



**Temposonics**

AN AMPHENOL COMPANY

## Data Sheet

# R-Series V RD5 PROFINET

Magnetostrictive Linear Position Sensors

- Space-saving installation due to detached sensor electronics housing
- Distance between sensor rod and sensor electronics up to 20 m (65.6 ft.)
- Field adjustments and diagnostics using the TempoLink® and TempoGate® smart assistants



THE NEW **V** GENERATION

## 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 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.

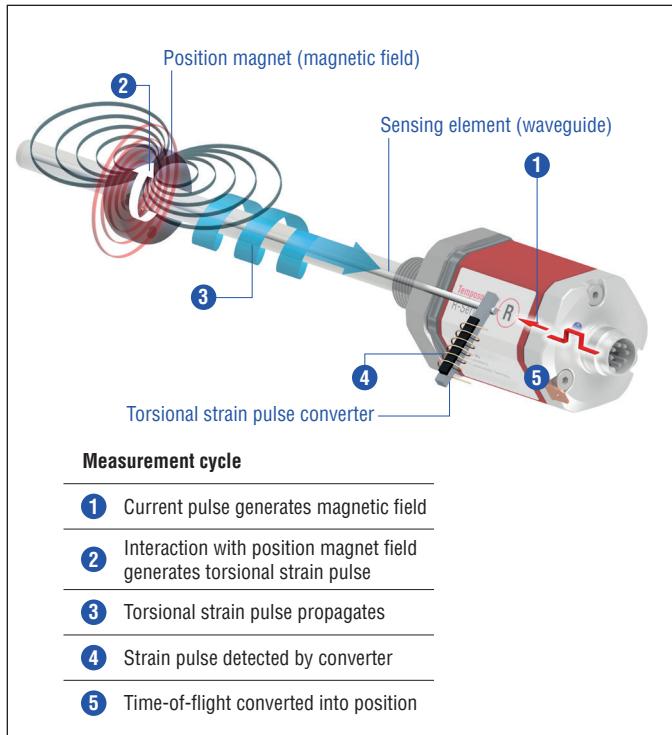
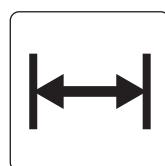


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

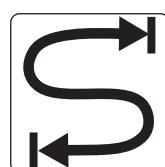
## R-SERIES V RD5 PROFINET

The Tempsonics® R-Series V brings very powerful sensor performance to meet the many demands of your application. The sensor RD5 is the version of the R-Series V with a detached sensor electronics. The main advantages of the version RD5 are:



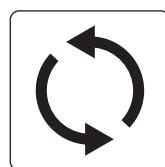
### Space-saving installation

The detached sensor electronics allow space-saving installation of the compact measuring rod.



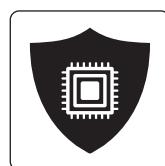
### Great distance

The sensor electronics can be mounted up to 20 m (65.6 ft.) away from the sensor rod. This offers more mounting locations for the remote electronics for easier installation, serviceability, or increased protection.



### Swappable sensor electronics

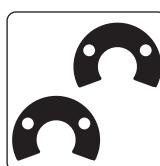
The sensor electronics can be ordered separately and can be connected to the previously installed RD5 sensor rod without further adaptation. This simplifies service repairs and saves costs.



### 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 PROFINET scores with the following features:



### 2 positions simultaneously

The R-Series V PROFINET can detect and report the position and velocity of up to 2 magnets simultaneously.



### R-Series V PROFINET

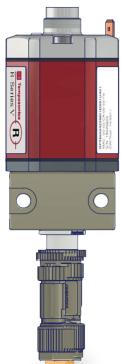
In addition to the measured position value via the PROFINET protocol further data about the current sensor status, such as the total distance travelled, the internal temperature and the total operating hours, can be displayed for diagnostic purposes.

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

The Tempolink® and the Tempogate® smart assistants support you in setup and diagnostics of the R-Series V. For more information of these assistants please see the data sheets:

- Tempolink® smart assistant (Document part number: [552070](#))
- Tempogate® smart assistant (Document part number: [552110](#))





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## RD5: COMPLETE SENSOR OR SEPARATE COMPONENTS – IT'S UP TO YOU

The RD5 sensor consists of 2 main components:

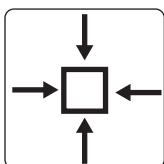
- 1 Sensor electronics assembly with mounting block and mating connector
- 2 Sensor rod assembly with cable and connector

The RD5 sensor is the latest version in the RD model line. These sensor models are unique in that their sensor rod is detached from the main electronics components and connected only by a joining cable.

The RD5 sensor is normally ordered as a **complete kit (RD5-K)**. Also, the **sensor rod assembly (RD5-R)** and the **sensor electronics assembly (RD5-E)** can each be ordered separately. This offers added flexibility for ordering just the replacement components needed or for keeping spare components on site for your more critical applications.

## RD5 VERSATILITY FOR SOLVING CHALLENGING APPLICATIONS

The RD5 sensor from Tempsonics® is characterized by its remote electronics. This allows you to move the sensor electronics away from the sensor rod for protection from harsh environments or when the installation space at the measuring point is too small to fit a RH5 rod version.



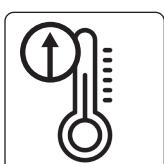
### Configure the sensor you need to fit your confined space applications

RD5 offers new options for confined installation spaces like a small footprint connector and a compact mounting block.



### Reduce or eliminate your machine down time

RD5 offers you easy ordering of spare or replacement components if sensor damage does occur.



### Use at high temperature applications

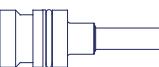
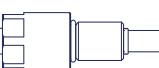
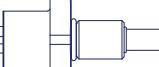
The sensor rod assembly of RD5 is rated up to 120 °C (248 °F) for stroke lengths up to 2540 mm (100 in.) and up to 105 °C (221 °F) for longer stroke lengths.

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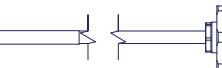
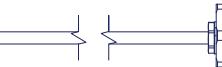


## THE RD5 OPTIONS – TO BEST FIT YOUR APPLICATION

### Sensor rod flange options

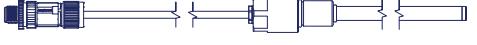
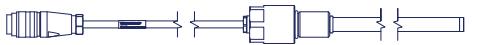
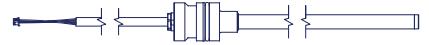
Image	Type	Advantage
	»S«	• Pressure fit for embedding in cylinder
	»M/T«	• Small threaded flange for confined space
	»C/D«	• Large surface hex flange

### Sensor rod cable options

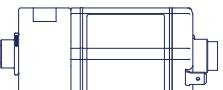
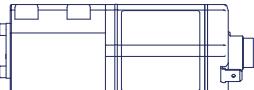
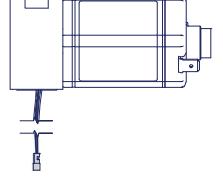
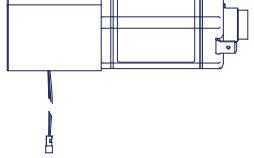
Image	Type	Advantage
	»W«	• Single wires allows small bend radius • For short distances up to 50 cm
	»K«	• PUR cable with min. bend radius of 24 mm • For distances up to 1.15 m
	»J«	• FEP cable with min. bend radius of 57 mm • For great distances up to 20 m

### Sensor rod connectors

(for connecting the sensor rod to the sensor electronics)

Image	Type	Advantage
	»G«	• Compact inline M12 connector • Suitable for cable type »J« and »K« • For side connection
	»W«	• Small footprint panel mount M12 connector • Suitable for cable type »W« • Requires joining cable RD5-C • For side connection
	»S«	• Standard inline M16 connector • Suitable for cable type »J« and »K« • For side connection
	»E«	• Compact inline flat connector • Suitable for cable type »J«, »K« and »W« • For bottom connection

### Sensor electronics mounting blocks with mating connectors

Image	Type	Advantage
	»G«	• Compact mounting block with side M12 mating connector • For sensor rod connector type »G« or joining cable RD5-C • For reduced mounting space
	»S«	• Classic mounting block with side M16 mating connector • For sensor rod connector type »S«
	»E«	• Compact mounting block with bottom connection and flat mating connector • For sensor rod connector type »E« • For reduced mounting space
	»B«	• Classic mounting block with bottom connection and flat mating connector • For sensor rod connector type »E«

## TECHNICAL DATA

Output					
Interface	PROFINET RT PROFINET IRT version 2.3				
Data format	Linear profile and encoder profile V4.2				
Data transmission rate	100 MBits/s (maximum)				
Measured value	Position, velocity/option: Simultaneous multi-position and multi-velocity measurements up to 2 magnets				
Measurement parameters					
Resolution: Position	0.5...100 µm (selectable)				
Cycle time	Stroke length	≤ 715 mm	2000 mm	≤ 4675 mm	≤ 5080 mm
	Cycle time	500 µs	1000 µs	2000 µs	4000 µs
Linearity deviation <sup>1,2</sup>	Stroke length	≤ 500 mm	> 500 mm		
	Linearity deviation	≤ ±50 µm	< ±0.01 % F.S.		
Repeatability	< ±0.001 % F.S. (minimum ±2.5 µm) typical				
Hysteresis	< 4 µm typical				
Temperature coefficient	< 15 ppm/K typical				
Operating conditions					
Operating temperature	Sensor electronics housing: -40...+85 °C (-40...+185 °F) Sensor rod with »J« type cable: -40...+120 °C (-40...+248 °F) (for stroke lengths up to 2540 mm (100 in.) and up to 105 °C (221 °F) for longer stroke lengths) Sensor rod with »K« type cable: -40...+80 °C (-40...+176 °F) Sensor rod with »W« type single wires: -40...+85 °C (-40...+185 °F)				
Humidity	90% relative humidity, no condensation				
Ingress protection	Sensor electronics housing: IP67 (with correctly mounted housing and connectors) Sensor rod with »J« or »K« type cable: IP67/IP69K Connector »G« or »S« type: IP67 (correctly mated), Connector »E« type: IP30 Sensor rod with »W« type single wires: IP67 Connector »W« type: IP67 (correctly mounted)				
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 RD5 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. <sup>3</sup>				
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 with amendments				
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 6](#)

1/ With position magnet # 251 416-2

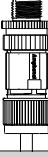
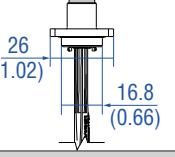
2/ For rod style »S« the linearity deviation can be higher in the first 30 mm (1.2 in.) of stroke length.

3/ The cable between the sensor element and the sensor electronics housing must be mounted in an appropriately shielded environment

Mechanical mounting	
Mounting position	Any
Mounting instruction	Please consult the technical drawings and the operation manual (document part number: <a href="#">551973</a> )
Electrical connection	
Connection type	2 × M12 female connectors (5 pin), 1 × M12 male connector (4 pin) or 2 × M12 female connectors (5 pin), 1 × M8 male connector (4 pin)
Operating voltage	+12...30 VDC ±20 % (9.6...36 VDC); the RD5 sensors must be power supplied via an external Class 2 power source in accordance with the UL approval
Power consumption	Less than 4 W typical
Dielectric strength	500 VDC (DC ground to machine ground)
Polarity protection	Up to -36 VDC
Overvoltage protection	Up to 36 VDC

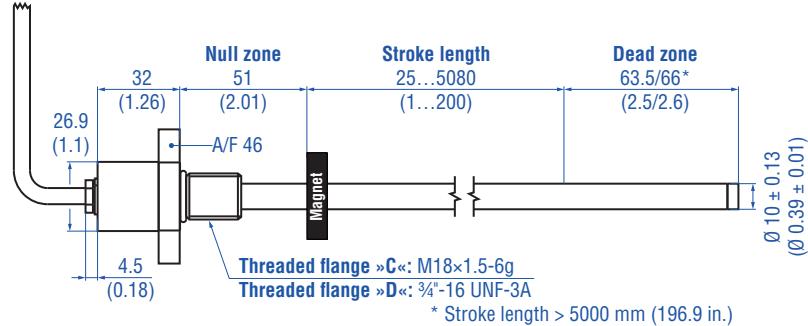
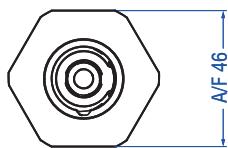
## TECHNICAL DRAWING – SENSOR ROD CABLES & CONNECTORS

Cable »J«	Cable »K«	Cable »W«
 <p>Material: FEP jacket, tan Min. bending radius: 57 mm (2.2 in) Operating temperature: -40...+120 °C (-40...+248 °F) Max. cable length: 20 m (65.6 ft.)</p>	 <p>Material: PUR jacket, black Min. bending radius: 24 mm (0.94 in) Operating temperature: -40...+80 °C (-40...+176 °F) Max. cable length: 1.15 m (3.9 ft.)</p>	 <p>Single wires, unshielded Min. bending radius: 4 mm (0.16 in.) Operating temperature: -40...+85 °C (-40...+185 °F) Max. cable length: 0.5 m (1.6 ft.)</p>

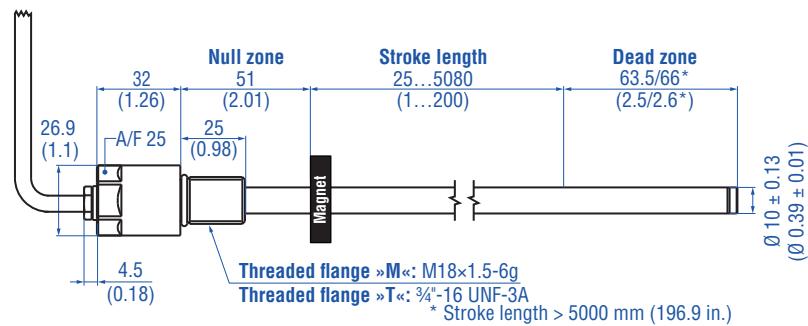
Connector »G«	Connector »S«	Connector »W«	Connector »E«
 <p>Operating temperature: -40...+105 °C (-40...+221 °F) Ingress protection: IP65/IP67 (correctly fitted) For side connection</p>	 <p>Operating temperature: -40...+105 °C (-40...+221 °F) Ingress protection: IP67 (correctly fitted) For side connection</p>	 <p>Operating temperature: -40...+85 °C (-40...+185 °F) Ingress protection: IP67 (correctly fitted) For side connection</p>	 <p>Operating temperature: -40...+85 °C (-40...+185 °F) Ingress protection: IP30 For bottom connection</p>

## TECHNICAL DRAWING – SENSOR ROD FLANGE TYPES

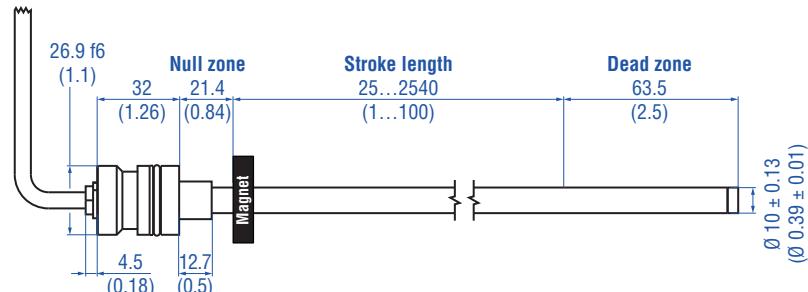
### Threaded flange »C« & »D«



### Threaded flange »M« & »T«



### Pressure fit flange »S«



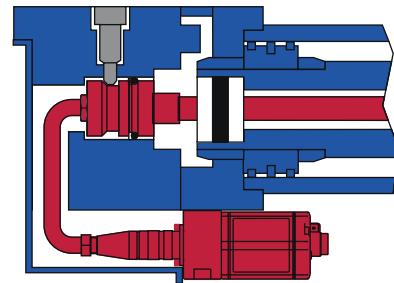
Controlling design dimensions are in millimeters and measurements in ( ) are in inches

Fig. 2: Tempsonics® RD5 sensor rod flange types

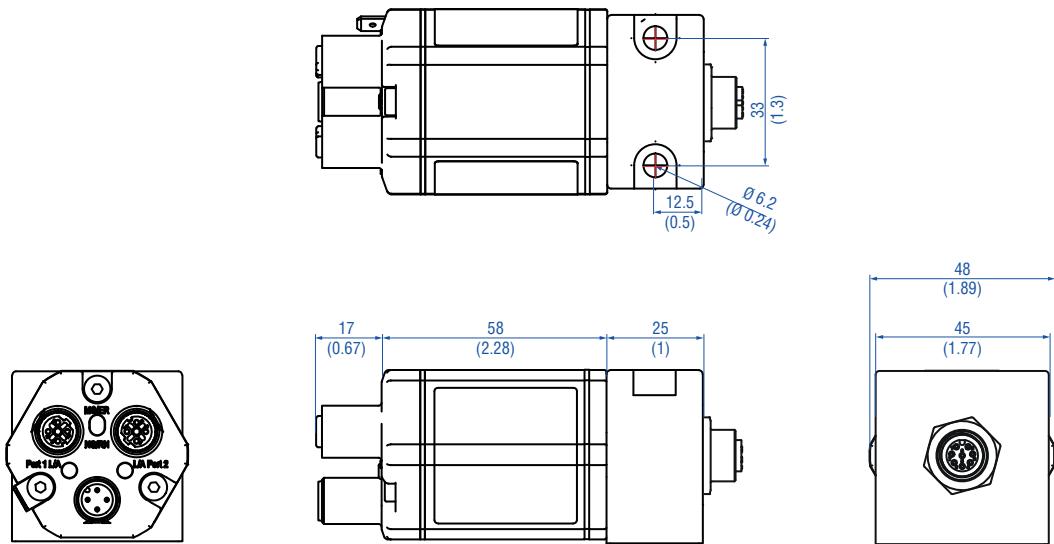
## TECHNICAL DRAWING – SENSOR ELECTRONICS & MOUNTING BLOCK

### RD5 with side connection

The connecting cable between the sensor electronics housing and the rod is connected to the side of the sensor electronics housing.



### Compact mounting block with side M12 mating connector, type »G«, example: Connection type D58 (connector outlet)

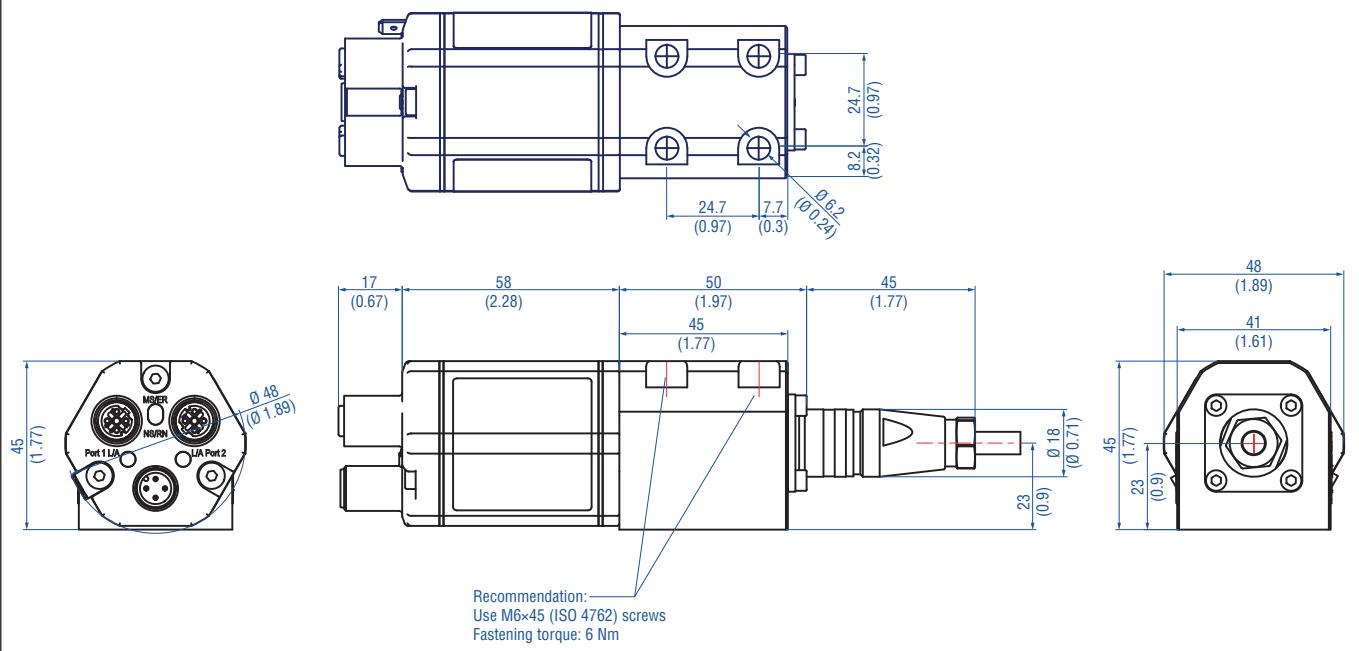


Controlling design dimensions are in millimeters and measurements in ( ) are in inches

Fig. 3: Tempsonics® RD5 sensor electronics & mounting block

## TECHNICAL DRAWING – SENSOR ELECTRONICS & MOUNTING BLOCK

Classic mounting block with side M16 mating connector, type »S«, example: Connection type D58 (connector outlet)



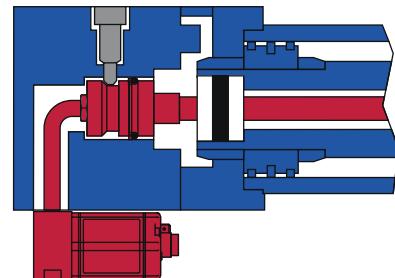
Controlling design dimensions are in millimeters and measurements in ( ) are in inches

Fig. 4: Tempsonics® RD5 sensor electronics & mounting block

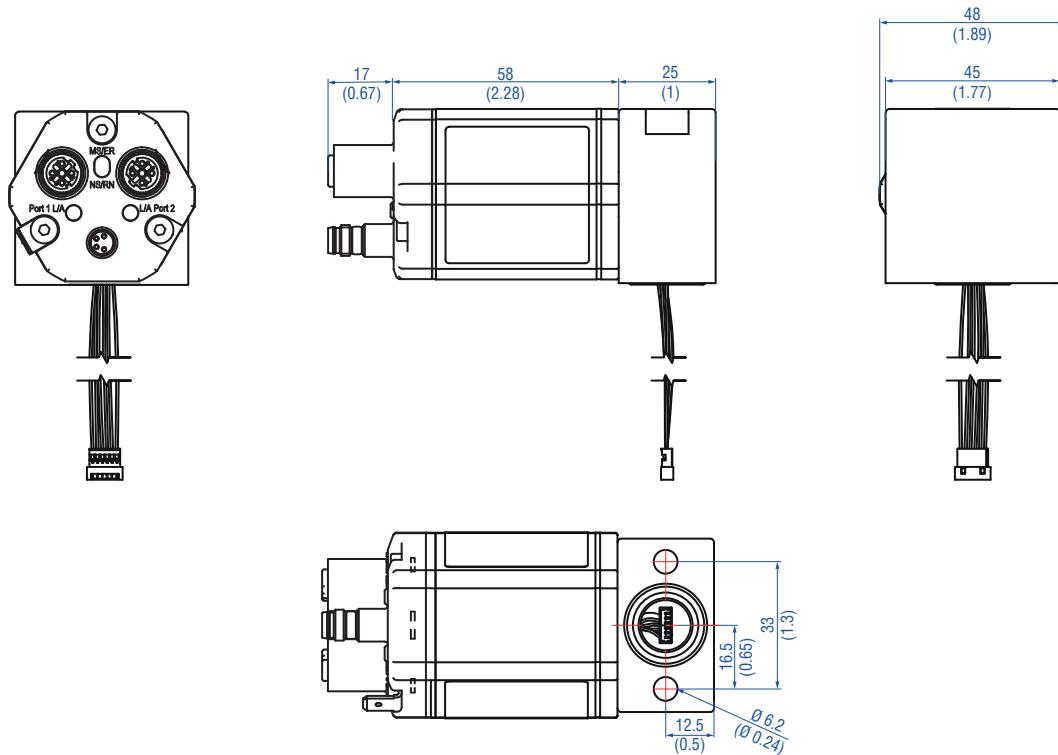
## TECHNICAL DRAWING – SENSOR ELECTRONICS & MOUNTING BLOCK

### RD5 with bottom connection

The connecting cable between the sensor electronics housing and the rod is connected to the bottom of the sensor electronics housing.



### Compact mounting block with bottom connection and flat mating connector, type »E«, example: Connection type D56 (connector outlet)



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

Fig. 5: Tempsonics® RD5 sensor electronics & mounting block

## TECHNICAL DRAWING – SENSOR ELECTRONICS & MOUNTING BLOCK

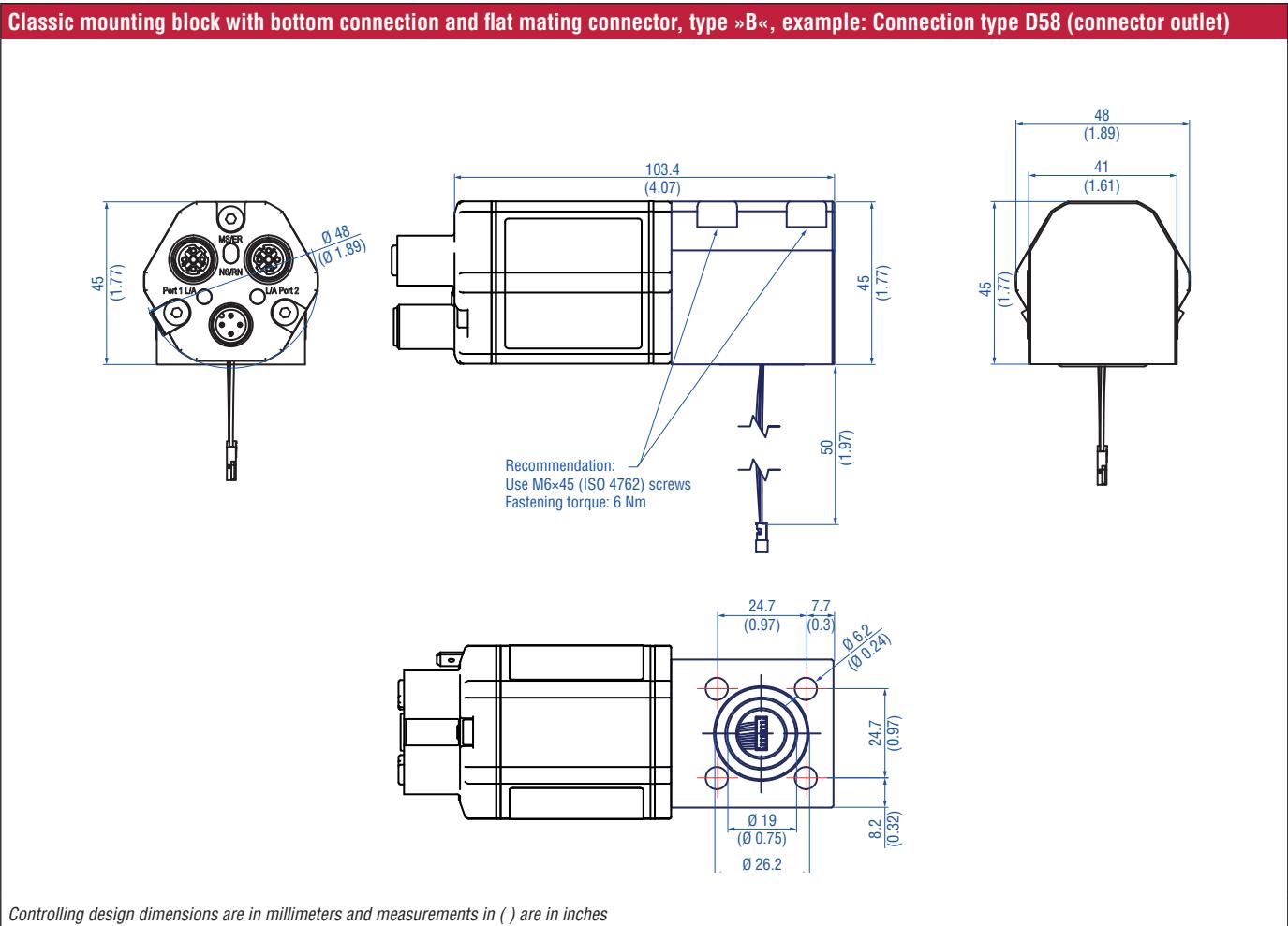


Fig. 6: Tempsonics® RD5 sensor electronics & mounting block

## CONNECTOR WIRING

D58		
Port 1 – Signal		
M12 female connector (D-coded)	Pin	Function
	1	Tx (+)
	2	Rx (+)
	3	Tx (-)
View on sensor	4	Rx (-)
Port 2 – Signal		
M12 female connector (D-coded)	Pin	Function
	1	Tx (+)
View on sensor	2	Rx (+)
	3	Tx (-)
	4	Rx (-)
Power supply		
M12 male connector (A-coded)	Pin	Function
	1	+12...30 VDC ( $\pm 20\%$ )
View on sensor	2	Not connected
	3	DC Ground (0 V)
	4	Not connected

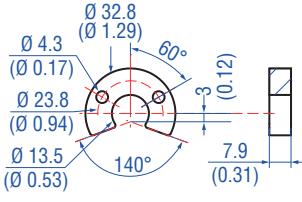
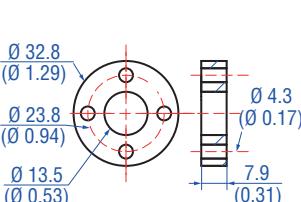
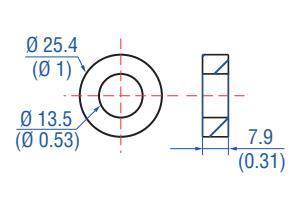
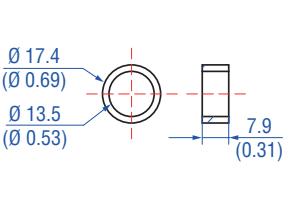
Fig. 7: Connector wiring D58

D56		
Port 1 – Signal		
M12 female connector (D-coded)	Pin	Function
	1	Tx (+)
View on sensor	2	Rx (+)
	3	Tx (-)
	4	Rx (-)
Port 2 – Signal		
M12 female connector (D-coded)	Pin	Function
	1	Tx (+)
View on sensor	2	Rx (+)
	3	Tx (-)
	4	Rx (-)
Power supply		
M8 male connector	Pin	Function
	1	+12...30 VDC ( $\pm 20\%$ )
View on sensor	2	Not connected
	3	DC Ground (0 V)
	4	Not connected

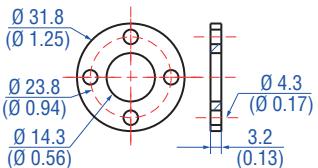
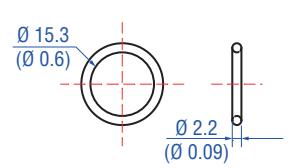
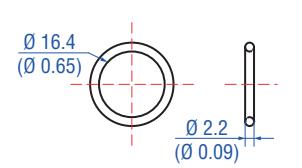
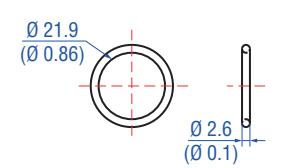
Fig. 8: Connector wiring D56

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

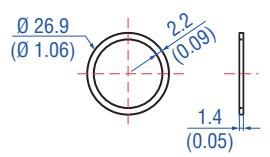
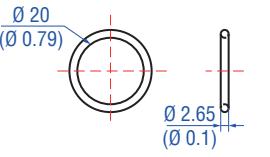
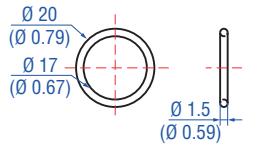
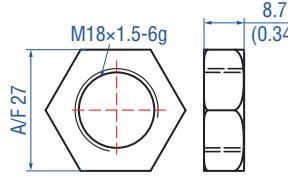
**Position magnets**

			
<b>U-magnet OD33</b> Part no. 251 416-2	<b>Ring magnet OD33</b> Part no. 201 542-2	<b>Ring magnet OD25.4</b> Part no. 400 533	<b>Ring magnet OD17.4</b> Part no. 401 032
Material: PA ferrite GF20 Weight: Approx. 11 g Surface pressure: Max. 40 N/mm <sup>2</sup> Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+120 °C (-40...+248 °F)	Material: PA ferrite GF20 Weight: Approx. 14 g Surface pressure: Max. 40 N/mm <sup>2</sup> Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+120 °C (-40...+248 °F)	Material: PA ferrite Weight: Approx. 10 g Surface pressure: Max. 40 N/mm <sup>2</sup> Operating temperature: -40...+120 °C (-40...+248 °F)	Material: PA neobond Weight: Approx. 5 g Surface pressure: Max. 20 N/mm <sup>2</sup> Operating temperature: -40...+105 °C (-40...+221 °F)

**Magnet spacer**

			
<b>Magnet spacer</b> Part no. 400 633	<b>O-ring for threaded flange</b> M18×1.5-6g Part no. 401 133	<b>O-ring for threaded flange</b> 3/4"-16 UNF-3A Part no. 560 315	<b>O-ring for pressure fit flange</b> Ø 26.9 mm Part no. 560 705
Material: Aluminum Weight: Approx. 5 g Surface pressure: Max. 20 N/mm <sup>2</sup> Fastening torque for M4 screws: 1 Nm	Material: Fluoroelastomer Durometer: 75 ± 5 Shore A Operating temperature: -40...+204 °C (-40...+400 °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**

			
<b>Back-up ring for pressure fit flange</b> Ø 26.9 mm Part no. 560 629	<b>O-ring for classic mounting block with bottom entry »B«</b> Part no. 561 435	<b>O-ring for compact mounting block with bottom entry »E«</b> Part no. 562 405	<b>Hex jam nut M18×1.5-6g</b> Part no. 500 018
Material: Polymyte Durometer: 90 Shore A	Material: FKM Durometer: 80 ± 5 Shore A Operating temperature: -15...+200 °C (5...+392 °F)	Material: BUNA Durometer: 70 Shore A Operating temperature: -40...+121 °C (-40...+249,8 °F)	Material: Steel, zinc plated

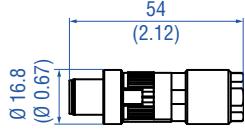
Controlling design dimensions are in millimeters and measurements in ( ) are in inches

## Mounting accessories

<p>Hex jam nut 3/4"-16 UNF-3A Part no. 500 015</p> <p>Material: Steel, zinc plated</p>	<p>Fixing clip Part no. 561 481</p> <p>Application: Used to secure sensor rods (Ø 10 mm (Ø 0.39 in.)) when using an U-magnet or block magnet</p> <p>Material: Brass, non-magnetic</p>
--	---

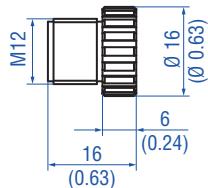
Controlling design dimensions are in millimeters and measurements in ( ) are in inches

## Cable connectors\* – Signal



**M12 D-coded male connector (4 pin), straight**  
Part no. 370 523

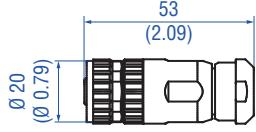
Material: Zinc nickel-plated  
Termination: Insulation-displacement  
Cable Ø: 6...7.2 mm (0.2...0.28 in.)  
Wire: 24 AWG – 22 AWG  
Operating temperature:  
-25...+85 °C (-13...+185 °F)  
Ingress protection: IP65 / IP67  
(correctly fitted)  
Fastening torque: 0.6 Nm



**M12 connector end cap**  
Part no. 370 537

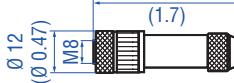
Female connectors M12 should be covered by this protective cap  
Material: Brass nickel-plated  
Ingress protection: IP67 (correctly fitted)  
Fastening torque: 0.39...0.49 Nm

## Cable connectors\* – Power



**M12 A-coded female connector (4 pin/5 pin), straight**  
Part no. 370 677

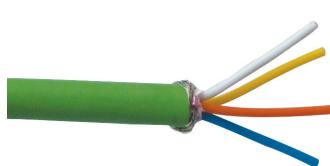
Material: GD-Zn, Ni  
Termination: Screw  
Contact insert: CuZn  
Cable Ø: 4...8 mm (0.16...0.31 in.)  
Wire: max. 1.5 mm<sup>2</sup> (16 AWG)  
Operating temperature:  
-30...+85 °C (-22...+185 °F)  
Ingress protection: IP67 (correctly fitted)  
Fastening torque: 0.6 Nm



**M8 female connector (4 pin), straight**  
Part no. 370 504

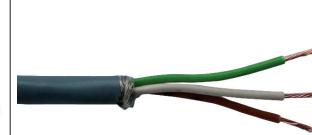
Material: CuZn nickel plated  
Termination: Solder  
Cable Ø: 3.5...5 mm (0.14...0.28 in.)  
Wire: 0.25 mm<sup>2</sup>  
Operating temperature:  
-40...+85 °C (-40...+185 °F)  
Ingress protection: IP67 (correctly fitted)  
Fastening torque: 0.5 Nm

## Cables



**PUR signal cable**  
Part no. 530 125

Material: PUR jacket; green  
Features: Cat 5, highly flexible, halogen free, suitable for drag chains, mostly oil & flame resistant  
Cable Ø: 6.5 mm (0.26 in.)  
Cross section: 2 x 2 x 0.35 mm<sup>2</sup> (22 AWG)  
Bending radius: 6 x D (fixed installation)  
Operating temperature:  
-20...+60 °C (-4...+140 °F)



**PVC power cable**  
Part no. 530 108

Material: PVC jacket; gray  
Features: Shielded, flexible, mostly flame resistant  
Cable Ø: 4.9 mm (0.19 in.)  
Cross section: 3 x 0.34 mm<sup>2</sup>  
Bending radius: 5 x D (fixed installation)  
Operating temperature:  
-30...+80 °C (-22...+176 °F)

## Cable sets



**Signal cable with M12 D-coded male connector (4 pin), straight – M12 D-coded, male connector (4 pin), straight**  
Part no. 530 064

Material: PUR jacket; green  
Feature: Cat 5e  
Cable length: 5 m (16.4 ft)  
Cable Ø: 6.5 mm (0.26 in.)  
Ingress protection: IP65, IP67, IP68 (correctly fitted)  
Operating temperature:  
-30...+70 °C (-22...+158 °F)



**Signal cable with M12 D-coded male connector (4 pin), straight – RJ45 male connector, straight**  
Part no. 530 065

Material: PUR jacket; green  
Feature: Cat 5e  
Cable length: 5 m (16.4 ft)  
Cable Ø: 6.5 mm (0.26 in.)  
Ingress protection M12 connector:  
IP67 (correctly fitted)  
Ingress protection RJ45 connector:  
IP20 (correctly fitted)  
Operating temperature:  
-30...+70 °C (-22...+158 °F)

\*/ Follow the manufacturer's mounting instructions

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.

Cable sets	Programming tools		
			
<p><b>Power cable with M8 female connector (4 pin), straight – pigtail</b>  <b>Part no. 530 066 (5 m (16.4 ft.))</b>  <b>Part no. 530 096 (10 m (32.8 ft.))</b>  <b>Part no. 530 093 (15 m (49.2 ft.))</b></p> <p>Material: PUR jacket; gray    Feature: Shielded    Cable Ø: 5 mm (0.2 in.)    Operating temperature:    -40...+90 °C (-40...+194 °F)</p>	<p><b>Power cable with M12 A-coded female connector (5 pin), straight – pigtail</b>  <b>Part no. 370 673</b></p> <p>Material: PUR jacket; black    Feature: Shielded    Cable length: 5 m (16.4 ft)    Ingress protection: IP67 (correctly fitted)    Operating temperature:    -25...+80 °C (-13...+176 °F)</p>	<p><b>TempoLink® kit for Tempsonics® R-Series V</b>  <b>Part no. TL-1-0-EM08 (D56)</b>  <b>Part no. TL-1-0-EM12 (D58)</b></p> <ul style="list-style-type: none"> <li>• Connect wirelessly via Wi-Fi enabled device or via USB with the diagnostic tool</li> <li>• Simple connectivity to the sensor via 24 VDC power line (permissible cable length: 30 m)</li> <li>• User friendly interface for mobile devices and desktop computers</li> <li>• See data sheet "TempoLink® smart assistant" (document part no.: <a href="#">552070</a>) for further information</li> </ul>	<p><b>TempoGate® smart assistant for Tempsonics® R-Series V</b>  <b>Part no. TG-C-0-Dxx</b>    (xx indicates the number of R-Series V sensors that can be connected (even numbers only))</p> <ul style="list-style-type: none"> <li>• OPC UA server for diagnostics of the R-Series V</li> <li>• For installation in the control cabinet</li> <li>• Connection via LAN and Wi-Fi</li> <li>• See data sheet "TempoGate® smart assistant" document part no.: <a href="#">552110</a> for further information</li> </ul>

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

## ORDER CODE FOR COMPLETE SENSOR: RD5 KIT



### NOTICE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
R	D	5	K													0			D	5		1		U	4		
a	b	c		d		e		f		g	h	i	j		k												

<b>a</b>	<b>Sensor model</b>
R	D 5 Sensor rod with detached electronics
<b>b</b>	<b>Sensor electronics components</b>
K	Kit includes both sensor rod and sensor electronics housing
<b>c</b>	<b>Design</b>
C	Threaded flange M18x1.5-6g (A/F 46)
D	Threaded flange 3/4"-16 UNF-3A (A/F 46)
M	Threaded flange M18x1.5-6g (A/F 25)
S	Pressure fit flange Ø 26.9 mm f6
T	Threaded flange 3/4"-16 UNF-3A (A/F 25)

<b>d</b>	<b>Sensor rod cable type and length</b>
J	X X X X X FEP cable, length in centimeters (range 0007...2000 cm). See historical available*, or select length from: 0020, 0030, 0080, 0300, 0500, 1000, 1500, or 2000 cm
K	X X X X X PUR cable, length in centimeters (range 0007...0115 cm). See historical available*, or select length from: 0020, 0030, or 0080 cm
W	X X X X X 6 single wires, length in centimeters (range 0007...0050 cm). Select length from: 0007, 0010, 0015, 0020, 0030, 0040 or 0050 cm

\* Historical lengths available:

0007 cm 0023 cm 0040 cm 0115 cm  
0010 cm 0025 cm 0060 cm  
0017 cm 0035 cm 0100 cm

Non-standard lengths for cable/wires are available; must be encoded in 1 cm increments and within the specified range

<b>e</b>	<b>Sensor rod connector type</b>
E	Flat connector
G	M12 connector (only for sensor rod cable type »J« and »K«)
S	M16 connector (only for sensor rod cable type »J« and »K«)
W	M12 square panel mount connector (only for sensor rod cable type »W«) Requires RD5-C joining cable (ordered separately)

The RD5 sensor is normally ordered as a kit containing the sensor rod and the sensor electronics housing/mounting block, all in one complete model number. For ordering the kit, use the **RD5-K** model number configurator below.

<b>f</b>	<b>Stroke length</b>
X X X X M	Flange »S«: 0025...2540 mm Flange »C«, »D«, »M«, »T«: 0025...5080 mm
<b>Stroke length (mm)</b>	<b>Ordering steps</b>
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
X X X X U	Flange »S«: 001.0...100.0 in. Flange »C«, »D«, »M«, »T«: 001.0...200.0 in.
<b>Stroke length (in.)</b>	<b>Ordering steps</b>
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	

<b>g</b>	<b>Sensor electronics mounting block with mating connector</b>
B	Classic mounting block with bottom connection and flat mating connector (only for sensor rod connector type »E«)
E	Compact mounting block with bottom connection and flat mating connector (only for sensor rod connector type »E«)
G	Compact mounting block with side M12 mating connector (only for sensor rod connector type »G« and »W«)
S	Classic mounting block with side M16 mating connector (only for sensor rod connector type »S«)

<b>h</b>	<b>Number of magnets</b>
X X	01...2 position(s) (1...2 magnet(s))

<b>i</b>	<b>Connection type</b>		
<b>D</b>	<b>5</b>	<b>6</b>	2×M12 female connectors (D-coded), 1×M8 male connector
<b>D</b>	<b>5</b>	<b>8</b>	2×M12 female connectors (D-coded), 1×M12 male connector (A-coded)

<b>j</b>	<b>System</b>
<b>1</b>	Standard

<b>k</b>	<b>Output</b>			
<b>U</b>	<b>4</b>	<b>0</b>	<b>2</b>	PROFINET RT & IRT, position and velocity, linear profile 1...2 magnet(s))
<b>U</b>	<b>4</b>	<b>0</b>	<b>1</b>	PROFINET RT & IRT, position and velocity, encoder profile 1 magnet)

### NOTICE

- Select the linear profile (U402) in **k** “Output” for multi-position measurement.
- Specify 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 multi-position measurement.

### DELIVERY

<b>RD5-K-C/D/M/T:</b>	Accessories have to be ordered separately.
<b>RD5-K-S:</b>	Sensor, O-ring, back-up ring

**Manuals, Software & 3D Models available at:**  
[www.temposonics.com](http://www.temposonics.com)

## ORDER CODE FOR SENSOR ROD ONLY



### NOTICE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
R	D	5	R												
a	b	c		d		e				f					

<b>a</b>	<b>Sensor model</b>
R	D 5 Sensor rod with detached electronics
<b>b</b>	<b>Sensor rod components</b>
R	Sensor rod assembly with cable and connector
<b>c</b>	<b>Design</b>
C	Threaded flange M18x1.5-6g (A/F 46)
D	Threaded flange 3/4"-16 UNF-3A (A/F 46)
M	Threaded flange M18x1.5-6g (A/F 25)
S	Pressure fit flange Ø 26.9 mm f6
T	Threaded flange 3/4"-16 UNF-3A (A/F 25)
<b>d</b>	<b>Sensor rod cable type and length</b>
J	X X X X X FEP cable, length in centimeters (range 0007...2000 cm). See historical available*, or select length from: 0020, 0030, 0080, 0300, 0500, 1000, 1500, or 2000 cm
K	X X X X X PUR cable, length in centimeters (range 0007...0115 cm). See historical available*, or select length from: 0020, 0030, or 0080 cm
W	X X X X X 6 single wires, length in centimeters (range 0007...0050 cm). Select length from: 0007, 0010, 0015, 0020, 0030, 0040 or 0050 cm
* Historical lengths available: 0007 cm 0023 cm 0040 cm 0115 cm 0010 cm 0025 cm 0060 cm 0017 cm 0035 cm 0100 cm	
Non-standard lengths for cable/wires are available; must be encoded in 1 cm increments and within the specified range	
<b>e</b>	<b>Sensor rod connector type</b>
E	Flat connector
G	M12 connector (only for sensor rod cable type »J« and »K«)
S	M16 connector (only for sensor rod cable type »J« and »K«)
W	M12 square panel mount connector (only for sensor rod cable type »W«) Requires RD5-C joining cable (ordered separately)

The RD5 sensor rod with cable/wires and connector can be ordered separately as a spare or replacement. For ordering just the sensor rod components, use the **RD5-R** model number configurator below.

<b>f</b>	<b>Stroke length</b>
X X X X M	Flange »S«: 0025...2540 mm Flange »C«, »D«, »M«, »T«: 0025...5080 mm
<b>Stroke length (mm)</b>	<b>Ordering steps</b>
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
X X X X U	Flange »S«: 001.0...100.0 in. Flange »C«, »D«, »M«, »T«: 001.0...200.0 in.
<b>Stroke length (in.)</b>	<b>Ordering steps</b>
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	

## DELIVERY



### RD5-R-C/D/M/T:

Sensor rod, O-ring

Accessories have to be ordered separately.

### RD5-R-S:

Sensor rod, O-ring, back-up ring

Manuals, Software & 3D Models available at:  
[www.temposonics.com](http://www.temposonics.com)

## ORDER CODE FOR SENSOR ELECTRONICS HOUSING AND MOUNTING BLOCK ONLY



## NOTICE

1	2	3	4	5	6	7	8	9	11	10	12	13	14	15
R	D	5	E		0		D	5		1	U	4	0	
a	b	c	d		e		f			g				

<b>a</b>	<b>Sensor model</b>
R	D 5 Sensor rod with detached electronics

<b>b</b>	<b>Sensor electronics components</b>
E	Sensor electronics assembly with mounting block and mating connector

<b>c</b>	<b>Sensor electronics mounting block with mating connector</b>
B	Classic mounting block with bottom connection and flat mating connector (only for sensor rod connector type »E«)
E	Compact mounting block with bottom connection and flat mating connector (only for sensor rod connector type »E«)
G	Compact mounting block with side M12 mating connector (only for sensor rod connector type »G« and »W«)
S	Classic mounting block with side M16 mating connector (only for sensor rod connector type »S«)

<b>d</b>	<b>Number of magnets</b>
X	X 01...2 position(s) (1...2 magnet(s))

<b>e</b>	<b>Connection type</b>
D	5 8 2×M12 female connectors (D-coded), 1×M12 male connector (A-coded)
D	5 6 2×M12 female connectors (D-coded), 1×M8 male connector

<b>f</b>	<b>System</b>
1	Standard

<b>g</b>	<b>Output</b>
U	4 0 2 PROFINET RT & IRT, position and velocity, linear profile (1...2 magnet(s))
U	4 0 1 PROFINET RT & IRT, position and velocity, encoder profile (1 magnet)

The RD5 sensor electronics housing with mounting block can be ordered separately as a spare or replacement. For ordering just the sensor electronics components, use the **RD5-E** model number configurator below.

## NOTICE

- Select the linear profile (U402) in **g** "Output" for multi-position measurement.
- Specify 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 multi-position measurement.

## DELIVERY

**RD5-E:**

As ordered

Accessories have to be ordered separately.

**Manuals, Software & 3D Models available at:**  
[www.temposonics.com](http://www.temposonics.com)

## ORDER CODE FOR RD5 JOINING CABLE – RD5-C



1	2	3	4	5	6	7	8	9	10	11
R	D	5	C	J					C	M
a	b			c					e	

a	Sensor model
R	D 5 Sensor rod with detached electronics
b	Joining cable
C	Joining cable (M12 to M12)
c	Cable type and length
J	X X X X FEP cable Length in centimeters (range 0050...2000 cm) Standard lengths are: 0050, 0100, 0300, 0500, 1000, 1500, 2000 cm
	Nonstandard lengths for the joining cable are available; must be encoded in 1 cm increments and within the specified range
d	Unit of measure
C	M Length in centimeters

The **RD5-C** joining cable is required when the sensor rod connector is the M12 square panel mount connector, **W**. For ordering the joining cable, use the RD5-C model number configurator below.

## DELIVERY



**RD5-C:**  
As ordered

Manuals, Software & 3D Models available at:  
[www.temposonics.com](http://www.temposonics.com)

## GLOSSARY

### E

#### Encoder Profile

The encoder profile corresponds to the specification of the encoder profile V4.2 (PNO no. 3.162). With this profile, the position and the velocity of one magnet can be measured and transferred simultaneously. (→ Linear Profile)

#### Extrapolation

The native measurement cycle time of a sensor increases with the stroke length. With extrapolation, the sensor is able to report data faster than the native cycle time, independent of the stroke length of the sensor. Without extrapolation, if data is requested faster than the native cycle time, the last measured value is repeated.

### G

#### GSDML

The properties and functions of a PROFINET IO field device are described in a GSDML file (**G**eneral **S**tation **D**escription). The XML-based GSDML file contains all relevant data that are important for the implementation of the device in the controller as well as for data exchange during operation. The GSDML file of the R-Series V PROFINET is available on the homepage [www.temposonics.com](http://www.temposonics.com).

### I

#### IRT Filter

With PROFINET IRT (**I**sochronous **R**eal **T**ime) a clock-synchronous data transmission takes place. The application, the data transmission as well as the device cycle are synchronous. IRT enables a clock-synchronous data exchange with a minimum cycle time of 250 µs in the network. The R-Series V PROFINET supports PROFINET RT and IRT. (→ RT)

### L

#### Linear Profile

The linear profile was developed by Temposonics and is tailored to the characteristics of magnetostrictive position sensors. With this profile, the positions and velocities of up to 30 magnets can be reported and transferred simultaneously. (→ Encoder Profile)

### M

#### Multi-position measurement

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

### P

#### PROFINET

PROFINET (**P**rocess **F**ield **N**etwork) is an Industrial Ethernet interface and is managed by the **P**ROFIBUS **N**utzerorganisation e.V. (PNO). The R-Series V PROFINET and its corresponding GSDML file are certified by the PNO.

### R

#### RT

With PROFINET RT (**R**eal **T**ime) the data exchange is without clock synchronization. In this case, the application, the data transmission and the field devices operate according to their own processing cycle. The R-Series V PROFINET supports PROFINET RT and IRT. (→ IRT)



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