Modular telecontrol system
I/O expansion modules

Increasing the number of inputs and outputs of the MFW basic modules

- Modular expansion possibilities for any basic module of the MFW product family with digital and analog I/O
- Easiest addressing and configuration by DIP switches
- 2 CAN bus interfaces per module
- Power supply via CAN bus interface
- Connection of I/O using plug-in terminals
- DIN rail mounting

Datasheet

09.03.2011

MFW-EM-DB-UK-004

Functional description

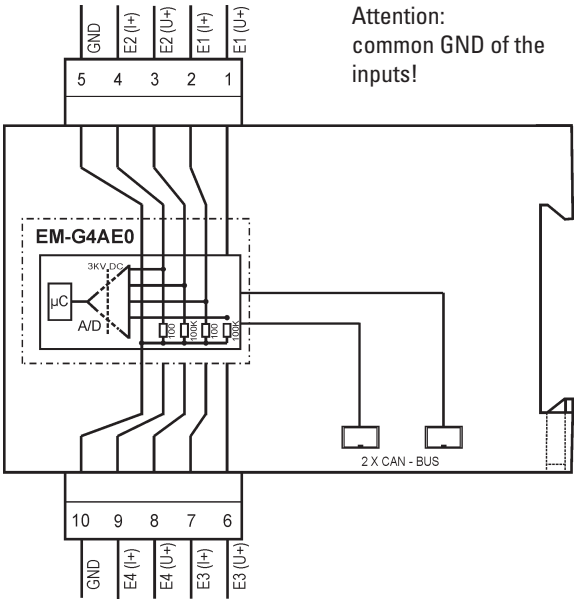
The extension of the amount of analog and digital I/Os of the MFW basic module is possible with the aid of the expansion modules. The connection is done by using the bus cable , which is in the scope of supply on one of the two CAN-bus sockets. The second socket is usable for the connection of another module or for test purposes.

The power of the modules is supplied over the CAN-bus. The configuration of the modules is done simply by the DIP switch.

Analog modules

The analog modules are available as input or output components.

The input modules contain 4 analog inputs, that have a common GND. The inputs are electrically isolated from the power supply. Each input can be switched between current and voltage by DIP switch (0 ... 20 mA or 0...10 V).



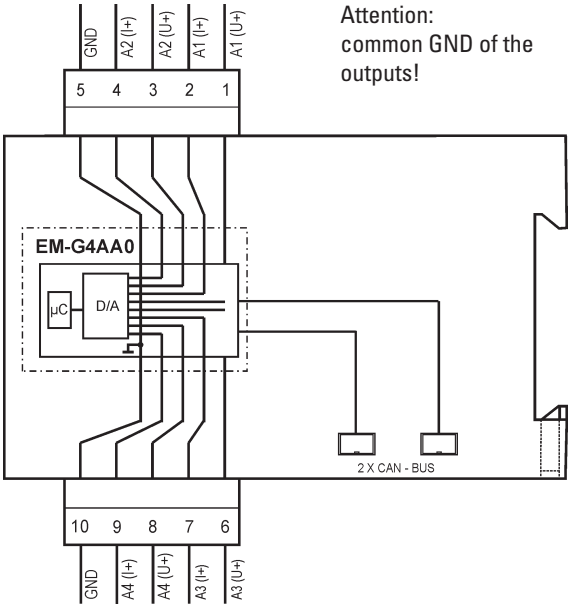
Attention:
common GND of the inputs!

Analog input module

The output modules include 4 short-circuit proof analog current and voltage outputs (0 ... 20 mA or 0...10 V),
for which no auxiliary voltage is required.

The common GND is equipotential with the power supply.

The connection of 4 ... 20 mA sensors is also possible, because the analog values are not alternated while transmission and therefore also failure states can be displayed.



Attention:
common GND of the outputs!

Analog output module

Digital inputs

Digital input modules are available in two different variants:

- Digital input module (Standard)
- Pulse-input module (All Inputs are switchable in common between static / pulses)

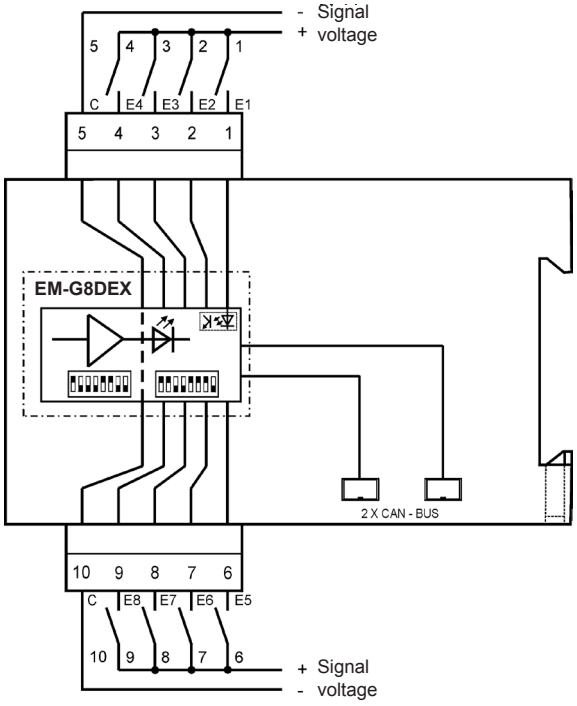
The 8 inputs of the module are configurable per DIP-switch to one of the following input types:

Binary input static
Except for logged values the actual state of the inputs is acquired and transmitted on every data exchange. To transmit a change of state safely, the state has to line up at least until it is being transmitted. With dial-up systems it means that the state must not change while a transmission is being on-going.

Pulse input
For transmission of short pulses the first 4 inputs can be configured for safe pulse transmission. Per DIP-switch two counting frequencies and corresponding pulse lengths can be adjusted. With the pulse input module „EM-G8DEX-0-BB-E“ all 8 inputs can be configured together as static binary inputs or pulse inputs.

Inverted inputs
With the inverted input module „EM-G8DEX-0-BB-E“ single inputs can be inverted.
The signals at these inputs are inverted before transmission and displayed through the red operation LED's.

Operating hour meter
The inputs DE1 and DE2 of the standard input modules „EM-G8DEX-0-BB-0“ can be used as operating hour meters. The detected operating hours are stored as counter values. The significance of pulses is parameterisable with 0,1 h respectively 1 h. The output of an input configured as operating hour meter can be done as a counter value (Operating hours) and / or as a binary value (Operation state).



Terminal assignment: Module with 8 digital inputs

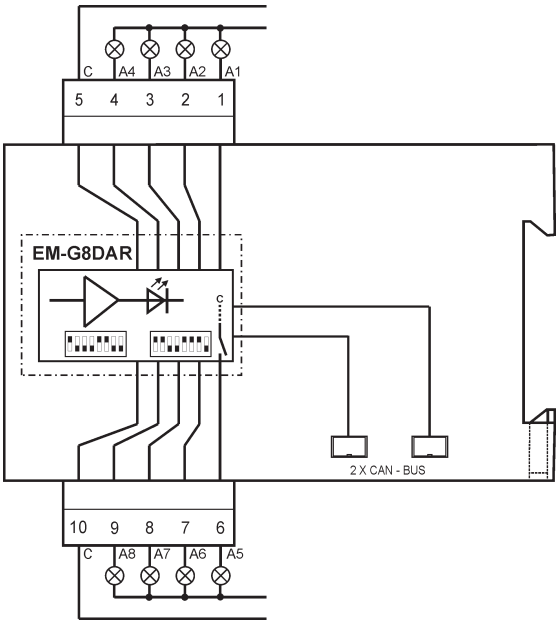
The 8 inputs are realised in 2 groups of 4 inputs with a common root. The 2 inputs groups are potentionally isolated against each other.

Relays output module

Relay output modules consist of 8 output relays. These can be used as static binary outputs or pulse outputs. By DIP-switch the outputs A1…A4 can optionally be switched between binary static output or counter value output. In combination with a pulse input module or a master device unit with IEC 60870-5-101/104 interface (output of a pulsed commands) all outputs of the expansion module are configurable as pulsed outputs. The output frequency (pulse width / -pause) is also possible to adapt via DIP-switch to the inputs of a further processing system.

Applications which have frequent switching processes (e.g. counter), we recommend using transistor modules, because the lifetime of relays is electrically and mechanically limited.

There are 2 groups each of 4 inputs or outputs with a common root that are electrically isolated from one another.



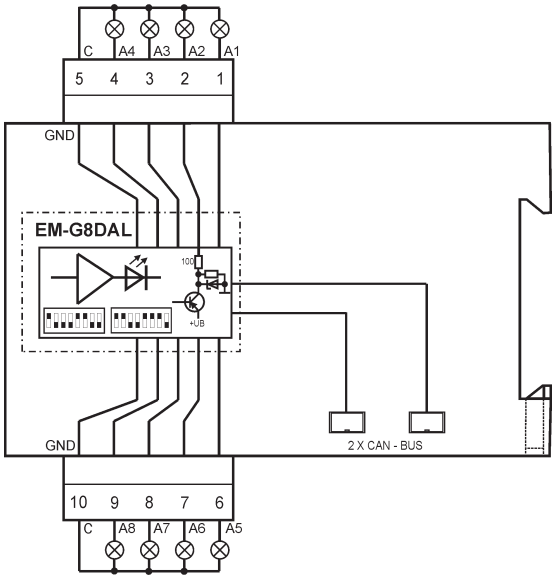
Terminal assignment of the relay module

Transistor output module

Transistor-output modules consist of 8 Transistor outputs. These can be used as static binary outputs or pulse outputs. Per DIP-switch the outputs A1 ... A4 are switchable between the operation modes binary static output or counter value output. In combination with a pulse input module or a master device unit with IEC 60870-5-101/104 interface (output of a pulsed commands) all outputs of the expansion module are configurable as pulsed outputs. The output frequency (pulse width / -pause) is also possible to adapt via DIP-switch to the inputs of a further processing system.

Attention:
Possitive switched PNP transistors!

All 8 transistor outputs switch against the common GND (Terminal „C“).

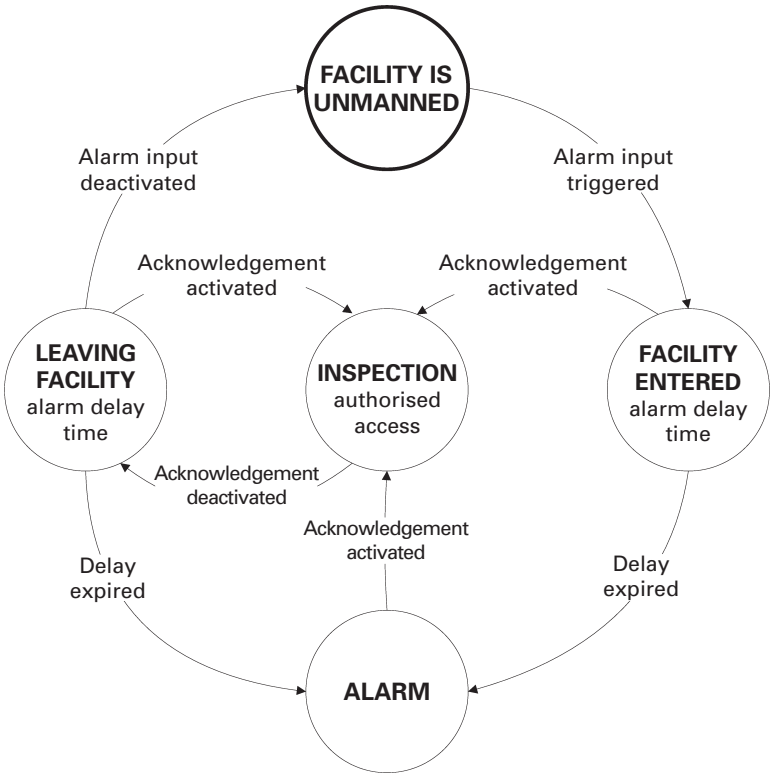


Terminal assignment of the transistor output module

Object protection module

The object-protection module is based on the hardware of a digital input module. Mechanical and electrical data are identically. However the function given in the following is realised.

Input 1 … 4	E1…E4 optional as binary- or counted measurand (adjustable via DIP-switch)
Input 5	binary input
Input 6	acknowledgement / inspection
Input 7	alarm input 1
Input 8	alarm input 2



Status diagram of the object protection functionality

The inputs E7 and E8 serve as alarm inputs (e.g. a door contact or a movement detector) in which the alarm input 2 (E8) operation mode can be adjusted per DIP-switch “B8” between operating (NO) and closed-circuit current (NC).

By a key switch attached to the input E6 (acknowledgement / inspection) the authorized inspection of the object can be signaled.

By activation of one of the two alarm inputs the status „FACILITY ENTERED“ is triggered and the message „object entered“ (E7) is generated. The alarm delay is running. Within the alarm delay time the status „INSPECTION“ can be achieved by actuating acknowledgement. If the acknowledgement does not occur, the plant switches to the status „ALARM“ after the expiration of the alarm delay time.
The message “Alarm / buglary “ (E8) is being triggered.

After leaving the facility by deactivation of the acknowledgement the status „LEAVING FACILITY” is engaged. Is the alarm input deactivated within the arming delay time, the plant engages the status “FACILITY IS UNMANNED “. The message “Facility entered” is deleted. If the alarm input is not deactivated during the arming delay time, the plant switches to the status “ALARM”. The message “Alarm / buglary “ (E8) is being triggered.

Technical data

General Data	
Operating and ambient temperature	-20 °C ... +60 °C
Air humidity	maximum 95 %, non-condensing
Connection terminals	pluggable
Cross wire section rigid or flexible	
without wire sleeves	0,2 ... 2,5 mm^2
with wire sleeves	0,25 ... 2,5 mm^2
Assembly	on C-DIN rail TS35 acc. to EN60715:2001-09
Housing / protection class	plastic / IP 40
Digital input module	
Power consumption	max. 1 W
Input variant	8 digital inputs
Signal voltage U_S	see table
Input resistance U_S	see table
Max. counting frequency	switchable between 5 Hz or 80 Hz *1
Min. pulse width / pause	500 ms or 50 ms *1
Electrical isolation between signal and supply voltage	4 kV_{eff}
Transistor output module	
Type of transistor outputs	plusswitching PNP-transistors
Power consumption	max. 2 W logic + load current
Load capacity at transistor outputs	max. 50 mA per output
Max. count rate	switchable between 1 Hz or 10 Hz *1
Min. pulse width / pause	500 ms or 50 ms *1
Relay output module	
Power consumption	max. 3 W
Contact type of relay outputs	8 x NO
Contact loading of the relay outputs*2	
minimum	1.2 V / 1 mA (suitable for control of LED)
maximum	250 V AC / 400 mA 250 V AC / 2 A (purely ohmic load) 30 V DC / 2 A 110 V DC / 0.2 A 220 V DC / 0.1 A
total 230V AC current	8 A (purely ohmic load)
Maximum count rate	switchable between 1 Hz or 10 Hz *1
Min. pulse width / pause	500 ms or 50 ms *1
Electrical isolation between relay contacts and power supply	4 kV_{eff}
Analog input modules	
Power consumption	max. 2 W
Input type	4 analog inputs (0 ... 10 V or 0 ... 20 mA)
Resolution	12 bit
Accuracy	less than 0.25 % of final value / 1 year *3
Input current load	100 Ω
Input resistance at voltage input	100 kΩ

Technical data

Analog output modules	
Power consumption	max. 3,5 W
Input type	4 analog outputs (0 ... 10 V or 0 ... 20 mA)
Resolution	12 Bit
Accuracy	less than 0.5 % of final value / 1 year *3
Max. burden output current load	500 Ω
Minimum impedance of voltage output	1 kΩ

Object-protection module	
Power consumption	max. 1 W
Signal voltage U_S	see table
Input resistance	see table
Max. counting frequency	5 Hz *1
Min. pulse width / pause	100 ms *1
Alarm delay time	0 s ... 4 min (adjustable via DIP-switch)
Alert on-delay time	alarm delay time + 30 s
Electrical isolation between signal and supply voltage	4 kV_{eff}

Digital input modules are available with various signal voltages U_S. The corresponding voltage is defined by the 13th digit of the type identification, e.g. EM-G8DEX-0-B**A**-0.

Signalvoltage U_S	Voltage key				
	A	B	E	F	U
Nominal voltage	12 V AC/DC	24 V AC/DC	60 V AC/DC	110 V AC/DC	220 V AC/DC
Maximum input voltage	24 V	48 V	75 V	130 V	255 V
Input voltage DC					
maximum low state	5,0 V DC	9,5 V DC	12,5 V DC	22,0 V DC	58,0 V DC
minimum high state	7,5 V DC	14,5 V DC	19,5 V DC	35,0 V DC	92,0 V DC
Input voltage AC					
maximum low state	3,5 V AC	6,5 V AC	9,0 V AC	15,0 V AC	40,0 V AC
minimum high state	10,0 V AC	19,0 V AC	25,0 V AC	45,0 V AC	120,0 V AC
Input resistance	approx. 5 kΩ	10 kΩ	22 kΩ	68 kΩ	180 kΩ

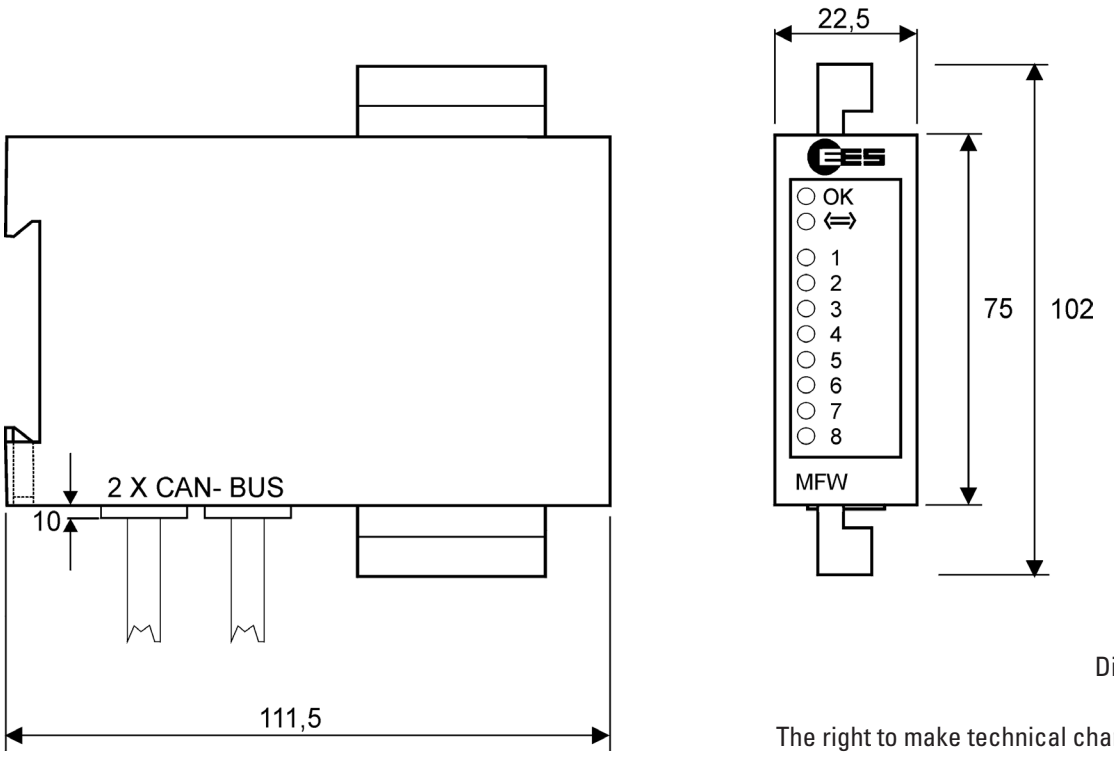
Available signal voltage of digital input modules

We recommend not to run pulse inputs with alternating voltage, but only with direct voltage.

If not otherwise noted, the given information for alternating voltage are refering to a sinusoidal alternating voltage with a frequency of 50/60 Hz and an ambient temperature of 25 °C.

*1 Other values on request
*2 We would be happy to supply you with more precise specifications on request.
*3 For greatest accuracy an annual calibration service is available.

Dimensional drawing



Dimensions in mm

The right to make technical changes is reserved

Order identification

Item number	Type	Description
97AXXGAX0BA0	EM-G8DEX-0-BA-0	8 DI, signal voltage 12 V
97AXXGAX0BB0	EM-G8DEX-0-BB-0	8 DI, signal voltage 24 V
97AXXGAX0BE0	EM-G8DEX-0-BE-0	8 DI, signal voltage 60 V
97AXXGAX0BF0	EM-G8DEX-0-BF-0	8 DI, signal voltage 110 V
97AXXGAX0BU0	EM-G8DEX-0-BU-0	8 DI, signal voltage 220 V
97AXXGAX0BBE	EM-G8DEX-0-BB-E	8 DI (static/pulse), signal voltage 24 V
97AXXGBX0BB0	EM-G8DAL-0-BB-0	8 Transistor outputs
97AXXGCX0BX0	EM-G8DAR-0-BX-0	8 Relay outputs
97AXXGEX0BX0	EM-G4AE0-0-BX-0	4 analog outputs 0 ... 20 mA or 0...10 V
97AXXGIX0BX0	EM-G4AA0-0-BX-0	4 analog outputs 0 ... 20 mA or 0...10 V
97AXXGAX0BB2	EM-G8DEX-0-BB-2	Object-protection module, 8 DI, signal voltage 24 V

Contact

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