PCD1.W5300-C15

E-Line analogue module

The module has a housing width of 35 mm (2 HP*) that is compatible with electrical control cabinets, is controlled via RS-485 and enables the recording of analogue measurement signals and the control of actuators with analogue control variables. This module can be used via a PCD as a remote input/output unit. Regulators and controllers can therefore be flexibly adjusted to adapt to specific requirements. It has four inputs and outputs, respectively, for all established sensor and actuator types in the industry.
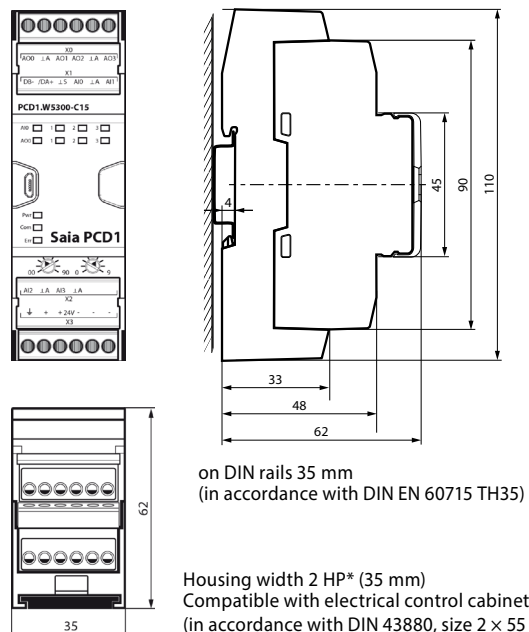
Features

▶ 4 analogue inputs, individually configurable via software
▶ 4 analogue outputs, individually configurable via software
▶ Electrical isolation between supply, bus and I/Os
▶ Pluggable terminal blocks, protected by flaps
▶ Status LEDs on the front
▶ RS-485, USB and NFC interfaces
▶ Freely programmable with Saia PG5®

General technical data

Power supply

Supply voltage	Nominal 24 VAC (50 Hz) or DC 24 VDC, -15/+20 % incl. 5 % ripple 24 VAC, -15 %/+10 % (in accordance with EN/IEC 61131-2)
Electrically isolated	500 VDC between power supply and RS-485 as well as between power supply and inputs/outputs
Power consumption max.	2 W

Interfaces

Communications interface	RS-485 with galvanic isolation Baud rate: 9,600, 19,200, 38,400, 57,600, 115,200 bps (autobauding)
Address switch for S-Bus address	Two rotary switches 0…9 Address range 0…253
Service interface	Micro USB NFC (Near Field Communication)

General data

Ambient temperature	Operation: 0 … +55 °C Storage: −40 … +70 °C

Dimensions and installation

on DIN rails 35 mm
(in accordance with DIN EN 60715 TH35)

Housing width 2 HP* (35 mm)
Compatible with electrical control cabinets
(in accordance with DIN 43880, size 2 × 55 mm)

* Horizontal pitch: 1 HP corresponds to 17.5 mm

Input/output configuration

Analogue inputs

Number	4	
Potential isolation	No	
Signal range and measured values (can be set via FBoxes)	Voltage measurement . . . . 0 V . . . +10 V -10 V . . . +10 V Current. . . . . -20 mA . . . +20 mA Resistance . . . . 0 Ω . . . 2500 Ω 0 Ω . . . 7500 Ω 0 Ω . . . 300 kΩ NTC10k . . . . 0 Ω . . . 300 kΩ NTC20k . . . . 0 Ω . . . 300 kΩ Pt1000 . . . . -50 °C . . . +400 °C Ni1000 . . . . -50 °C . . . +210 °C Ni1000 L&S . . . . -30 °C . . . +140 °C	
	+/– 20V (independent of input configuration) voltages > 15 V / < –15 V, can result in incorrect values at other inputs	
Input delay	Channel update	4 ms (all channels are updated during this time)
	Hardware input filter time constant	Current / voltage measurement τ = 2.5 ms Resistance τ ≈ 8 ms
	Digital input filter	10 values (0.2 to 50 ms)

Mode		Resolution [bit]	Resolution [measured value]	Accuracy (at TAmbient = 25°C)	Display
Voltage	0…10 V	13	1.22 mV (linear) $R_{IN} = 220\,k\Omega$	0.3% of the measured value +/– 10 mV	0…1000 (standard) or user scaling
	–10 V …+10 V	12 + sign	2.44 mV (linear) $R_{IN} = 220\,k\Omega$	0.3% of the measured value +/– 10 mV	0…1000 (standard) or user scaling
Current	–20 mA …+20 mA	12 + sign	5.2 µA (linear) $R_{SHUNT} = 240\,k\Omega$	0.3 % of the measured value +/– 20 µA	0…1000 (standard) or user scaling
Resistance	0…2500 Ω	12	0.50 …0.80 Ω Measured current: 1.0 …..1.3 mA	0.3% of the measured value +/– 3 Ω	0…25,000
	0…7500 Ω	13	0 .. 3000 Ω: 1 ….. 2 Ω 3000 .. 7500 Ω: 2 ….. 4 Ω Measured current: 0.6 …..1.3 mA	0.3% of the measured value +/– 8 Ω 0.3% of the measured value +/– 15 Ω	0…75,000
	0…300 kΩ	13	0 …..15 kΩ: 1 …. 10 Ω 15 …..40 kΩ: 10 …. 40 Ω 40 …..70 kΩ: 40 …100 Ω 70 ….100 kΩ: 100 …200 Ω 100 ….300 kΩ: 0.2 …1.5 kΩ Measured current: 30 µA ….1.3 mA	0.3% of the measured value +/– 40 Ω 0.3% of the measured value +/– 160 Ω 0.5% of the measured value +/– 400 Ω 1.0% of the measured value +/– 800 Ω 2.5% of the measured value +/– 5.0 kΩ	0…300,000
NTC10k [2]		13	–40 .. +120 °C: 0.05 …..0.1 °C	–20…+60 °C: +/– 0.6 °C –30…+80 °C: +/– 1.0 °C –40…+120 °C: +/– 2.8 °C	–400…1200 [1]
NTC20k [2]		13	–10 .. +80 °C: 0.02 .. 0.05 °C –20 .. +150 °C: < 0.15 °C	–15…+75 °C: +/– 0.6 °C –20…+95 °C: +/– 1.0 °C +95…+120 °C: +/– 2.5 °C +120…+150 °C: +/– 5.8 °C	–200…1500 [1]
Pt 1000		12	–50 .. +400 °C: 0.15 .. 0.25 °C Measured current: 1.0 ….1.3 mA	0.3% of the measured value +/– 0.5 °C	–500…4000
Ni 1000		12	–50 .. +210 °C: 0.09 .. 0.11 °C Measured current: 1.0 ….1.3 mA	0.3% of the measured value +/– 0.5 °C	–500…2100
Ni 1000 L&S		12	–30 .. +140 °C: 0.12 … 0.15 °C Measured current: 1.0 ….1.3 mA	0.3% of the measured value +/– 0.5 °C	–300…1400

[1] The PCD register outputs the value 0…300 kΩ.

[2] The temperature curves for NTC are not standardised and may differ depending on the manufacturer. A CSV file can be used for the value generation with a linearisation FBox. The CSV file can be found on the support page (link, see last page).

Analogue outputs

| Number	4
Resolution	12 bit
Signal ranges	0…10 V, -10…+10 V
Protection	Short-circuit protection
Resolutions	2.44 mV (0…10 V), 4.88 mV (±10 V)
Max. load at output	1 kΩ (10mA @ 10 V)
Accuracy (at TAmbient = 25°C)	0.3% of the value +/- 10 mV
Residual ripple	< 15 mVpp
Temperature error (0°C…+55°C)	+/- 0.2%
Output delay	Channel update: 1 ms (all channels are updated during this time)
	Time constant hardware output filter: Voltage measurement τ = 2.5 ms
Local override operation	None

Terminal technology

Rigid or flexible wires with a diameter of up to 1.5 mm² can be used. A max. of 1 mm² is permitted with wire ferrules.
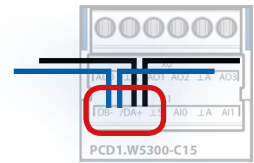
Connection concept

The device is supplied by a 24 VDC or AC voltage supply.
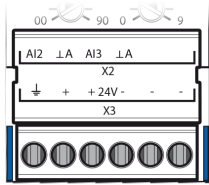
Bus wiring

DB- and /DA+ terminals must be used for exchanging data between the modules. The bus is through-wired to a terminal to ensure the exchange between modules to avoid an interruption in the bus connection.
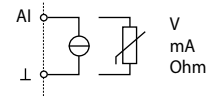

Flexible RS-485 cables with a cross section of no more than 0.75 mm² are permissible for bus wiring. A cable cross section of 1.5 mm² per terminal applies overall. External bus terminating resistors must be used.

Assignment overview
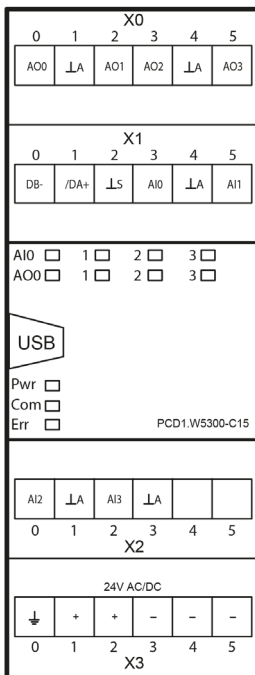
Connection diagrams

Analogue input

AI ⎯ V / mA / Ohm
⊥

Analogue output

AO ⎯ 0…10 V (3.3 mA max.)
⊥
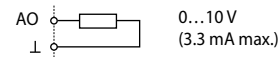
GND	⊥	ground
DGND	⊥D	digital galvanic isolated ground
AGND	⊥A	analogue galvanic isolated ground
SGND	⊥S	signal ground
	a, b, ..	alphanumeric index by different grounds

⑤ Programming

The modules are programmed with Saia PG5® via a master controller or directly via Micro USB.

Program
Non-volatile memory (Flash memory)

Program blocks	
COB	COB 0
XOB	XOB 10, 12, 13 and 16
PB/FB	100 with maximum hierarchy of 8

Data types	
ROM Text/DB	50

Memory	
64 kByte	Program memory

Media
Volatile memory (RAM) without battery backup

Data types	
2000	Register
2000	Flag
200	Timer / Counter

Memory	
5 kByte	Memory (RAM) for 50 Text/DB
2 kByte	Memory (EEPROM) for up to 500 parameters (media) backup
Real-time clock (RTC)	Cyclic synchronisation with PCD controller

Supported libraries

The modules are planned with Saia PG5® using FBoxes or IL. The Saia PG5® Fupla Editor provides a selection of FBoxes which significantly simplify engineering.

PG5 standard FBox libraries:

- Binary
- Blinker
- Block Control (without SB)
- Buffers
- Com.Text (not interpreted)
- Converter
- Counter
- DALI E-Line Driver (new)
- Data Block
- Data Buffer
- EIB Driver (partly)
- EnOcean (partly)

- Flip-Flop
- Floating Point (IEEE only)
- HVC (partly)
- Indirect
- Integer
- Ladder
- Move In/Out
- MP-Bus
- Regulation (partly)
- Special, sys info (partly)
- Timer

In addition to these libraries, an "E-Suite" library is available for specific applications that can be created with the Saia PCD1 E-Line modules. An example for the electrical plant: shade control, light dimming…
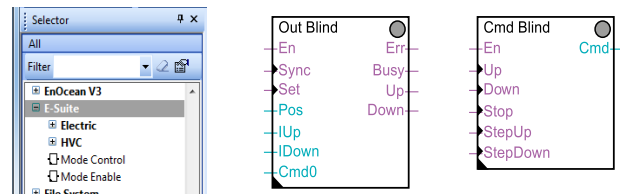
Further information, including which FBoxes are supported, Getting Started, etc. can be found on our support page
www.saia-support.com

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.

PCD1.W5300-C15

Terminal set
32304321-003-S

Order details

Type	Short description	Description	Weight
PCD1.W5300-C15	Saia PCD® E-Line programmable modules	Programmable E-Line input/output module for analogue applications supply 24 VAC/VDC 4 analogue inputs 12 bits 0…10 V, ±10 V, 0(4)…20 mA, Pt/Ni 1000, NTC, 0…2500 Ohm, 0…7500 Ohm, 0…300 kOhm 4 analogue outputs 12 bits, 0…10 V (4 mA max.) 3 interfaces: RS-485 (S-Bus), USB & NFC (Service)	120 g
32304321-003-S	Terminal set	6-pin terminal. Set of 6 terminal blocks	40 g