S0 pulse counter
with Modbus interface

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 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

PCD7.H104D

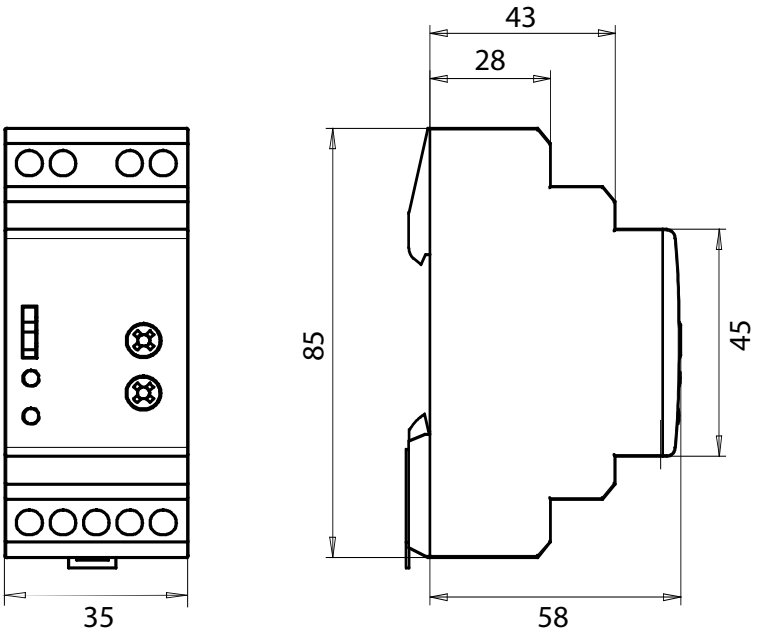
Technical Data

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	–25°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

S0 inputs

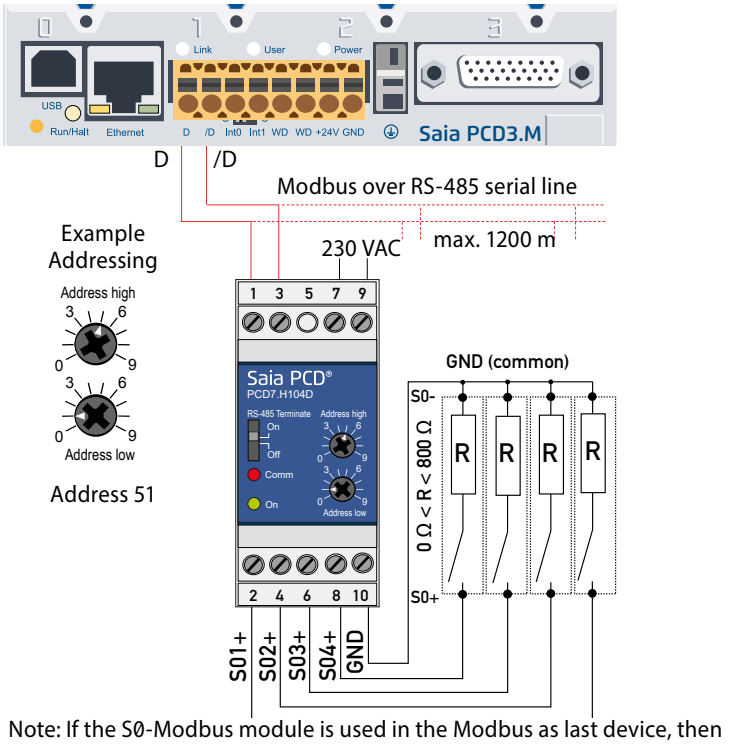
- Comply with S0 standard 62053-31
- Counts pulses as '0' when R < 800 Ω
- Counts pulses as '1' when R > 1 MΩ
- Voltage max. (GND-S0) 13 VDC
- Current max. (with 0 Ω) 6 mA
- Pulses low min. 30 ms
- Pulses high min. 30 ms
- Frequency max. 17 Hz

Changing the Modbus-Address

- The Modbus address can be set with the rotary switches.
- The address is set max. 10 s 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 PCD7.H104D module isn't communicating via the bus and the two LEDs are flashing each with 1 Hz, 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 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 The parity is automatically detected
Bus cable	Twisted, shielded, 2 × 0.5 mm², 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 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 = 49˙664 1 × 65˙536 + 49˙664 = 115˙200 bps
06			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			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 × 65˙536 + 60˙383 = 912˙351 = 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 × 65˙536 + 60˙383 = 912˙351 = 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 × 65˙536 + 60˙383 = 912˙351 = 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 × 65˙536 + 60˙383 = 912˙351 = 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

ATTENTION

These devices must only be installed by a professional electrician, otherwise there is the risk of fire or the risk of an electric shock.

WARNING

Product is not intended to be used in safety critical applications, using it in safety critical applications is unsafe.

WARNING - Safety

The unit is not suitable for the explosion-proof areas and the areas of use excluded in EN 61010 Part 1.

WARNING - Safety

Check compliance with nominal voltage before commissioning the device (see type label). Check that connection cables are free from damage and that, when wiring up the device, they are not connected to voltage.

NOTE

In order to avoid moisture in the device due to condensate build-up, acclimatise the device at room temperature for about half an hour before connecting.

CLEANING

The device can be cleaned in dead state with a dry cloth or cloth soaked in soap solution. Do not use caustic or solvent-containing substances for cleaning.

MAINTENANCE

These devices are maintenance-free. If damaged during transportation or storage, no repairs should be undertaken by the user.

GUARANTEE

Opening the module invalidates the guarantee.

WEEE Directive 2012/19/EC Waste Electrical and Electronic Equipment directive
The product should not be disposed of with other household waste. Check for the nearest authorized collection centers or authorized recyclers. The correct disposal of end-of-life equipment will help prevent potential negative consequences for the environment and human health.

EAC Mark of Conformity for Machinery Exports to Russia, Kazakhstan or Belarus.

PCD7.H104D

Order details

Type	Short description	Description	Weight
PCD7.H104D	S0 Plse counter with Modbus	Pulse counter for collecting, converting and transmitting S0 pulses via Modbus, with 4 S0 pulse inputs, powered by 230 VAC, 50/60 Hz	180 g

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