R-Series V RDV Analog
Magnetostrictive Linear Position Sensors

- Space-saving installation due to detached sensor electronics housing
- Backwards compatible with RD4 generation
- All advantages of the R-Series V
MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Tempsonics rely on the company's proprietary magnetostrictive technology, which can determine position with a high level of precision and robustness. Each Tempsonics® 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 RDV Analog

The Tempsonics® R-Series V brings very powerful sensor performance to meet the many demands of your application. The sensor RDV is the version of the R-Series V with a detached sensor electronics. The main advantages of the version RDV are:

- **Space-saving installation**
  The detached sensor electronics allows space-saving installation of the compact measuring rod.

- **R-Series V platform**
  The detached sensor electronics is based on the R-Series V and offers all advantages of the innovative series.

- **Backwards compatible**
  Mechanically and electrically, the sensors are backwards compatible with the RD4. This means that the sensor rod or the sensor electronics can be replaced without any problems.

- **Protection of the sensor electronics**
  By separating the robust sensor rod from the complex evaluation electronics improved protection against process influences can be realized.

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) that fits best 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 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 | ≤ 5080 mm |
  - | Update time | 0.25 ms | 0.333 ms | 0.5 ms | 1.0 ms | 2.0 ms | 2.2 ms |
- **Linearity deviation**
  - | Stroke length | ≤ 500 mm | > 500 mm |
  - | Linearity deviation | ≤ ±50 μm | < ±0.01 % F.S. |
- **Repeatability**
  - < ±0.001 % F.S. (minimum ±1 μm)
- **Hysteresis**
  - < 4 μm typical
- **Temperature coefficient**
  - < 30 ppm/K typical

**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**
  - Sensor electronics: IP67 (with correctly mounted housing and connectors)
  - Measuring rod with connecting cable for side cable entry: IP65
  - Measuring rod with single wires and flat connector with bottom cable entry: IP30
- **Shock test**: 100 g/11 ms, IEC standard 60068-2-27
- **Vibration test**: 10 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 RDV sensors fulfill the requirements of the EMC directives 2014/30/EU, UKSI 2016 No. 1091 and TR CU 020/2011 under the condition of an EMC compliant installation
- **Operating pressure**: 350 bar (5076 psi)/700 bar (10,153 psi) peak (at 10 × 1 min) for sensor rod
- **Magnet movement velocity**: Any

#### Design/Material

- **Sensor electronics housing**: Aluminum (painted), zinc die cast
- **Sensor rod with flange**: Stainless steel 1.4301 (AISI 304)
- **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…2540 mm (1…100 in.) for pressure-fit flange »S«
  - 25…5080 mm (1…200 in.) for all threaded flanges

Technical data “Mechanical mounting” and “Electrical connection” on page 4

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1/ With position magnet # 251 416-2
2/ For rod style »S« the linearity deviation can be higher in the first 30 mm (1.2 in.) of stroke length
3/ The cable between the sensor element and the sensor electronics housing must be mounted in an appropriately shielded environment
**Mechanical mounting**

<table>
<thead>
<tr>
<th>Mounting position</th>
<th>Any</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting instruction</td>
<td>Please consult the technical drawings on <a href="#">page 5</a>, <a href="#">page 6</a>, <a href="#">page 7</a> and <a href="#">page 8</a> and the operation manual (document part number: 552063)</td>
</tr>
</tbody>
</table>

**Electrical connection**

<table>
<thead>
<tr>
<th>Connection type</th>
<th>1 × M16 male connector (6 pin), 1 × M12 male connector (5 pin) or cable outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>12…30 VDC ±20 % (9.6…36 VDC)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>&lt; 3.25 W</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>500 VDC (DC ground to machine ground)</td>
</tr>
<tr>
<td>Polarity protection</td>
<td>Up to −36 VDC</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>Up to 36 VDC</td>
</tr>
</tbody>
</table>
**TECHNICAL DRAWING**

**RDV with bottom cable entry**

- The connecting cables between the sensor electronics housing and the rod are routed into the interior via the bottom of the sensor electronics housing.
- Rod and connecting cable are fully encapsulated and protected against external disturbances.

**RDV with bottom cable entry, example: EXX/GXX/LXX/UXX (angled cable outlet)**

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

Fig. 2: Temposonics® RDV sensor electronics housing with bottom cable entry.
RDV with side connection

- The connecting cable between the sensor electronics housing and the rod is connected to the side of the sensor electronics housing.
- Rod and connecting cable are sealed against dust and protected against water jets.

RDV with side cable entry, example: Connection type D60 (connector outlet)

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

Recommendation:
Use M6x45 (ISO 4762) screws
Fastening torque: 6 Nm

Fig. 3: Temposonics® RDV sensor electronics housing with side cable entry
RDV with side cable entry, example: Connection type D34 (connector outlet)

RDV with side cable entry, example: Connection type HXX/RXX (straight cable outlet)

RDV with side cable entry, example: Connection type TXX (straight cable outlet)

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

Fig. 4: Temposonics® RDV sensor electronics housing with different outlet options
Threaded flange »C« & »D« (for bottom or side cable entry)

- **PUR cable:** Ø 6 (Ø 0.24)
- **Bending radius:** > 24 (> 0.94)
- **Cable length (bottom cable entry):** 65/170/230/350
  (2.6/6.7/9.1/13.8)
- **Cable length (side cable entry):** 250/400/600
  (9.8/15.7/23.6)

- **Null zone:** 32 (1.26)
- **Stroke length:** 25…5080
  (1…200)
- **Dead zone:** 63.5/66*
  (2.5/2.6)

Threaded flange »C«: M18×1.5-6g
Threaded flange »D«: ¾"-16 UNF-3A

* Stroke length > 5000 mm (196.9 in.)

---

Threaded flange »M« (for bottom or side cable entry)

- **PUR cable:** Ø 6 (Ø 0.24)
- **Bending radius:** > 24 (> 0.94)
- **Cable length (bottom cable entry):** 65/170/230/350
  (2.6/6.7/9.1/13.8)
- **Cable length (side cable entry):** 250/400/600
  (9.8/15.7/23.6)

- **Null zone:** 32 (1.26)
- **Stroke length:** 25…3080
  (1…100)
- **Dead zone:** 63.5/66*
  (2.5/2.6)

Threaded flange »M«: M18×1.5-6g

* Stroke length > 5000 mm (196.9 in.)

---

Threaded flange »T« (for bottom or side cable entry)

- **PUR cable:** Ø 6 (Ø 0.24)
- **Bending radius:** > 24 (> 0.94)
- **Cable length (bottom cable entry):** 65/170/230/350
  (2.6/6.7/9.1/13.8)
- **Cable length (side cable entry):** 250/400/600
  (9.8/15.7/23.6)

- **Null zone:** 32 (1.26)
- **Stroke length:** 25…2540
  (1…100)
- **Dead zone:** 63.5/66*
  (2.5/2.6)

Threaded flange »T«: ¼"-16 UNF-3A

* Stroke length > 5000 mm (196.9 in.)

---

Pressure fit flange »S« (for bottom or side cable entry)

- **PUR cable:** Ø 6 (Ø 0.24)
- **Bending radius:** > 24 (> 0.94)
- **Cable length (bottom cable entry):** 65/170/230/350
  (2.6/6.7/9.1/13.8)
- **Cable length (side cable entry):** 250/400/600
  (9.8/15.7/23.6)

- **Null zone:** 32 (1.26)
- **Stroke length:** 25…2540
  (1…100)
- **Dead zone:** 63.5

* Stroke length > 5000 mm (196.9 in.)

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

*Fig. 5: Temposonics® RDV flange types*
## Connector Wiring

### D34

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

*order dependent

**View on sensor**

Fig. 6: Connector wiring D34

### D60

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

*order dependent

**View on sensor**

Fig. 7: Connector wiring D60

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

<table>
<thead>
<tr>
<th>Cable</th>
<th>Output Pin</th>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GY</td>
<td>Position (magnet 1)</td>
<td></td>
</tr>
<tr>
<td>2*</td>
<td>YE</td>
<td>Position (magnet 2) or reverse position (magnet 1) or speed or velocity (magnet 1) or temperature inside the sensor electronics housing</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Signal Ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>WH</td>
<td>DC Ground (0 V)</td>
<td></td>
</tr>
</tbody>
</table>

*order dependent

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

**View on sensor**

Fig. 8: Connector wiring cable outlet

### 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>H X X</td>
<td>Part no. 530 052 PUR ➔ L X X</td>
<td>Part no. 530 052</td>
</tr>
<tr>
<td>R X X</td>
<td>Part no. 530 032 PVC ➔ E X X</td>
<td>Part no. 530 032</td>
</tr>
<tr>
<td>T X X</td>
<td>Part no. 530 112 FEP ➔ G X X</td>
<td>Part no. 530 157</td>
</tr>
</tbody>
</table>

**Fig. 9: Cable types assignment**
# Temposonics® R-Series V RDV Analog

**Data Sheet**

## FREQUENTLY ORDERED ACCESSORIES – Additional options available in our Accessories Catalog [551444](#)

<table>
<thead>
<tr>
<th>Position magnets</th>
<th>O-rings</th>
<th>Magnet spacer</th>
<th>O-rings</th>
<th>Mounting accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U-magnet OD33</strong></td>
<td><strong>O-ring for threaded flange M18×1.5-6g</strong></td>
<td><strong>Magnet spacer Part no. 400 633</strong></td>
<td><strong>O-ring for pressure fit flange Ø 26.9 mm</strong></td>
<td><strong>Back-up ring for pressure fit flange Ø 26.9 mm</strong></td>
</tr>
<tr>
<td>Part no. 251 416-2</td>
<td>Part no. 201 542-2</td>
<td>Part no. 400 633</td>
<td>Part no. 560 705</td>
<td>Part no. 560 629</td>
</tr>
<tr>
<td>Weight: Approx. 11 g</td>
<td>Surface pressure: Max. 40 N/mm²</td>
<td>Weight: Approx. 5 g</td>
<td>Durometer: 90 Shore A</td>
<td>Operating temperature: -15…+200 °C (5…+392 °F)</td>
</tr>
<tr>
<td>Fastening torque for M4 screws: 1 Nm</td>
<td>Fastening torque for M4 screws: 1 Nm</td>
<td>Surface pressure: Max. 20 N/mm²</td>
<td>Fastening torque for M4 screws: 1 Nm</td>
<td>Operating temperature: -15…+200 °C (5…+392 °F)</td>
</tr>
</tbody>
</table>

**U-magnet OD33**

- **Part no.** 251 416-2
- **Material:** PA ferrite GF20
- **Weight:** Approx. 11 g
- **Surface pressure:** Max. 40 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -40…+105 °C (−40…+221 °F)

**Ring magnet OD33**

- **Part no.** 201 542-2
- **Material:** PA ferrite
- **Weight:** Approx. 10 g
- **Surface pressure:** Max. 40 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -40…+105 °C (−40…+221 °F)

**Ring magnet OD25.4**

- **Part no.** 400 533
- **Material:** PA ferrite
- **Weight:** Approx. 14 g
- **Surface pressure:** Max. 40 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -40…+105 °C (−40…+221 °F)

**Ring magnet OD17.4**

- **Part no.** 401 032
- **Material:** PA neobond
- **Weight:** Approx. 5 g
- **Surface pressure:** Max. 20 N/mm²
- **Operating temperature:** -40…+105 °C (−40…+221 °F)

**Material:** Fluoroelastomer

- **Durometer:** 75 ± 5 Shore A
- **Operating temperature:** -40…+204 °C (−40…+400 °F)

**Material:** Nitrile rubber

- **Operating temperature:** -53…+107 °C (−65…+225 °F)

**O-rings**

<table>
<thead>
<tr>
<th><strong>Part no.</strong></th>
<th><strong>Material</strong></th>
<th><strong>Durometer</strong></th>
<th><strong>Operating Temperature</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>251 416-2</td>
<td>Polymyte</td>
<td>90 Shore A</td>
<td>-15…+200 °C (5…+392 °F)</td>
</tr>
<tr>
<td>201 542-2</td>
<td>Polymyte</td>
<td>90 Shore A</td>
<td>-15…+200 °C (5…+392 °F)</td>
</tr>
<tr>
<td>400 533</td>
<td>Polymyte</td>
<td>90 Shore A</td>
<td>-15…+200 °C (5…+392 °F)</td>
</tr>
<tr>
<td>560 629</td>
<td>Polymyte</td>
<td>90 Shore A</td>
<td>-15…+200 °C (5…+392 °F)</td>
</tr>
<tr>
<td>560 705</td>
<td>Fluoroelastomer</td>
<td>75 ± 5 Shore A</td>
<td>-40…+204 °C (−40…+400 °F)</td>
</tr>
<tr>
<td>560 315</td>
<td>Fluoroelastomer</td>
<td>75 ± 5 Shore A</td>
<td>-40…+204 °C (−40…+400 °F)</td>
</tr>
<tr>
<td>560 705</td>
<td>Nitrile rubber</td>
<td>20 Shore A</td>
<td>-53…+107 °C (−65…+225 °F)</td>
</tr>
</tbody>
</table>

**Magnet spacer**

- **Part no.** 400 633
- **Material:** Aluminum
- **Weight:** Approx. 5 g
- **Surface pressure:** Max. 20 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -40…+105 °C (−40…+221 °F)

**O-ring for threaded flange M18×1.5-6g**

- **Part no.** 401 133
- **Material:** Fluorocover + softener Durometer: 75 ± 5 Shore A
- **Surface pressure:** Max. 40 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -40…+204 °C (−40…+400 °F)

**O-ring for threaded flange ¾”-16 UNF-3A**

- **Part no.** 560 315
- **Material:** Fluorocover + softener Durometer: 75 ± 5 Shore A
- **Surface pressure:** Max. 40 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -40…+204 °C (−40…+400 °F)

**Back-up ring for pressure fit flange Ø 26.9 mm**

- **Part no.** 560 629
- **Material:** Polymyte
- **Durometer:** 90 Shore A
- **Surface pressure:** Max. 40 N/mm²
- **Fastening torque for M4 screws:** 1 Nm
- **Operating temperature:** -15…+200 °C (5…+392 °F)

**O-ring for mounting block with bottom entry**

- **Part no.** 561 435
- **Material:** FKM
- **Durometer:** 80± 5 Shore A
- **Surface pressure:** Max. 80 N/mm²
- **Operating temperature:** -40…+204 °C (−40…+400 °F)

**Hex jam nut M18×1.5-6g**

- **Part no.** 500 018
- **Material:** Steel, zinc plated
- **Surface pressure:** Max. 80 N/mm²

**Hex jam nut ¾”-16 UNF-3A**

- **Part no.** 500 015
- **Material:** Steel, zinc plated
- **Surface pressure:** Max. 80 N/mm²

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

<table>
<thead>
<tr>
<th>Ø 3.2 (Ø 0.13)</th>
<th>M3 fastening screws (6+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 (2.36)</td>
<td></td>
</tr>
<tr>
<td>16 (0.63)</td>
<td></td>
</tr>
<tr>
<td>12 (0.47)</td>
<td></td>
</tr>
<tr>
<td>20 (0.79)</td>
<td></td>
</tr>
</tbody>
</table>

Fixing clip
Part no. 561 481

Application: Used to secure sensor rods (Ø 10 mm (Ø 0.39 in.)) when using an U-magnet or block magnet
Material: Brass, non-magnetic

Controlling design dimensions are in millimeters and measurements in ( ) are in inches
## Temposonics® R-Series V RDV Analog

### Data Sheet

#### Cable connectors*

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>Part No.</th>
<th>Material</th>
<th>Termination</th>
<th>Cable Ø</th>
<th>Operating Temperature</th>
<th>Ingress Protection</th>
<th>Fastening Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16 female connector (6 pin), straight</td>
<td>370 423</td>
<td>Zinc nickel plated</td>
<td>Solder</td>
<td>6…8 mm</td>
<td>−40…+100 °C</td>
<td>IP65/IP67</td>
<td>0.6 Nm</td>
</tr>
<tr>
<td>M16 female connector (6 pin), angled</td>
<td>370 460</td>
<td>Zinc nickel plated</td>
<td>Solder</td>
<td>6…8 mm</td>
<td>−40…+100 °C</td>
<td>IP65/IP67</td>
<td>0.6 Nm</td>
</tr>
<tr>
<td>M12 A-coded female connector (4 pin/5 pin), straight</td>
<td>370 677</td>
<td>GD-Zn, Ni</td>
<td>Screw; max. 0.75 mm²</td>
<td>5…8 mm</td>
<td>−25…+85 °C</td>
<td>IP67</td>
<td>0.6 Nm</td>
</tr>
<tr>
<td>M12 A-coded female connector (5 pin), angled</td>
<td>370 678</td>
<td>GD-Zn, Ni</td>
<td>Screw; max. 0.75 mm²</td>
<td>5…8 mm</td>
<td>−25…+85 °C</td>
<td>IP67</td>
<td>0.4 Nm</td>
</tr>
</tbody>
</table>

* Follow the manufacturer's mounting instructions

Color of connectors and cable jacket may change. Colors of the cores and technical properties remain unchanged.

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

#### Cables

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Part No.</th>
<th>Material</th>
<th>Features</th>
<th>Cross Section</th>
<th>Bending Radius</th>
<th>Operating Temperature</th>
<th>Ingress Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC cable</td>
<td>530 032</td>
<td>PVC jacket; gray</td>
<td>Twisted pair, shielded, flexible</td>
<td>3 × 2 × 0.14 mm²</td>
<td>10 × D</td>
<td>−40…+105 °C</td>
<td>IP65/IP67</td>
</tr>
<tr>
<td>PUR cable</td>
<td>530 052</td>
<td>PUR jacket; orange</td>
<td>Twisted pair, shielded, highly flexible, halogen free, suitable for drag chains, mostly oil &amp; flame resistant</td>
<td>3 × 2 × 0.25 mm²</td>
<td>5 × D</td>
<td>−40…+105 °C</td>
<td>IP65/IP67</td>
</tr>
<tr>
<td>FEP cable</td>
<td>530 112</td>
<td>FEP jacket; black</td>
<td>Twisted pair, shielded, flexible, high thermal resistance, mostly oil &amp; acid resistant</td>
<td>4 × 2 × 0.25 mm²</td>
<td>8 × D</td>
<td>−100…+180 °C</td>
<td>IP67</td>
</tr>
<tr>
<td>FEP cable</td>
<td>530 157</td>
<td>FEP jacket; black</td>
<td>Twisted pair, shielded</td>
<td>3 × 2 × 0.14 mm²</td>
<td>10 × D</td>
<td>−40…+180 °C</td>
<td>IP67</td>
</tr>
</tbody>
</table>

Material: PVC jacket; gray
Features: Twisted pair, shielded, flexible
Cable Ø: 6 mm (0.23 in.)
Cross section: 3 × 2 × 0.14 mm²
Bending radius: 10 × D
Operating temperature: −40…+105 °C
Ingress protection: IP65/IP67

Material: PUR jacket; orange
Features: Twisted pair, shielded, highly flexible, halogen free, suitable for drag chains, mostly oil & flame resistant
Cable Ø: 6.4 mm (0.25 in.)
Cross section: 3 × 2 × 0.25 mm²
Bending radius: 5 × D
Operating temperature: −40…+105 °C
Ingress protection: IP65/IP67

Material: FEP jacket; black
Features: Twisted pair, shielded, flexible, high thermal resistance, mostly oil & acid resistant
Cable Ø: 6.7 mm (0.26 in.)
Cross section: 3 × 2 × 0.14 mm²
Bending radius: 8 – 10 × D
Operating temperature: −100…+180 °C
Ingress protection: IP67
## Cables

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Part No.</th>
<th>Description</th>
<th>Material</th>
<th>Features</th>
<th>Cable Ø</th>
<th>Cross Section</th>
<th>Bending Radius</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone cable</td>
<td>530 176</td>
<td>Cables with M12 A-coded female connector (5 pin), straight – pigtail</td>
<td>Silicone jacket; black</td>
<td>Twisted pair, shielded</td>
<td>6.3 mm</td>
<td>3 × 2 × 0.14 mm²</td>
<td>7 × D</td>
<td>-50...+150 °C (-58...+302 °F)</td>
</tr>
<tr>
<td>Cable with M12 A-coded female connector (5 pin), angled – pigtail</td>
<td>370 673</td>
<td>Cable length: 5 m (16.4 ft)</td>
<td>PUR jacket; black</td>
<td>Shielded</td>
<td></td>
<td></td>
<td></td>
<td>-25...+80 °C (-13...+176 °F)</td>
</tr>
<tr>
<td>Cable with M12 A-coded female connector (5 pin), straight – pigtail</td>
<td>370 675</td>
<td>Ingress protection: IP67 (correctly fitted)</td>
<td>PUR jacket; black</td>
<td>Shielded</td>
<td></td>
<td></td>
<td></td>
<td>-25...+80 °C (-13...+176 °F)</td>
</tr>
</tbody>
</table>

## Cable Sets

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Part No.</th>
<th>Description</th>
<th>Material</th>
<th>Features</th>
<th>Cable Length</th>
<th>Ingress Protection</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone cable</td>
<td>530 176</td>
<td>Cable with M12 A-coded female connector (5 pin), straight – pigtail</td>
<td>Silicone jacket; black</td>
<td>Twisted pair, shielded</td>
<td>5 m</td>
<td>IP67</td>
<td>-25...+80 °C (-13...+176 °F)</td>
</tr>
<tr>
<td>Cable with M12 A-coded female connector (5 pin), angled – pigtail</td>
<td>370 673</td>
<td>Cable length: 5 m (16.4 ft)</td>
<td>PUR jacket; black</td>
<td>Shielded</td>
<td></td>
<td>IP67</td>
<td>-25...+80 °C (-13...+176 °F)</td>
</tr>
<tr>
<td>Cable with M12 A-coded female connector (5 pin), straight – pigtail</td>
<td>370 675</td>
<td>Ingress protection: IP67 (correctly fitted)</td>
<td>PUR jacket; black</td>
<td>Shielded</td>
<td></td>
<td>IP67</td>
<td>-25...+80 °C (-13...+176 °F)</td>
</tr>
</tbody>
</table>

## Programming tools

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Part No.</th>
<th>Description</th>
<th>Features</th>
<th>Connect wirelessly via Wi-Fi enabled device or via USB with the diagnostic tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand programmer for analog output</td>
<td>253 124</td>
<td>Easy teach-in-setups of stroke length and direction on desired zero/span positions. For sensors with 1 magnet.</td>
<td>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.</td>
<td>Connect wirelessly via Wi-Fi enabled device or via USB with the diagnostic tool</td>
</tr>
<tr>
<td>Cabinet programmer for analog output</td>
<td>253 408</td>
<td>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.</td>
<td>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.</td>
<td>Simple connectivity to the sensor via 24 VDC power line (permissible cable length: 30 m)</td>
</tr>
<tr>
<td>TempoLink kit for Temposonics® R-Series V</td>
<td>TL-1-0-AD60 (for D60)</td>
<td>• Connect wirelessly via Wi-Fi enabled device or via USB with the diagnostic tool</td>
<td>Connect wirelessly via Wi-Fi enabled device or via USB with the diagnostic tool</td>
<td>User friendly interface for mobile devices and desktop computers</td>
</tr>
<tr>
<td></td>
<td>TL-1-0-AD34 (for D34)</td>
<td>• Simple connectivity to the sensor via 24 VDC power line (permissible cable length: 30 m)</td>
<td>Simple connectivity to the sensor via 24 VDC power line (permissible cable length: 30 m)</td>
<td>See data sheet “TempoLink® smart assistant” (document part no.: 552070) for further information</td>
</tr>
</tbody>
</table>

Controlling design dimensions are in millimeters and measurements in () are in inches
Color of connectors and cable jacket may change. Colors of the cores 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>
</tbody>
</table>

Order code: K2-A-370677-xxxxyy-530032-0
(where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)

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

Order code: K2-A-370423-xxxxyy-530032-0 (where xxxx = cable length and yy = unit in centimeters “CM” or feet “FT”)

**Notice for extension cables**

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

**Standard cable lengths**

<table>
<thead>
<tr>
<th>Standard cable lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meters</td>
</tr>
<tr>
<td>1.5</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>4.6</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>7.6</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>15.2</td>
</tr>
</tbody>
</table>

Color of connectors and cable jacket may change. Colors of the cores and technical properties remain unchanged.
# ORDER CODE

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| R | D | V | a | b | c | d | e | f | g | h | i | j | k | l |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

## a Design

**RDV** Detached sensor electronics “Classic”

## b Design

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| C | Threaded flange M18×1.5-6g (A/F 46) |
| D | Threaded flange ¼“-16 UNF-3A (A/F 46) |
| M | Threaded flange M18×1.5-6g (A/F 24) |
| S | Pressure fit flange Ø 26.9 mm f6 |
| T | Threaded flange ¾“-16 UNF-3A (A/F 23) |

## c Mechanical options

### For side cable entry

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| A | PUR cable with M16 connector, 250 mm length |
| B | PUR cable with M16 connector, 400 mm length |
| C | PUR cable with M16 connector, 600 mm length |

### For bottom cable entry

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 | Single wires with flat connector, 65 mm length |
| 4 | Single wires with flat connector, 170 mm length |
| 5 | Single wires with flat connector, 230 mm length |
| 6 | Single wires with flat connector, 350 mm length |

## d Stroke length

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| X | X | X | M |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**Flange »S«**: 0025…2540 mm  
**Flange »C«, »D«, »M«, »T«**: 0025…5080 mm

### Stroke length (mm)  
**Ordering steps**  
- 25… 500 mm: 5 mm
- 500… 750 mm: 10 mm
- 750…1000 mm: 25 mm
- 1000…2500 mm: 50 mm
- 2500…5080 mm: 100 mm

### Stroke length (in.)  
**Ordering steps**  
- 1… 20 in.: 0.2 in.
- 20… 30 in.: 0.4 in.
- 30… 40 in.: 1.0 in.
- 40…100 in.: 2.0 in.
- 100…200 in.: 4.0 in.

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

## e Number of magnets

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 0 | X | 01…02 Position(s) (1…2 magnet(s)) |

## 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. 530 032)  
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

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 | Standard |

## h Output

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| A | Current |
| V | Voltage |
### Function

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Position (1 or 2 magnets/outputs)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Position and speed (1 magnet and 2 outputs)</td>
<td>Specify the maximum speed value in section 3</td>
</tr>
<tr>
<td>3</td>
<td>Position and velocity (1 magnet and 2 outputs)</td>
<td>Specify the maximum velocity value in section 4</td>
</tr>
<tr>
<td>4</td>
<td>Position and reverse position (1 magnet and 2 outputs)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Position and temperature inside the sensor electronics housing (1 magnet and 2 outputs)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Differential (2 magnets and 1 output)</td>
<td></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 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 20…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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(optional: use when “Function” is 2 or 3)</td>
</tr>
</tbody>
</table>

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 10.0 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.

### NOTICE

- Specify the number of magnets for your application and order the 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 in.).
- Use magnets of the same type for differential/multi-position measurement.

---

**DELIVERY**

RDV-C/-D/-M/-T: Sensor, O-ring
RDV-S: Sensor, O-ring, back-up ring

Manuals, Software & 3D Models available at: www.temposonics.com
## 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) |