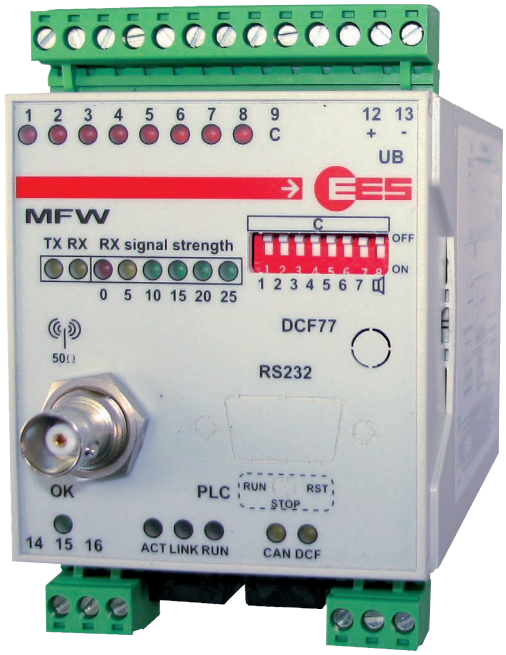
MFW – Modular radio telecontrol system



Data radio in four frequency ranges

› Registration free and free of charge radio transmission in ISM-band: 35 cm / 500 mW and 70 cm / 10 mW for distances up to 10 km
› Time slot radio (0,1 – 1 W)
› 1:24 radio data transmission (0,1 – 1 W)
› Radial communication: 1 master station and up to 31 substations
› Substations can be used as relay stations
› Integrated diagnostic tools for the radio transmission
› Easy parameterisation of the modules by DIP-switches
› Easy coupling to other transmission media, e.g. two-wire networks, within the framework of the MFW-family as well as coupling to third party systems over various interfaces and numerous protocols

Datasheet

11.09.2016

MFW-FUNK-DB-UK-005

NOTE: This datasheet is based on the German issue. All technical and additional information are depending on the conditions and regulations of the German authorities. Their validity range does not cover foreign countries. Please take into account that therefore deviant radio engineering could be considered.

General description

As an alternative to the GSM-based radio transmissions (CSD-, GPRS- or UMTS-transmission) a data transmission can also be carried out via the four following radio types

- 70-cm-ISM-Band
- 35-cm-ISM-Band
- 70-cm-Time slot radio
- 1:24-Data radio

The advantages of such communication are:

- None or only little operating costs
- Independency from providers and the degree of expansion of telecommunication nets
- Setting up of own infrastructures

At a used transmit power of 10 mW in 70-cm-ISM-band and 500 mW in the 35-cm-ISM-band the equipment is registration-free and toll-free. Dependent on the topological conditions of the local area distances of more than 10 km are practicable. Before installing a radio transmission system, in principle, the radio trunk line should be judged regarding the local conditions. We would be pleased to support you. Please do not hesitate to consult our service team.

The radio telecontrol equipment of the following radio types must be registered and it is subject to a fee during operation.

- 70-cm-band with transmit power > 10 mW
- timeslot radio
- 1:24 radio data transmission

The registration must be filed at the users local PTT regulatory authority for telecommunications.

Please be advised that your local conditions and restrictions can differ from the technical specification given in this brochure. Basic requirement for a proper function of the radio installation is the knowledge of the area and radio environment, as well as local conditions of buildings and power supply. This work has to be done by the buyer or end user.

If there is no radio trunk line between the master station and one or several substations, other substations can be used as relay station for transmission. For the radio trunk line from the central unit to the substation arbitrary relay stations can be used. The number of substations used as relay stations in the transmission path is only limited to the data volume which is to be transmitted and the referring available time. This has to be taken into account, especially with time slot radio.

The radio transmission frequency is set via DIP-switch. This enables flexible adjustment to the local conditions. This, however, doesn't apply to the time slot and 1:24 radio data transmission. This equipment has to be factory-aligned to the values provided by the users local regulatory authority.

Numerous practical diagnosis tools are integrated in the modules; i.e. field strength display and an internal speaker for the check of the radio traffic on the corresponding frequency. With the diagnosis interface (RS 232) furthermore history data, status and fault information can be accessed.

The duty cycle of the data transmission is dependent on the extension degree of the radio network (i.e. number of connected stations and possibly installed relay stations), the data volume of each station and also the used radio band.

Radio band	Transmitting conventions
70-cm-ISM-Band	Data can be cyclically exchanged constantly without restrictions
35-cm-ISM-Band	Data can be cyclically exchanged constantly , however the effective transmitting time of a radio station is limited to 10% of the available time.
1:24-Data Radio	A radio station is allowed to transmit data for a maximum of 1 hour per day. This hour can be used depending on the requirement coherently or throughout the day.
70-cm-Time Slot Radio	Within the timeslot radio the transmission time of the whole radio network (Master and substations) is fixed to a time slot of 6 s per minute. Therefore in one region up to 10 networks can be operated on the same radio frequency.

If you have time critical applications kindly let us know, we would be happy to support you with detailed information.

Archiving functionality (optionally)

MFW-Stations can provide two data storages in addition to the process image which represent the current values of the in- and outputs, their values can also be transmitted over the telecontrol connection.

Measurement archive – Time cyclically saving of pre-processed inputs, counter and measurement values with time stamp

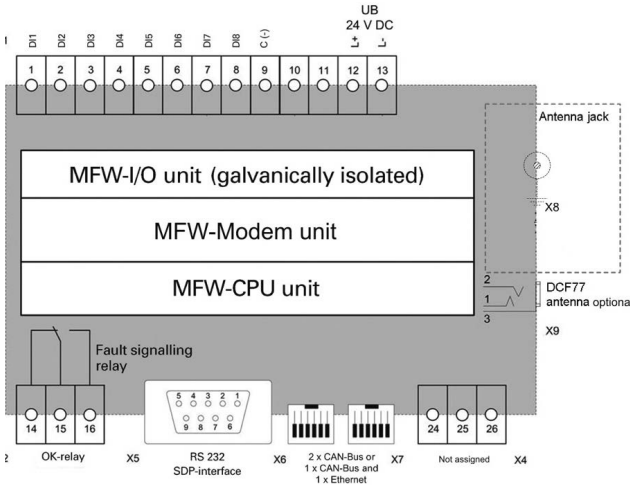
Event archive – Event triggered saving of occurring events and messages and present counter and measured values at the event with time stamp

Energy saving functionality in MFW-Substations (optionally)

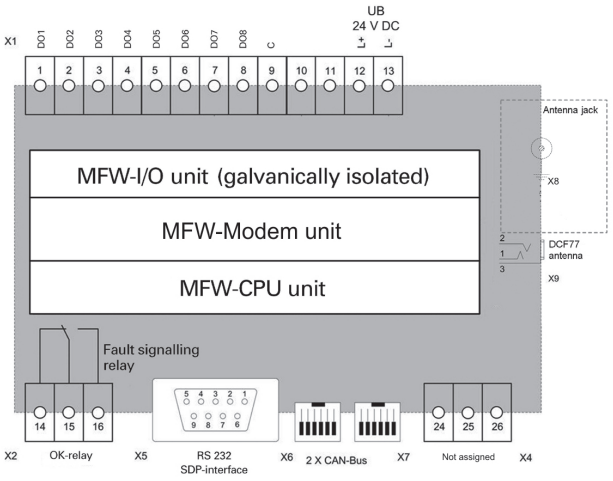
MFW-Substations in Low-Power-Variant provide an energy management and can switch between two operating states communication mode and energy saving mode in order to reduce the power consumption at parameterisable times. This funcionality enables an extremly reduced energy consumption for supply with solar or battery powered installation.

Comprehensive informationen to these to functions can be found in the separate additional document "Datalogging functions of MFW System"

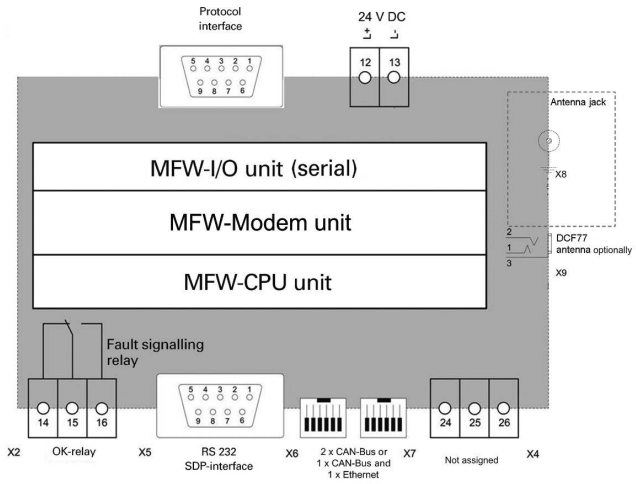
Terminal assignments



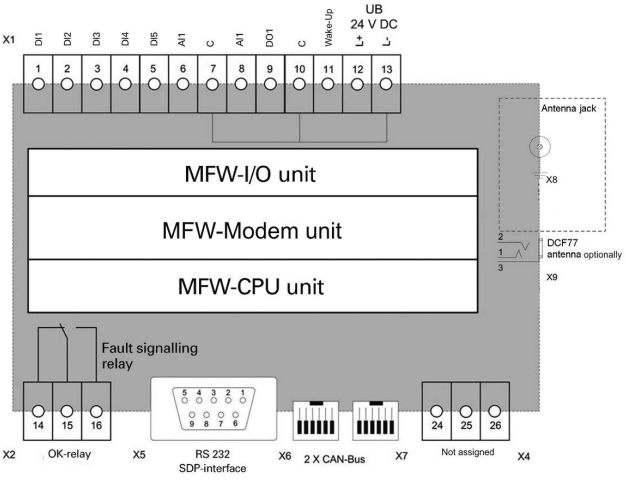
Basic module with 8 digital inputs



Basic module with 8 relay outputs



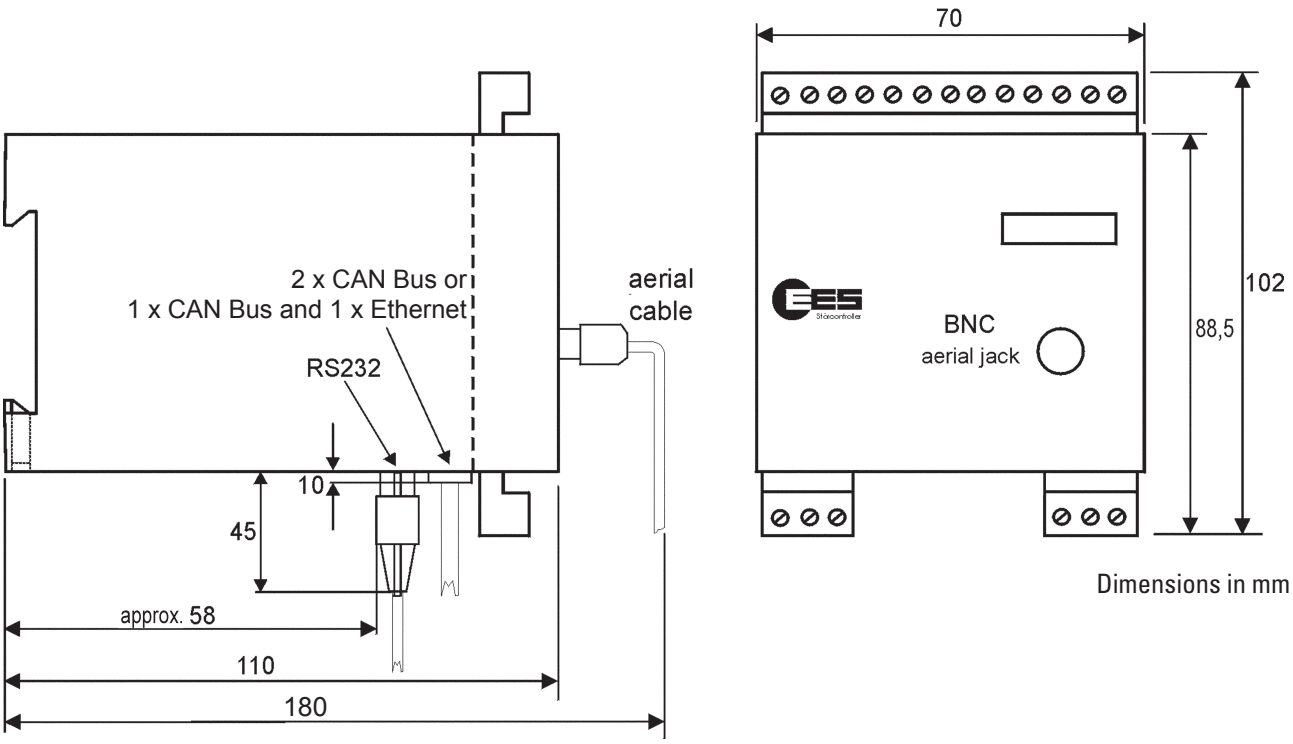
Basic module with protocol interface



Low-Power basic module

Note @ Low-Power modules:
DO1 is a plus switching PNP transistor.
The common GND of the inputs „C“ is equipotential with „L-“ of the supply voltage.

Dimensional drawing



Dimensions in mm

Basic MFW module with radio modem

Technical Data

General data	
Assembly	on C-DIN rail TS35 acc. to EN60715:2001-09
Housing / Protection class	ABS / IP 40
Connection terminals	pluggable
Cable cross section rigid or flexible	
without wiresleeves	0,2 ... 2,5 mm²
with wiresleeves	0,25 ... 2,5 mm²
Operating and ambient temperature	-20°C ... + 60°C
Air humidity	maximum 95% non-condensing
Operating voltage UB	
Nominal operating voltage	24 V DC
Operating voltage range	
Basic module	10 ... 32 V DC
With expansion modules	20 ... 32 V DC
Radio modem 70-cm-band	
Frequency range	433.125 MHz - 434.700 MHz
Transmit power	10 mW
Power consumption	
with digital inputs maximum	2.5 W
with relay outputs maximum	3.5 W

Radio modem 35-cm-band	
Frequency range	869.400 MHz - 869.650 MHz
Transmit power	500 mW
Transmitter duty cycle maximum	1:10
Power consumption	
with digital inputs maximum	3 W
with relay outputs maximum	4 W
Radio modem time slot radio	
Frequencies [MHz]	447,9750; 447,9875; 448,0000; 448,1250; 448,1375; 448,0500; 448,0625; 448,0750; 448,0875
Transmit power	0,1 – 1 W (factory set)
Power consumption	
with digital inputs maximum	3.5 W
with relay outputs maximum	4.5 W
Radio modem 1:24-Data radio	
Frequencies [MHz]	459,5300 ; 459,5500; 459,5700 ; 459,5900
Transwith power	0,1 – 1 W (factory set)
Power consumption	
with digital inputs maximum	3.5 W
with relay outputs maximum	4.5 W
Basic modules with 8 DI	
Signal voltage US	
Nominal voltage	24 V AC/DC
Maximum voltage	48 V
Minimum voltage for High-state	14,5 V DC / 19,0 V AC
Maximum voltage for Low-state	9,5 V DC / 6,5 V AC
Input resistance	ca. 10 kΩ
Maximum counting frequency	10 Hz *1
Minimum pulse width	50 ms *1
electrical isolation between	
output and supply voltage	4 kV_{eff}
Basic modules with 8 DO	
Contact rating of relay outputs*2	
Minimum	1,2 V / 1 mA (suitable for driving LED)
Maximum	250 V AC / 400 mA 250 V AC / 2 A (only 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 (only resistive load)
Maximum counting frequency	12 Hz
Pulse width / off-time	40 ms
Electrical isolation between output and supply voltage	4 kV_{eff}

Basic module as Low-Power Variant (Option Energy saving functionality)	
Power consumption in	
Communication-Mode (only basic module)	dependent on Modem (see above)
Current consumption in energy-saving mode	< 2 mA
Operating voltage limits *3	
Range 1 > 9,6 V	"Normal" operating state
Range 2 < 9,6 V	Communication mode no longer possible, but archiving continues (return to the "normal" operating state when the operating voltage > 10.8 V)
Range 3 < 4,5 V	No archiving possible; the real-time clock keeps on running, no data loss.
Range 4 < 2,5V	Loss of the archives, failure of real-time clock!
Potential separation	Equipotential between inputs and supply voltage
Ramp-up time	parameterisable 0 ... 255 s
Tracking time	parameterisable 0 ... 65535 s
Buffer time of the internal battery pack	at least 12 h
Charging time of the internal battery pack	maximum 72 h
Digital inputs @ Low-Power Modules	
Input voltage	
Nominal voltage	24 V DC
Maximum voltage	48 V DC
Minimum voltage for High-state	7,0 V DC
Maximum voltage for Low-state	2,2 V DC
Input resistance	
E1 ... E4	approx. 100 kΩ
E5 ... E6	approx. 33 kΩ
Maximum counting frequency	10 Hz
Minimum pulse width / pause	50 ms
Namur-Inputs	
According to the standards	EN50227 (DIN 19234) or IEC60947-5-6
Switching threshold	
Low	< 1.2 mA
High	> 2.1 mA
No-load voltage	8.2 V
Internal resistance	1 KΩ
Error status (Error bit set)	Current < 0.3 mA – open circuit > 6 mA – short circuit
Max. count rate	25 Hz
Min. pulse width / pause	20 ms
Analog inputs	
Measuring range	0 ... 10 V
Resolution	10 bits
Deviation	< 0.5% of measuring range limit value
Input resistance	70 KΩ

Wake-up input	
Input voltage	
Rated voltage	24 V AC/DC
Maximum voltage	48 V DC
Minimum voltage for high-state	7.0 V DC
Maximum voltage for low-state	2.2 V DC
Input resistance	approx. 100 kΩ
Minimum pulse width	1 s
EMC compatibility acc. to	
Noise immunity acc. to Industry areas	EN 61000-6-2:2006-03
Static discharge (ESD)	EN 61000-4-2:2001-12 Class 3
Elektromagnetic Fields	EN 61000-4-3:2008-06 Class 3
Fast transients (BURST)	EN 61000-4-4:2005-07 Class 3
Surge voltage (SURGE)	EN 61000-4-5:2007-06 Class 3
Conducted disturbance	EN 61000-4-6:2008-04 Class 3
Voltage drop	EN 61000-4-29: 2001-10
Radiated emission for industry areas	EN 61000-6-4:2007-09
Radio interference	EN 55011:2007-11 Class A

*1 We recommend to drive pulsed inputs not with AC, but only with DC voltage.
*2 We would be happy to supply you with more precise specifications on request.
*3 The internal battery buffers range 3

If not otherwise specified the given information for alternating voltage are referring to a sinusoidal alternating voltage with a frequency of 50/60 Hz.

Please see separate data sheet for specifications of the expansion modules.

The right to make technical changes is reserved

Ordering identification

Master modules with 70-cm-Band Modem 10 mW

Article No.	Type	Options / Process coupling
97BFAGAN0BB0	MF-F70LP-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97BFAGCN0BX0	MF-F70LP-G8DAR-DIA-0-BX-0	8 relay outputs
97BFA1BN0BX0	MF-F70LP-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97BFA3MN0BX0	MF-F70LP-3PPDP-DIA-0-BX-0	Protocol interface Profibus-DP
97EFA1HPABX0	MD-F70LP-1P10X-AKP-A-BX-0	Data logger / IEC60870-5-101/104
97EFA1DJABX0	MD-F70LP-1PMIP-AKP-A-BX-0	Data logger / Modbus-RTU/-TCP

Substation modules with 70-cm-Band Modem 10 mW

Article No.	Type	Options / Process coupling
97HFAGAN0BB0	UF-F70LP-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97HFAGCNABX0	UF-F70LP-G8DAR-DIA-0-BX-0	8 relay outputs
97HFA1BN0BX0	UF-F70LP-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97HFA1JNABX0	UF-F70LP-1PMIP-DIA-A-BX-0	Protocol interface Modbus-RTU/-TCP
97LFAGLN0BB0	UL-F70LP-G2N6D-DIA-0-BB-0	Energy saving function, Data logger and 6 DE, 2 Namur

Master modules with 35-cm-Band Modem 500 mW

Article No.	Type	Options / Process coupling
97BFCGAN0BB0	MF-F35HP-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97BFCGCN0BX0	MF-F35HP-G8DAR-DIA-0-BX-0	8 relay outputs
97BFC1BN0BX0	MF-F35HP-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97BFC3MN0BX0	MF-F35HP-3PPDP-DIA-0-BX-0	Protocol interface Profibus-DP
97EFC1HPABX0	MD-F35HP-1P10X-AKP-A-BX-0	Data logger / IEC 60870-5-101/104

Substation modules with 35-cm-Band Modem 500 mW

Article No.	Type	Options / Process coupling
97HFCGAN0BB0	UF-F35HP-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97HFCGCN0BX0	UF-F35HP-G8DAR-DIA-0-BX-0	8 relay outputs
97HFC1BN0BX0	UF-F35HP-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97HFC1JNABX0	UF-F35HP-1PMIP-DIA-A-BX-0	Protocol interface Modbus-RTU/-TCP
97LFCGLN0BB0	UL-F35HP-G2N6D-DIA-0-BB-0	Energy saving function, Data logger und 6 DI, 2 Namur

Master modules with time slot radio modem (0,1 – 1 W)

Article No.	Type	Options / Process coupling
97BFDGAN0BB0	MF-F70ZS-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97BFDGCN0BX0	MF-F70ZS-G8DAR-DIA-0-BX-0	8 relay outputs
97BFD1BN0BX0	MF-F70ZS-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97BFD3MN0BX0	MF-F70ZS-3PPDP-DIA-0-BX-0	Protocol interface Profibus-DP
97BFDXJNABX0	MF-F70ZS-1PMIP-DIA-A-BX-0	Data logger / Modbus-RTU/-TCP
97EFD1HPABX0	MD-F70ZS-1P10X-DIA-A-BX-0	Data logger / IEC 60870-5-101/104

Ordering identification

Substation modules with time slot radio modem (0,1 – 1 W)

Article No.	Type	Options / Process coupling
97HFCGAN0BB0	UF-F70ZS-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97HFC1BN0BX0	UF-F70ZS-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97KFD1JNABX0	UD-F70ZS-1PMIP-DIA-A-BX-0	Data logger / Modbus-RTU/-TCP

Master modules with 1:24-Data radio modem (0,1 – 1 W)

Article No.	Type	Options / Process coupling
97BFEGCN0BX0	MF-F7024-G8DAR-DIA-0-BX-0	8 relay outputs
97BFE1BN0BX0	MF-F7024-1P512-DIA-0-BX-0	RS232 Protocol interface 3964R/RK512
97EFE1HPABX0	MD-F7024-1P10X-DIA-A-BX-0	Data logger / IEC 60870-5-101/104

Substation modules with 1:24-Data radio modem (0,1 – 1 W)

Article No.	Type	Options / Process coupling
97HFE1BN0BX0	UF-F7024-1P512-DIA-0-BX-0	RS232 Protocol interface (3964R/RK512)
97HFEGAN0BB0	UF-F7024-G8DEX-DIA-0-BB-0	8 digital Inputs signal voltage 24 V
97KFEGAN0BB0	UD-F7024-G8DEX-DIA-0-BB-0	Data logger / 8 DI signal voltage 24 V
97LFEGLN0BB0	UL-F7024-G2N6D-DIA-0-BB-0	Energy saving function, Data logger and 6 DI, 2 Namur

Expansion modules

Further informationen can be seen in separate data sheet of the expansion modules

Accessories

Expansion modules, aerials, cable for connection to PC or Laptop, power supply units, DC/DC converters, battery back-up charging units, battery packs.

Contact

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