

# EM Module MREL – Revision 1 - Device Reference Manual – P –

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purchase price of the product giving rise to the claim, regardless of whether such claim is brought in breach of contract or warranty, negligence, strict liability or otherwise.

## Reshipment / Return

Please remove all connections and peripheral devices when returning the module to the manufacturer. Use an appropriate packaging to protect the module during transport.

## Packaging

In order to avoid damage in transit the module has been shipped with a protective packaging. The packaging is made of recyclable materials which should be recycled.

## Proper Disposal



At the end of its life, dispose the device properly.

## Customer Support

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Please contact:

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## Technical Support

For technical information about hardware and software please contact:

[support@eepd.de](mailto:support@eepd.de)

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## Preface

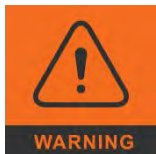
### Read this first

**About this guide** This manual describes the MREL module; its goal is to describe the module, how it works, how to integrate it and how to use it.

### Safety First



The red danger sign warns you if incorrect operation puts your life or health at great risk. Both the components and the peripherals could be destroyed.



The orange warning sign warns you that an incorrect or missing operation could seriously endanger your health or destroy the used components.



The yellow caution sign indicates that an incorrect or missing action could damage the components.



The yellow ESD symbol indicates that electrostatic sensitive components could be destroyed. Unpack shielded components only with ESD protection such as an ESD wristband or on an ESD protected area.



The information sign gives you further information and advice for optimal use of this product. For example, it draws your attention to necessary or optional accessories.

## 1 Ordering Information

### 1.1 Available Modules

Ordering Number	Function	Connection	Color	Pinout – see Tab. 2
IMRELA0	relay	direct connection	gray	relay connector
IMRELA30	relay	direct connection	magenta	relay connector
IMRELACO	relay	cable connection	gray	relay connector

Tab. 1: Available Modules

## 2 Installation and Operation

### 2.1 Intended use

The device is intended to be used in industrial environments. Its purpose is to control four relays over a USB connection in order to switch voltages/loads on or off within the specified range.

Loads could be i.e. LEDs, small electric motors or the control coil of a 24V/48V power contactor with freewheeling diode.

The manufacturer does not assume any liability for damages that have occurred due to unintended use.

### 2.2 System Information

#### 2.2.1 Required tools

No tools are required for a standard connection or DIN rail mounting. However, a module protection is recommended for standard connections.

For a secure mounting on the optional module holder from E.E.P.D. we recommend following tools:

- Module holder: cross-headed screwdriver

Further required tools depend on mounting type and place.

#### 2.2.2 External documents

Please note also external mounting and user manuals.

#### 2.2.3 Software

The module supports the following operating systems:

Microsoft® Windows® 10  
Microsoft® Windows® 10 IoT Core  
Linux Kernel 3.4 or later

#### 2.2.4 Technical support

For technical information about hardware or software please contact [support@eepd.de](mailto:support@eepd.de)



## 2.2.5 Installation and connection regulations



**Please follow all safety instructions at the place of installation.**

**Please ensure that during installation no voltage is applied.**

**Please ensure that during mechanical installation no cables are connected**

## 2.2.6 Scope of supply

Please check before installation that all required parts are complete:

- 1x MREL USB module
- 1x cross-headed screw M2.5x11
- Installation and Operation manual
- Driver CD

## 2.2.7 System characteristics – usage

The relay module allows a system extension to high power switching applications via USB port. The relays are designed for an absolute maximum of 5 A. The adapter module can be connected to your system by Plug & Play, power supply via USB port. The module has four green status LEDs, which light up to indicate current flow through the relay coil.

Due to the compact design with integrated DIN rail mount, the relay adapter is perfect suitable for switching up to 4 electrical loads with monitoring the respective states.

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## 2.3 Mounting solutions

### 2.3.1 Installation on an USB port

If the installation site permits, the USB adapter module can be plugged into any standard USB 3.0/2.0/1.1 Type A socket.



**To avoid mechanical stress on interfaces, we recommend to use our industrial USB-Hub TB-H or our industrial PC TB-M. For applications with standard computers we recommend to use the IMRELACO version with a cable connection.**



**The full range of functions depends on the respective USB port.  
There is also a cable option available**

## 3 Product Description

### 3.1 Features and specifications

#### Power Supply

USB VCC (+5 V supply, current limited to 500 mA)

#### Connector

Molex 12 pin Micro-Fit™

#### Relays

4 change over relays

Relay power: max. 60 V / max. 5 A (AC)

#### LED

4 green LEDs light up, when current flows through the relay coil

#### USB Client Port

1 USB 2.0 type A

Cable solution optional

#### OS Support

Linux Kernel 3.4 or later

Android

Microsoft® Windows® 10

Microsoft® Windows® 10 IoT Core

#### Housing

ABS-PC

#### Cooling

Designed for fanless operation.

#### Conformity

CE, ROHS, REACH

#### Dimension

Approx. 93 mm x 39 mm x 27 mm

#### Weight

Approx. 40 grams

#### Mounting

Industrial PC TB-M or industrial USB-Hub TB-H or  
DIN rail mounting

## 3.2 Environmental Specification

### Max. Operating Temperature

-40°C to +85°C ambient



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**Other operating temperature ranges upon request**

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### Max. Storage Temperature

-40°C to +85°C

### Max. rel. Humidity for all versions

95% @ 40°C Non-condensing

### 3.3 Pin out description

#### 3.3.1 Relay Connector



Fig. 1: Relay Connector Detail

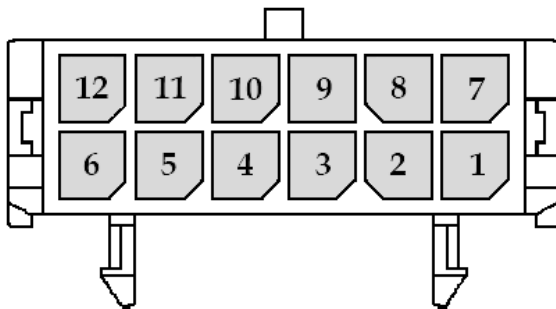


Fig. 2: Relay Connector Schematic



**Counterpart plug**  
**Molex 04302512xx**

PIN	Signal
1	RELAY_1_NO
2	RELAY_1_CO
3	RELAY_1_NC
4	RELAY_3_NC
5	RELAY_2_NO
6	RELAY_2_CO
7	RELAY_4_NO
8	RELAY_4_CO
9	RELAY_4_NC
10	RELAY_3_NO
11	RELAY_3_CO
12	RELAY_2_NC

Tab. 2: Relay Connector

### 3.3.2 Single USB



Fig. 3: Single USB Detail

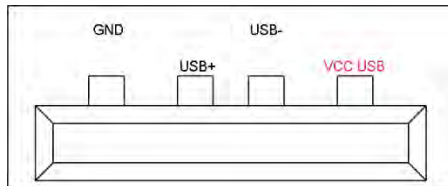


Fig. 4: Single USB Detail Schematic

PIN	Signal
1	VCC_USB
2	USB_N
3	USB_P
4	GND

Tab. 3: Single USB Connector



**There is a cable option available for the USB port:**



Fig. 5: USB Cable Option

## 4 Software

### Virtual COM Port

Send ASCII signs to the Com-port, baud rate doesn't matter

#### 4.1 Field Descriptions

Field	Length of field	Possible character	Description
1	1	#	Beginn of a Command
2	1	w, r, c	w -> write r -> read c -> configuration
3	2	sb, fl, im, hw, re, an, sn	sb -> firmware small boot block revision fl -> firmware loader revision im -> firmware image revision hw -> hardware revision re -> relais sn -> serial number (15 characters) an -> adapter number (Only '0'-'9' & range 0...255 is allowed). Every adapter should have an unique number.
4	1, 2 or 4	XY  UVWX  a	First Number -> Relay number X = 1-4 Second Number Y-> 1 = On / 0 = Off (with field 2 = w (write) only) Set all relays with one command -> U = relay 1, V = relay 2, W = relay3 & X = relay 4 (with field 2 = w (write) only) a – show status of all relays (with field 2 = r (read) only) See examples for more information
	1	!	End of a Command

Tab. 4: Field Descriptions

## 4.2 Examples

command	answer	Description
#rsb!	-rsb=1.2.3-OK	Read Firmware Revision Small Boot Block (major.minor.engineering)
#rfl!	-rfl=2.3.4-OK	Read Firmware Revision Firmware Loader (major.minor.engineering)
#rim!	-rim=3.4.5-OK	Read Firmware Revision Image (major.minor.engineering)
#rhw!	-rhw=1.1.1-OK	Read board's Hardware Revision (major.minor.engineering)
#wre11!	-RELAIS1=1-OK	Set relais 1 = 1 - relay connector pins RELAY_1_NO (1) & RELAY_1_CO (2) are closed - relay connector pins RELAY_1_NC (3) & RELAY_1_CO (2) are opened RELAY_1_CO (2) are opened - relay connector pins RELAY_1_NC (3) & RELAY_1_CO (2) are closed
#wre21!	-RELAIS2=1-OK	Set relais 2 = 1 - relay connector pins RELAY_2_NO (5) & RELAY_2_CO (6) are closed - relay connector pins RELAY_2_NC (12) & RELAY_2_CO (6) are opened
#wre20!	-RELAIS2=0-OK	Set relais 2 = 0 - relay connector pins RELAY_2_NO (5) & RELAY_2_CO (6) are opened - relay connector pins RELAY_2_NC (12) & RELAY_2_CO (6) are closed
#wre0101!	-RELAIS=0101-OK	Set all relays: Relay1 = 0, Relay2 = 1, Relay3 = 0, Relay4 = 1
#rre1!	-RELAIS1=1-OK	Read status Relais 1 = 1 - relay connector pins RELAY_1_NO (1) & RELAY_1_CO (2) are closed - relay connector pins RELAY_1_NC (3) & RELAY_1_CO (2) are opened

Tab. 5: Examples

Command	answer	Description
#rrea!	-RELAIS=1011-OK	Read status of all relays: Relay 1 = 1, Relay 2 = 0, Relay 3 = 1, Relay 4 = 1
#ran!	-ran=053-OK	Read adapter number of the device (the number is "53")
#wan125!	-wan=125-OK	Write adapter number to "125". The number of writes are limited due to hardware ( $\approx 20000$ ). Use with care! The serial number has to have 3 characters (Only '0'-'9' & range 0...255 is allowed).
#cfd!	-cfd-OK	Set all back to factory defaults: -all relays set to 0 (all relay connector pins RELAY_X_NO & RELAY_X_CO are opened & RELAY_X_NC & RELAY_X_CO are closed, X = 1..4)
#rsn!	-rsn=MTREA02-0000000-OK	HW – Serial number (15 characters)
Queue Overflow detected	-oflw=o:0x5-ER	Answer only: overflow – 5 bytes are missed in FW output queue (to FW)
Queue Overflow detected	-oflw=i:0x10-ER	Answer only: overflow – 16 bytes are missed in FW input queue (from FW)
Queue Overflow detected	- oflw=o:0x13i:0x20-ER	Answer only: Overflow – 19 bytes are missed in FW output queue (to FW) and Overflow – 512 bytes are missed in FW input queue (from FW)
#wan1234!	-#wan1234-??	No valid command – only 3 characters are allowed!
#wan12a!	-#wan12a-??	No valid command – only digits '0'—'9' are allowed

Tab. 5: Examples



## 5 Appendix

### Revision History

Date	Version	Changes
17.01.2019	1.0	First release
02.09.2020	1.1	Public Release

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