Main characteristics
- Four input channels, each with 4 spring terminals, all inputs software configurable
- Electrical isolation between input channels and PCD ground (the channels themselves are not separated against each other)
- Integrated cold junction for thermocouple
- External cold junction compensation can be measured via channel 0
- RTD measurement with 2, 3, or 4-wire connection
- The linearization and all compensation activities as well as the conversion into °C, °F and K is done in the module (Thermocouples types R, S, T, E, N on request)

Powerful sensor diagnostics
- Overshoot and undershoot detection in measurement range
- Line breaks detection
- Short-circuit detection for resistance thermometers (RTD)
- 3 LEDs to indicate configuration, data acquisition, connection states, line breaks or short circuits

Hardware configuration
- PCD3.W745 modules are for use with the following units HPCD3.M6893, HPCD3.Txxx and HPCD3.Cxxx
- The functions of the module are defined by the firmware or by the programming environment for the respective CPU.

Indicators and connections

<table>
<thead>
<tr>
<th>LED</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Run</td>
<td>The Run LED blinks when the data acquisition is running</td>
</tr>
<tr>
<td>1</td>
<td>Error</td>
<td>The Error LED indicates that the module has no valid configuration.</td>
</tr>
<tr>
<td>2</td>
<td>Sensor Error</td>
<td>Indicates that at least one of the inputs detects: no connection, line break, short circuit</td>
</tr>
</tbody>
</table>
Technical Data

All specifications at 25 °C ambient temperature, unless otherwise noted.

<table>
<thead>
<tr>
<th>Sensor types</th>
<th>TC Type J</th>
<th>TC Type K</th>
<th>Pt100</th>
<th>Ni100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input range for temperature sensors</td>
<td>−210 ... 1200 °C</td>
<td>−270 ... 1372 °C</td>
<td>−200 ... 850 °C</td>
<td>−60 ... 250 °C</td>
</tr>
<tr>
<td>DIN IEC 584</td>
<td>DIN IEC 584</td>
<td>DIN IEC 751</td>
<td>DIN IEC 43760</td>
<td></td>
</tr>
<tr>
<td>Measurement range</td>
<td>−75 mV ... +75 mV</td>
<td>-</td>
<td>Pt/Ni100: 0 ... 600 Ω</td>
<td>Pt/Ni1000: 0 ... 5000 Ω</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 °C</td>
<td>0.1 °C</td>
<td>2.5 μV</td>
<td>0.01 Ω (Range 600 Ω)</td>
</tr>
<tr>
<td>Measuring error in % of full scale value</td>
<td>0.05 %</td>
<td>0.05 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measuring error in °C

Alternative to the "measuring error in %" specification above:

-100 ... +100 °C: <0.4 °C
-150 ... +500 °C: <0.7 °C
-150 ... +1000 °C: <1.0 °C

Temperature coefficient of full scale value

-100 ... +100 °C: <0.3 °C
-150 ... +500 °C: <0.4 °C
-200 ... +850 °C: <0.5 °C

Sampling time per channel | 250 ms | 20 ppm/K |
Measurement resolution | 16 Bit | |
50 Hz rejection | >75 dB | |
80 Hz rejection | >60 dB | |
Line break detection | ✓ | ✓ | ✓ | ✓ |
Short circuit detection | ✗ | ✓ | ✓ | ✓ |
Linearization | on Board | |
Compensation of cold junction temperature | on Board | N/A |
Cold junction internal | yes | N/A |
Cold junction external | yes | N/A |
Connection techniques for resistors (RTD’s) | N/A | 2-wire | 3-wire | 4-wire |
Galvanic isolation | 500 VDC between CPU and analogue inputs | |
Ambient temperature | Operation: 0 ... +50 °C without forced ventilation |
| Storage: −25 ... +85 °C | |
Power supply | No external power supply necessary | |
Internal power consumption from +5V bus | 200 mA | |
Wire gauge | max. 0.5 mm² (AWG 20) | |
Wire Stripping | Remove 10 mm of isolation | |

Internal reference junction (internal cold junction)

The built-in Reference Junction is used when thermocouples are directly connected to the module

<table>
<thead>
<tr>
<th>Built-in Temperature sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
</tr>
<tr>
<td>Resolution</td>
</tr>
<tr>
<td>Measuring error at 25 °C</td>
</tr>
<tr>
<td>Drift over operating Temperature Range (0 ... 55 °C)</td>
</tr>
<tr>
<td>Stabilization time</td>
</tr>
</tbody>
</table>

1) For thermocouples, the full measurement range is offered. The specifications of resolution and accuracy are given for temperatures higher than −150 °C. For lower temperatures than −150 °C, the characteristics of thermocouples become worse. If thermocouples are used in this very low temperature range, the tolerance should be calculated using the tolerance specifications for the ±75 mV range and the thermocouple characteristic.

2) Measuring error in % and temperature coefficient specifications made for the measurement ranges ±75 mV, 600 Ω, 5000 Ω.

3) Technical data of the internal cold junction are specified in the following section.
I/O modules and I/O terminal blocks may only be plugged in and removed when the Control Edge PCD and the external +24 V are disconnected from the power supply.

It is strongly recommended to check the total power consumption of all modules in a system structure with CPU and in all HPCD3.C100 expansions to ensure that the maximum allowable power consumption is not exceeded.

The module racks like CPU and expansion housin provide the following internal power

<table>
<thead>
<tr>
<th>Module rack</th>
<th>+5 V</th>
<th>V+</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPCD3.M6893</td>
<td>600 mA</td>
<td>100 mA</td>
</tr>
<tr>
<td>HPCD3.C200</td>
<td>1000 mA</td>
<td>100 mA</td>
</tr>
</tbody>
</table>

When using expansion units, it is recommended to place the PCD3.W745 modules in the base unit (CPU). This prevents undesirable effects such as a possible voltage drop across the connection cable from the expansion unit to the base unit.

This module includes components that are sensitive to electrostatic discharges.

---

**Block diagram**

- Bus connector
- I/O Bus interface
- DC/DC converter
- Optocoupler
- SPI interface
- Constant current-source & MUX
- Temperatur-sensor CJC int.
- Inputs-Multiplexer
- EMC Filter

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Module configuration

Sensor types / input ranges

The module has four input channels, which are individually configurable:

**Thermocouples (TC)**
- Type J / K according to IEC584

**Resistive Temperature detectors (RTD)**
- Pt100 / Pt 1000 according to IEC751
- Ni100 / Ni1000 according to DIN 43760

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Range (°C)</th>
<th>Range (°F)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC Typ K (NiCr-Ni)</td>
<td>-270...+1372</td>
<td>-454...+2501</td>
<td>°C</td>
</tr>
<tr>
<td>TC Typ J (Fe-CuNi)</td>
<td>-210...+1200</td>
<td>-346...+2192</td>
<td>°C</td>
</tr>
<tr>
<td>RTD Pt100</td>
<td>-200...+850</td>
<td>-328...+1562</td>
<td>°C</td>
</tr>
<tr>
<td>RTD Ni100</td>
<td>-60...+250</td>
<td>-76...+482</td>
<td>°C</td>
</tr>
<tr>
<td>RTD Ni1000</td>
<td>-60...+250</td>
<td>-76...+482</td>
<td>°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage measurement using sense inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV ±75 mV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ohm</th>
<th>Range</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 Ω</td>
<td>0...600 Ω</td>
<td>10 mΩ</td>
</tr>
<tr>
<td>5000 Ω</td>
<td>0...5000 Ω</td>
<td>100 mΩ</td>
</tr>
</tbody>
</table>

* mV-range: Output value • 2.5 = voltage in μV

Measurement unit

The measurement unit for temperature sensors can be configured per module:

- °C Temperature output in 1/10 °C
- °F Temperature output in 1/10 °F
- K Temperature output in 1/10 K

For voltage and Ohm input ranges, this configuration takes no effect.

Connection & compensation techniques

<table>
<thead>
<tr>
<th>Connection &amp; compensation technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTD 2 – Wire connection</td>
</tr>
<tr>
<td>3 – Wire connection</td>
</tr>
<tr>
<td>4 – Wire connection</td>
</tr>
<tr>
<td>Ni1000</td>
</tr>
<tr>
<td>Ni1000</td>
</tr>
<tr>
<td>mV</td>
</tr>
</tbody>
</table>

** In this operating mode, input 0 is used to measure the temperature of the external reference junction
Configuration and connection examples

General example for RTD and thermocouple connection

- **Input 0**: Sensor: Pt100, Comp.: CJC int
- **Input 1**: Sensor: Ni1000, Comp.: CJC ext
- **Input 2**: Sensor: TC K, Comp.: CJC int
- **Input 3**: Sensor: TC J

### Designation

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RthX+</td>
<td>Constant current output for RTD measurement</td>
</tr>
<tr>
<td>SensX+</td>
<td>Positive line of the differential voltage input (Sense +)</td>
</tr>
<tr>
<td>SensX−</td>
<td>Negative line of the differential voltage input (Sense −)</td>
</tr>
<tr>
<td>GND</td>
<td>Sensor ground, galvanic separated from CPU ground</td>
</tr>
</tbody>
</table>

Use of an external isothermal block (CJCext)

- **Input 2**: Thermocouple type K combined with external cold junction CJC ext. (RTD Pt 100, 2 - wire) at input 0 for cold junction compensation.
### Ordering information

<table>
<thead>
<tr>
<th>Type</th>
<th>Short description</th>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCD3.W745</td>
<td>Temperature module, 4 inputs</td>
<td>Universal temperature measurement module for up to 4 measuring inputs, resolution 16 bits, TC Type J &amp; K and 4 wires Pt/Ni 100/1000 (with soldered I/O spring terminal block)</td>
<td>100 g</td>
</tr>
</tbody>
</table>
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 EN61010 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. Do not use a damaged device!

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, no repairs should be undertaken by the user.

GUARANTEE
Opening the module invalidates the guarantee.

Observe this instructions (data sheet) and keep them in a safe place. Pass on the instructions (data sheet) to any future user.

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
EAC Mark of Conformity for Machinery Exports to Russia, Kazakhstan or Belarus.
Sales and Service
For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

**ASIA PACIFIC**
Honeywell Process Solutions,  
(TAC) [hfs-tac-support@honeywell.com](mailto:hfs-tac-support@honeywell.com)

**EMEA**
Honeywell Process Solutions,  
Phone: +80012026455 or +44 (0)1344 656000

**AMERICA’S**
Honeywell Process Solutions,  
Phone: (TAC) 1-800-423-9883 or 215/641-3610  
(Sales) 1-800-343-0228

**Australia**
Honeywell Limited  
Phone: +(61) 7-3846 1255  
FAX: +(61) 7-3840 6481  
Toll Free 1300-36-39-36  
Toll Free Fax: 1300-36-04-70

**China – PRC - Shanghai**
Honeywell China Inc.  
Phone: (86-21) 5257-4568  
Fax: (86-21) 6237-2826

**Singapore**
Honeywell Pte Ltd.  
Phone: +(65) 6580 3278  
Fax: +(65) 6445-3033

**South Korea**
Honeywell Korea Co Ltd  
Phone: +(822) 799 6114  
Fax: +(822) 792 9015

**WARRANTY/REMEDY**
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.
While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

*Specifications are subject to change without notice.*

---

For more information
Learn more about ControlEdge PCD, visit our website [www.honeywellprocess.com/ControlEdgePCD](http://www.honeywellprocess.com/ControlEdgePCD) or contact your Honeywell account manager.

**Honeywell Process Solutions**
2101 CityWest Blvd, Houston TX 77042  
Honeywell House, Skimped Hill Lane

Bracknell, Berkshire, England RG12 1EB UK  
Building #1, 555 Huanke Road,

Zhangjiang Hi-Tech Industrial Park,  
Pudong New Area, Shanghai 201203  
©2020 Honeywell International Inc.  
Document No.: 51-52-03-97  
Rev.1.1  
August 2020