Resistance Isolator
Type 9180

- World-wide unique dual channel solution
  - space saving, only 8.8 mm per channel
- For 2-, 3- and 4-wire circuits
- Resistance range from 18 $\Omega$ up to 391 $\Omega$ resp. 180 $\Omega$ up to 3910 $\Omega$
- Installation possible in Zone 2
- Intrinsically safe input [EEx ia] IIC
- Galvanic isolation between input, output and power supply
- Short rise time enables the operation along with Multiplexer
- 1 and 2 channels

Basic function: analog input, Ohm, 1 and 2 channels.
The resistance isolators are used for intrinsically safe operation of Pt 100 and Pt 1000 resistance thermometer or other resistance sensors.
The measured value is transferred to the output.
## Selection Table

<table>
<thead>
<tr>
<th>Version</th>
<th>Channels</th>
<th>Measuring range</th>
<th>Ordering Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>18 ... 391 Ω</td>
<td>9180/10-77-11.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>180 ... 391 Ω</td>
<td>9180/11-77-11.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>18 ... 391 Ω</td>
<td>9180/20-77-11.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>180 ... 391 Ω</td>
<td>9180/21-77-11.</td>
</tr>
</tbody>
</table>

### Add. to Ordering Code

- **Screw terminal**: 9180/..-..-..s
- **Spring clamp terminal**: 9180/..-..-..k
- **Insulation displacement connectors**: 9180/..-..-..q

## Technical Data

### Certificates
- BVS 05 ATEX E 176 X

### Explosion protection
- \( II \ (1) \ GD \) [Ex ia] IIC/IIB and \( II \ 3 \ G \) EEEx nAC T4

### Installation
- in Zone 2, Div. 2 and in the safe area

**Safe maximum values (CENELEC)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. voltage ( U_i )</td>
<td>6.5 V</td>
</tr>
<tr>
<td>Max. current ( i_c )</td>
<td>16.4 mA</td>
</tr>
<tr>
<td>Max. power ( P_c )</td>
<td>27 mW (linear characteristic)</td>
</tr>
<tr>
<td>Max. capacitance ( C_c ) for IIC / IIB</td>
<td>25 μF / 570 μF</td>
</tr>
<tr>
<td>Max. inductance ( L_c ) for IIC / IIB</td>
<td>120 mH / 450 mH</td>
</tr>
<tr>
<td>Internal capacitance ( C_i ) and inductance ( L_i )</td>
<td>negligible</td>
</tr>
<tr>
<td>Insulation voltage ( U_m )</td>
<td>250 V</td>
</tr>
</tbody>
</table>

Further information and combinations of values, see certification.

### Power supply

- **Nominal voltage** \( U_N \): 24 V DC
- **Voltage range**: 18 V ... 31.2 V
- **Nominal current (at \( U_N \))**: 1 / 2 channels = 27 mA / 37 mA
- **Power consumption (at \( U_N \))**: 1 / 2 channels \( \leq 650 \) mW / 890 mW
- **Power losses (at \( U_N \))**: 1 / 2 channels \( \leq 600 \) mW / 720 mW
- **Indication**: LED green „PWR“
- **Polarity reversal protection**: yes
- **Undervoltage monitoring**: yes (no faulty module / output states)

### Galvanic isolation

- **Test voltage under regulations EN 50020**
  - I.S. input to output: 1.5 kV AC
  - I.S. input to power supply: 1.5 kV AC
  - I.S. input to configuration interface: 1.5 kV AC
  - I.S. input to error-contact: 1.5 kV AC

- **Test voltage under regulations EN 50178**
  - Output to power supply: 350 V AC
  - Output to configuration interface: 350 V AC
  - Outputs to each other: 350 V AC
  - Error-contact to power supply and outputs: 350 V AC

There is no galvanic isolation between the I.S. input channels

### I.S. input

- **Connection type (no. of wires)**: 2, 3, 4-wire circuits
- **Setup via DIP switch**: 0.25 mA
- **Sensor current**: \( \leq 200 \) μA at 2-wire circuits
- **Max. conductor resistance**: \( \leq 100 \) Ω at 3-and 4-wire circuits
- **Measurement range**: 18 Ω ... 391 Ω
- **Resolution average**: 10 mΩ

### Output

- **Output signal**: 2, 3, 4-wire circuits
- **Setting time (10% ... 90%)**: \( \leq 10 \) ms
- **Response time (input = output)**: 1 sec
- **Sensor current**: 200 μA ... 5 mA
- **Connection type (no. of wires)**: 2, 3, 4-wire circuits

### Further information and combinations of values, see certification.
### Technical Data

#### Error detection I.S. input

<table>
<thead>
<tr>
<th></th>
<th>9180/0-..-..</th>
<th>9180/1-..-..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-circuit</td>
<td>&gt; 394 Ω</td>
<td>3940 Ω</td>
</tr>
<tr>
<td>Short-circuit</td>
<td>&lt; 16 Ω</td>
<td>160 Ω</td>
</tr>
<tr>
<td>Behaviour of output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-circuit</td>
<td>&gt; 10 kΩ</td>
<td>10 kΩ</td>
</tr>
<tr>
<td>Short-circuit</td>
<td>&lt; 10 kΩ</td>
<td>10 kΩ</td>
</tr>
<tr>
<td>Settings (switch LF)</td>
<td>activated / deactivated</td>
<td>activated / deactivated</td>
</tr>
<tr>
<td>Error detection</td>
<td>LED red „LF“ each channel</td>
<td>LED red „LF“ each channel</td>
</tr>
<tr>
<td>Error messaging and power supply failure</td>
<td>- Contact (30 V / 100 mA), closed to ground in case of error</td>
<td>- Contact (30 V / 100 mA), closed to ground in case of error</td>
</tr>
<tr>
<td></td>
<td>pac-Bus, floating contact</td>
<td>pac-Bus, floating contact</td>
</tr>
<tr>
<td></td>
<td>(30 V / 100 mA)</td>
<td>(30 V / 100 mA)</td>
</tr>
</tbody>
</table>

#### Error limits
- Accuracy, typical data expressed as % of basic range at UH, 23 °C
- Middle measurement error
  - ≤ 0.1 %
- Temperature influence
  - ≤ 0.1 % / 10 K

#### Electromagnetic compatibility
- Tested under the following standards and regulations:
  - EN 61326 (IEC/EN 61000-4-1...6 and 11; EN 55022 Class B)
  - NAMUR NE 21 (IEC/EN 61000-4-1...6, 8 and 11; EN 55022 Class B)

#### Ambient conditions
- Ambient temperature: -20 °C ... +60 °C / +70 °C (watch instructions)
- Relative humidity (no condensation): ≤ 95 %

#### Connection diagram
- For 9180/10-77-11 (Hazardous area) and (Safe area)
- For 9180/20-77-11 (Hazardous area) and (Safe area)

#### Configuration input
- Resistance thermometer / RTD
  - 2-wire
  - 3-wire
  - 4-wire

<table>
<thead>
<tr>
<th>Channel 2</th>
<th>Channel 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Configuration diagram" /></td>
<td><img src="image2" alt="Configuration diagram" /></td>
</tr>
</tbody>
</table>

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**Note:**
- All specifications and diagrams are based on the General Catalogue 13.02.2007.
## Technical Data

<table>
<thead>
<tr>
<th>Configuration output</th>
<th>Type</th>
<th>2-wire</th>
<th>3-wire</th>
<th>4-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>9180/1.-77-11</td>
<td>channel 1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9180/2.-77-11</td>
<td>channel 1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9180/2.-77-11</td>
<td>channel 2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Mechanical data

- **Connection one wire**
  - rigid
  - flexible, end covering sleeves (without / with plastic sleeving)
  - 0.2 ... 2.5 mm²
  - 0.25 ... 2.5 mm²
- **Connection two wires**
  - rigid
  - flexible, end covering sleeves
  - 0.2 ... 1 mm²
  - 0.25 ... 1 mm²
- **Weight**
  - approx. 160 g
- **Mounting type**
  - on DIN rail acc. to EN 50022 (NS35/15; NS35/7.5) or in pac-Carrier horizontal or vertical
- **Mounting position**
  - IP 30
- **Casing protection class**
  - IP 20
- **Casing material**
  - PA 6.6
- **Fire protecting class (UL-94)**
  - V0

### Dimension drawings (all dimensions in mm) - subject to alterations

- **Dimension X**
  - Screw terminals: 108 mm
  - Spring clamp terminals: 128 mm
  - Insulation displacement connectors: 131 mm

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We reserve the right to make alterations to the technical data, weights, dimensions, designs and products available without notice. The illustrations cannot be considered binding.