

S0 pulse counter with Modbus interface EEM-CONVERTER

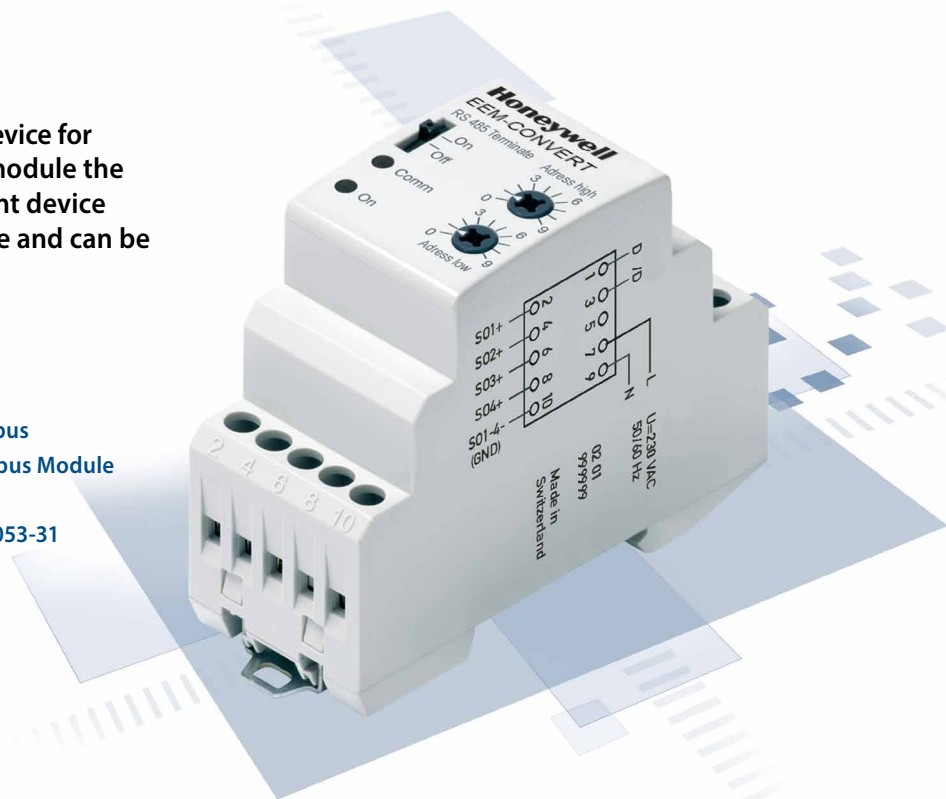
The S0-Modbus coupler module is a device for the collection of S0 pulses. With this module the consumption data of any measurement device with a S0 output becomes bus capable and can be accessed by a master of Modbus.

Main features

- Up to 99 S0-Modbus Modules on the same bus
- 4 S0 pulse inputs (S01+... S04+) per S0-Modbus Module
- Up to 396 S0 devices on the same Modbus
- The inputs comply with the S0 standard 62053-31
- Integrated RS-485 termination resistor
- LED for bus activity indication

Order number

EEM-CONVERT



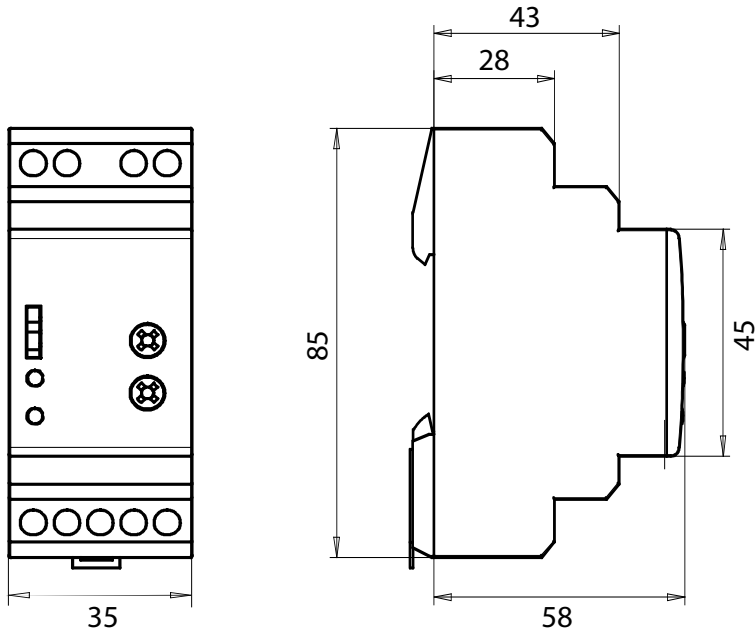
Technical Data

Protection type as DIN40050	IP 40 connections IP 20
Operating voltage Un	230 VAC (-20/+15%)
Current draw	< 12 mA
Power draw	< 3 W
Temperature	<ul style="list-style-type: none"> ■ Operation -25°C ... +55°C ■ Storage -25°C ... +70°C
EMC / noise immunity	<ul style="list-style-type: none"> ■ Surge voltage according to IEC61000-4-5 on main electric circuit, 4 kV 1.2/50 μs ■ Surge voltage according to IEC61000-4-5 at S0 inputs, 1 kV 1.2 / 50 μs ■ Burst voltage according to IEC61000-4-4, <ul style="list-style-type: none"> ■ Main electric circuit 4 kV direct ■ S0 inputs 2 kV capacitive ■ Bus connections 1 kV capacitive ■ ESD according to IEC61000-4-2, <ul style="list-style-type: none"> ■ Contact 8 kV, air 8 kV
Insulation characteristics	<ul style="list-style-type: none"> ■ 4 kV/50 Hz test according to VDE0435 ■ 6 kV 1.2 / 50 μs surge voltage according to IEC61000-4-5 ■ Device protection class II
LEDs	<ul style="list-style-type: none"> ■ Run indication by green LED (On) ■ Function indication by red LED when bus active

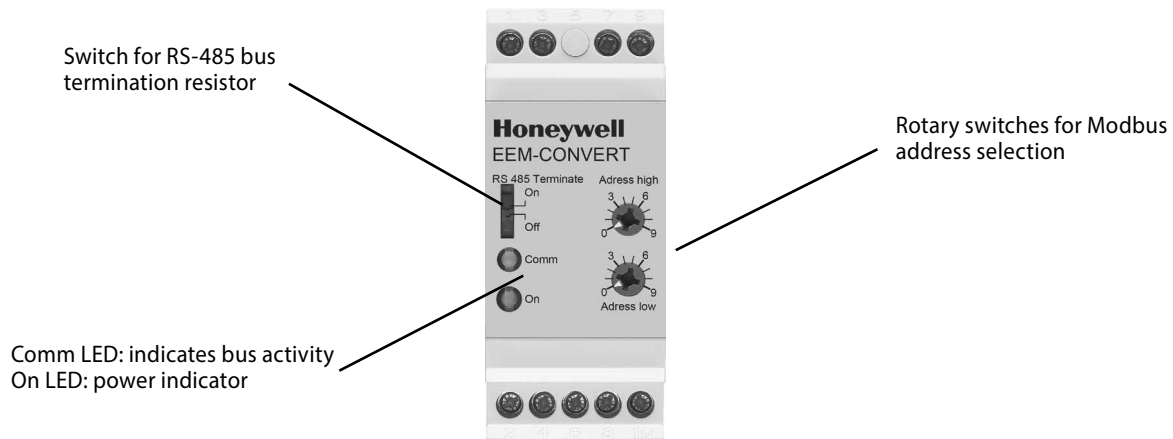
Mounting

Mounting	On 35 mm DIN top-hat rail (EN50022) any mounting position
Connections	For Pozidrive, Philips or slot-head screwdriver N°1 S0x, Modbus, 230 VAC 0.5 ... 2.5 mm²

Dimensioned drawings



Display elements / settings



S0 inputs

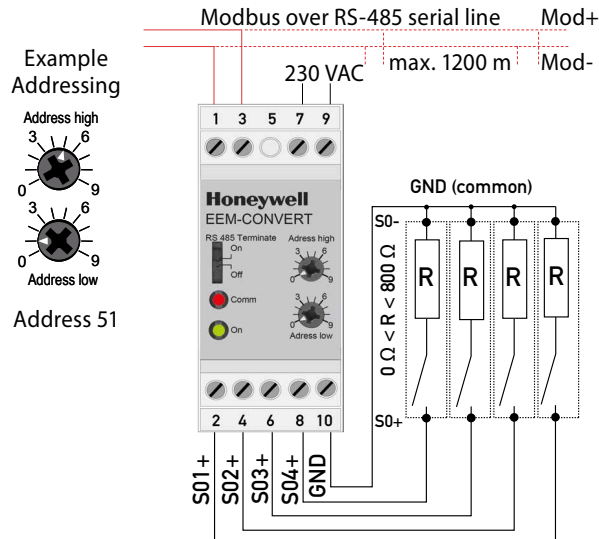
- Comply with S0 standard 62053-31
- Counts pulses as '0' when $R < 800 \Omega$
- Counts pulses as '1' when $R > 1 M\Omega$
- Voltage max. (GND-S0) 13 VDC
- Current max. (with 0Ω) 6 mA
- Pulses low min. 30 ms
- Pulses high min. 30 ms
- Frequency max. 17 Hz

Changing the Modbus-Address

- The Modbus address can be set with the rotary switches.
- The address is set max. 10s as soon as the rotary switches no longer were rotated.

Note: Modbus don't allow a device address '0'. Nevertheless if it is set, the EEM-CONVERT module isn't communicating via the bus and the the two LEDs are flashing each with 1Hz, however the S0 pulses are counted

Wirings Diagram



Note: If the S0-Modbus module is used in the Modbus as last device, then the sliding switch «RS-485 Terminate» need to be in the position «On».

Technical data Modbus

Protocol	Modbus RTU according to IDA specification
Bus system	RS-485 serial line
Transmission rate (bps)	2400-4800-9600-19'200-38'400-57'600-115'200. The transmission baudrate is automatically detected
Transmission mode	Even parity: 8 data bits, 1 stop bit Odd parity: 8 data bits, 1 stop bit No parity: 8 data bits, 2 stop bits The transmission mode is automatically detected
Bus cable	Twisted, shielded, 2 × 0.5 mm ² , 1200 m max. (without repeater)
Response time	Write: max. 30 ms Read: max 20 ms

- Default baudrate: 19'200 BPS, 8 data bits, 1 stop bit, even parity
- The communication is ready 10 s after the power on
- For a description of the used registers please look at the register page

Data transmission

- Only «Read Holding Registers [03]/ Write Multiple Registers [16]» instructions are recognized.
- Up to 20 registers can be read and two registers can be written at a time.
- The device supports broadcast messages.
- In accordance with the modbus protocol, a register R is numbered as R - 1 when transmitted.
- The device has a voltage monitoring system. In case of voltage loss, registers are stored in EEPROM (transmission rate, etc.)

Exception Responses

- ILLEGAL FUNCTION [01]: The function code is not implemented.
- ILLEGAL DATA ADDRESS [02]: The address of some requested registers is out of range or more than 20 registers have been requested.
- ILLEGAL DATA VALUE [03]: The value in the data field is invalid for the referenced register.

Registers

For double registers (4–5, 16–17, 28–29, 30–31, 32–33, 34–35) the high register is sent first (big_Endian).
Counters (28–29, 30–31, 32–33, 34–35) can be reset by writing 0 in both registers.

R	Read	Write	Description	Unit or Value
01	X		Firmware Version	Ex: «10»= FW 1.0
02	X		Number of supported registers	will give «43»
03	X		Number of supported flags	will give «0»
04–05	X		Baudrate [BPS]	Ex: Baudrate High = 1 ; Baudrate Low = 49'664 1 x 65'536 + 49'664 = 115'200 bps
06			Not used	will give a «0»
07	X		Type/ASN Funktion	will give «EE»
08	X		Type/ASN Funktion	will give «M–»
09	X		Type/ASN Funktion	will give «CO»
10	X		Type/ASN Funktion	will give «NV»
11	X		Type/ASN Funktion	will give «ER»
12			Not used	will give a «0»
13			Not used	will give a «0»
14			Not used	will give a «0»
15	X		HW Version	Ex: «10»= HW 1.0
16–17	X		Serial Number	Unique 32 bits serial number
18			Not used	will give a «0»
19			Not used	will give a «0»
20			Not used	will give a «0»
21			Not used	will give a «0»
22	X		Status/Protect	«0» = no Problem «1» = Problem with last communication request
23	X		Timeout	will give «Timeout [ms]»
24	X		Modbus Address	1–99
25			Not used	will give a «0»
26			Not used	will give a «0»
27			Not used	will give a «0»
28–29	X	X	Counter S01	Ex: Counter S01 High = 13. Counter S01 Low = 60'383; 13 x 65'536 + 60'383 = 912'351 Counter S01: 912'351/2000 = 456.2 kWh
30–31	X	X	Counter S02	Ex: Counter S02 High = 13. Counter S02 Low = 60'383; 13 x 65'536 + 60'383 = 912'351 Counter S02: 912'351/2000 = 456.2 kWh
32–33	X	X	Counter S03	Ex: Counter S03 High = 13. Counter S03 Low = 60'383; 13 x 65'536 + 60'383 = 912'351 Counter S03: 912'351/2000 = 456.2 kWh
34–35	X	X	Counter S04	Ex: Counter S04 High = 13. Counter S04 Low = 60'383; 13 x 65'536 + 60'383 = 912'351 Counter S04: 912'351/2000 = 456.2 kWh
36	X	X	Impulses per unit for S01	Ex: 2000 = 2000 Imp/kWh
37	X	X	Impulses per unit for S02	Ex: 2000 = 2000 Imp/kWh
38	X	X	Impulses per unit for S03	Ex: 2000 = 2000 Imp/kWh
39	X	X	Impulses per unit for S04	Ex: 2000 = 2000 Imp/kWh
40	X	X	ID for S01	User defined identification number
41	X	X	ID for S02	User defined identification number
42	X	X	ID for S03	User defined identification number
43	X	X	ID for S04	User defined identification number

Honeywell

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Subject to change without notice. Printed in Switzerland
PP31-002 ENG02 07.2014