Data sheet

S0 pulse counter with Modbus interface

Controls Division

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 every Saia PCD® or through the Modbus as well as to all master of Modbus.

Main features:

- Up to 99 Saia® S0-Modbus Modules on the same bus
- 4 S0 pulse inputs (S01+... S04+) per Saia® 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

PCD7.H104D

Technical Data

Protection type as DIN40050	IP 40 | connections IP 20	
Operating voltage Un Current draw Power draw	230 VAC (-20/+15%) < 12 mA < 3 W	
Temperature	■ Operation ■ Storage	-10°C … +55°C -25°C … +70°C

EMC / noise immunity	■ 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,
	  ■ Main electric circuit 4 kV direct
	  ■ S0 inputs 2 kV capacitive
	  ■ Bus connections 1 kV capacitive
	■ ESD according to IEC61000-4-2,
	  ■ Contact 8 kV, air 8 kV	

Insulation characteristics	■ 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	■ 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
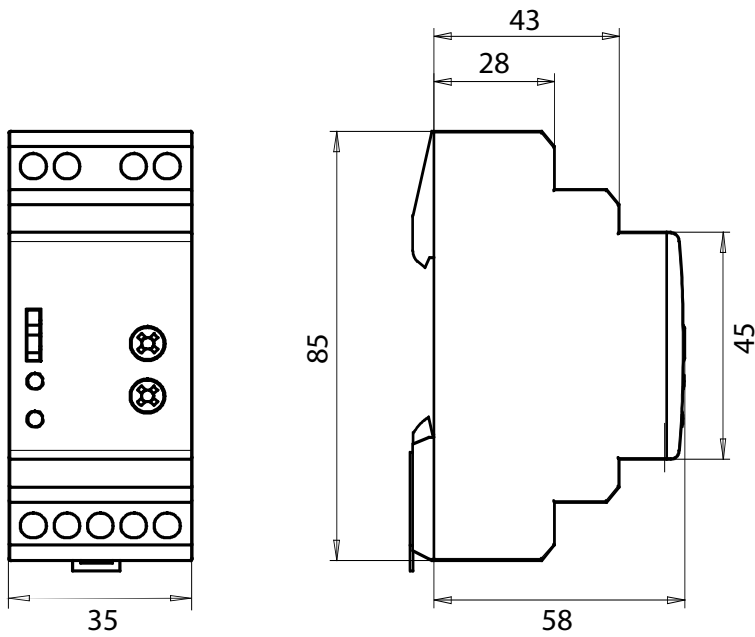
Display elements / settings

Switch for RS-485 bus termination resistor

Rotary switches for Modbus address selection

Comm LED: indicates bus activity
On LED: power indicator

SO inputs:

- Comply with SO standard 62053-31
- Counts pulses as '0' when   R < 800 Ω
- Counts pulses as '1' when   R > 1 MΩ
- Voltage max. (GND-SO)   13 VDC
- Current max. (with 0 Ω)   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 loger were rotated.

Note:
Modbus don't allow a device address '0'. Nevertheless if it is set, the PCD7.H104D 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
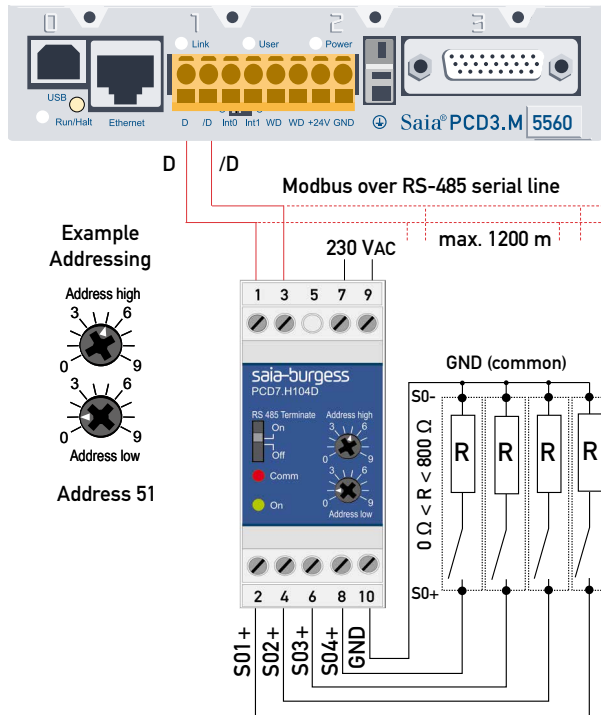
Note: If the S0-Modbus module is used in the Modbus as last device, then the sliding switch «RS485 Terminate» need to be in the position «On».

Technical data Modbus

Protocol	Modbus RTU according to IDA specification
Bus system	RS-485 serial line
Transmission rate (bps)	2'400–4'800–9'600–19'200–38'400–57'600–115'200. The transmission baudrate as well as the parity is automatically detected
Bit settings	Even parity: 8 data bits, 1 stop bit Odd parity: 8 data bits, 1 stop bit No parity: 8 data bits, 2 stop bits
Bus cable	Twisted, shielded, 2×0.5 mm², 1200 m max. (without repeater)
Response time (to system response)	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 30 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 registeris 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 = 49664 1 x 65536 + 49664 = 115'200 bps
06	X		Not used	will give a «0»
07	X		Type/ASN Funktion	will give «PC»
08	X		Type/ASN Funktion	will give «D7»
09	X		Type/ASN Funktion	will give «H1»
10	X		Type/ASN Funktion	will give «04»
11	X		Type/ASN Funktion	will give «D»
12	X		Not used	will give a «0»
13	X		Not used	will give a «0»
14	X		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	X		Not used	will give a «0»
19	X		Not used	will give a «0»
20	X		Not used	will give a «0»
21	X		Not used	will give a «0»
22	X		Status/Protect	«0» = no Problem «1» = Problem with last communication request
23	X		Timeout	Comm Timout [ms]
24	X		Modbus Address	1–99
25	X		Not used	will give a «0»
26	X		Not used	will give a «0»
27	X		Not used	will give a «0»
28–29	X	X	Counter S01	Ex: Counter S01 High = 13. Counter S01 Low = 60383 13 x 65536 + 60383 = 912351 = 912351 Counter S01: 912351/2000 = 456.2 kWh
30–31	X	X	Counter S02	Ex: Counter S02 High = 13. Counter S02 Low = 60383 13 x 65536 + 60383 = 912351 = 912351 Counter S02: 912351/2000 = 456.2 kWh
32–33	X	X	Counter S03	Ex: Counter S03 High = 13. Counter S03 Low = 60383 13 x 65536 + 60383 = 912351 = 912351 Counter S03: 912351/2000 = 456.2 kWh
34–35	X	X	Counter S04	Ex: Counter S04 High = 13. Counter S04 Low = 60383 13 x 65536 + 60383 = 912351 = 912351 Counter S04: 912351/2000 = 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

Contact

Supplied by: