Data Sheet

R-Series V RP5 Analog
Magnetostrictive Linear Position Sensors

- Output of position and speed/velocity
- Dual magnet position measurement
- Field adjustments and diagnostics using the TempoLink® smart assistant
MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics rely on the company's proprietary magnetostrictive technology, which can determine position with a high level of precision and robustness. Each Temposonics® position sensor consists of a ferromagnetic waveguide, a position magnet, a strain pulse converter and a supporting electronics. The magnet, connected to the object in motion in the application, generates a magnetic field at its location on the waveguide. A short current pulse is applied to the waveguide. This creates a momentary radial magnetic field and torsional strain on the waveguide. The momentary interaction of the magnetic fields releases a torsional strain pulse that propagates the length of the waveguide. When the ultrasonic wave reaches the beginning of the waveguide it is converted into an electrical signal. Since the speed of the ultrasonic wave in the waveguide is precisely known, the time required to receive the return signal can be converted into a linear position measurement with both high accuracy and repeatability.

R-SERIES V RP5 Analog

The Temposonics® R-Series V brings very powerful sensor performance to meet the many demands of your application. The main advantages of the profile version RP5 with Analog output (current/voltage) are:

- **High shock and vibration resistance**
  The R-Series V is the long term solution for harsh environments that have high levels of shock and vibration.

- **Internal resolution 0.1 µm**
  The sensor works with an internal resolution of 0.1 µm to detect and report smallest position changes.

- **Dual output channel**
  The sensor is available with single output channel or with dual output channels.

- **Multiple output options**
  The following values can be output via the second output:
  - Speed/velocity of the first magnet
  - Reversed position of the first magnet
  - Position of the second magnet
  - Temperature in the sensor electronics housing

In addition the R-Series V Analog scores with the following features:

- **2 positions simultaneously**
  The R-Series V Analog can detect and report the position of up to 2 magnets simultaneously.

- **R-Series V Analog**
  With the R-Series V Analog you can configure the Analog output (current/voltage) for your application and also adjust it on site with the smart assistant.

All settings under control with the smart assistant for the R-Series V

The TempoLink® smart assistant supports you in setup and diagnostics of the R-Series V. For more information of the assistant please see the data sheet:

- **TempoLink® smart assistant**
  (Document part number: 552070)
# TECHNICAL DATA

## Output

**Analog**  
Voltage: 0...10 / 10...0 / −10...+10 / +10...−10 VDC (min. controller load > 5 kΩ)  
Current: 4(0)...20/20...4(0) mA (min./max. load 0/500 Ω)

**Measured output variables**  
Position for one or two position magnets  
Position + speed (without direction) or velocity (with direction) for one position magnet  
Position for one position magnet + temperature inside the sensor electronics housing

## Measurement parameters

### Position measurement

**Null/Span adjustment**  
100 % of electrical stroke  
**Resolution**  
16 bit (internal resolution 0.1 µm)  
**Update time**  
Stroke length | ≤ 200 mm | ≤ 350 mm | ≤ 1200 mm | ≤ 2400 mm | ≤ 4800 mm | ≤ 6350 mm  
Update time | 0.25 ms | 0.333 ms | 0.5 ms | 1.0 ms | 2.0 ms | 5.0 ms

**Linearity deviation**  
< ±0.01 % F.S. (minimum ±50 µm)  
**Repeatability**  
< ±0.001 % F.S. (minimum ±1 µm)  
**Hysteresis**  
< 4 µm typical  
**Temperature coefficient**  
< 30 ppm/K typical

### Speed/velocity measurement

**Range**  
0.01...10 m/s or 1...400 in./s  
**Deviation**  
≤ 0.05 %  
**Resolution**  
16 bit (minimum 0.01 mm/s)

## Operating conditions

**Operating temperature**  
−40...+85 °C (−40...+185 °F)  
**Humidity**  
90 % relative humidity, no condensation  
**Ingress protection**  
IP67 (connectors correctly fitted)/IP68 (3 m/3 d) for cable outlet  
**Shock test**  
150 g/11 ms, IEC standard 60068-2-27  
**Vibration test**  
30 g/10...2000 Hz, IEC standard 60068-2-6 (excluding resonant frequencies)  
**EMC test**  
Electromagnetic emission according to EN 61000-6-3  
Electromagnetic immunity according to EN 61000-6-2  
The RP5 sensors fulfill the requirements of the EMC directives 2014/30/EU, UKSI 2016 No. 1091 and TR CU 020/2011

**Magnet movement velocity**  
Magnet slider: Max. 10 m/s; U-magnet: Any; block magnet: Any

## Design/Material

**Sensor electronics housing**  
Aluminum (painted), zinc die cast  
**Sensor profile**  
Aluminum  
**RoHS compliance**  
The used materials are compliant with the requirements of EU Directive 2011/65/EU and EU Regulation 2015/863 as well as UKSI 2022 No. 622

**Stroke length**  
25...6350 mm (1...250 in.)

## Mechanical mounting

**Mounting position**  
Any  
**Mounting instruction**  
Please consult the technical drawings on page 4 and the operation manual (document part number: 552063)

## Electrical connection

**Connection type**  
1 × M16 male connectors (6 pin), 1 × M12 male connector (5 pin) or cable outlet  
**Operating voltage**  
12...30 VDC ±20 % (9.6...36 VDC)  
**Power consumption**  
< 3.25 W  
**Dielectric strength**  
500 VDC (DC ground to machine ground)  
**Polarity protection**  
Up to −36 VDC  
**Overvoltage protection**  
Up to 36 VDC

1/ With position magnet # 251 416-2
**TECHNICAL DRAWING**

**RP5-M, example: Connection type D60 (connector outlet)**

- **Magnet**: Ø 5.3 (0.21)
- **Sensor electronics housing**: Ø 5.3 (0.21)
- **Null zone**: 28 (1.1) mm
- **Stroke length**: 25...6350 (1...250) mm
- **Dead zone**: 66/71* (2.6/2.8*) mm

* Stroke length > 5000 mm (196.9 in.)

**RP5-G/-S, example: Connection type D34 (connector outlet)**

- **Magnet**: Ø 5.3 (0.21)
- **Sensor electronics housing**: Ø 5.3 (0.21)
- **Null zone**: 28 (1.1) mm
- **Stroke length**: 25...6350 (1...250) mm
- **Dead zone**: 66/71* (2.6/2.8*) mm

* Stroke length > 5000 mm (196.9 in.)

**RP5-M, example: Connection type EXX/GXX/LXX/UXX (angled cable outlet)**

- **Magnet**: Ø 5.3 (0.21)
- **Sensor electronics housing**: Ø 5.3 (0.21)
- **Null zone**: 28 (1.1) mm
- **Stroke length**: 25...6350 (1...250) mm
- **Dead zone**: 66/71* (2.6/2.8*) mm

* Stroke length > 5000 mm (196.9 in.)

**RP5-M, example: Connection type HXX/RXX/TXX (straight cable outlet)**

- **Magnet**: Ø 5.3 (0.21)
- **Sensor electronics housing**: Ø 5.3 (0.21)
- **Null zone**: 28 (1.1) mm
- **Stroke length**: 25...6350 (1...250) mm
- **Dead zone**: 66/71* (2.6/2.8*) mm

* Stroke length > 5000 mm (196.9 in.)

Controlling design dimensions are in millimeters and measurements in ( ) are in inches.

Fig. 2: Temposonics® RP5 with U-magnet/magnet slider
### Connector Wiring

#### D34

<table>
<thead>
<tr>
<th>M12 male connector</th>
<th>Output</th>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>+12…30 VDC (±20 %)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Position (magnet 1)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>DC Ground (0 V)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2*</td>
<td>Position (magnet 2) or reverse position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(magnet 1) or speed or velocity (magnet 1) or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>temperature inside the sensor electronics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>housing</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>Signal Ground</td>
</tr>
</tbody>
</table>

* order dependent

View on sensor

![Connector wiring D34](image)

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#### D60

<table>
<thead>
<tr>
<th>M16 male connector</th>
<th>Output</th>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>Position (magnet 1)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Signal Ground</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>Position (magnet 2) or reverse position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(magnet 1) or speed or velocity (magnet 1) or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>temperature inside the sensor electronics</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>Signal Ground</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>+12…30 VDC (±20 %)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>DC Ground (0 V)</td>
</tr>
</tbody>
</table>

* order dependent

View on sensor

![Connector wiring D60](image)

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### HXX or LXX / RXX or EXX / TXX or GXX / UXX

<table>
<thead>
<tr>
<th>Cable</th>
<th>Output</th>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>GY</td>
<td>Position (magnet 1)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>YE</td>
<td>Position (magnet 2) or reverse position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(magnet 1) or speed or velocity (magnet 1) or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>temperature inside the sensor electronics</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>GN</td>
<td>Signal Ground</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>BK</td>
<td>+12…30 VDC (±20 %)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>RD</td>
<td>DC Ground (0 V)</td>
</tr>
</tbody>
</table>

* order dependent

For cable type TXX, the extra red & blue wires are not used.

View on sensor

![Connector wiring for cable outlet](image)

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### Notice

For sensors with current output (order code section h Output [A Current], the output 1 (position (magnet 1)) must be connected in any case.

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### Cable Types Assignment

<table>
<thead>
<tr>
<th>Straight cable outlet</th>
<th>Cable type</th>
<th>Angled cable outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>HXX</td>
<td>PUR</td>
<td>HXX</td>
</tr>
<tr>
<td>RXX</td>
<td>PVC</td>
<td>RXX</td>
</tr>
<tr>
<td>TXX</td>
<td>FEP</td>
<td>TXX</td>
</tr>
</tbody>
</table>

Part no. 530 052

Part no. 530 032

Part no. 530 112

Part no. 530 157

![Cable types assignment](image)
**FREQUENTLY ORDERED ACCESSORIES** – Additional options available in our Accessories Catalog [SS1444]

**Position magnets**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Material</th>
<th>Weight (approx.)</th>
<th>Surface Pressure</th>
<th>Fastening Torque for M4 Screws</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>252 182</td>
<td>Magnet slider S, joint at top</td>
<td>GRP, magnet hard ferrite</td>
<td>35 g</td>
<td>Max. 40 N/mm²</td>
<td>1 Nm</td>
<td>−40…+105 °C (−40…+221 °F)</td>
</tr>
<tr>
<td>252 184</td>
<td>Magnet slider V, joint at front</td>
<td>GRP, magnet hard ferrite</td>
<td>35 g</td>
<td></td>
<td>1 Nm</td>
<td>−40…+85 °C (−40…+185 °F)</td>
</tr>
<tr>
<td>252 183</td>
<td>Magnet slider N, longer ball-joint arm</td>
<td>GRP, magnet hard ferrite</td>
<td>35 g</td>
<td></td>
<td>1 Nm</td>
<td>−40…+85 °C (−40…+185 °F)</td>
</tr>
<tr>
<td>253 421</td>
<td>Magnet slider G, backlash free</td>
<td>GRP, magnet hard ferrite</td>
<td>25 g</td>
<td></td>
<td>1 Nm</td>
<td>−40…+85 °C (−40…+185 °F)</td>
</tr>
</tbody>
</table>

**Mounting accessories**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Material</th>
<th>Weight (approx.)</th>
<th>Surface Pressure</th>
<th>Fastening Torque for M5 Screws</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>251 416-2</td>
<td>U-magnet OD33</td>
<td>PA ferrite</td>
<td>11 g</td>
<td></td>
<td>1 Nm</td>
<td>−40…+105 °C (−40…+221 °F)</td>
</tr>
<tr>
<td>403 448</td>
<td>Block magnet L</td>
<td>Plastic carrier with hard ferrite magnet</td>
<td>20 g</td>
<td></td>
<td>1 Nm</td>
<td>−40…+75 °C (−40…+167 °F)</td>
</tr>
<tr>
<td>400 802</td>
<td>Mounting clamp</td>
<td>Stainless steel (AISI 304)</td>
<td></td>
<td></td>
<td>4.5 Nm</td>
<td></td>
</tr>
<tr>
<td>401 602</td>
<td>T-nut</td>
<td>Stainless steel (AISI 304)</td>
<td></td>
<td></td>
<td>4.5 Nm</td>
<td></td>
</tr>
</tbody>
</table>

Controlling design dimensions are in millimeters and measurements in ( ) are in inches.
### Cable connectors*  

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M16 female connector (6 pin), straight</td>
<td>M16 female connector (6 pin), angled</td>
<td>M12 A-coded female connector (4 pin/5 pin), straight</td>
<td>M12 A-coded female connector (5 pin), angled</td>
<td></td>
</tr>
<tr>
<td>Part no. 370 423</td>
<td>Part no. 370 460</td>
<td>Part no. 370 677</td>
<td>Part no. 370 678</td>
<td></td>
</tr>
<tr>
<td>Termination: Solder</td>
<td>Termination: Solder</td>
<td>Termination: Screw</td>
<td>Termination: Screw</td>
<td></td>
</tr>
<tr>
<td>Cable Ø: 6…8 mm (0.24…0.31 in.)</td>
<td>Cable Ø: 6…8 mm (0.24…0.31 in.)</td>
<td>Cable Ø: 4…8 mm (0.16…0.31 in.)</td>
<td>Cable Ø: 5…8 mm (0.2…0.31 in.)</td>
<td></td>
</tr>
<tr>
<td>Operating temperature: −40…+100 °C (−40…+212 °F)</td>
<td>Operating temperature: −40…+95 °C (−40…+203 °F)</td>
<td>Operating temperature: −30…+85 °C (−22…+185 °F)</td>
<td>Operating temperature: −25…+85 °C (−13…+185 °F)</td>
<td></td>
</tr>
<tr>
<td>Ingress protection: IP65/IP67 (correctly fitted)</td>
<td>Ingress protection: IP67 (correctly fitted)</td>
<td>Ingress protection: IP67 (correctly fitted)</td>
<td>Ingress protection: IP67 (correctly fitted)</td>
<td></td>
</tr>
<tr>
<td>Fastening torque: 0.6 Nm</td>
<td>Fastening torque: 0.6 Nm</td>
<td>Fastening torque: 0.6 Nm</td>
<td>Fastening torque: 0.4 Nm</td>
<td></td>
</tr>
</tbody>
</table>

### Cables

<table>
<thead>
<tr>
<th>Cables</th>
<th>PVC cable</th>
<th>PUR cable</th>
<th>FEP cable</th>
<th>FEP cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part no. 530 032</td>
<td>Part no. 530 052</td>
<td>Part no. 530 112</td>
<td>Part no. 530 157</td>
<td></td>
</tr>
<tr>
<td>Material: PVC jacket; gray</td>
<td>Material: PUR jacket; orange</td>
<td>Material: FEP jacket; black</td>
<td>Material: FEP jacket; black</td>
<td></td>
</tr>
<tr>
<td>Features: Twisted pair, shielded, flexible</td>
<td>Features: Twisted pair, shielded, highly flexible, halogen free, suitable for drag chains, mostly oil &amp; flame resistant</td>
<td>Features: Twisted pair, shielded, flexible, high thermal resistance, mostly oil &amp; acid resistant</td>
<td>Features: Twisted pair, shielded</td>
<td></td>
</tr>
<tr>
<td>Cable Ø: 6 mm (0.23 in.)</td>
<td>Cable Ø: 6.4 mm (0.25 in.)</td>
<td>Cable Ø: 7.6 mm (0.3 in.)</td>
<td>Cable Ø: 6.7 mm (0.26 in.)</td>
<td></td>
</tr>
<tr>
<td>Cross section: 3 × 2 × 0.14 mm²</td>
<td>Cross section: 3 × 2 × 0.25 mm²</td>
<td>Cross section: 4 × 2 × 0.25 mm²</td>
<td>Cross section: 3 × 2 × 0.14 mm²</td>
<td></td>
</tr>
<tr>
<td>Bending radius: 10 × D</td>
<td>Bending radius: 5 × D</td>
<td>Bending radius: 8 – 10 × D</td>
<td>Operating temperature: −40…+180 °C (−40…+356 °F)</td>
<td></td>
</tr>
<tr>
<td>(fixed installation)</td>
<td>(fixed installation)</td>
<td>(fixed installation)</td>
<td>Operating temperature: −40…+180 °C (−40…+356 °F)</td>
<td></td>
</tr>
<tr>
<td>Operating temperature: −40…+105 °C (−40…+221 °F)</td>
<td>Operating temperature: −30…+80 °C (−22…+176 °F)</td>
<td>Operating temperature: −100…+180 °C (−148…+356 °F)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Follow the manufacturer’s mounting instructions  
Color of connectors and cable jacket may change. Color codes for the individual wires and technical properties remain unchanged.  
Controlling design dimensions are in millimeters and measurements in ( ) are in inches.
**Cable**

<table>
<thead>
<tr>
<th>Silicone cable</th>
<th>Cable with M12 A-coded female connector (5 pin), straight – pigtail</th>
<th>Cable with M12 A-coded female connector (5 pin), angled – pigtail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part no. 530 176</td>
<td>Part no. 370 673</td>
<td>Part no. 370 675</td>
</tr>
</tbody>
</table>

- **Silicone cable**
  - **Material:** Silicone jacket; black
  - **Features:** Twisted pair, shielded
  - **Cable Ø:** 6.3 mm (0.25 in.)
  - **Cross section:** 3 × 2 × 0.14 mm²
  - **Bending radius:** 7 × D (fixed installation)
  - **Operating temperature:** −50…+150 °C (−58…+302 °F)

- **Cable with M12 A-coded female connector (5 pin), straight – pigtail**
  - **Material:** PUR jacket; black
  - **Features:** Shielded
  - **Cable length:** 5 m (16.4 ft)
  - **Ingress protection:** IP67 (correctly fitted)
  - **Operating temperature:** −25…+80 °C (−13…+176 °F)

- **Cable with M12 A-coded female connector (5 pin), angled – pigtail**
  - **Material:** PUR jacket; black
  - **Features:** Shielded
  - **Cable length:** 5 m (16.4 ft)
  - **Ingress protection:** IP67 (correctly fitted)
  - **Operating temperature:** −25…+80 °C (−13…+176 °F)

**Programming tools**

<table>
<thead>
<tr>
<th>Hand programmer for analog output</th>
<th>Cabinet programmer for analog output</th>
<th>TempoLink® kit for Temposonics® R-Series V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part no. 253 124</td>
<td>Part no. 253 408</td>
<td>Part no. TL-1-0-AD60 (for D60)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part no. TL-1-0-AS00 (for cable outlet)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part no. TL-1-0-AD34 (for D34)</td>
</tr>
</tbody>
</table>

- **Hand programmer for analog output**
  - **Part no. 253 124**
  - **Features:** Easy teach-in-setsups of stroke length and direction on desired zero / span positions. For sensors with 1 magnet.

- **Cabinet programmer for analog output**
  - **Part no. 253 408**
  - **Features:** Features snap-in mounting on standard DIN rail (35 mm). This programmer can be permanently mounted in a control cabinet and includes a program/run switch. For sensors with 1 magnet.

- **TempoLink® kit for Temposonics® R-Series V**
  - **Part no. TL-1-0-AD60 (for D60)**
  - **Part no. TL-1-0-AS00 (for cable outlet)**
  - **Part no. TL-1-0-AD34 (for D34)**
  - **Features:**
    - Connect wirelessly via Wi-Fi enabled device or via USB with the diagnostic tool
    - Simple connectivity to the sensor via 24 VDC power line (permissible cable length: 30 m)
    - User friendly interface for mobile devices and desktop computers
    - See data sheet “TempoLink® smart assistant” (document part no.: 552070) for further information

Controlling design dimensions are in millimeters and measurements in ( ) are in inches.

Color of connectors and cable jacket may change. Color codes for the individual wires and technical properties remain unchanged.
### Extension cables M12

<table>
<thead>
<tr>
<th>PVC cable with M12 female connector (6 pin), straight – pigtail</th>
<th>PUR cable with M12 female connector (6 pin), straight – pigtail</th>
<th>FEP cable with M12 female connector (6 pin), straight – pigtail</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC cable (part no. 530 032) with M12 female connector, straight (part no. 370 677)</td>
<td>PUR cable (part no. 530 052) with M12 female connector, straight (part no. 370 677)</td>
<td>FEP cable (part no. 530 112) with M12 female connector, straight (part no. 370 677)</td>
</tr>
<tr>
<td>Order code: <strong>K2-A-370677-xxxxyy-530032-0</strong>  (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)</td>
<td>Order code: <strong>K2-A-370677-xxxxyy-530052-0</strong>  (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)</td>
<td>Order code: <strong>K2-A-370677-xxxxyy-530112-0</strong>  (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)</td>
</tr>
</tbody>
</table>

### Extension cables M16

<table>
<thead>
<tr>
<th>PVC cable with M16 female connector (6 pin), straight – pigtail</th>
<th>PUR cable with M16 female connector (6 pin), straight – pigtail</th>
<th>FEP cable with M16 female connector (6 pin), straight – pigtail</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC cable (part no. 530 032) with M16 female connector, straight (part no. 370 423)</td>
<td>PUR cable (part no. 530 052) with M16 female connector, straight (part no. 370 423)</td>
<td>FEP cable (part no. 530 112) with M16 female connector, straight (part no. 370 423)</td>
</tr>
<tr>
<td>Order code: <strong>K2-A-370423-xxxxyy-530032-0</strong>  (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)</td>
<td>Order code: <strong>K2-A-370423-xxxxyy-530052-0</strong>  (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)</td>
<td>Order code: <strong>K2-A-370423-xxxxyy-530112-0</strong>  (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)</td>
</tr>
</tbody>
</table>

### Notice for extension cables M12/M16

**Standard cable lengths**

<table>
<thead>
<tr>
<th>Meters</th>
<th>Feet</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>5</td>
<td>0150</td>
</tr>
<tr>
<td>2</td>
<td>6.6</td>
<td>0200</td>
</tr>
<tr>
<td>4.6</td>
<td>15</td>
<td>0460</td>
</tr>
<tr>
<td>5</td>
<td>16.4</td>
<td>0500</td>
</tr>
<tr>
<td>7.6</td>
<td>25</td>
<td>0760</td>
</tr>
<tr>
<td>10</td>
<td>32.8</td>
<td>1000</td>
</tr>
<tr>
<td>15.2</td>
<td>50</td>
<td>1520</td>
</tr>
</tbody>
</table>

For additional extension cables reference the accessory catalog for industrial sensors (document part no.: **551444**).

---

Color of connectors and cable jacket may change. Color codes for the individual wires and technical properties remain unchanged.
## ORDER CODE

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>P</td>
<td>5</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>f</td>
<td>g</td>
<td>h</td>
<td>i</td>
<td>j</td>
<td>k</td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### a Sensor model

**R** P 5 Profile

### b Design

- **G** Magnet slider backlash free (part no. 253 421)
- **L** Block magnet L (part no. 403 448)
- **M** U-magnet OD33 (part no. 251 416-2)
- **N** Magnet slider longer ball-jointed arm (part no. 252 183)
- **O** No position magnet
- **S** Magnet slider joint at top (part no. 252 182)
- **V** Magnet slider joint at front (part no. 252 184)

### c Mechanical options

- **A** Standard
- **V** Fluorelastomer seals for the sensor electronics housing

### d Stroke length

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X X X X M</td>
<td>0025…6350 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Standard stroke length (mm)  
Ordering steps:
- 25…500 mm: 25 mm
- 500…2500 mm: 50 mm
- 2500…5000 mm: 100 mm
- 5000…6350 mm: 250 mm

#### Standard stroke length (in.)  
Ordering steps:
- 1…20 in.: 1.0 in.
- 20…100 in.: 2.0 in.
- 100…200 in.: 4.0 in.
- 200…250 in.: 10.0 in.

Non-standard stroke lengths are available; must be encoded in 5 mm/0.1 in. increments.

### e Number of magnets

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X X</td>
<td>01…02 Position(s) (1…2 magnet(s))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### f Connection type

#### Connector

- **D 3 4** M12 male connector (5 pin)
- **D 6 0** M16 male connector (6 pin)

#### Angled cable outlet

- **E X X** XX m/ft. PVC cable (part no. 530 032)
  E01…E30 (1…30 m/3…99 ft.)
  See “Frequently ordered accessories” for cable specifications
- **G X X** XX m/ft. FEP cable (part no. 530 157)
  G01…G30 (1…30 m/3…99 ft.)
  See “Frequently ordered accessories” for cable specifications
- **L X X** XX m/ft. PUR cable (part no. 530 052)
  L01…L30 (1…30 m/3…99 ft.)
  (Note the temperature range of the cable!)
  See “Frequently ordered accessories” for cable specifications
- **U X X** XX m/ft. Silicone cable (part no. 530 176)
  U01…U30 (1…30 m/3…99 ft.)
  See “Frequently ordered accessories” for cable specifications

#### Straight cable outlet

- **H X X** XX m/ft. PUR cable (part no. 530 052)
  H01…H30 (1…30 m/3…99 ft.)
  (Note the temperature range of the cable!)
  See “Frequently ordered accessories” for cable specifications
- **R X X** XX m/ft. PVC cable (part no. 530 032)
  R01…R30 (1…30 m/3…99 ft.)
  See “Frequently ordered accessories” for cable specifications
- **T X X** XX m/ft. FEP cable (part no. 530 112)
  T01…T30 (1…30 m/3…99 ft.)
  See “Frequently ordered accessories” for cable specifications

Encode in meters if using metric stroke length.  
Encode in feet if using US customary stroke length.

### g System

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### h Output

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tempsonics® R-Series V RP5 Analog Data Sheet**
**Temposonics® R-Series V RP5 Analog Data Sheet**

### Function

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Position (1 or 2 magnets/outputs)</td>
</tr>
<tr>
<td>2</td>
<td>Position and speed (1 magnet and 2 outputs) Specify the maximum speed value in section 1</td>
</tr>
<tr>
<td>3</td>
<td>Position and velocity (1 magnet and 2 outputs) Specify the maximum velocity value in section 1</td>
</tr>
<tr>
<td>4</td>
<td>Position and reverse position (1 magnet and 2 outputs)</td>
</tr>
<tr>
<td>5</td>
<td>Position and temperature inside the sensor electronics housing (1 magnet and 2 outputs)</td>
</tr>
<tr>
<td>6</td>
<td>Differential (2 magnets and 1 output)</td>
</tr>
</tbody>
</table>

### Options

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Standard</td>
</tr>
<tr>
<td>3</td>
<td>Over range output mode</td>
</tr>
</tbody>
</table>

### Output range

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0…10 VDC or 4…20 mA</td>
</tr>
<tr>
<td>1</td>
<td>10.0…0 VDC or 20…4 mA</td>
</tr>
<tr>
<td>2</td>
<td>−10…+10 VDC or 0…20 mA</td>
</tr>
<tr>
<td>3</td>
<td>+10…−10 VDC or 0…0 mA</td>
</tr>
<tr>
<td>V</td>
<td>0…10 VDC for position, −10…+10 VDC for velocity</td>
</tr>
</tbody>
</table>

### Max. speed or velocity value

(Conditional: use when 1 “Function” is 2 or 3)

- For metric stroke lengths encode speed or velocity in m/s for the values 0.01 to 9.99 m/s (001…999)
- For US customary stroke lengths encode speed or velocity in inches/s for the values 1 to 400 in./s (001…400)

To get a speed or velocity output of 0.025 m/s or 10 m/s for the R-Series V Analog, enter code (00E) for 0.025 m/s or (A00) for 10.0 m/s in the order code.

### Delivery

- Sensor
- Position magnet (not valid for RP5 with design «O»)
- 2 mounting clamps up to 1250 mm (50 in.) stroke length
- +1 mounting clamp for each 500 mm (20 in.) additional stroke length

**Manuals, Software & 3D Models available at:**

www.temposonics.com

### Notice

- For RP5, the magnet selected in 1 “Design” is included in the scope of delivery. Specify the number of magnets for your application. For multi-position measurements with more than 1 magnet order the other magnets separately.
- The number of magnets is limited by the stroke length. The minimum allowed distance between magnets (i.e. front face of one to the front face of the next one) is 75 mm (3 inch).
- Use magnets of the same type for differential/multi-position measurement.
Glossary

A

Analog output
For a sensor with analog output, the measured value is output as an analog voltage signal or current signal.

D

Differential
For differential measurement, the distance between the two position magnets is output as a value.
(→ multi-position measurement)

M

Max. speed or velocity value
For speed or velocity, the output value generated is scaled based on the maximum speed or velocity value indicated in the order code.

Measuring direction
• Forward: Values increasing from sensor electronics housing to rod end/profile end
• Reverse: Values decreasing from sensor electronics housing to rod end/profile end

Multi-position measurement
During the measurement cycle, the positions of every magnet on the sensor are simultaneously reported. The velocity or speed is continuously calculated based on these changing position values as the magnets are moved.

O

Over range output mode
When enabled this mode allows the position output values to continue to increase or decrease when the magnet travels beyond the active stroke range.

R

Resolution
The sensor precisely measures time to provide the position measurement. For the analog output the measured time value is converted into an analog voltage signal or current signal using a high-performance Digital to Analog Converter (DAC) having 16 bits of resolution.

S

Speed
The output value for speed indicates how fast the position magnet is being moved, independent of the measuring direction. (→ Velocity)

T

Temperature inside the sensor electronics housing
The temperature inside the sensor electronics housing is reported as an analog voltage signal or current signal. For each output range, the 0 % output value has the factory default setpoint at −40 °C, and the 100 % output value has the default setpoint at +100 °C.
Note: A dedicated temperature chip is used for the output signal and its values may vary from those reported on the TempoLink® application screen.

V

Velocity
The output value for velocity indicates how fast the position magnet is being moved, and in which direction. (→ Speed)