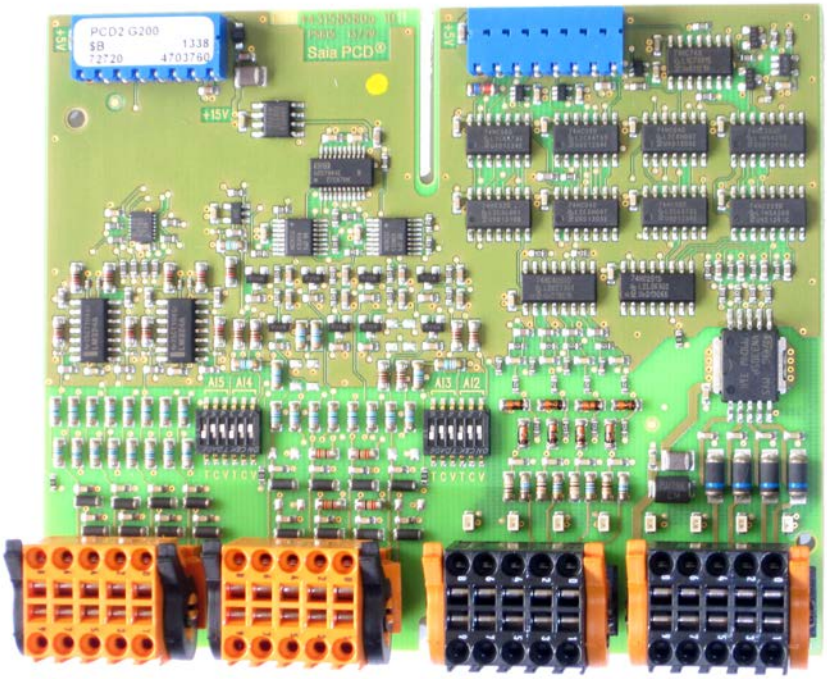


Document 27/635; Version EN02 │ 2014-02-18

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## Document revisions

| Revision | Date | Modified | Comments |
|---|---|---|---|
| EN01 | 2013-10-07 | 2013-10-07 | New document |
| EN02 | 2014-02-19 | div. corrections | |

# 1 Overview PCD2.G200

The PCD2.G200 is a double I/O-module that uses two I/O-slots and includes the following functions :
- 4 digital outputs 24VDC
- 4 digital inputs 24VDC
- 8 analogue inputs 12bit (2 x 0 … 10V, 4 x selectable 0 … 10V, Pt/Ni1000 or 0 … 20mA, 2 x Pt/Ni 1000
- 8 analogue outputs 0...10V (10 Bit)

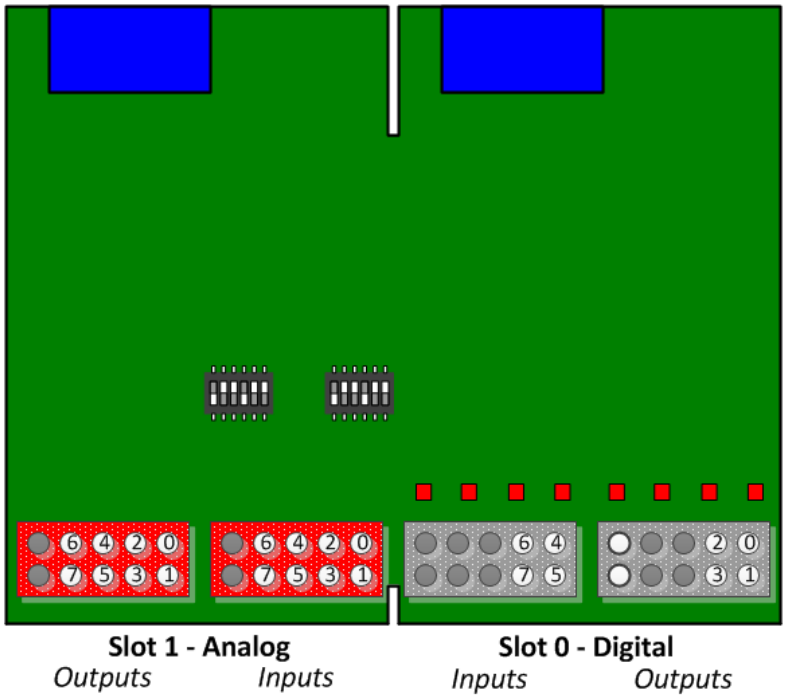


Figure 1: Modul Übersicht

# 2 Specifications

| Technical data | |
|---|---|
| **COMPATIBILITY** | PCD1, PCD2 |
| Storage temperature | -25…+70 °C |
| Ambient temperature operating | 0…+55 °C |
| Relative air humidity | 10…95% r.h. non condensing |
| **POWER** | |
| Module power supply voltage | +5V and V+ IOBUS<br>And 24V ext. for digital outputs |
| Current consumption | 12mA on +5V and max. 35mA on V+ |
| Galvanic separation | No |
| **DIGITAL OUTPUTS** | |
| Number of outputs | 4, electrically connected, source operation |
| Addressing | O 0 ..3 (+BA) |
| Voltage range | 10…32 VDC, smoothed, max. 10% residual ripple |
| Output current | 5…500 mA (leakage current max. 0,1 mA)<br>min. load resistance: 48Ω |
| Short circuit protection | yes |
| Voltage drop | max. 0.3 V at 0.5 A |
| Output delay | Typically 50 µs, max. 100 µs for resistive load |
| Overvoltage protection | TVS 39V |
| LEDs | yes |
| Terminals | 1 plug-in spring-load terminal block, 10-pole, 3.5mm for wiring up to 1mm2, black |
| **DIGITAL INPUTS** | |
| Number of inputs | 4, electrically connected, source operation |
| Addressing | I 4 ..7 (+BA) |
| Input voltage | Typ. 24 VDC smoothed or pulsed<br>H level: 15…30V<br>L level: -30…+5V |
| Input current | typ. 7 mA at 24 VDC (IEC 61131-2, Typ 1) |
| Input delay | typ. 8 ms |
| Overvoltage protection | no (Umax = +/-34V) |
| LEDs | yes |
| Terminals | 1 plug-in spring-load terminal block, 10-pole, 3.5mm for wiring up to 1mm2, black |

Figure 2: Technical Data

| Technical data | |
|---|---|
| **ANALOGUE INPUTS** | |
| Number of inputs | 8 |
| Confiquration | AI0 / AI1 0…10V<br>AI2 / AI3 / AI4 / AI5: Dip Switch selectable<br>AI6 / AI7 PT/NI1000 |
| Galvanic separation | no |
| Signal ranges | 0…10 V Resolution*) 2.44 mV<br>0…20 mA, Resolution*) 4.88 µA<br>*) Resolution = value of least significant bit (LSB) |
| Resolution (digital representation) | 12 bits (0…4095) rsp. directly in 1/10 °C or in 0.1Ω |
| Connection technique for sensors | 2-wires (passiv input) |
| Measuring principle | Single ended |
| Input resistance | 10V range: 20kΩ<br>20mA range: 125Ω<br>PT/NI1000: 7.5kΩ |
| Input filter | typ. 10 ms (0…10V)<br>typ. 20 ms (0…20mA; PT/NI1000) |
| Input ranges for temperature sensors | PT1000: -50…+400°C<br>NI1000: -60…+200°C<br>NI1000L&S-60…+200°C<br>Resistance 0 … 2500 Ω<br>Resistance 0 … 300 kΩ |
| Accuracy at 25°C | ± 0.5% (±0.4% ±4LSB) |
| Temperature error (0…+55°C) | ± 0.25% |
| Overrange protection | 10V range: + 35V (39V TVS Diode)<br>20mA range: no ( 40mA max.) |
| Terminals | 1 plug-in spring-load terminal block, 10-pole, 3.5mm for wiring up to 1mm2, orange |
| **ANALOGUE OUPUTS** | |
| Number of outputs | 8 |
| Galvanic separation | no |
| Signal ranges | 0…10 V Resolution 10 mV, LSB (least significant bit) |
| Resolution (digital representation) | 10 bits (0…1023) |
| Accuracy at 25°C | ± 0.5% ± 50mV |
| Temperature error (0…+55°C) | ± 0.25% |
| Load resistance | min. 3kΩ |
| Short-circuit protection | yes, permanent |
| Terminals | 1 plug-in spring-load terminal block, 10-pole, 3.5mm for wiring up to 1mm2, orange |

Table 1: Technical data of the module

## 2.1 Resolution

| Mode | Resolution [analogue] | Resolution [digital] | Read Values |
|---|---|---|---|
| Voltage 0 ... +10V | 2.44 mV (linear) | 1mV | 0…+10‘000 |
| Current 0…+20mA | 5.14 uA (linear) | 1uA | 0…+20‘000 |
| Resistance 0...2'500 Ω | 0.50... 0.80 Ω | 0.1Ω | 0...25’000 |
| Resistance 0...300 kΩ | 0...10kΩ: 2...14 Ω<br>10k...20kΩ 14...40 Ω<br>20k...40kΩ: 40..130 Ω<br>40k...70kΩ: 130..350 Ω<br>70k...100kΩ: 350...700 Ω<br>100k...300kΩ: 0.7...4.5 kΩ | 1Ω | 0..300’000 |
| Pt 1000 | -50...+400°C: 0.15 ... 0.25°C | 0.1°C | -500...4000 |
| Ni 1000 | -60 ... +200°C: 0.09 ... 0.11°C | 0.1°C | -600...2000 |
| Ni 1000 L&S | -60 ... +200°C: 0.12 ... 0.15°C | 0.1°C | -600...2000 |

Table 2: Resolution of the module

## 2.2 Dip Switch position

The input circuit for the analogue inputs AI2 .. AI5 can be selected by mini Dip switches:

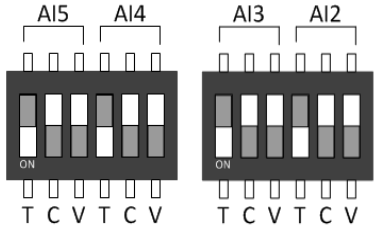


Figure 3: DIP Switches

The modes T (NI/PT1000), C (0..20mA) or V (0..10V) are selected by putting the switch in the down position. Only one switch per channel has to be on, except in the 0..300kΩ range where the T and the V switch must be on.
The above picture shows the default setting (all on T) where all inputs are configured in the temperature measurement mode.

## 2.3 I/O connection

4 plug-in spring-load terminal blocks, 10-pole, 3.5mm for wiring up to 1mm2
Weidmüller Type K. Orange: Part No. 4 405 5048 0, black Part No. 4 405 5054 0

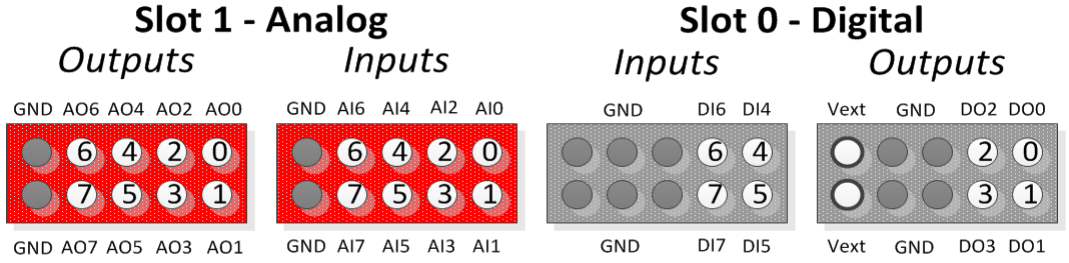


Figure 4: Inputs connections

# 3 Preparing the PLC system

## 3.1 CPU FW

The analog inputs/outputs can be mapped in the device configurator.
Therefore the PCD firmware must be version PCD1.M2xx0_1.22.28 rsp. PCD2.M5xx0_1.22.28 or newer.
Older PCD's can be updated by downloading a new FW with the PG5 firmware download tool:

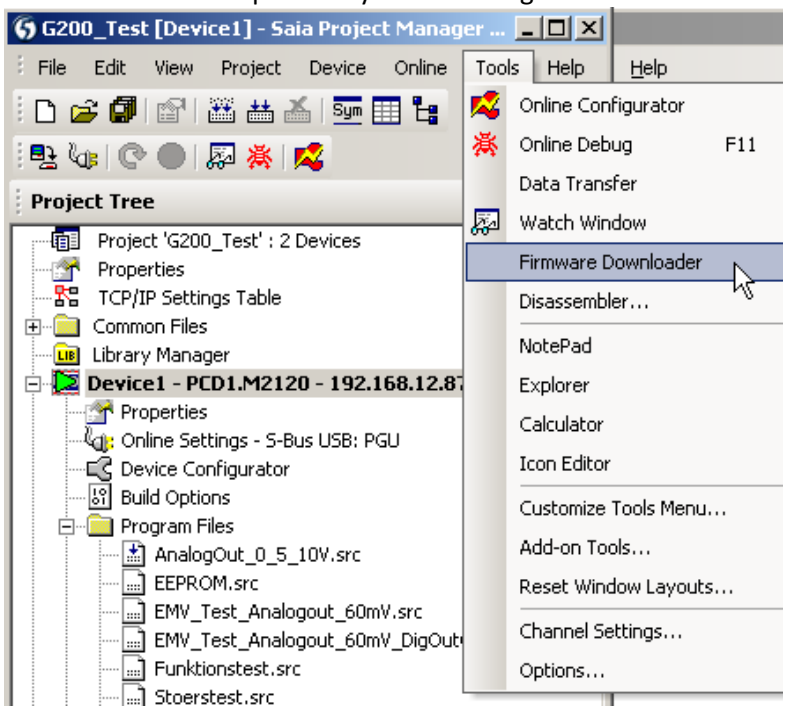


Figure 5: Firmware Downloader Tool

Actual FW can be find on the support website www.sbc-support.com

## 3.2 Preparing PG5

The G200 module can only be used with the software version PG5 2.1.200 or newer.
Please, verify if your system is up-to-date. You find the last PG5 version on the support Website www.sbc-support.com

From PG5 version V2.1.300 on the G200 is fully supported.
For older versions the following templates:

| | |
|---|---|
| - pcd2multifunction.saiaxml | G200 configuration |
| - pcd1mxxx0.saiaxml | PCD1 modul selection |
| - pcd2mxx0.saiaxml | PCD2 modul selection |

Have to be copied in the template directory.
Example: C:/Program Files (x86)/**Saia-Burgess/PG5 V2.1.200/DeviceTemplates**

## 3.2.1 Device configurator

### 3.2.1.1 Choosing the module

The PCD2.G200 can be selected from the Multi-Function Modules and placed on Slot0 for PCD1 :

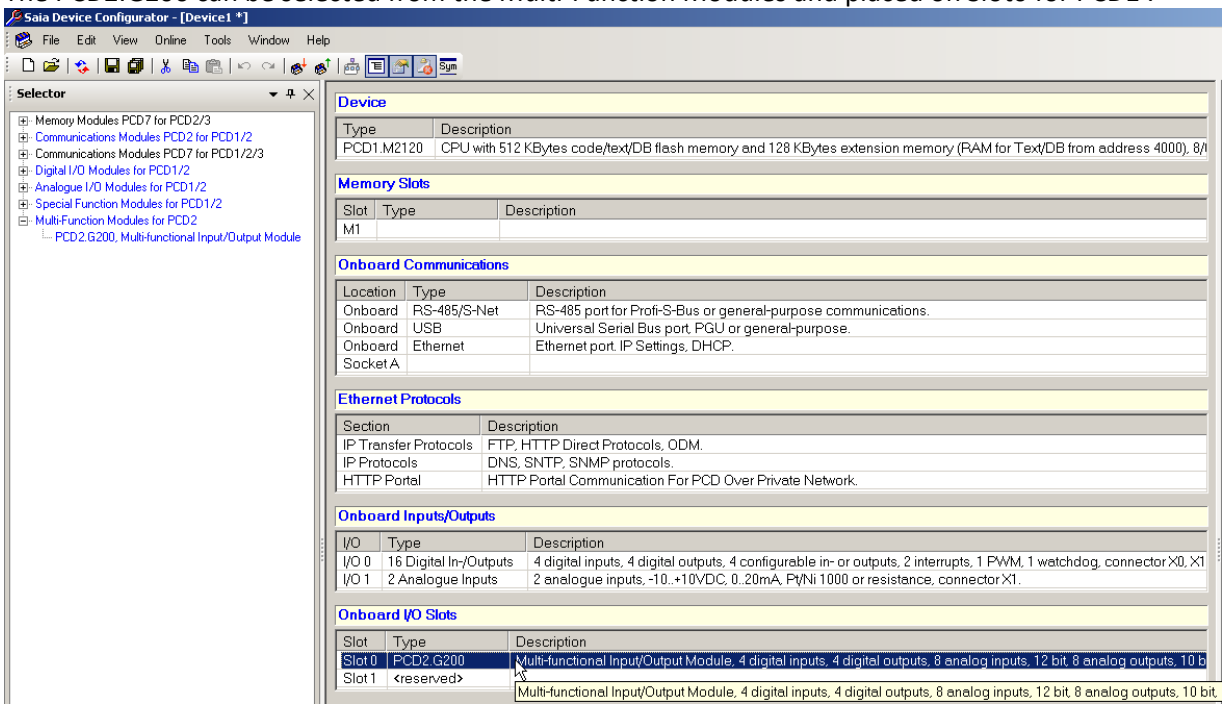


Figure 6: Device Configurator

For PCD2 systems only the even slots (0,2,4,6) are allowed.

### 3.2.1.2 Configuring Analog Inputs

The Media Mapping for analog inputs and outputs has to be set to Yes:

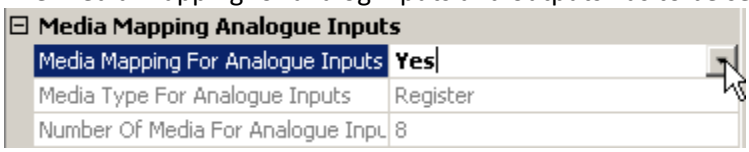


Figure 7: Mapping Analogues Inputs

For each analog input there are several resolution options to select :

Analog inputs 0 and 1 can be set to 0..10000mV or user defined range or to non converted 12 bit values 0..4095:

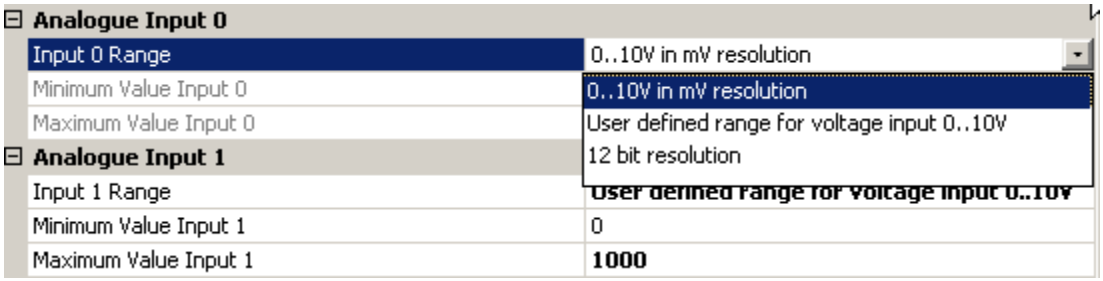


Figure 8: Range selection AI0 / AI1

The default user range is 0 .. 1000

The Analog Inputs 2 to 5 (with the DIP switches) havethe following possibilities :

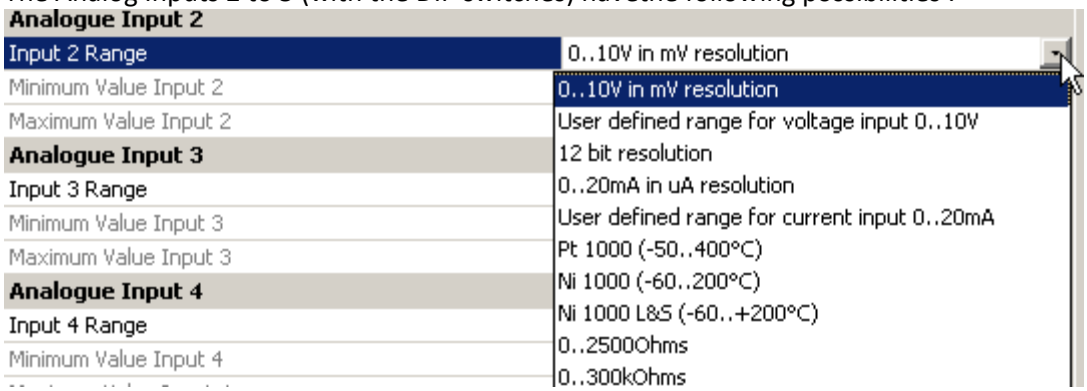


Figure 9: Range selection AI2 .. AI5

**The selected resolution has to correspond with the DIP switch position on the G200.**
There is no automatic recognition when uploading the configuration from the CPU since the DIP switch position can not be read by the CPU.

For the Analog Inputs 6 and 7 there are the following options :

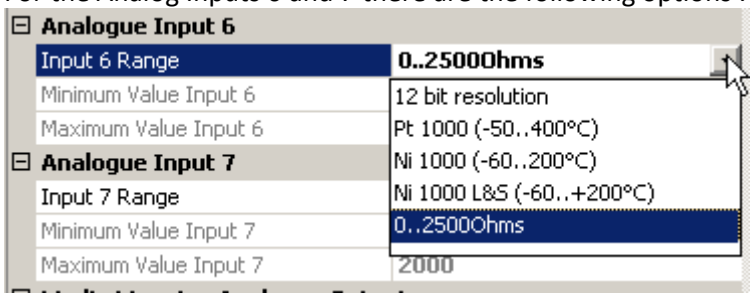


Figure 10: Range selection AI6 / AI7

### 3.2.1.3 Configuring Analog Outputs

Each analog output can be configured to 0…10000mV or 10bit values 0…1923 or to any other user defined range:

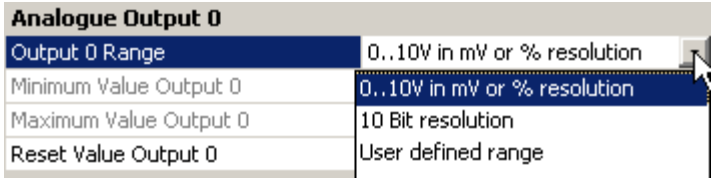


Figure 11: Range selection Analogues Outputs

Additionally a reset value can be specified:

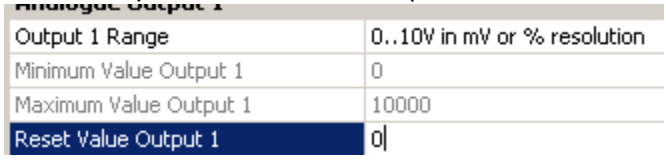


Figure 12: Reset value Analogues Outputs

### 3.2.1.4 Configuring Digital Inputs / Outputs

The digital Outputs can be addressed directly on O 0 .. O 3 (+BaseAddress of the slot).
The digital Inputs can be addressed directly on I 4 .. I 7 (+BaseAddress of the slot).
They can also be mapped like any standard digital module.

### 3.2.2 Media mapping

With media mapping, each G200 module uses the following registers:

| Slot 0, PCD2.G200, Multi-functional Input/Output Module, 4 digital inputs, 4 digital outputs, 8 analog inputs, 12 bit, 8 | | | | |
|---|---|---|---|---|
| S.IO.Slot0.DigitalInput | F [8] | | | Public |
| IO.Slot0.RdDigitalOutput0 | F | S.IO.Slot0.DigitalInput + 0 | Read digital output 0 | Public |
| IO.Slot0.RdDigitalOutput1 | F | S.IO.Slot0.DigitalInput + 1 | Read digital output 1 | Public |
| IO.Slot0.RdDigitalOutput2 | F | S.IO.Slot0.DigitalInput + 2 | Read digital output 2 | Public |
| IO.Slot0.RdDigitalOutput3 | F | S.IO.Slot0.DigitalInput + 3 | Read digital output 3 | Public |
| IO.Slot0.DigitalInput4 | F | S.IO.Slot0.DigitalInput + 4 | Digital input 4 | Public |
| IO.Slot0.DigitalInput5 | F | S.IO.Slot0.DigitalInput + 5 | Digital input 5 | Public |
| IO.Slot0.DigitalInput6 | F | S.IO.Slot0.DigitalInput + 6 | Digital input 6 | Public |
| IO.Slot0.DigitalInput7 | F | S.IO.Slot0.DigitalInput + 7 | Digital input 7 | Public |
| S.IO.Slot0.DigitalOutput | F [4] | | | Public |
| IO.Slot0.WrDigitalOutput0 | F | S.IO.Slot0.DigitalOutput + 0 | Write digital output 0 | Public |
| IO.Slot0.WrDigitalOutput1 | F | S.IO.Slot0.DigitalOutput + 1 | Write digital output 1 | Public |
| IO.Slot0.WrDigitalOutput2 | F | S.IO.Slot0.DigitalOutput + 2 | Write digital output 2 | Public |
| IO.Slot0.WrDigitalOutput3 | F | S.IO.Slot0.DigitalOutput + 3 | Write digital output 3 | Public |
| S.IO.Slot0.AnalogueInput | R [8] | | | Public |
| IO.Slot0.AnalogueInput0 | R | S.IO.Slot0.AnalogueInput + 0 | Analogue input 0 | Public |
| IO.Slot0.AnalogueInput1 | R | S.IO.Slot0.AnalogueInput + 1 | Analogue input 1 | Public |
| IO.Slot0.AnalogueInput2 | R | S.IO.Slot0.AnalogueInput + 2 | Analogue input 2 | Public |
| IO.Slot0.AnalogueInput3 | R | S.IO.Slot0.AnalogueInput + 3 | Analogue input 3 | Public |
| IO.Slot0.AnalogueInput4 | R | S.IO.Slot0.AnalogueInput + 4 | Analogue input 4 | Public |
| IO.Slot0.AnalogueInput5 | R | S.IO.Slot0.AnalogueInput + 5 | Analogue input 5 | Public |
| IO.Slot0.AnalogueInput6 | R | S.IO.Slot0.AnalogueInput + 6 | Analogue input 6 | Public |
| IO.Slot0.AnalogueInput7 | R | S.IO.Slot0.AnalogueInput + 7 | Analogue input 7 | Public |
| S.IO.Slot0.AnalogueOutput | R [8] | | | Public |
| IO.Slot0.AnalogueOutput0 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 0 | Public |
| IO.Slot0.AnalogueOutput1 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 1 | Public |
| IO.Slot0.AnalogueOutput2 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 2 | Public |
| IO.Slot0.AnalogueOutput3 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 3 | Public |
| IO.Slot0.AnalogueOutput4 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 4 | Public |
| IO.Slot0.AnalogueOutput5 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 5 | Public |
| IO.Slot0.AnalogueOutput6 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 6 | Public |
| IO.Slot0.AnalogueOutput7 | R | S.IO.Slot0.AnalogueOutput +... | Analogue output 7 | Public |

Figure 13: PG5, media mapping

In the user program the analogue I/O's are accessed with the symbols:

Example: set Analog Output2 to 5V :

```
LD      IO.Slot0.AnalogueOutput2
5000                                    ; range selected= 10000mV
```

The CPU reads the inputs at before executing the COB and updates the outputs after executing the COB.

For „mixed" I/O Modules as the G200 the digital outputs have also a input symbol IO.Slot0.RdDigitalOutput0...3 , but these are not used in this case.

To write the outputs only the symbols IO.Slot0.WrDigitalOutput0...3 are used.

The effective addresses can be seen in the Data List View:

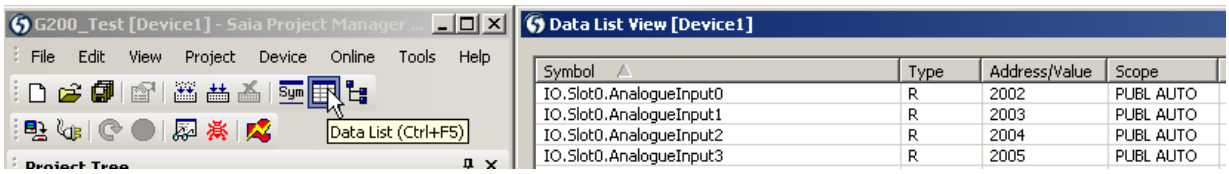


Figure 14: effective addresses

# 4 Example of linearization

NTC sensors are not inplemented in the Device Configurator because these sensors are not standardized. To use a NTC with the module PCD2.G200, please configure the desired channel in mode “0..300kΩ” and use the linearization FBox available in PG5 environment.

In the FBox the resistance values of the sensor have to be entered that the conversion to a temperature is executed.

A project example can be downloaded from the SBC Support Website:
http://www.sbc-support.com/en/services/getting-started/programm-examples/pg5-21/general.html

# 5 Contact

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