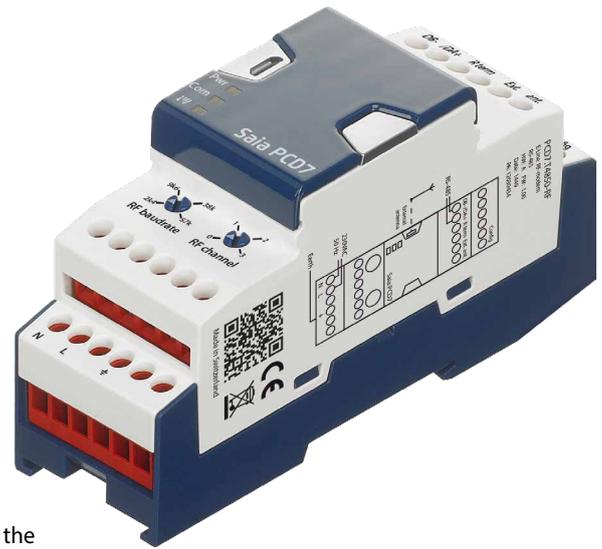


# E-Line PCD7.T4850-RF

## RF-Modem for Modbus and S-Bus



The PCD7.T4850-RF modem transparently transfers the connected Modbus or S-Bus interface (RS-485) via radio. The 869 MHz frequency range freely available across Europe. With the CE self-declaration from SBC, the devices can thus be operated without additional authorisation by the customer. The modules have an integrated antenna to enable data transfer without the use of additional hardware. If an external antenna is required, it can be mounted on the front panel using a connector. The classic hat-form of the 35-mm-wide housings fit into any switch cabinet. The device has a rotary switch for the parameter configuration that can be used to adjust the radio data rate and channel. Systems with Saia PG5 have a prefabricated F-Box. This radio coupling device can, for example, be used to connect SBC energy meters to an energy-management system during a retrofitting.

### Main features

- Wireless transmission of Modbus or S-Bus interfaces (RS-485)
- Europe-wide free 869 MHz frequency band
- Use as point-to-multi-point
- Internal and external antenna
- Industrial quality in accordance with EN61000-6-2
- Electrically isolated RS-485 interface

### Technical data

#### Power supply

Supply voltage	230 VAC, -20/+20%
Current consumption/ power consumption	< 18 mA/< 4 W
Electrically isolated	2.3 kVAC

#### Interfaces

Modbus or S-Bus, wired	RS-485 interface with galvanic isolation Baud rate: 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200 bps (auto bauding)
Radio	869 MHz band 2,400, 9,600, 38,400, 57,600 bps Four radio channels

#### General data

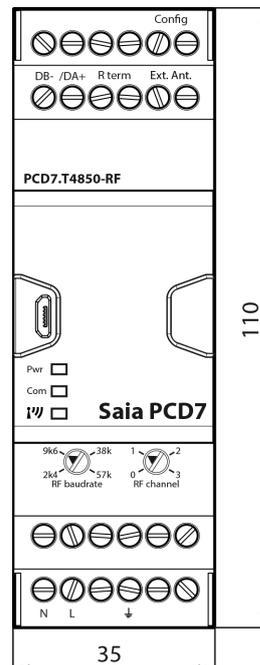
Ambient temperature	Operation: -25...+55°C without forced ventilation Storage: -40...+70°C
Connection terminals	Screw terminals max. 1.5 mm <sup>2</sup>

### F-Box

- F-Box to configure the radio modules



### Dimensions



Housing width 2 TE (35 mm), electrical control cabinet compatible (in accordance with DIN43880)

## Interfaces

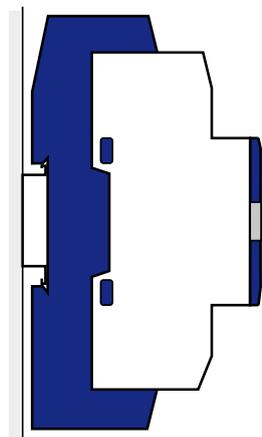
### RS-485 wired interface

Terminals	DB-/DA+							
Baud rate	2400, 4800, 9600, 19'200, 38'400, 57'600, 115'200 bps (auto bauding)							
Transfer protocol	Modbus (8N1, 8E1 or 8O1) or S-Bus							
Frame max length	Max. 512 bytes							
Timeout table (E.g. 32 registers per request) A timeout calculator is available on the support page.	RF baud rate [bps]	Baud rate RS-485 [ms]						
		2400	4800	9600	19200	38400	57600	115200
	2400	3300	2600	2350	2250	2200	2150	2150
	9600	1750	1100	850	700	650	650	600
	38400	1350	650	450	300	250	250	200
57600	1300	650	400	250	200	200	150	
all values in milliseconds [ms]								
The wired RS-485 interface supports up to 32 unit-load units, in accordance with the RS-485 standard. The SBC energy meters for example have 1/4 unit loads, on the RS-485 bus.								
Terminating resistor	Integrated, can be activated via a wire jumper between «Rterm»							

### Radio transmission

Antenna	Internal or external
Baud rate	2400, 9600, 38'400, 57'600 bps selectable via rotary knob
Frequency band	869.475–869.6 MHz
Channel	4 channels selectable via rotary knob <b>0:</b> 869.475 MHz <b>1:</b> 869.525 MHz <b>2:</b> 869.575 MHz <b>3:</b> 869.600 MHz
Radio power	2–100 mW (3 dBm–20 dBm) – standard ex works 40 mW
Maximum reach Line-of-sight	External antenna: 6000 m, 2400 bps, 100 mW (20 dBm) Internal antenna: 1000 m, 2400 bps, 100 mW (20 dBm)
Module	► Point-to-multi-point ► Addressable
Duty cycle	The limitation of the transmission time is specified by standard ERC 70-03, so that no device can occupy a frequency band continuously more than 10%. This limitation must be controlled by the master device, which is connected via a RS-485 interface to the PCD7.T4850-RF.

## Mounting



On a 35-mm top-hat rail (in accordance with DIN EN 60715 TH35)

## Channels/baud rate/radio power (max.)

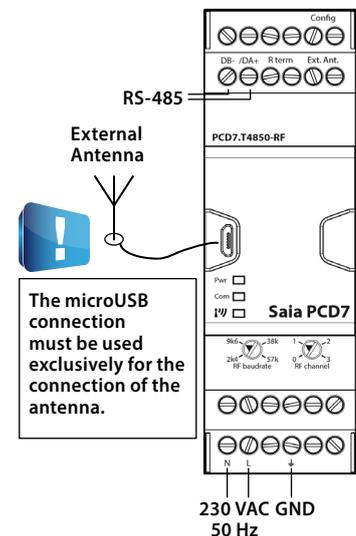
Channel number	Baud rate RF			
	2k4	9k6	38k4	57k6
0	20 dBm 100 mW	16 dBm 40 mW	16 dBm 40 mW	16 dBm 40 mW
1	20 dBm 100 mW	20 dBm 100 mW	20 dBm 100 mW	20 dBm 100 mW
2	20 dBm 100 mW	16 dBm 40 mW	16 dBm 40 mW	16 dBm 40 mW
3	20 dBm 100 mW	16 dBm 40 mW	16 dBm 40 mW	X*

\* If the channel 3 and the baud rate 57k6 are selected, the modem will automatically switch to channel 2 (869.575 MHz).



During a reconfiguration, if the chosen maximum power exceeds the maximum allowed, the RF modem adapts the power to the maximum allowed.

## Connection diagram



## Standards/authorisations

### EMC (electromagnetic compatibility)

IEC 61000-6-2	Surge	▪ Main circuit, 2 kV 1.2/50 us
IEC 61000-6-2	Burst	▪ Main circuit: 2 kV direct ▪ RS-485 connection: 1 kV capacitive
IEC 61000-6-2	ESD	▪ Contact: 4 kV ▪ Air: 8 kV
IEC 61131-2:2007	Isolation:	▪ 2.3 kV AC/1 min Device of protection class II

### Standards

Radio directives	ERC 70-03 ETSI EN 300 220-1 ETSI EN 300 220-2
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### Authorisations

Europe	The CE authorisation enables the PCD7.T4850-RF wireless modems to be used in all EU states including Switzerland and Norway.
other countries	upon request

## LEDs

Pwr	Shows the current consumption of the device
Com	Serial/RF communication
	OFF: No or only a weak wireless connection Flashes: Average wireless connection ON: Good wireless connection

## Antenna

### Internal antenna

Configuration	Standard antenna, activated ex works
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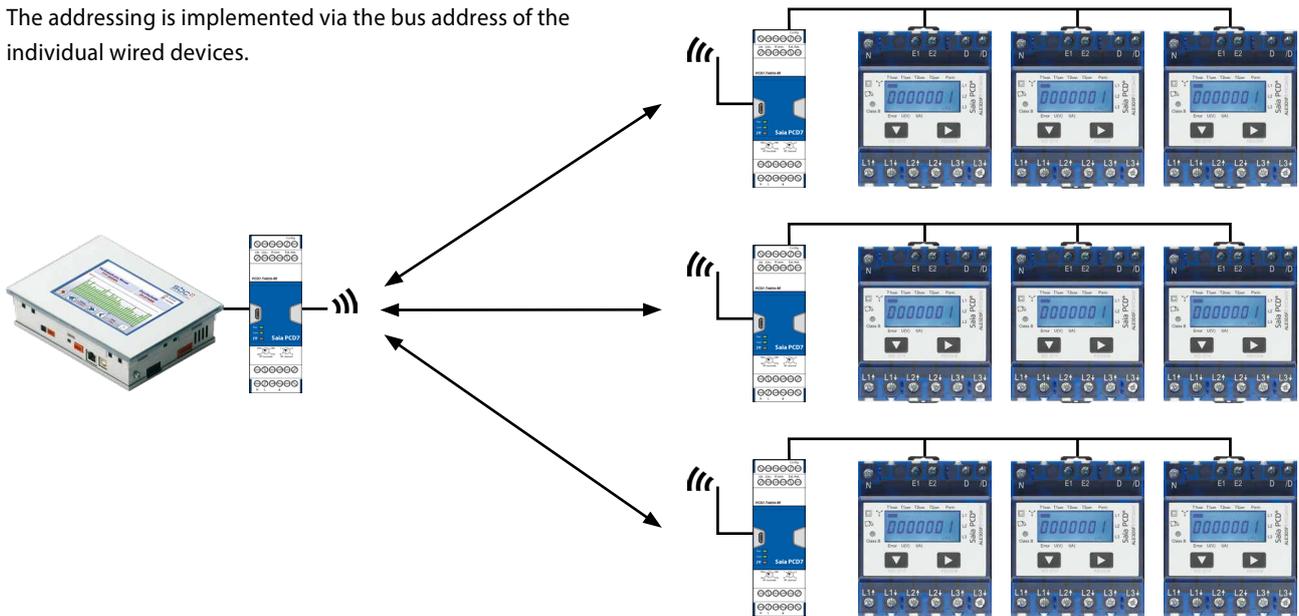
### External antenna

Connection	Via the micro USB plug on the front plate with a microUSB SMA adapter (included in the delivery scope)
Switching	Via external bridge between «Ext. ant.»
Antenna	Recommended antenna PCD7.K840.

## Network architecture

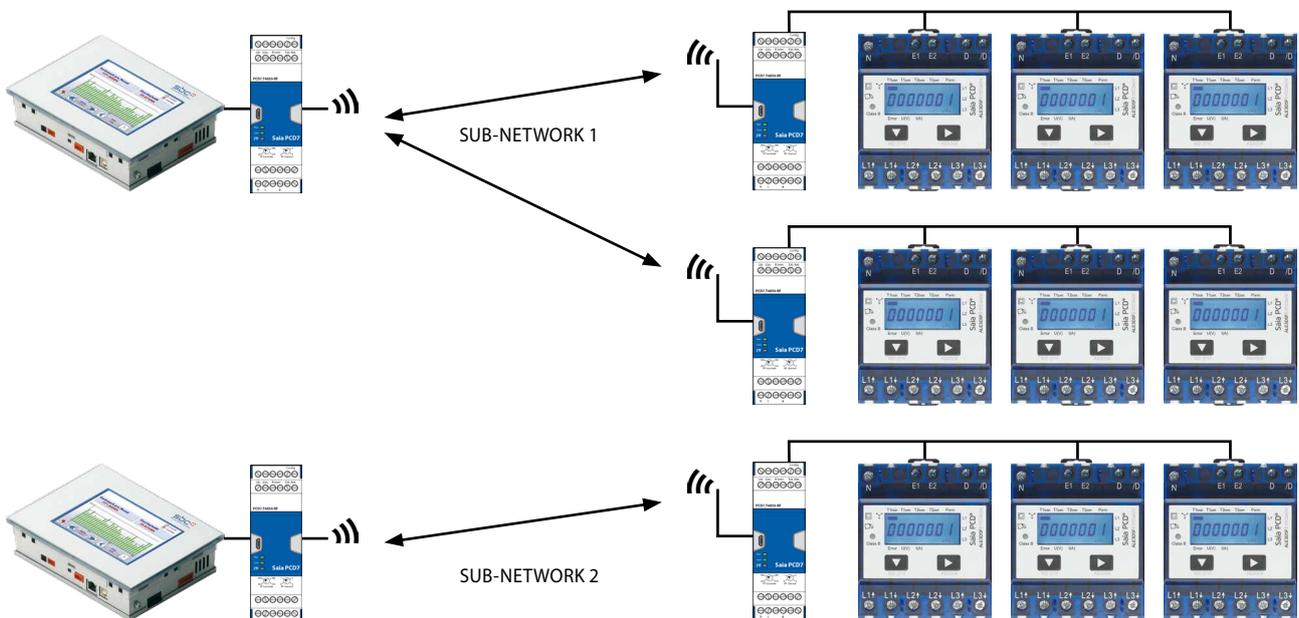
### Module: Transparent transmission

The transparent transmission is the standard settings ex works. The data is transmitted to all wireless slave modems. The addressing is implemented via the bus address of the individual wired devices.



### Module: Sub-network

The wireless modems can be split into sub-networks in advanced mode. The telegrams are then received by the respective slave modems only. Several devices can be therefore operated with the same bus address in different sub-networks. However, the master devices can only be assigned to one sub-network respectively.



## Configuration

### Advanced mode

To switch to advanced mode, a bridge must be laid between the "Config" terminals. This can be carried out with a wire. If configuration mode is activated, the radio output will be deactivated and the RF modem communicates at 9600 baud. After the bridge is removed, the radio output is automatically switched to active again.

### AT commands

To change the configuration of the RF module or to read the values adjusted, a communication via RS-485 in the AT format can also be used alongside the FBox. All characters are in ASCII format. Each command/response must be ended with CR(0x0D) and LF(0x0A). If the inquiry has been processed, then a "O" (0x4F) is returned as response. If a problem occurs, the response is "E" (0x45).

<b>ATS231=x</b>	Configuration of the radio power x can be 0...6 0 = 20 dBm (maximum output) 1 = 18 dBm 2 = 16 dBm (standard value ex works) 3 = 13 dBm 4 = 10 dBm 5 = 7 dBm 6 = 3 dBm (minimum output)
<b>ATS253=x</b>	Number of the wireless network 1...250/255 1 = standard ex works 1...250 = number of the sub-network in address mode 255 = Broadcast, all sub-networks are addressed
<b>ATREAD</b>	Reading of the configuration (is sent as a frame): <b>ATSMOD=x</b> Mode for the wireless mode 0 = Modem mode <b>ATSTER=x</b> RS485 terminal resistance 0 = not present/1 = switched on <b>ATSANT=x</b> Active antenna 0 = internal antenna/1 = external antenna <b>ATSBPS=x</b> Transmission rate of the radio path 0 = 2,400 bps 1 = 9,600 bps 2 = 38,400 bps 3 = 57,600 bps <b>ATS_CH=x</b> Frequency of the radio channel 0 = 869.475 MHz 1 = 869.525 MHz 2 = 869.575 MHz 3 = 869.600 MHz <b>ATS231=x</b> Configuration of the radio power 0 = 20 dBm (maximum output) 1 = 18 dBm 2 = 16 dBm (standard value ex works) 3 = 13 dBm 4 = 10 dBm 5 = 7 dBm 6 = 3 dBm (minimum output) <b>ATS253=x</b> Number of the wireless network 1...250/255 1 = standard ex works 1...250 = number of the sub-network in address mode 255 = broadcast, all sub-networks are addressed
<b>ATSRST</b>	Reset of the wireless modem. After a reset, the initiation of the wireless modem takes 10 seconds (to the standard value ex works): UART: 9600 bps, 8N1 / RF Power: 16 dBm / Subnet RF: 001

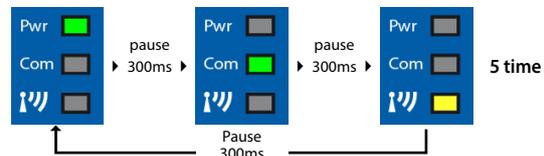
<b>ATSTAT</b>	Reading of the basic device data <b>ATS400=x</b> ASN number (PCD7.T4850) <b>ATS401=x</b> FW version (for example 1.00.00) <b>ATS500=x</b> HW version (for example «A») <b>ATS501=x</b> Production data year/calendar week (2015/11) <b>ATS502=x</b> Serial number 4 bytes
<b>ATRFST</b>	Signal strength of the RF signals 0...-25,5 dBm 0...-7,9      ▪ good signal level -8,0...-11,9      ▪ sufficient signal level -12,0...-25,5      ▪ poor signal level

### NFC

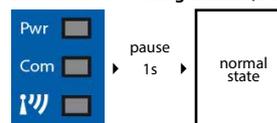
This device is compatible with the SBC NFC app. The reading and configuration can be realised with the app. The bridge between terminals «Config» must not be used for reading/configure with the NFC app.

### LED Sequences of the RF-modem

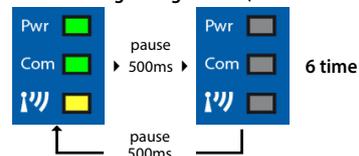
#### After a RESET



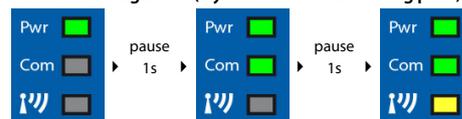
#### After a correct configuration (if user remove the config-bridge)



#### After a wrong configuration (if the user remove the config-bridge)



#### Put in the config mode (if you connect to the config pads)



## Order details

Type	Interface	230 VAC	24 VDC	Adapter micro USB-SMA
PCD7.T4850-RF	RS-485	Yes	No	Yes

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