Harmony Analog

Converters for thermocouples,
Converters for Pt100 probes,
Voltage/current converters
Harmony

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Schneider Electric
Harmony Analog
Converters for thermocouples
Converters for Pt100 probes
Voltage/current converters

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# Harmony Analog

**Converters for thermocouples**

**Converters for Pt100 probes**

**Voltage/current converters**

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## Product types

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<th>Converters for J and K type thermocouples</th>
<th>Universal and Optimum converters for Pt100 probes</th>
<th>Universal voltage/current converters</th>
</tr>
</thead>
</table>

---

## Input type

- J (Fe-CuNi)
- K (Ni-CrNi)
- Pt100, 2, 3 and 4 fils

---

## Input signal

<table>
<thead>
<tr>
<th>Temperature range (°C)</th>
<th>Voltage</th>
<th>Current</th>
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</thead>
<tbody>
<tr>
<td>0...150</td>
<td>0...10 V</td>
<td>4...20 mA</td>
</tr>
<tr>
<td>0...300</td>
<td>0...10 V</td>
<td>4...20 mA</td>
</tr>
<tr>
<td>0...600</td>
<td>0...10 V</td>
<td>0...20 mA</td>
</tr>
<tr>
<td>0...1200</td>
<td>0...10 V</td>
<td>0...20 mA</td>
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<tr>
<td>-40...100</td>
<td>0...10 V</td>
<td>0...20 mA</td>
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<tr>
<td>-100...100</td>
<td>0...10 V</td>
<td>0...20 mA</td>
</tr>
<tr>
<td>0...200</td>
<td>0...10 V</td>
<td>0...20 mA</td>
</tr>
<tr>
<td>0...500</td>
<td>0...10 V</td>
<td>0...20 mA</td>
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</tbody>
</table>

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## Output signal

<table>
<thead>
<tr>
<th>Voltage/Current</th>
<th>Voltage</th>
<th>Current</th>
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</thead>
<tbody>
<tr>
<td>Switchable: 0...10 V</td>
<td>0...10 V</td>
<td>0...20 mA</td>
</tr>
<tr>
<td>Switchable: 4...20 mA</td>
<td>4...20 mA</td>
<td>0...20 mA</td>
</tr>
</tbody>
</table>

---

## Supply voltage

- 24V ± 20%, not isolated
- 24V ± 20%, isolated

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## Built-in protection

- Reverse polarity, overvoltage and short-circuit
- Reverse polarity, overvoltage and short-circuit

---

## Conformity/Approvals

- Conforming to standards: IEC 60947-1, IEC 60584-1
- Approvals: UL, CSA, GL, CE

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## Type

- RMTJ40BD
- RMTJ60BD
- RMTK80BD
- RMTK90BD
- RMPT16BD, RMPT18BD
- RMPT24BD, RMPT28BD
- RMPT30BD, RMPT32BD
- RMPT50BD, RMPT52BD
- RMPT70BD, RMPT72BD
- RMCN22BD
- RMCN22BD
- RMCV60BD
- RMCA61BD

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**Pages**: 6 and 7
The Harmony Analog range of converters is designed to convert signals emitted by sensors or electrical measurements into standard electrical signals which are compatible with automation platforms, controllers (thermal processes, speed, …). They also allow the connection distance between a sensor and the measurement acquisition device to be increased: for example between a thermocouple and a programmable controller.

Conforming to IEC standards, UL and CSA certified, these converters are suitable for universal use.

Measurement signals for thermocouples and Pt100 probes

The voltages induced by thermocouples vary between 10 and 80 mV/°C, Pt100 probes (100 ohms at 0 °C) produce about 0.5 mV/°C, with measurement currents of 1 mA. Depending on the sensor, the signal to be measured ranges from a few mV (thermocouple) to 250 and 700 mV for a Pt100 probe.

It is therefore difficult to transmit these low level signals over long electric lines without encountering problems of interference, signal reduction or errors.

Connecting Harmony Analog converters close to the sensors resolves these problems:

- 4-20 mA current loops transmitted over a long distance are less sensitive to interference than low level voltage signals from sensors,
- signal reductions during transmission (resistance) of voltages do not occur,  
- the cables used to connect the converters to process equipment (programmable controllers) are standard cables, which are more cost effective than extension cables or compensation cables suitable for low level signals for Pt100 probes or thermocouples.

Presentation

The Harmony Analog range

The Harmony Analog range has been developed both to take account of the most common applications and to ensure great simplicity of installation:

- pre-set input and output scales, requiring no adjustment
- outputs protected against reverse polarity, overvoltage and short-circuits
- 24 V power supply
- sealable protective cover
- rail mounting and screw fixing onto mounting plate
- LED indicator on the front panel
- input and output selector switches on the front panel
- output with fallback value if no input signal is present (due to failure of a sensor, for example).

The Harmony Analog converter range is divided into four families:

- Converters for J and K type thermocouples: RMTJ/K
- Universal converters for Pt100 probes: RMPT0
- Optimum converters for Pt100 probes: RMPT3
- Universal voltage/current converters: RMC.
**Presentation (continued), description**

**Harmony Analog**

**Converters for thermocouples**

**Converters for Pt100 probes**

**Voltage/current converters**

---

**Presentation**

**Converters for J and K type thermocouples**

Thermocouples, which consist of two metals with different thermo-electric characteristics, produce a voltage that varies according to temperature. This voltage is transmitted to the Harmony Analog converter which converts it to a standard signal.

Converters for thermocouples have cold junction compensation to allow detection of measurement errors induced by the connection to the device itself.

Converters for J and K type thermocouples have:

- for inputs, a pre-set temperature range, depending on the model:
  - Type J: 0...150 °C, 0...300 °C.
  - Type K: 0...600 °C, 0...1200 °C.

- for outputs, a switchable signal:
  - 0...10 V, 0...20 mA, 4...20 mA.

**Universal converters for Pt100 probes**

Pt100 probes with platinum resistor are electrical conductors whose resistance varies according to the temperature.

This ohmic resistance is transmitted to the Harmony Analog converter which converts it to a standard signal.

Universal converters for Pt100 probes have:

- for inputs, a pre-set temperature range, depending on the model:
  - -100...100 °C.
  - 0...40 °C.
  - 0...250 °C.
  - 0...500 °C.

- for outputs, a switchable signal:
  - 0...10 V, 0...20 mA, 4...20 mA.

The products in the family Universal converters for Pt100 probes allow wiring of Pt100 probes in 2, 3 and 4-wire mode.

**Optimum converters for Pt100 probes**

Derived from the above family, these converters have:

- for inputs, a pre-set temperature range identical to that of universal converters for Pt100 probes.

- for outputs: 0...10V signal dedicated to Zelio Logic relays (1) analogue inputs.

They allow Pt100 probes to be wired in 2, 3 and 4-wire mode.

**Universal voltage/current converters**

This family of converters allows the adaptation of electrical values (voltage/current). Four products are available:

- a cost effective converter which will convert a 0...10 V signal to a 4...20mA signal or vice versa.

- a Universal voltage/current converter allowing the most common signals. They have:
  - for inputs, a voltage/current range:
    - - 0..10 V, ± 10 V, 0...20 mA, 4...20 mA.
  - for outputs, a switchable voltage/current range:
    - - 0...10 V, ± 10 V, 0...20 mA, 4...20 mA.

- two Universal voltage/current converters which allow conversion of electrical power signals, both a.c. and d.c.

They have the following, depending on the model:

- for **voltages**, a range of 0 to 500 V ( or )

- for outputs, a switchable voltage/current range:
  - - 0...10 V, 0...20 mA, 4...20 mA.

- for **currents**, a range of 0 to 15 A ( or )

- for outputs, a voltage/current range:
  - - 0..10 V, 0...20 mA, 4...20 mA.

**Description**

Harmony Analog converters have the following on their front panel, depending on the model:

1. Two terminals for 24 V supply connection
2. A ‘Power ON’ LED
3. Three input selector switches (depending on model)
4. An output selector switch (depending on model)
5. A sealable protective cover
6. A screw terminal block for inputs
7. A screw terminal block for outputs

---

(1) Converters dedicated to Zelio Logic smart relays. Consult catalog ref. DIA3ED2111202EN
# Converters for J and K type thermocouples

<table>
<thead>
<tr>
<th>Type</th>
<th>Temperature range °C</th>
<th>°F</th>
<th>Switchable output signal</th>
<th>Reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type J</td>
<td>0...150</td>
<td>32...302</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMTJ40BD</td>
<td>0.120</td>
<td>0.264</td>
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<tr>
<td></td>
<td>0...300</td>
<td>32...572</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMTJ60BD</td>
<td>0.120</td>
<td>0.264</td>
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<tr>
<td>Type K</td>
<td>0...600</td>
<td>32...1112</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMTK90BD</td>
<td>0.120</td>
<td>0.264</td>
</tr>
<tr>
<td></td>
<td>0...1200</td>
<td>32...2192</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMTK90BD</td>
<td>0.120</td>
<td>0.264</td>
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</table>

# Universal converters for Pt100 probes

<table>
<thead>
<tr>
<th>Type</th>
<th>Temperature range °C</th>
<th>°F</th>
<th>Switchable output signal</th>
<th>Reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
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<tbody>
<tr>
<td>Pt100</td>
<td>- 40...40</td>
<td>- 40...104</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
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<td>0.264</td>
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<td>- 100...100</td>
<td>- 148...212</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMPT20BD</td>
<td>0.120</td>
<td>0.264</td>
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<tr>
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<td>0...100</td>
<td>32...212</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMPT30BD</td>
<td>0.120</td>
<td>0.264</td>
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<tr>
<td></td>
<td>0...250</td>
<td>32...482</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMPT50BD</td>
<td>0.120</td>
<td>0.264</td>
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<td></td>
<td>0...500</td>
<td>32...932</td>
<td>0...10 V, 0...20 mA, 4...20 mA</td>
<td>RMPT70BD</td>
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# Optimum converters for Pt100 probes (1)

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<th>°F</th>
<th>Output signal</th>
<th>Reference</th>
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<th>Weight lb</th>
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<tr>
<td>Pt100</td>
<td>- 40...40</td>
<td>- 40...104</td>
<td>0...10 V or 4...20 mA</td>
<td>RMPT13BD</td>
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<td></td>
<td>- 100...100</td>
<td>- 148...212</td>
<td>0...10 V or 4...20 mA</td>
<td>RMPT23BD</td>
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<td>0.264</td>
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<td>0...10 V or 4...20 mA</td>
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<td>0.120</td>
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<tr>
<td></td>
<td>0...500</td>
<td>32...932</td>
<td>0...10 V or 4...20 mA</td>
<td>RMPT73BD</td>
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(1) Converters dedicated to Zelio Logic smart relays. Consult catalog ref. DIA3ED211202EN
### Universal voltage/current converters

**Supply voltage **± 24 V ± 20 %, non isolated

<table>
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<tr>
<th>Input signal</th>
<th>Output signal</th>
<th>Reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
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</thead>
<tbody>
<tr>
<td>0…10 V or 4…20 mA</td>
<td>0…10 V or 4…20 mA</td>
<td>RMCN22BD</td>
<td>0.120</td>
<td>0.264</td>
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</table>

**Supply voltage **± 24 V ± 20 %, isolated

<table>
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<tr>
<th>Input signal</th>
<th>Output signal</th>
<th>Reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>0…10 V, ± 10 V, 0…20 mA, 4…20 mA</td>
<td>Switchable: 0…10 V, ± 10 V, 0…20 mA, 4…20 mA</td>
<td>RMCL55BD</td>
<td>0.120</td>
<td>0.264</td>
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</table>

<table>
<thead>
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<th>Output signal</th>
<th>Reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
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</thead>
<tbody>
<tr>
<td>0…50 V, 0…300 V, 0…500 V</td>
<td>Switchable: 0…10 V, 0…20 mA, 4…20 mA</td>
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<table>
<thead>
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<th>Output signal</th>
<th>Reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
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<tbody>
<tr>
<td>0…1.5 A, 0…5 A, 0…15 A</td>
<td>0…10 V or 0…20 mA, 4…20 mA</td>
<td>RMCA61BD</td>
<td>0.150</td>
<td>0.330</td>
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### Connection accessories

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<th>Weight lb</th>
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<th>Unit reference</th>
<th>Weight kg</th>
<th>Weight lb</th>
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<td>NSYTRR42PE</td>
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<td>0.055</td>
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