

Data sheet

EWIO₂-M

(M-Bus)

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Part no.

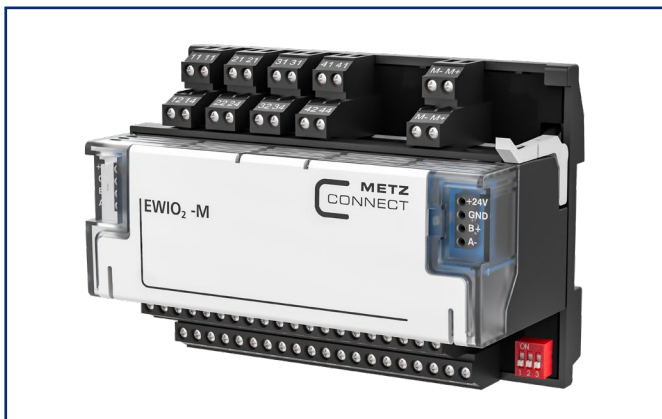
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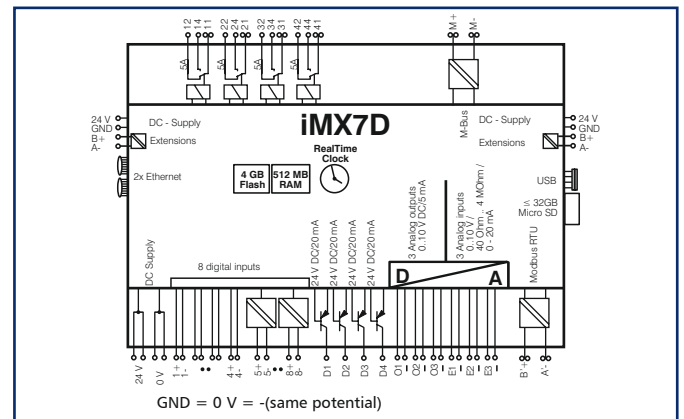
2023-10-31

Version G

Illustration



Wiring diagram



Product specification

The EWIO₂-M is a powerful data logger for the energy consumption monitoring and energy monitoring in buildings, on machines, plants and systems. Two Ethernet ports with a Daisy Chain function are available for the chain further Data logger and connection to the LAN network. The system is parameterised, configured and commissioned through a platform-independent web browser. The M-Bus and Modbus RTU interfaces enable to read different meters: e.g. electricity, water, gas and heat. Optionally, the measured values can either be sent from the data base (push) or read out (pull) via mail (SSL) or FTP (SFTP). Simple functions and control tasks in building or industrial automation can be created and visualized via the graphic programming interface „Node-RED“ integrated in the web interface and the numerous digital and analog I/Os. An integrated μ SD memory card expands the range of functions of the EWIO₂-M for save settings, data and applications.



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Technical Data

General Features

Network	2 Port Ethernet LAN 10/100 BaseT Daisy-Chain
Protocol	TCP/IP
M-Bus	for 80 M-Bus charges
RJ45 jack according to	EN 60603-7-51 Ed.1 (12/2008)
Interfaces	
max. 6 MR-I/O modules expandable (second NG4 necessary)	1x extension bus for I/O modules (MR-series) by jumper plug
max. 32 Modbus RTU subscribers	1x Modbus RTU, e.g. counter
Service interface	USB-A
Memory card slot (4 GB integrated)	μSD max. 32 GB
Operating temperature	-5° to 55° C
Storage temperature	-25° to 70° C

Mechanical Features

Dimensions (W x H x D)	125 x 93 x 60,81 mm
Housing	45 mm front height / 7 HP
Side-by-side mounting	without spacing
Mounting position	user defined, recommended horizontally
Weight	397 g
Protection class (IEC 60529)	IP20
Impact resistance (IEC 62262)	IK06
Mounting on standard rail	TH35 (IEC 60715)
Terminal blocks	two-tier screw type
Conductor cross-section	0,33 – 2,5 mm ² / AWG 22 – 12

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Technical Data

Electrical Features

Nominal voltage	24 V DC $\pm$ 10%
Nominal current (max.)	500 mA
Power dissipation (max.)	12 Watt

Materials

Housing upper part	polycarbonate
Housing color upper part	translucent
Housing lower part	polyamide
Housing color lower part	black
Housing cover	polyamide
Color of housing cover	light gray

Controller unit

Processor	NXP i.MX7D Dual Core ARM-A7, 1 GHz
Internal memory	RAM 512 MB / Flash 4 GB
External memory expansion (up to)	4 GB integrated, expandable to max. 32 GB
Operating system	Linux embedded > 4.9.88 (Debian)
Real Time Clock	
Accuracy of clock	1 s / day
Power drop bridging operation	10 h

Visualization

Operating indicators	LED
Power on	green
Boot up activity / failure	red
Ethernet Link	green
10/100 MBit	yellow
Status indication	LED
Switching status	yellow
Cable length adjustment	yellow
One-man operation	yellow

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Technical Data

Inputs and Outputs

Digital inputs

8x inputs or 8x S0 inputs of these, 4x contact inputs for potential-free switches	
Switching voltage	15 Volt DC $\pm$ 10 %
Switching threshold	5 Volt $\pm$ 10 %
Switching current	$\geq$ 1 mA
Metering function	max. 80 Hz input frequency
Inputs for externally supplied switching states	4x galvanically isolated (DI5, DI6, DI7, DI8)
max. switching voltage	24 Volt AC/DC $\pm$ 10 %
Status display for each input	LED yellow

Analog inputs

Quantity	3x individually configurable resistance or voltage/current inputs
Resistance range	40 Ohm - 4 MOhm
Voltage range	0 to 10 V DC
Current range	0 to 20 mA
Resolution	15 Bit
Measuring range end value failure	0.1 % at voltage and current measurement < 0,1 % at resistance measurement < 12 k Ω < 1,0 % at resistance measurement > 12 k Ω
Input resistance	1 M Ω , 2% at voltage measurement 200 Ω , 1% at current measurement

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Technical Data

The following sensor types are supported, whose measured values are then converted into temperature values:

Sensor type	Measuring area
0(2)...10 V	0...100 %
KP10	-50...+150 °C
KP250	-50...+150 °C
ML2	-50...+150 °C
Ni100	-50...+150 °C
Ni1000 (DIN)	-50...+150 °C
Ni1000 (L&G)	-50...+150 °C
Ni1000 (Carel)	-50...+150 °C
NTC1,8K	-50...+150 °C
NTC5K	-50...+150 °C
NTC10K	-40...+150 °C
NTC10KPRE	-50...+150 °C
NTC20K	-30...+150 °C
PT100	-100...+850 °C
PT1000	-100...+850 °C
Balco500	-40...+150 °C
Satchwell DC1100	-20...+120 °C
Satchwell DC1400	-40...+120 °C

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Inputs and Outputs	
Relay outputs	
DPST Relay	4x
Contact material	AgSnO ₂
Switching current	max. 6 A/230 V ohmic load
Isolation voltage	1000 V _{RMS} (open contacts) 4000 V _{RMS} (contact - coil; >= 5.5 mm)
Status display for each relay	LED yellow
Manual control for each relay	tact
Switching automatic/manual operation	press tact > 1 s
Clearance and creepage distances relay coil -contact	>= 5.5 mm
Digital outputs	
Transistor outputs	4x switchable with current limit
Switching voltage	24 Volt (= operating voltage)
Switching current	max. 20 mA
Status display for each output	LED yellow
Analog outputs	
Analog outputs	3x
Voltage range	0 to 10 V DC
Output current	max. 5 mA , load 2 kΩ
Resolution	14 Bit
Failure	< 1%
Status display for each output	LED yellow, brightness changes according to the output voltage
Manual control facility for each output	5 buttons. 3 for selecting the output, 2 to change the voltage

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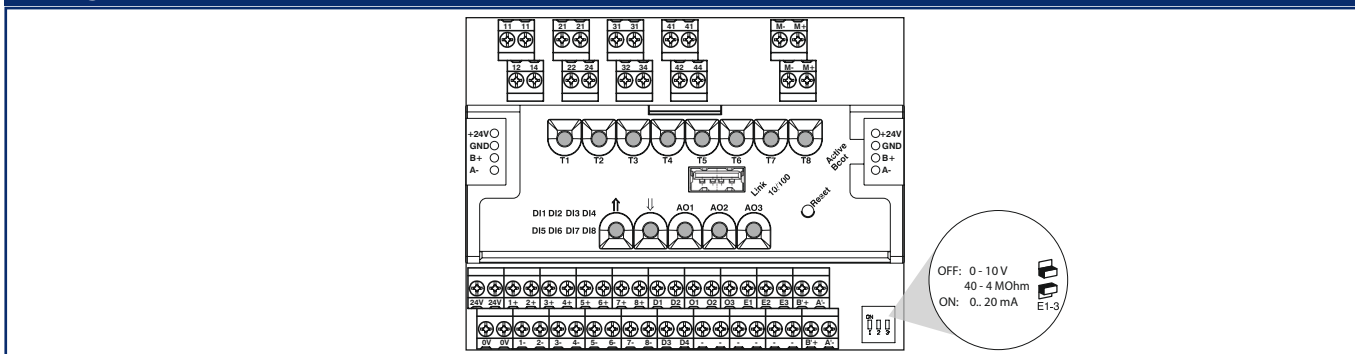
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Wiring



Description	Button	Contacts		LED display
Relay output changeover contacts 6 A	T1	11-12-14		T1 ON (yellow)
	T2	21-22-24		T2 ON (yellow)
	T3	31-32-34		T3 ON (yellow)
	T4	41-42-44		T4 ON (yellow)
Analog output 0-10 V	AO1/	O1/-		O1 ON (yellow)
	AO2/	O1/-		O2 ON (yellow)
	AO3/	O3/-		O2 ON (yellow)
Digital output 24 V / 20 mA	T5	D1/-		
	T6	D2/-		
	T7	D3/-		
	T8	D4/-		
Analog input 0-10 V / 40-4 MOhm / 0-20 mA		E1/-	see picture above	
		E2/-		
		E3/-		
Digital Input	(T1)	1+/1-		DI1 ON (yellow)
	(T2)	2+/2-		DI2 ON (yellow)
	(T3)	3+/3-		DI3 ON (yellow)
	(T4)	4+/4-		DI4 ON (yellow)
	(T5)	5+/5-	galvanically isolated	DI5 ON (yellow)
	(T6)	6+/6-		DI6 ON (yellow)
	(T7)	7+/7-		DI7 ON (yellow)
	(T8)	8+/8-		DI8 ON (yellow)

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Wiring

Description	Button	Contacts	LED display
Operating Voltage		24 V / 0 V	
Jumper for operating voltage		24 V / GND	
M-Bus		M+/M- M+/M-	
RS-485 / Modbus RTU		B'+/A'- B'+/A'-	
Jumper for extension modules		B+/A- B+/A-	
USB		USB	
Ethernet 10/100 MBit communication interface		RJ45	
Ethernet connection			Link (green)
10/100 MBit connection			100 MBit (yellow)
EWIO ₂ -M is ready			Active (green)
EWIO ₂ -M boots			Boot (red)
EWIO ₂ -M new boot procedure	Reset		Reset (red)

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Software specifications

Linux typical programs (embedded versions)

for system functions:

crond	time control
vsftpd	FTP, FTPS
ifplugd	HotPlug
udhcpd	DHCP
sendmail	E-mail
watchdog	Watchdog
busybox	service programs

Communication basis

- LAN with static or dynamic address assignment (DHCP)
- Console connection by special cable (USB – serial)
- Bus for extension modules
- RS485

Communication protocols web interface

HTTP, HTTPS, JS, CSS, JSON

www	folder with web content, CGI files
webgate	System service for web interface
API	for remote access via web interface

System services M-Bus

mbus controller	M-Bus master
mbus_shortCircuit	M-Bus short circuit detection

Functions:

- Primary, secondary addressing
- Search at the M-Bus
- Variable Baud rates per M-Bus slave
- Several data telegrams
- Telegram repetition in case of failure
- Freeze function (depending on slave)
- Average determination
- Division factor calculation
- Min./max. analysis



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Software specifications

System functions

Update functions

- Update for Kernel (image), Root-FS (image), user space (file based)
- Firmware storage on flash or SD card
- Software reboot

Alarm

- Sending of pre-configured mails in case of defined system states (last hardware start, last software start, ethernet link stable since...)
- Sending of e-mails from applications

System state

- Display of the last (current) Syslog entries
- Display of memory usage
- Password change for web interface and system

Drivers for I/Os, file interface

- digital, analog inputs and outputs
- Sensors (PTxxx) can be directly connected to the EWIO₂-M

Time setting

- NTP
- manually
- Import from the PC
- Time zone setting

File transfer for backup, analysis, distribution

- Configuration files
- Measured value files

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Software specifications

Applications (shell, python scripts)

- editable in the web interface
- can be linked with cyclical readout of measured values (for example min./max. monitoring)
- I/O analysis (also of other EWIO₂-M that can be accessed by TCP/IP)
- Possibility to send e-mails from an application (alarm etc.)

Node-RED

- Graphical, data stream oriented development tool
- Editable and visualizable in the web interface
- Visualization as „kiosk mode“
- Search of EWIO₂ in the same network
- Connection to EWIO₂ (also other EWIO₂ accessible via TCP/IP)
- Digital input (Node-RED-node) reacts on change (signal level or pulse meter)
- Analog input (Node-RED-node) reacts to change
- Digital output (Node-RED-node) controls output
- Analog output (Node-RED-node) controls output
- Meter (Node-RED-node) reacts to measured values of meter data points
- Display and selection of data points (I/Os, meters) on EWIO₂ and expansion modules
- Display of live values at the data point
- Pre-installed nodes for M-Bus
- Additional nodes can be installed via the Node-RED palette

Dimensional drawing

