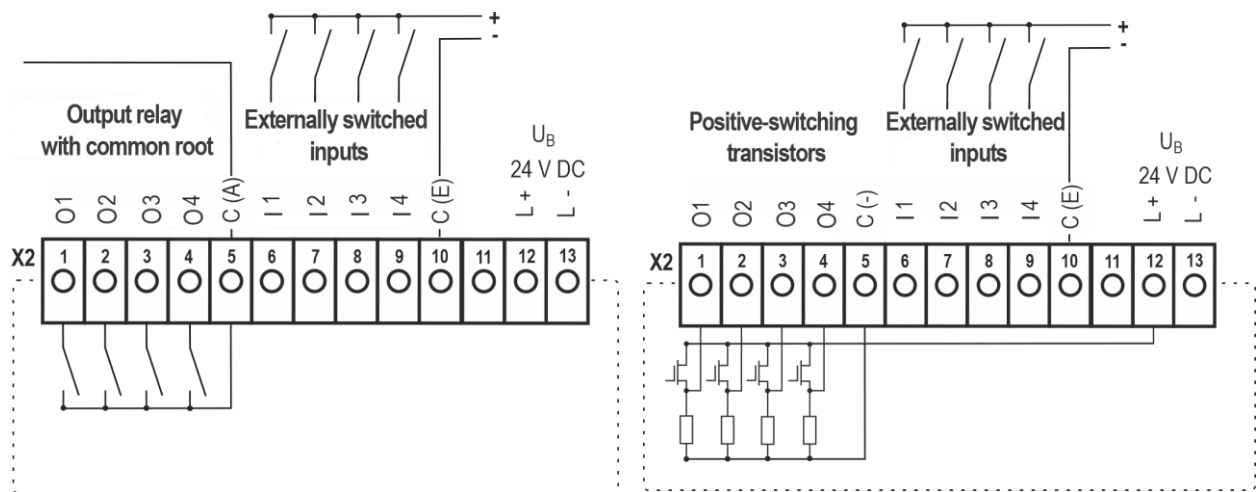


Figure 3-3: Circuit example of the inputs and outputs in the module variants with output relay and with output transistors

3.4 Interfaces of the modules

The modules have the following interfaces:

- USB-B socket Parameterization and diagnostic interface
- RJ11 socket System bus (not used in this version)
- RJ45 socket Ethernet

The USB interface is located on the front, the system bus and Ethernet on the bottom of the devices.

3.4.1 USB interface

The USB interface serves two purposes:

Parameterization	- Parameterization of special parameters via PC program
Diagnostics	- Simple diagnostics and fault localization of the telecontrol system using using a terminal program (e.g., Hyperterminal in Windows or MFW Commander)

To use the USB interface as a service or diagnostic interface, the terminal program used must be set to the following values:

- 115200 baud
- 8 bits
- 1 start bit
- 1 stop bit
- No parity
- No flow control

3.4.2 Ethernet connection

This interface can be used as a parameterization and diagnostic interface as an alternative to the USB interface. The interface is deactivated in the delivery state and must first be activated via parameterization using the USB connection. Please refer to the sections of this manual that describe the interface settings.

3.5 Connections, indicator lights , and DIP switches

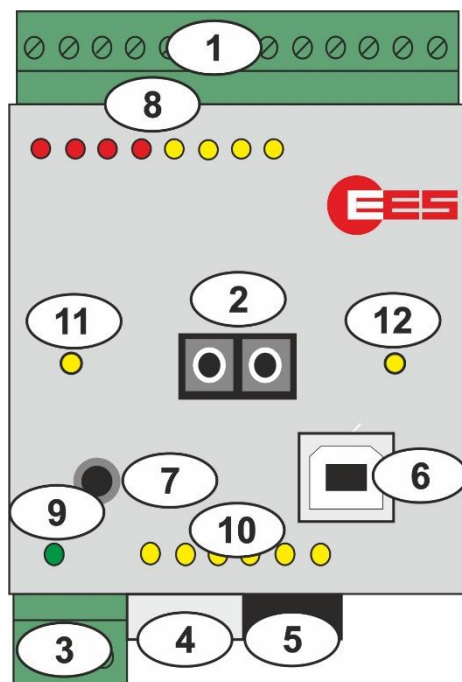


Figure 3-4: Front of a module

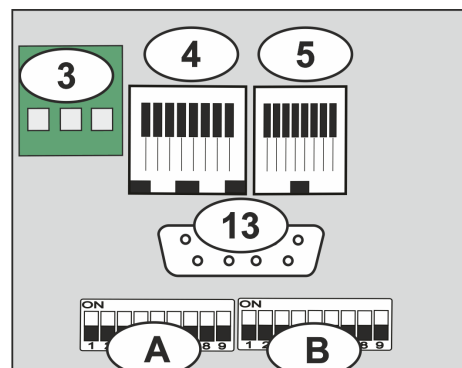


Figure 3-5: Bottom of the module

- [1] Terminal X2 (galvanic I/Os and operating voltage)
- [2] Sockets (LC duplex fiber optic connectors)
- [3] Terminal X3 (fault indicator relay)
- [4] RJ45 socket X4 (LAN interface)
- [5] RJ11 socket X5 (system bus)
(not used in this version)
- [6] Socket X1 USB interface
- [7] Socket X7 (for DCF77 active antenna)
- [8] Indicator lights
Outputs red
Inputs yellow
Light up when a signal is present.
- [9] "Operating status" indicator light (green)
Steady light - No error
Off - No supply voltage or
Module defective
Flashing - Error
(→ , section "Diagnostic functions")
- [10] 6 status LEDs (yellow)
L/A - Off, no connection to the network
- flashing, activity on the network connection
(CRS active)
SPD - Off, no network connection or
network 10 Base-T
- on, network connection 100 Base-T
RUN - not used
BUS - Fiber optic connection*¹
CAN - not used
DCF - Not used

- [11] Status LED RX (yellow)
LED lights up when data is received via fiber optic cable
- [12] Status LED TX (yellow)
LED lights up when data is sent via fiber optic cable

[13] RS232 socket (not used in this version)

[A & B] DIP switch for configuration (→ Configuration chapter)

*1 Master: LED is off when a continuous signal is present at Rx.
Substation: LED is off when there is no Rx connection.

3.6 Diagnostic functions

Various diagnostic information is available for monitoring and evaluating system functions. This includes, for example, the signaling of system errors via LED and relay contact or further information via the diagnostic interface.

3.6.1 "Operating status" indicator light and fault signal relay

The green "Operating status" indicator light provides information about the current status of the station or system:

- | | |
|------------------------------|---|
| • Steady light | = no error |
| • Flashing | = error (→ , section "Error codes") |
| • Off | = no power supply |
| • Fast flashing (flickering) | = Transferring or saving new parameters |

A flashing sequence consists of:

- Number of long flashes → 1st digit of the error code
- Number of short flashes → Second digit of the error code
- Pause

Example: long, short, short, short, pause = error code 13



If several errors occur simultaneously, the one with the highest priority is always displayed.

In addition to the "Operating status" indicator light, a relay with changeover contact signals the status of the station. (The status of the entire system is signaled on the master module).

Contact 14/15 closed - Power failure or error (→ , section "Error codes")

Contact 15 / 16 closed - No error

3.6.2 Error codes

The error numbers listed in the following table correspond to the flashing sequences of the "Operating status" indicator light.

Example:

Error 13 - Error at substation
Flashing sequence of the indicator light - long, short, short, short, pause

The following table lists the error codes for all modules. However, some errors can only occur on certain modules (master or substation).

Error number	Error	Comment
13	Error in substation	An error is reported in the substation
15	Station not accessible	The respective master or substation cannot be reached (connection interrupted).
16	No connection → substation master	There is a continuous signal, so no substation can transmit.
17	Poor connection	→ Master substation
65	LAN error	No connection to LAN
68	NTP error	No connection to NTP server
94 / 95	Memory error	If this error occurs, the module must be sent to the manufacturer for inspection.

Table 3-2: Error codes

3.6.3 Diagnosis via USB interface

Additional information about the system status can be obtained via the USB interface using a terminal program (e.g., MFW Commander or hyper terminal). The interface parameters of the terminal program must be set as follows:

- 115200 baud
- 8 bits
- 1 start bit
- 1 stop bit
- No parity
- No flow control

3.6.4 Diagnosis via Ethernet

Diagnostic commands can also be issued and diagnostic data queried via the network connection using the programs mentioned above (e.g., MFW Commander or hyper terminal).



When delivered, the modules do not have an IP address and the Telnet port is deactivated. Both must first be specified or activated in the parameterization via the USB interface. (→ , sections "IP Address" and "Telnet Port Activation" in the Parameterization chapter of this document)



Please note the network settings on your PC and the configuration of your network.

3.6.5 Diagnostic commands

This section lists the commands that can be used to query diagnostic information. Upper and lower case letters in the command are ignored. The commands must be terminated with <ENTER>.

Command /Syntax	Function
f<No.>	f - Output of currently pending errors (error codes) f<No.> - Outputs the error text associated with error number <No.> <i>Example:</i> f<ENTER> → "Error: 15" f15<ENTER> → "Error: Station not accessible"
hl hl<n>	Output of the entire history or the most recent entries <i>Example:</i> hl5 → Output of the last 5 entries in the history hl → Output the entire history hl0 → Stops outputting the history
s	Outputs the DIP switch settings of the module as a 0/1 sequence 1 = ON, 0 = OFF <i>Example:</i> Switch= <10000000 >,<10000000 > < SA1 – SA8>< SA9,SB1 – SB7> <i>The positions of switches SB8 and SB9 are not output.</i>
i	Output of the station address or number of connected substations <i>Master example:</i> Number of substations =1 Module number 0 <i>Example substation:</i> Substation no. = 1 Module number = 0 <i>Note: With this device variant, module number 0 is always used and also output.</i>
n	Output of the hardware serial number
t	Reading parameters t52 Serial number of the module t53 Software version number

Table 3-3: Diagnostic commands

3.7 Terminal assignment

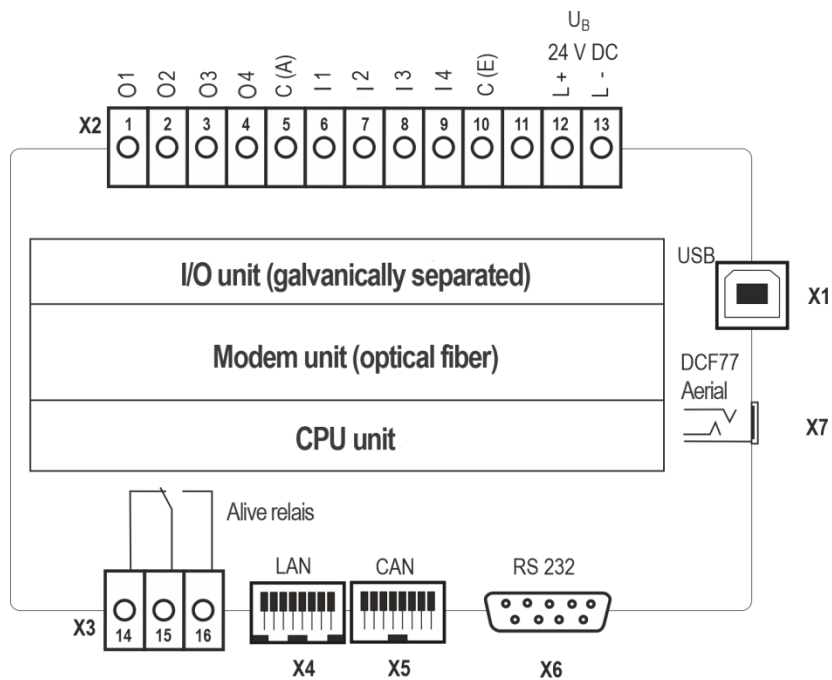


Figure 3-6: Terminal assignment of the module with 4 digital inputs and 4 outputs

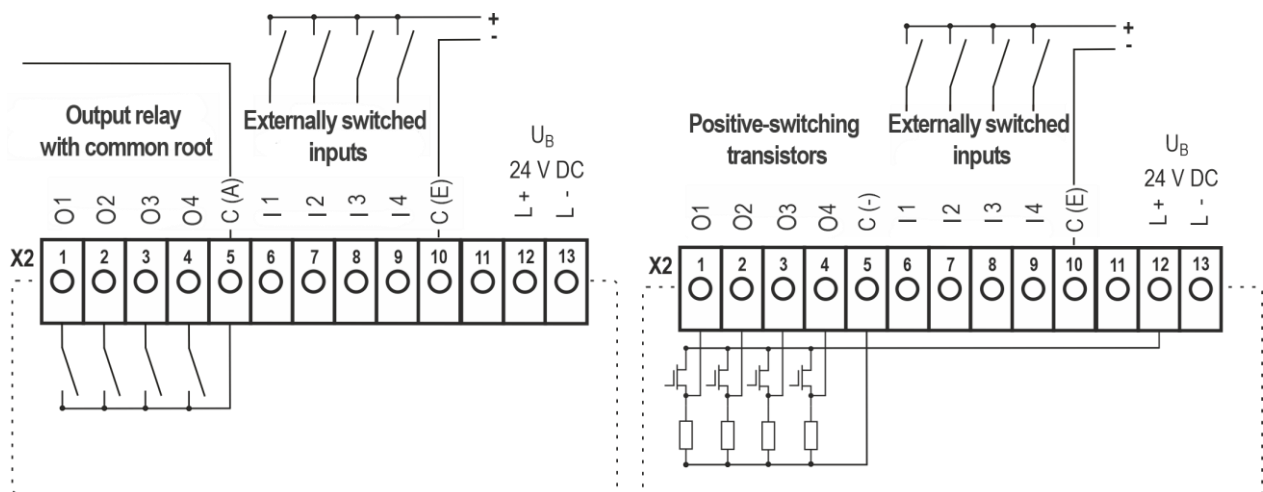


Figure 3-7: Circuit example of the inputs and outputs in the variants with output relay and with output transistors

3.8 Dimensional drawing

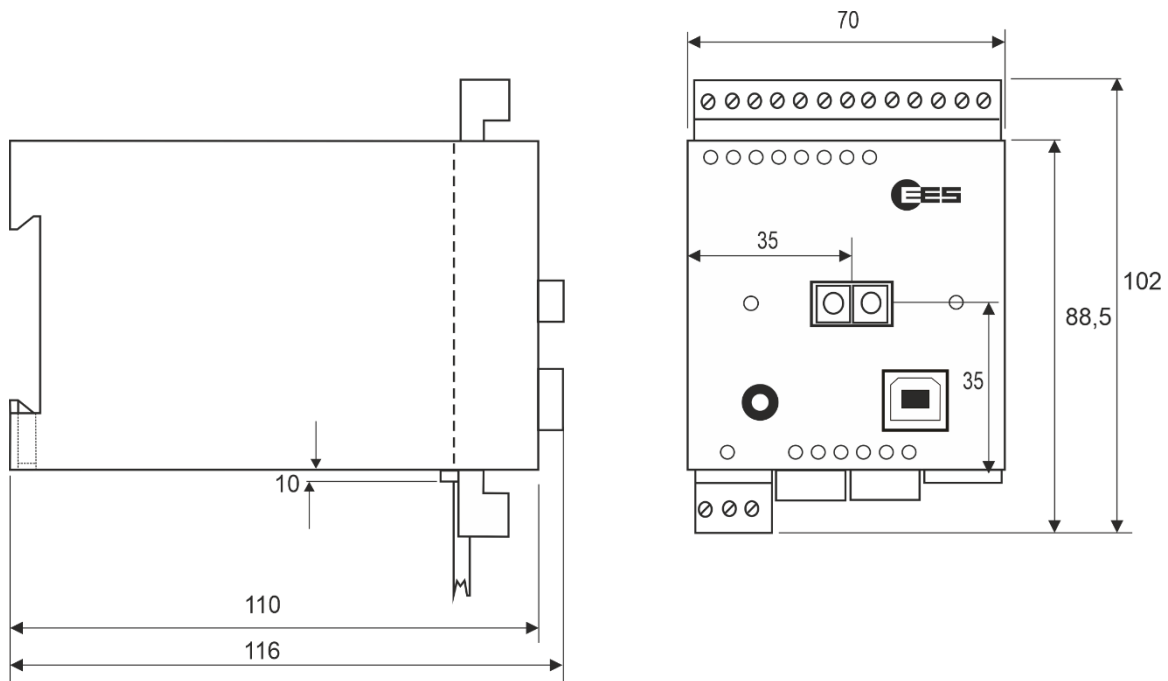


Figure 3-8: Dimensional drawing of the modules



Please observe the minimum bending radius of the optical fiber used during installation.

3.9 Technical data

General data

Mounting	On TS35 C-rail according to EN60715:2001-09
Housing / Protection class	ABS / IP 40
Weight	approx. 320 g
Connection terminals	Pluggable
Conductor cross-section rigid or flexible without ferrules	0.2 ... 2.5 mm ²
with wire end ferrules	0.25 ... 2.5 mm ²
Operating and ambient temperature	-20 °C ... + 60 °C
Humidity	Maximum 95% non-condensing

Operating voltage

Nominal operating voltage U_B	24 V DC
Operating voltage range	20 ... 32 V DC
Power consumption	approx. 3.5 W

Optical fiber

Optical fiber connectors standard	2 LC duplex sockets according to IEC 61754-20
Signal delay Master → Substation with relay outputs	< 10 ms
with transistor outputs	< 5 ms
Signal delay substation → master	< n x 10 ms (n = number of substations on the master)

Version for single-mode fiber optics @1310 nm

Minimum/maximum budget with 9/125 µm fiber optic cable	30 dB / 35 dB
--	---------------

Version for multimode fiber @1310 nm

Budget minimum/maximum with 50/125 µm fiber optic cable	10 dB / 18 dB
---	---------------

Relay outputs

Contact rating of relay outputs*1	
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 (purely resistive load)
Galvanic isolation between output and supply voltage	4 kV _(eff)

Transistor outputs

Type of transistor outputs	Positive switching transistors
Load capacity of transistor outputs	Maximum 100 mA per output
Galvanic isolation between output and supply voltage	None

Inputs

The inputs can be designed for different signal voltages U_s . The corresponding voltage is specified by the 23rd digit of the type designation

Signal voltage U_s	Voltage code			
	B	E	F	J
Nominal voltage	24 V AC/DC	60 V AC/DC	110 V AC/DC	220 V AC/DC
Maximum input voltage	48 V	75 V	130 V	255 V
Input voltage DC				
Maximum low state	9.5 V DC	12.5 V DC	22.0 V DC	58.0 V DC
Minimum high state	14.5 V DC	19.5 V DC	35.0 V DC	92.0 V DC
Input voltage AC				
Maximum low state	6.5 V AC	9.0 V AC	15.0 V AC	40.0 V AC
Minimum high state	19.0 V AC	25.0 V AC	45.0 V AC	120.0 V AC
Input resistance	10 k Ω	22 k Ω	68 k Ω	180 k Ω

Galvanic isolation between
signal and supply voltage 4 kV_(eff)

EMC compatibility according 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 will be happy to provide you with more detailed specifications on request.

Unless otherwise specified, the specifications for AC voltage refer to a sinusoidal AC voltage with a frequency of 50/60 Hz and all specifications refer to an ambient temperature of 25 °C.

The devices are designed and manufactured for industrial use in accordance with EMC standards.



The devices are designed and manufactured for industrial use in accordance with EMC standards.



Note!

Incorrect use (e.g., deviations from the specified values for temperature, supply voltage, or signal voltage) can cause damage to the devices.

Subject to technical changes

4 Assembly and installation



Warning!

The devices may only be installed by qualified personnel (electricians) with the operating voltage switched off.

1. Unpack all modules of the transmission system and check them for transport damage. Report any transport damage immediately to the responsible transport company. Please check the delivery for completeness using the delivery note.



The delivery may consist of a master module and substation modules.

2. Select installation locations for the individual stations.
3. Configure the modules → Chapter "Configuration via DIP switch".
4. Secure the modules to the mounting rail.
5. Connect the input and output cables according to the terminal assignment.



The length of the input and output cables should not exceed 3 m.

6. Connect the power supply to the module. The expansion modules are powered via the system bus cable.



The length of the supply cables should not exceed 10 m.

7. Connect the fiber optic cables.



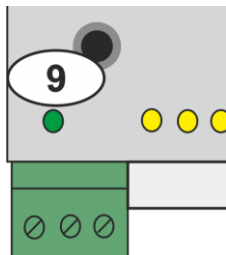
The devices and patch cables have protective caps for the fiber optic cables. Please remove these just before plugging in the patch cables. If only unidirectional transmission is used, cover the free plug connection with optional individual dust caps. Dust deposits on the fiber optic cables or in the sockets lead to attenuation or, in the worst case, make the data connection impossible.

8. Switch on the power supply.
9. If necessary, configure the remote control system (→ , see the relevant chapter "Configuration via PC").

10. Switch on the power supply. The transmission system is ready for operation when the LEDs are in the following state.

LED	Color	Status
Operating indicator "OK"	Green	Steady light
TX/RX	Yellow	Fast flashing light

Table 4-1: Status of the LED indicators when the transmission system is functioning properly



If the green "Operating status" LED on the module flashes, there is a fault. (→ section "Error codes").

5 Configuration via DIP switch

The most important settings for the devices can be made using the DIP switches located on the underside of the modules.

In bidirectional operation, the transmission system consists of a central unit (master) and 1 to 31 substations. Each station is assigned a station number. Each station number may only be assigned once in the system.

In unidirectional transmission, only one fiber optic cable is used to send commands to all substations simultaneously. There is no feedback from the substations. In this case, the expansion is not limited to 31 substations. Zero substations are set on the master and station number 0 is set on all substations.

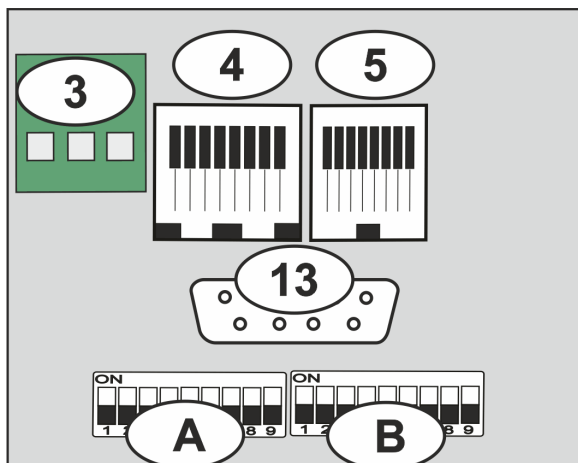


Figure 5-1: Underside of the modules

DIP switch	Meaning	Values
A1 – A9	Not used	OFF
B1 – B5	Master: Number of substations Substation: Station number	See table
B6	Master: Linking of outputs with "OR" or "AND" function Substation: not assigned	OFF – "OR" link ON - "AND" link
B7	Intrinsically safe state of the outputs in the event of communication interruption	OFF – off ON - on
B8 – B9	Not used	OFF

Table 5-1: Meaning of the module's DIP switches



The number of substations or station numbers is set using binary coding.

Number of substations / Station number	B1 $2^0 = 1$	B2 $2^1 = 2$	B3 $2^2 = 4$	B4 $2^3 = 8$	B5 $2^4 = 16$
0 (unidirectional operation)	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF
31	ON	ON	ON	ON	ON

Table 5-2: Example settings for the number of substations (master) or station number (substation)

6 Parameterization

The MFW parameterization program was developed to make it as easy and convenient as possible to configure the optional settings of the MFW via a PC. It is suitable for parameterizing all MFW modules that have parameterizable settings in addition to the DIP switch configuration. With the help of the program, the parameters are set in a menu-driven manner and loaded into the respective module of the station via the USB interface or network.



When delivered, the devices do not have an IP address and the Telnet port is deactivated. Both must first be specified or activated during parameterization via the USB interface. (→ , sections "IP address" and "Telnet port activation" in the "Parameterization" chapter of this document). Therefore, the basic parameterization must be carried out via the USB connection.



Factory parameterization can be carried out by the manufacturer in accordance with the user's specifications.

6.1 Parameterization program

6.1.1 Installation of the parameterization program

Installation requirements

- PC with Pentium processor or higher / Installation and, if necessary, administrator rights
- At least 16 MB RAM
- At least 30 MB free hard disk space
- CD-ROM drive for installation
- Free USB port or network connection for communication with the MFW modules
- Windows 7, 8, 10, and 11 operating system

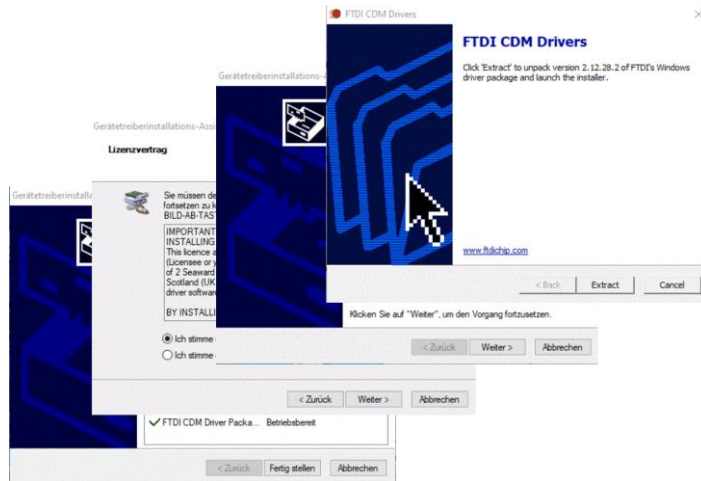
Installing the software

Download the software from the download area of the EES homepage www.ees-online.de.

Start the file "EES MFW Parametriersoftware Vx.x.x setup.exe" via a file browser (e.g., Windows Explorer - call up via the Windows key & E) or the taskbar (Start/Run/...) and follow the instructions on the screen.

6.1.2 Installing the USB driver

If the MFW device is not recognized at the USB interface, the required USB driver is probably not yet installed on your PC. You can find the driver in the download area of the EES homepage www.ees-online.de. The name of the installation program is CDM21228_Setup.exe.



Start the file and follow the installation prompts:

1. Extract the driver files.
2. Agree to the installation of the drivers.
3. Read the license agreement and confirm it.
4. Confirm that the driver installation is complete.

Figure 6-1: Driver installation dialogs

6.1.3 Program interface

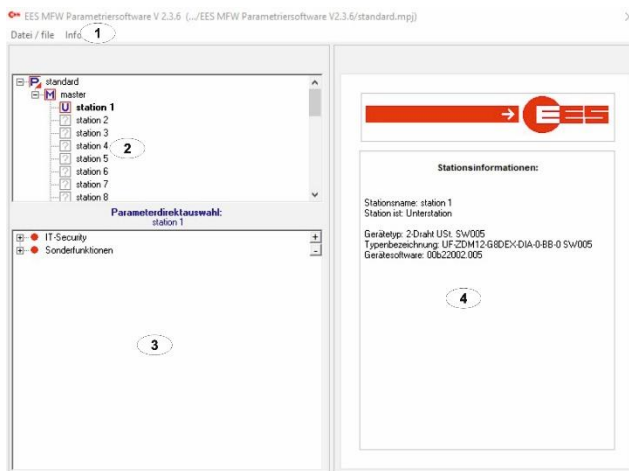


Figure 6-2: Interface of the parameterization program

The interface of the parameterization program shows 4 elements:

- [1] Menu bar
- [2] Project window
- [3] Parameter selection window
- [4] Station information (basic information about the selected station)

6.1.4 Menu bar

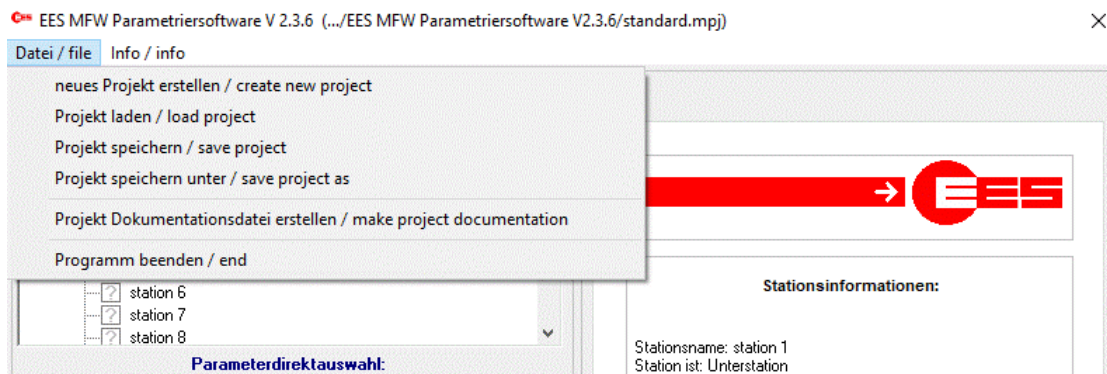


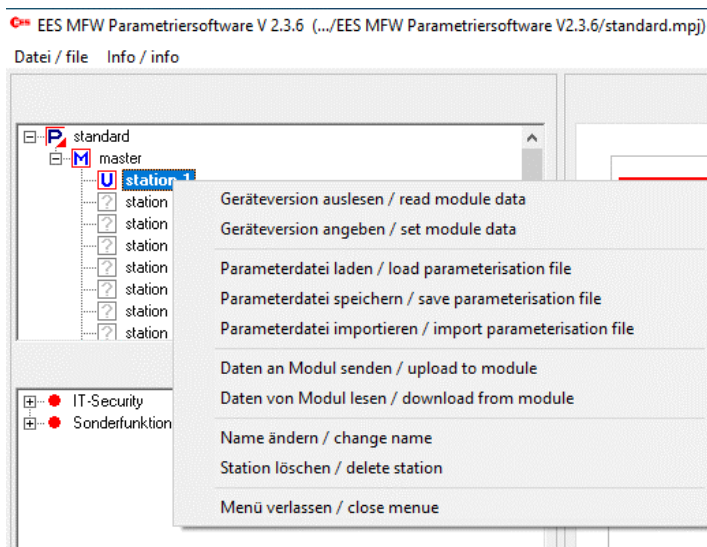
Figure 6-3: Open "File" menu

The following actions can be performed using the "File" menu item:

- Create a new project
- Load an existing project
- Saving a project
- Save a project under a new name
- Exit program

6.1.5 Project window

The project window displays the tree structure of an MFW project with all associated stations. Since the fiber optic system is a point-to-point transmission system, only the master and the first substation are required.



Right-clicking on a station in the project tree opens a context menu with the functions listed below.

Figure 6-4: Open context menu for station 1

Menu item	Function
Read device version	This function reads the module type and software version from the connected device and loads the corresponding standard parameter set.
Specify device version	If the module is not connected, the module type and software version can alternatively be assigned in the dialog box that opens. e.g. Station 0 (Master) Module type MF-L1xxC-G8DEX-DIA-B-BX-0 Confirm your selection by clicking the "Apply data" button.
Save parameter file	Save the parameters of a station independently of the project in an external file.
Load parameter file	The parameters saved in a file are assigned to the selected station. This function is used to exchange parameters between stations with the same software version or to transfer parameters from another project.
Import parameter file	The parameters stored in a file are assigned to the selected station. The module types or software versions of the two associated modules do not have to match. Only the parameters that are present in both modules are transferred. The other parameters remain in their previous settings. This function is used to exchange parameters between stations with different software versions (e.g., software update) or to transfer partial parameterizations (e.g., interface settings).
Send data to module	Write module parameters to MFW
Read data from module	Read parameters from the MFW module
Change name	Change the name of the device or project (e.g., Pump Station 1)
Delete station	Remove a station from the project. Only the station and its parameter set are removed. The station's memory space is retained.
Exit menu	Close menu

Table 6-1: Context menu items

6.1.6 Parameter selection and parameter window

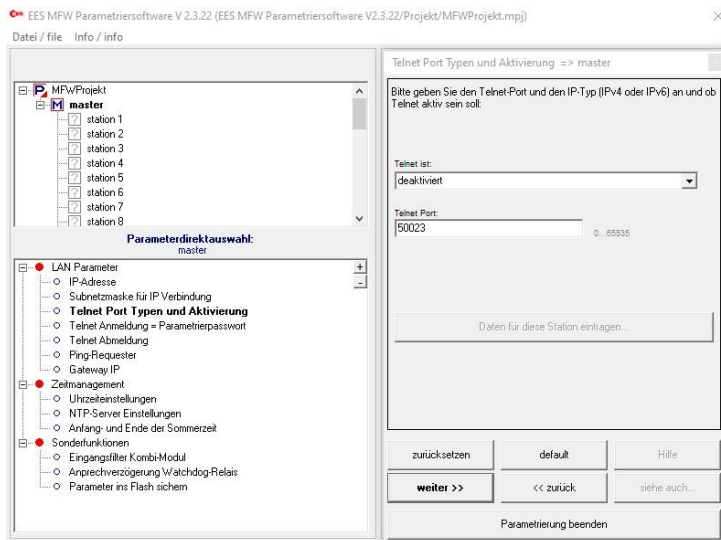
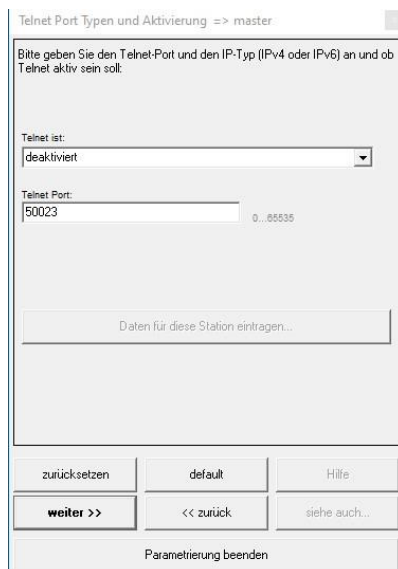


Figure 6-5: Program interface with parameter window activated

The parameter selection window below the project window lists all parameters for the station activated in the project window. The list is sorted by parameter groups (e.g., LAN parameters and special functions). Clicking on the plus sign in front of the parameter group lists the individual parameters. If such a parameter is activated by clicking on it, the parameter window opens above the window with the station information.



To make it easier to configure parameters that are linked to different stations, you can open several windows side by side. To do this, simply move the open parameter window from its position before activating a new parameter. However, only one parameter window can be opened per station.



Each parameter window contains a short description of the parameter, one or more adjustable values, and 8 buttons, the meanings of which are explained in the following table.

Figure 6-6: Parameter window

Button	Function
Enter data ...	Save modified data
Reset	Reset the modified but not yet saved value to the default value.
Default	Restore the default setting for the parameter.
Help	Call up an explanation of the parameter (currently not supported).
Next >>	Switch to the next parameter
<< Back	Switch to the previous parameter
See also	Cross-reference to related parameters
Exit parameterization	Closes this parameter window

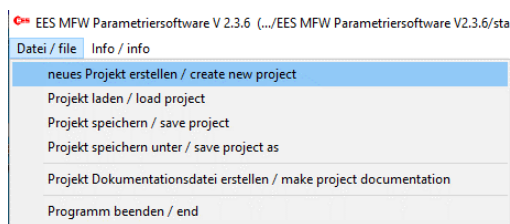
Table 6-2: Functions of the parameter window

6.1.7 Projects

A project contains all the information for an MFW system. This includes the system structure and the parameters for all stations.

6.1.7.1 Create a new project or load from file

The parameters of all stations in an MFW system are stored in a project. The following steps are necessary to create a new project:



Creating a new project

- Select the menu item "File / Create new project"
- Enter the project name
- Select the storage location

Loading an existing project

- Select the menu item "File / Load Project"
- Specify the project folder
- Select project (file with the extension mpj)

Figure 6-7: Open "File" menu item



If, when loading a project, the program detects that the data set for a station no longer corresponds to the current program status (e.g., in the case of an extended setting range or newly activated functions), it will ask whether the existing data set should be used (recommended if all required functions have been usable without problems up to now) or whether the data set should be updated (import). If you select the "Import" option, this may require subsequent settings – to do this, please open the automatically created "Import info" project in a second instance of the parameterization software after importing and follow the instructions displayed.

6.1.7.2 Saving a project

The entire project can be saved to any folder using the "File" menu button under "Save project as." "Save project" saves the open project under the same name.

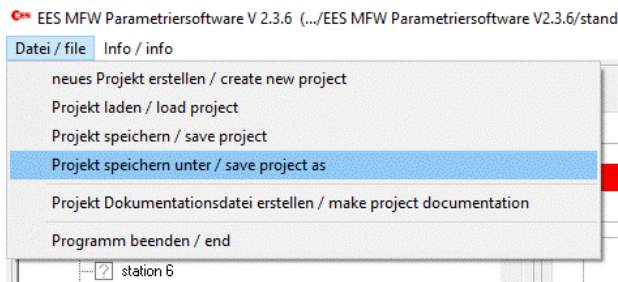


Figure 6-8: Open "File" menu for saving a project

6.1.7.3 Saving individual stations of a project

Alternatively, the parameters of individual stations can be saved separately. A single module file can be saved in any directory by selecting the context menu (right-click on the desired station) and choosing the "Save parameter file" command.

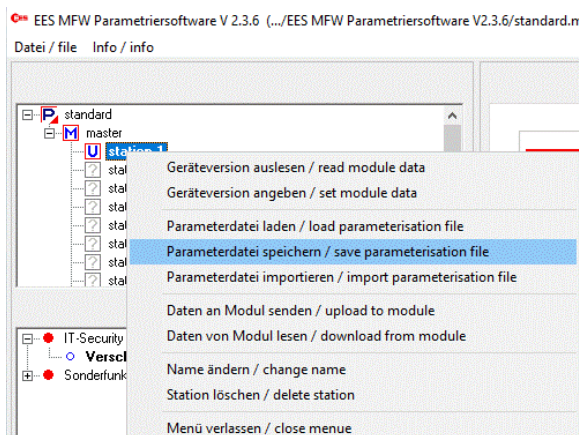


Figure 6-9: Context menu of Station1 opened
Saving the parameter file of the station independently of the project.

6.1.7.4 Project files

A project always consists of several files that are stored in a directory of your choice.

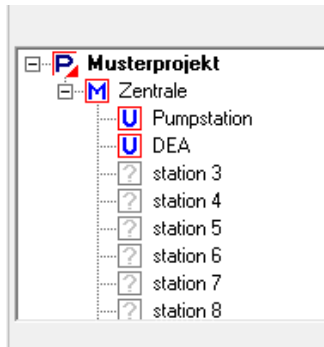


Figure 6-10: Project tree

The project shown above with the name "Sample Project" was saved in the folder named "Sample Project"

and contains the following files:

- *SampleProject.mpj*
- *SampleProject.ini*
- *Central.xml* (parameter file of the master)
- *Pumpstation.xml* (parameter file of substation 1)
- *DEA.xml* (parameter file of substation 2)
- *Project Sample Project Backup info on*
(for each backup, a text file with information about the software version and the date and time of saving)

If you want to back up this project or transfer it to another computer, simply copy the entire project folder.

6.1.8 Stations

Once a project has been opened or newly created, the individual stations can be edited.

6.1.8.1 Create new station

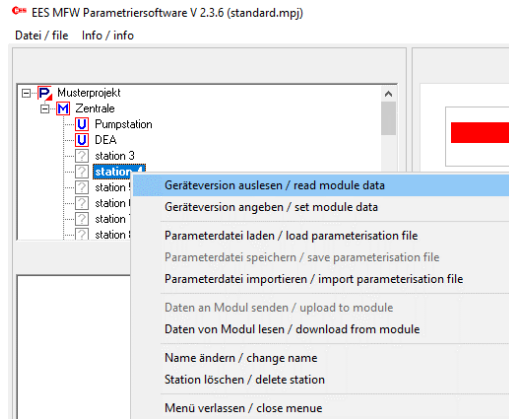


Figure 6-11: Open context menu for station 1

Right-clicking on a station in the project tree opens a context menu, the first two functions of which can be used to assign a device to the station:

Read device version

Read module type and software version from the connected device and load the corresponding standard parameter set.

Specify device version

Alternatively, the module type and software version can be assigned.



If a module type has been assigned to a station, a colored "M" for master or "U" for substation appears instead of the question mark in front of the station name. Now the standard parameter set can be edited, an existing parameter set can be read from a module, or a file can be loaded.

6.1.8.2 Apply parameter set

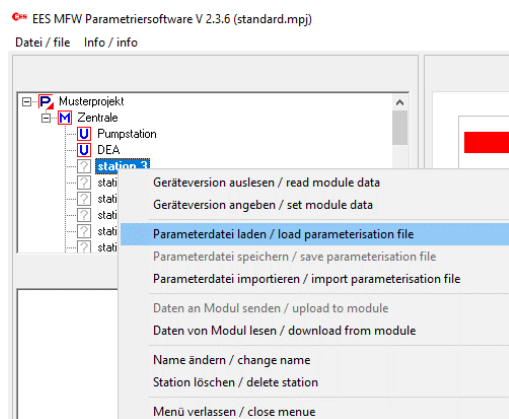


Figure 6-12: Open context menu for station 3

Right-clicking on a station in the project tree opens a context menu with two options for applying a parameter set.

Load parameter file

The parameters of another station with the same software number, which are stored in an xml file, are assigned to the station.

the same software number. This file can come from the same project or from another project.

Import parameter file

The parameters stored in an XML file are assigned to the station. The module types or software versions of the two associated modules do not have to match. Only the parameters that are common to both modules are transferred. All other parameters remain in the existing setting. This function is used to exchange parameters between stations with different software versions (e.g. when restoring the parameters of a station after a software update) or to adopt partial parameterizations (e.g., interface settings).

6.1.9 Changing the parameter set of a station

To change the parameters of a station, the saved project can be edited and the data then imported into the corresponding station. Alternatively, the parameters can also be read directly from the station in question, edited, and then imported again. Right-click on the corresponding MFW module in the project tree and select "Read data from module" from the menu. In the window that opens, you can choose between three transfer options:

- directly via the USB interface
- Remote parameterization via modem connection (not possible in the fiber optic version)
- Parameterization via network connection

6.1.9.1 Reading out the parameters via the USB interface

This is the standard method for reading the parameters of a station. The COM port assigned to the respective USB interface on the PC is used for this purpose. Please set the correct COM port and the baud rate 115200.

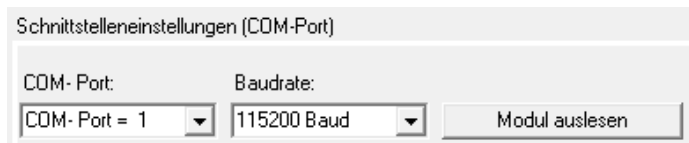


Figure 6-13: COM port setting for reading the parameters of a module



You can find which COM port has been assigned to the USB interface in the PC settings.

6.1.9.2 Reading the parameters via a network connection

If the IP address of the module is known and the Telnet port is enabled, the parameters can be read out via remote parameterization using a network connection (LAN or WAN).



Telnet is disabled in the factory default state and must first be enabled in the parameterization for use.

Figure 6-14: Setting for reading the parameters of a module via network connection

Please check the box "Establish TCP/IP connection" and enter the access data. This must correspond to the parameterization stored on the device (→ , section "Parameterization/LAN parameters/Telnet port activation").



The settings for network access can be saved under "Save texts" and reloaded for later transfers via the "Load texts" option. The last used data is preset by default.

6.1.9.3 Editing a station's parameter set

If a module type and a corresponding parameter set have been assigned to a station using one of the above options, the parameters can be modified. Selecting the station with the left mouse button displays all parameters of the station in the parameter selection window. Selecting one of these parameters by clicking with the left mouse button opens the parameter window on the left side. The necessary settings can be made in this parameter window.

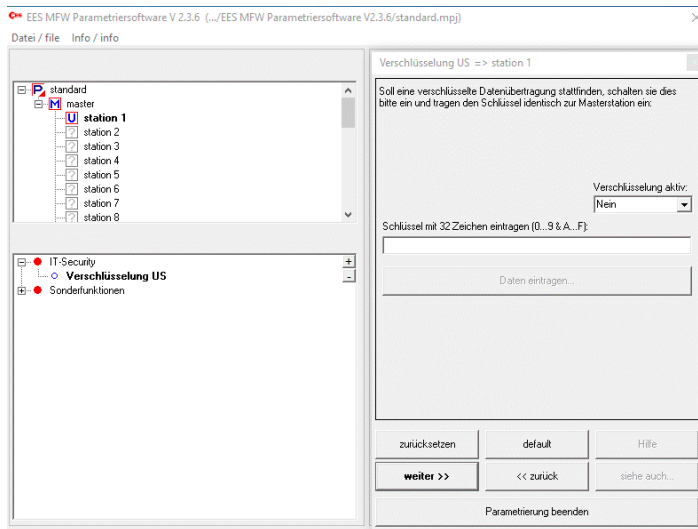


Figure 6-15: Program interface with parameter window activated for substation 1.



For sensible settings, please be sure to refer to the description of the parameters further down in this document. Incorrect settings or the import of incorrect parameters or files can cause malfunctions in the respective modules or in the entire MFW structure. EES cannot accept any liability for this.

6.1.9.4 Writing parameter sets to the module

To transfer the data from the parameterization program to the MFW module, right-click on the corresponding MFW module in the project tree and select "Send data to module" from the menu. In the window that opens, you can choose between three transfer options:

- directly via the USB interface
- Remote parameterization via modem connection (not possible in the LWL version)
- Parameterization via network connection (only for modules with Ethernet connection and Telnet function enabled in the parameter set stored on the device).

The procedure corresponds to the description for reading out the parameters in the sections above.



The parameter set is only completely stored in the MFW module when the green "Operating status" indicator light no longer flashes rapidly (flickers).

6.2 Parameter descriptions

The following sections explain all parameters according to their structure in the parameter selection window. However, the parameterization program only offers the parameters that are required for the selected device type.

6.2.1 LAN parameters

This parameter group contains all network parameters if the devices have a network interface.

6.2.1.1 IP address

IP address on the local network:

Enter the IP address of the module on the local network here, i.e., the IP address with which the module itself is registered on the Ethernet connection (LAN) of a router. This address is used for parameterization or diagnosis via Telnet or the MFW Commander. For IT security reasons, the address 0.0.0.0 is entered in the delivery state, which means that the connection is deactivated.



The address entered here must be outside the router's DHCP range.

6.2.1.2 Subnet mask for IP connection

A subnet or partial network is a physical segment of a network in which the IP addresses match in certain parts. These subnets can be connected to each other via routers and then form a large contiguous network.

In conjunction with a device's IP address, the subnet mask determines which IP addresses this device can reach within its own network without the aid of a router and for which recipients it must send the packets to a router (gateway) for forwarding to other networks.

6.2.1.3 Telnet port activation

If the IP address is known, parameterization and diagnostics can be performed via a Telnet port in addition to the USB interface. The Telnet port is deactivated in the factory settings.

In addition to activating the Telnet port, a port number must be specified.

- The port number must be specified for remote access via Telnet.
- The port number is used for port forwarding on any router that may be present in the system. Port forwarding itself must be set on the router.
- The port must be enabled in the router's firewall.



After commissioning, the Telnet port should be deactivated again for IT security reasons.

6.2.1.4 Telnet login = Parameterization password

A user ID and password must be specified for parameterization via a network connection.

Parameter	Value range
User ID	10 characters (special characters permitted)
Password	10 characters (special characters permitted)

Table 6-3: Telnet login parameters

6.2.1.5 Telnet logout

Time after which the MFW automatically closes the connection if no activity (parameterization or diagnostic commands) is detected. After the connection is closed, it must be reopened if further diagnostic actions are to be performed.

Parameter	Value range	Factory setting
Time	Hours and minutes 0 : 0 - no time limit 4 : 15 maximum time limit	5 minutes

Table 6-4: Telnet logout parameters

6.2.1.6 Ping requester

The "ping command" is used to test whether an IP address is accessible. This sends a data packet to an IP address and evaluates the response. The command for diagnosing a connection is very useful, but carries the risk of spying on connected stations. To protect against such attacks, responses to such "ping commands" can be prevented.

For IT security reasons, the response to the "ping command" is disabled in the factory default settings.

6.2.1.7 Gateway IP address

Modules that communicate with higher-level stations outside the local network via routers or other communication channels do not send their telegrams directly to the higher-level station, but to the router, which in this case acts as a gateway. The gateway is the IP address of the router must be entered as the gateway.

This parameter is only required in more complex networks (see Subnet mask parameter).

6.2.2 Time management

MFW modules have an internal real-time clock. This can be synchronized either via an external DCF77 receiver or an NTP server. Which of these options is selected depends on the specific application.

6.2.2.1 Time settings

Time source:

- **DCF77**
There is no time shift due to undefined transmission delays in the network. However, DCF77 receivers require at least 3 minutes after switching on to determine the exact time, and an external receiver is required, which is available as an accessory.
- **NTP server**
If a time server accessible in the network is to be used, the necessary settings must be made in the "NTP server settings" parameter.

In addition, the time zone and automatic summer/winter time changeover can be set. For the latter, the "Start and end of summer time" parameter must also be edited.

6.2.2.2 NTP server settings

If time synchronization is to be performed via an NTP server, two alternative NTP server addresses, the query interval, and the port number of the NTP service must be set in this parameter.

6.2.2.3 Start and end of daylight saving time

If the summer/winter time changeover is to be used, the relevant data must be entered in this parameter. This can be done automatically or set manually.

6.2.3 Special functions

6.2.3.1 Input filter combination module ()

This parameter can be used to specify how long a signal must be present in order to be detected and transmitted. Times from 0 to 1000 ms can be selected. All signals with a pulse duration shorter than the value set here are ignored.

Factory setting: 1 ms

6.2.3.2 Watchdog relay response delay

Under certain circumstances, it makes sense for an error not to be signaled immediately at the fault indicator relay, but only after it has been present for a certain period of time. This parameter can be used to set a time between 0 s and 43 minutes and 59 s during which the fault relay is prevented from being triggered.

Factory setting: no delay

7 Use and product life cycle

7.1 Maintenance

To ensure a long service life for the product, regular maintenance is required, which is limited to cleaning and care activities for the devices used. These activities may only be carried out by trained specialist personnel. Improperly performed maintenance work can lead to partial or complete failure of the product.



Warning!

All maintenance work must only be carried out when the device is disconnected from the power supply!

7.2 Repair

In the event of partial or complete failure of the product, repair work may be necessary. Due to the complexity of the device, this work may only be carried out by the manufacturer. Improperly performed repair work will void any warranty or guarantee claims. Please contact our customer service department.



Technical service:

Elektra Elektronik GmbH & Co Störcontroller KG
Hummelbühl 7-7/1
71522 Backnang
Tel.: +49 (0) 7191/182-0
Fax: +49 (0) 7191/182-200
Email: info@ees-online.de

7.3 Decommissioning

In the event of temporary or permanent decommissioning of the product, proceed as follows. This may only be carried out by trained specialist personnel. Improperly performed activities may result in partial or complete failure of the product.



Warning!

All work related to decommissioning must only be carried out when the device is disconnected from the power supply!

Decommissioning:

- Disconnect the device from the power supply
- Disconnect the wiring and fiber optic connector
- Remove the device from the top-hat rail.

Proper storage until recommissioning or shipment to the manufacturer's customer service department requires suitable premises in accordance with the storage conditions in the "Technical Data" section.

In the event of complete decommissioning, proceed as described in section 7.6 "Disposal."

In the event of recommissioning, proceed as described in section 4 "Assembly and installation."

7.4 Packaging and transport

If the product needs to be transported for repair or relocation, ensure that appropriate packaging and transport conditions are in place so that the device is not damaged in any way during transport.

**Packaging instructions:**

Please ensure that suitable shipping packaging is used (original packaging if possible).

Please observe country-specific regulations for shipping electronic products.

7.5 Spare parts

Partial or complete failure of the product can be prevented by appropriate repair work using suitable spare parts, which, due to the complexity of the device, may only be carried out by the manufacturer. Please contact our customer service department.

**Technical service:**

Elektra Elektronik GmbH & Co Störcontroller KG

Hummelbühl 7-7/1

71522 Backnang

Tel.: + 49 (0) 7191/182-0

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Email: info@ees-online.de

7.6 Disposal

The disposal of defective products or old devices can have potentially negative effects on health and the environment, so they must be disposed of in a harmless and environmentally friendly manner in accordance with regional legal disposal regulations. Alternatively, return delivery to the manufacturer should be considered.

**Disposal instructions:**

Returning the packaging to the material cycle reduces waste and saves raw materials. Dispose of packaging materials that are no longer needed at the regional collection points for the dual recycling system. If possible, keep the packaging during the warranty period so that you can pack the device properly in the event of a warranty claim.

The disposal of the device itself falls under the scope of electronic waste. If necessary, contact your local waste disposal company for information on suitable disposal methods. Do not dispose of electrical appliances in household waste; use the regional collection points instead. If electrical appliances are disposed of in an uncontrolled manner, hazardous substances can enter the groundwater and thus the food chain during weathering, or poison flora and fauna for years.

8 List of changes

Edition	Change	Date	Name
V000	Creation	February 20, 2025	R. Schöner