

PCD3.W380

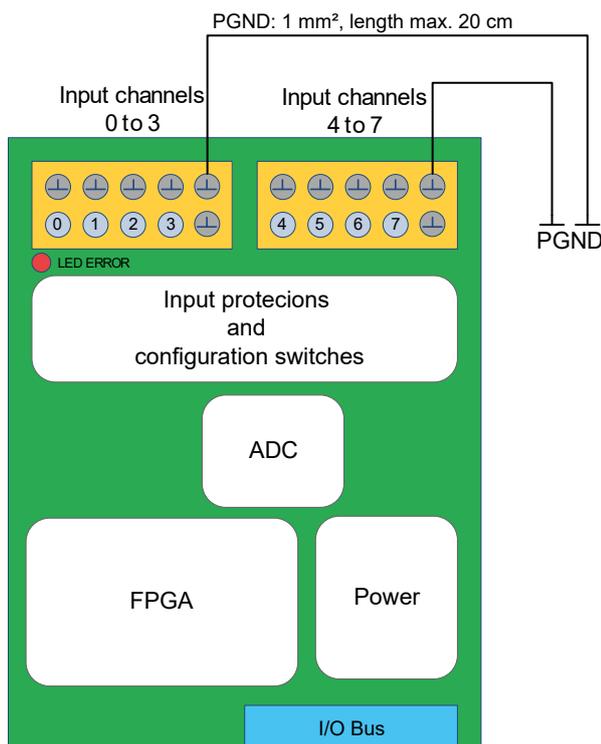
Universal analogue input module, 8 channels, 13 bits (12 bits+sign), selectable by software

This module PCD3.W380 is a universal analogue input module with innovative embedded features. It offers many advantages for all involved parties (project manager, programmer, panel builder and end user). The 8 analogue inputs with 13-bit resolution can be individually configured by software for the various sensor types. Opening the module case and plugging jumpers is no longer necessary. There are 2 connection terminals for each input. Additional external distribution terminals are not required. In addition to 0...10 V, +/- 10 V, 0(4)...20 mA, Pt/Ni 1000 also NTC10k/NTC20k temperature sensors are supported. Thanks to the numerous measuring ranges spare parts handling and service become easier, more flexible and less expensive. The precision of the inputs is 0.3% or better (based on the full range). This module can also be used in applications where the data acquisition speed is important. Each channel value is updated in internal buffer every 680 µs that means each input value is refreshed at 1.5 kHz. Digital filters can be configured individually for all inputs.



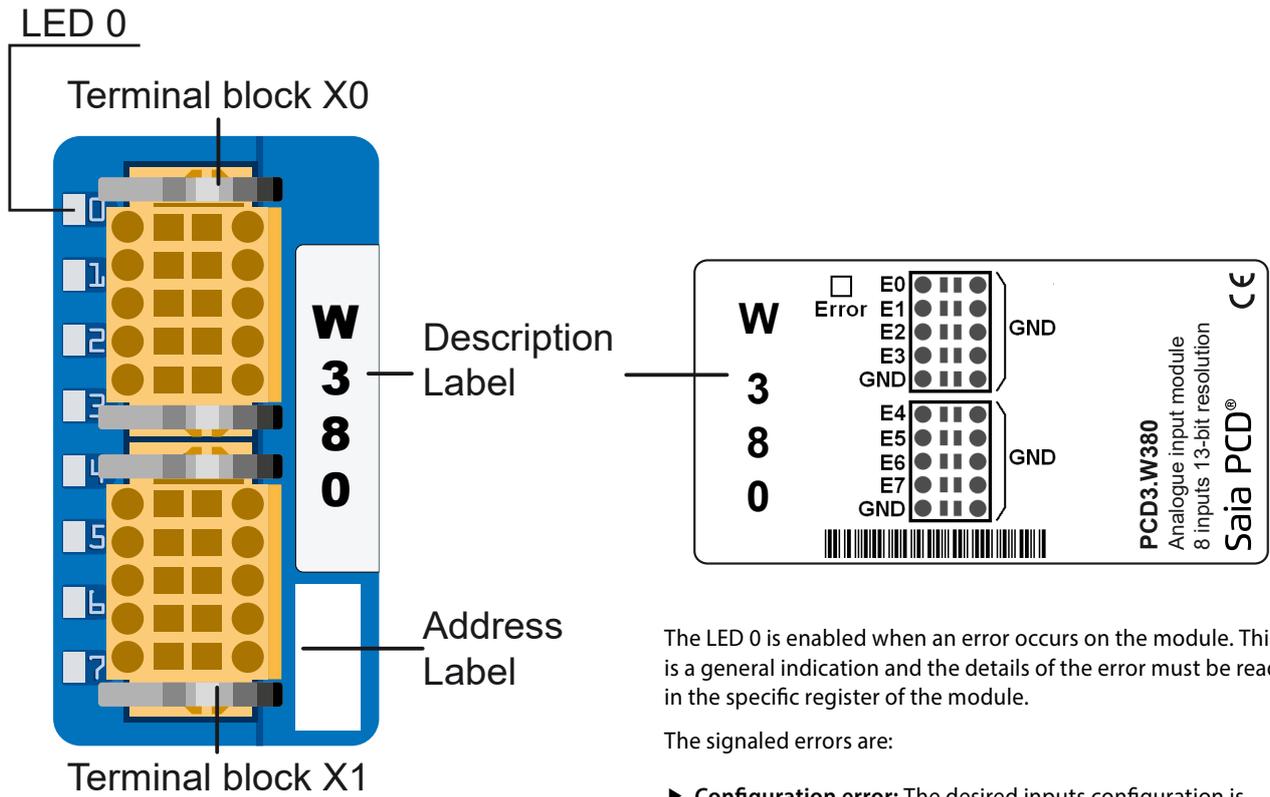
An LED on the housing indicates module errors, which can also be evaluated in the user program. The inputs are also protected against configuration errors by the user.

Module overview



Inputs connection

X0	1: GND	3: GND	5: GND	7: GND	9: GND
	0: CH0	2: CH1	4: CH2	6: CH3	8: GND
X1	1: GND	3: GND	5: GND	7: GND	9: GND
	0: CH4	2: CH5	4: CH6	6: CH7	8: GND



The LED 0 is enabled when an error occurs on the module. This is a general indication and the details of the error must be read in the specific register of the module.

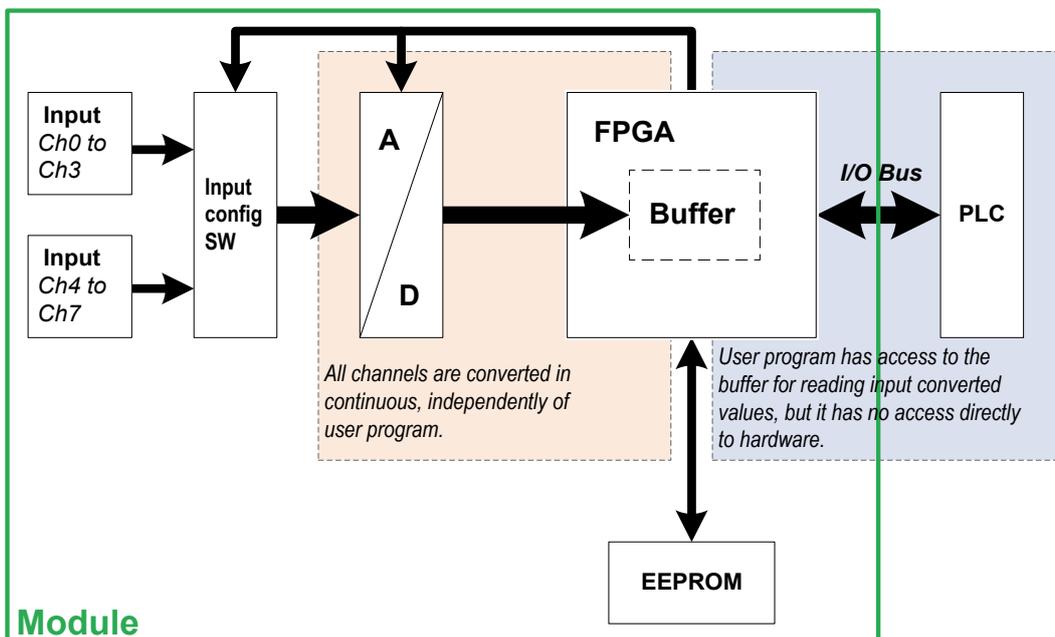
The signaled errors are:

- ▶ **Configuration error:** The desired inputs configuration is not applied correctly.
- ▶ **ADC-Fehler:** A/D converter doesn't respond.
- ▶ **Calibration error:** Module not calibrated.
- ▶ **Protection mode:** An input channel has been automatically put in protection mode, because the module detects a situation which can cause important damages to hardware.

Block diagram

The PLC communicates with the module through the I/O Bus.

The data acquisition is independent of the rest. The input values are continuously updated into the internal buffer. One value is stored per channel. The values are sent to the PLC when the user program sends a defined request to the module.



The configuration of the module is done in PG5 Device Configurator. The user program can read the input values or input configurations by specific registers.

Specifications

Technical data

Compatibility	PCD3 (PCD1 and PCD2 in combination with PCD3.Cxxx)		
Power			
Module power supply voltage	+5V and V+ IOBUS		
Current consumption	25 mA on +5 V and 25 mA on V+		
Galvanic separation	No		
Inputs			
Number of Inputs	8		
Input ranges of each mode		Minimum	... Maximum
	Voltage	-10 V	... +10 V
	Current	-20 mA	... +20 mA
	Resistance	0 Ω	... 2'500 Ω
		0 Ω	... 300 kΩ
	Diode	0 V	... 5 V
	Pt1000	-50 °C	... +400 °C
	Ni1000	-50 °C	... +200 °C
	Ni1000L&S	-30 °C	... +130 °C
	NTC10k	used in range 0	... 300 kΩ
NTC20k	used in range 0	... 300 kΩ	
Absolute maximum input voltage	±20 V (independent of the inputs configuration)		
Temperature error (0°C ... +55°C)	± 0.2%		
Inputs configuration	Each input can be configured individually in 5 modes (ranges above)		
Configuration method	Software (PG5, Device Configurator)		
User connector	Per channel: 1 pin for input and 1 pin for ground 2 pins for protective ground and 2 pins for ground in supplement		
User connector	Up to 1 mm ²		
Timing			
Refresh of each channel	680 μs (all channels are updated during this time)		
Hardware input filter time constant	Voltage		τ = 2,5 ms
	Current		τ = 2,5 ms
	Resistance	(< 2'500 Ω) * (typ. for R < 300 kΩ) **	τ < 4,4 ms τ ≈ 8 ms
	Diode	(typ. for U < 5 V)	τ ≈ 4,4 ms
Digital input filter available	No Filter	One value per cycle	τ = 680 us
	Filter 1:	Mean of 4 cycles	τ = 2,72 ms
	Filter 2:	Mean of 8 cycles	τ = 5,44 ms
	Filter 3***:	Mean of 16 cycles	τ = 10,88 ms
Min. number of I/O Bus accesses to read one channel	28 (~28 us)		

* Temperature sensors Pt1000, Ni1000 and Ni1000L&S.

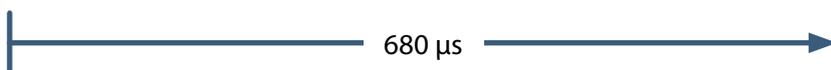
** Temperature sensors NTC10k and NTC20k.

*** Recommended filter, configured by default in Device Configurator.

Input values acquisition

The module is able to acquire and convert the each channel one by one, with a total cycle time of 680 μs:

CH0 à CH1 à CH2 à CH3 à CH4 à CH5 à CH6 à CH7 à CH0 à ...



Protection mode

The input stage configuration (switch) is automatically modified when the module enters in protection mode. The input values of the others channels could be out of the specified tolerances when a channel is in protection mode.

The modules from version 'A2' have an automatic reconfiguration mechanism after the active protection has become active. Once triggered, the input will remain for 10 seconds in protection mode. After 10 seconds, the input will switch back to normal operating configuration. If the input is still in overload condition, protection will again be activated. This feature is available only with firmware version greater than 1.24.10.

For Modules with version 'A' or 'A1' the protection will also be activated when an overload occurs, but to switch back to normal operation mode the PCD has to be restarted.



The PCD used for the module PCDx.W380 must be updated with a firmware version 1.22.28 or higher. Please, download the last firmware version from the support website and load it in the PCD with the PG5 Firmware Downloader Tool.



For programming the modules PCD3.W380, no FBox is available.



xx7 and RIOs: the firmware reads in the values according to the configuration (I/O Builder or network configurator).



I/O modules and I/O terminal blocks may only be plugged in and removed when the Saia PCD® and the external +24 V are disconnected from the power supply.



Watchdog: This module can be used on all base addresses; there is no interaction with the watchdog on the CPUs.



Further information can be found in the Manual on "I/O-modules for PCD1 / PCD2 series and for PCD3 series PCD2 and PCD3" 27-600_ENG.

Ordering information

Type	Short description	Description	Weight
PCD3.W380	Analogue input module 8 inputs 13-bit resolution	Universal analogue input module, 8 channels, 13 bits (12 bits+sign), selectable by software, 0...10 V, ±10 V, 0...20 mA, ±20 mA, Pt/Ni 1000, 0...2500 Ohm, 0...300 kOhm (for NTC sensors) (2 connectors type K included)	80 g

Accessories

Type	Short description	Description	Weight
4 405 5048 0	Plug-in, type K	Plug-in spring terminal block, 2x5-pole up to 1.0 mm ² (orange block), labelled 0 to 9, connector type "K"	15 g

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