Datasheet 26/598; EN05 | PCD2/3.W380 | 2014-11-07  

Saia PCD2/3.W380  
Analogue input module  
8 inputs 13-bit resolution

This new module 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. Each input has 2 connection terminals. In addition to 0…10V, +/- 10V, 0(4)...20mA, 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 680us 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.

**Signal ranges**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Resolution [Bit]</th>
<th>Resolution [measure]</th>
<th>Accuracy (@ T&lt;sub&gt;Ambient = 25°C&lt;/sub&gt;)</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage -10V ... +10V</td>
<td>12 + Sign</td>
<td>2.44 mV (linear)</td>
<td>0.2% of measured value +/- 10mV</td>
<td>-10'000...+10'000</td>
</tr>
<tr>
<td>Current -20mA...+20mA</td>
<td>12 + Sign</td>
<td>5.39 µA (linear)</td>
<td>0.2% of measured value +/- 20µA</td>
<td>-20'000...+20'000</td>
</tr>
<tr>
<td>Resistance 0...2'500 Ω</td>
<td>12 bit</td>
<td>0.50...0.80 Ω</td>
<td>0.2% of measured value +/- 3 Ω</td>
<td>0...25'000</td>
</tr>
<tr>
<td>Resistance 0...300 kΩ</td>
<td>13 bit</td>
<td>0...10kΩ: 1...10 Ω</td>
<td>0.2% of measured value +/- 40 Ω</td>
<td>0.300'000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10k...40kΩ: 10...40 Ω</td>
<td>0.2% of measured value +/- 160 Ω</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40k...70kΩ: 40...100 Ω</td>
<td>0.5% of measured value +/- 400 Ω</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>70k...100kΩ: 100...200 Ω</td>
<td>1.0% of measured value +/- 800 Ω</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100k...300kΩ: 0.2...1.5 kΩ</td>
<td>2.5% of measured value +/- 5.0kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measuring current: 30µA ... 1.3mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pt 1000</td>
<td>12 bit</td>
<td>-50...+400°C: 0.15 ... 0.25°C</td>
<td>0.2% of measured value +/- 0.5°C</td>
<td>-500...4000</td>
</tr>
<tr>
<td>Ni 1000</td>
<td>12 bit</td>
<td>-50...+200°C: 0.09 ... 0.11°C</td>
<td>0.2% of measured value +/- 0.5°C</td>
<td>-500...2000</td>
</tr>
<tr>
<td>Ni 1000 L&amp;S</td>
<td>12 bit</td>
<td>-30...+130°C: 0.12 ... 0.15°C</td>
<td>0.2% of measured value +/- 0.5°C</td>
<td>-300...1300</td>
</tr>
<tr>
<td>Diode 0...5'000mV</td>
<td>12 bit</td>
<td>1.22mV (linear)</td>
<td>0.2% of measured value +/- 10mV</td>
<td>0...5'000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measuring current: 0.7...1.3mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The measuring current was chosen to be the best compromise between the resolution and the sensors self-heating effect, which is negligible for most of the sensors and applications. Even in bad measuring conditions with Pt/Ni1000 sensors with a low thermal coupling as 4mW/K, the maximal error produced by the sensors self-heating is lower than 0.3°C. For NTC10k and NTC20k temperature sensors the input must be configured in mode “Resistance 0...300kΩ”.

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The inputs are connected with the module by two 10-pins connectors for wires up to 1mm2. The connectors provide two pins per input channel, one for the input and one for the ground. All the ground pins are internally connected together.

### Technical data

**COMPATIBILITY**
- PCD1, PCD2, PCD3

**POWER**
- Module power supply voltage: +5V and V+ IOBUS
- Current consumption: 25mA on +5V and 25mA on V+
- Galvanic separation: No

**INPUTS**
- Number of inputs: 8
- Input ranges of each mode:
  - -10V…+10V, -20mA…+20mA, 0…2500Ω, 0…300kΩ, Diode 0V…5V, Pt/Ni1000, Ni1000 L&S, NTC10k, NTC20k
- Absolute maximum input voltage: +/- 20V (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) in the PG5 Device Configurator
- User connector: Per channel: 1 pin for input and 1 pin for ground
- Inputs wiring: Up to 1mm²

**TIMING**
- Refresh of each channel: 680us (all channels are updated during this time)
- Hardware input filter time constant:
  - Voltage: τ = 2.5ms
  - Current: τ = 2.5ms
  - Resistance: ( < 2500Ω)¹
    - (typ. for R<300kΩ)²: τ < 4.4ms
  - Diode: (typ. for U<5V): τ = 4.4ms
- Digital input filter available:
  - No Filter: One value per cycle: τ = 680 us
  - Filter 3ms:
    - Mean of 4 cycles: τ = 2.72 ms
  - Filter 6ms:
    - Mean of 8 cycles: τ = 5.44 ms
  - Filter 12ms:
    - Mean of 16 cycles: τ = 10.88 ms
- Min. number of I/O Bus accesses to read one channel: 28 (~28us)

¹ Temperature sensors Pt1000, Ni1000 and Ni1000 L&S
² Temperature sensors NTC10k and NTC20k.

### Ordering information

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCD2.W380</td>
<td>8 analogue input module for PCD1/2</td>
<td>40 g</td>
</tr>
<tr>
<td>PCD3.W380</td>
<td>8 analogue input module for PCD3</td>
<td>80 g</td>
</tr>
</tbody>
</table>

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