# Data Sheet

R-Series V RF5 Analog
Magnetostrictive Linear Position Sensors

Improved flexible sensor rod

▮ Flexible sensor rod with improved features
▮ Stroke length up to 20 m
▮ Field adjustments and diagnostics using the TempoLink® smart assistant

THE NEW **V** GENERATION

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 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.

Measurement cycle

❶	Current pulse generates magnetic field
❷	Interaction with position magnet field generates torsional strain pulse
❸	Torsional strain pulse propagates
❹	Strain pulse detected by converter
❺	Time-of-flight converted into position
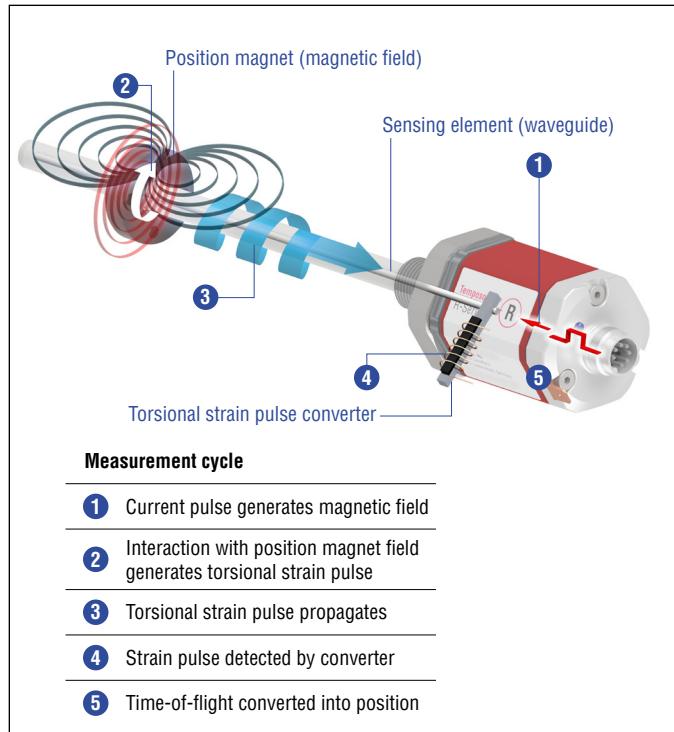
Fig. 1: Time-of-flight based magnetostrictive position sensing principle

R-SERIES Ⅴ RF5 Analog

The Temposonics® R-Series Ⅴ brings very powerful sensor performance to meet the many demands of your application.
The RFV sensor is the R-Series Ⅴ with improved flexible sensor rod. The main advantages of the flexible sensor rod are:
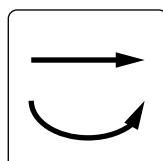
Straight and curved line
The flexible sensor rod enables position measurement on straight and also curved line.
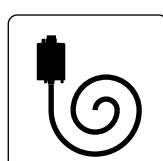
Compact for transport and storage
For transport and storage, the RF5 sensor can be coiled up. This saves costs and space.
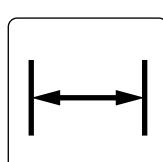
Installation with little space
Due to the bendable rod, the RF5 sensor can be installed even if only little space is available.
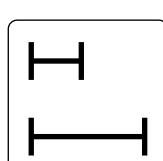
Large stroke length range
The sensor is available with stroke lengths from 150 mm to 20,000 mm and thus can be used in both short and long distance applications.

In addition the R-Series Ⅴ Analog scores with the following features:
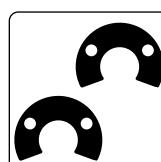
2 positions simultaneously
The R-Series Ⅴ Analog can detect and report the position of up to 2 magnets simultaneously.
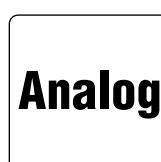
R-Series Ⅴ Analog
With the R-Series Ⅴ Analog you can configure the Analog output (current/voltage) that it fits best for your application and also adjust it on site with the smart assistant.

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)

ADVANTAGES OF THE R-SERIES Ⅴ RF5 COMPARED TO THE R-SERIES Ⅴ RFV

R-Series Ⅴ RFV
(previous design)

R-Series Ⅴ RF5
(improved design)
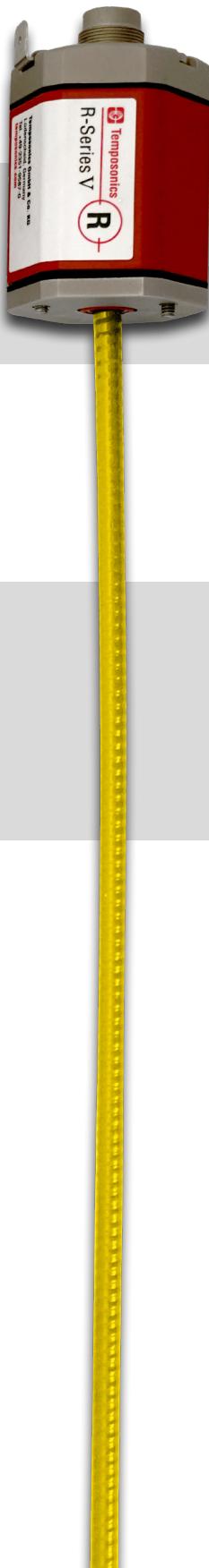
The first magnetostrictive sensor with a flexible sensor rod was developed and introduced to the market by Temposonics over 25 years ago. With this experience, we have further developed the sensor to improve handling in your application. The R-Series V RF5 offers you the following advantages:

Shortened non-flexible area
- Compared to the previous design, the non-flexible area of the RF5 has been reduced by more than 70 % from 107 mm to 30 mm.
- ➢ *This makes it easier to install the sensor, especially in confined spaces.*

Smooth transition
- The transition between the non-flexible and flexible areas is designed to be smooth.
- ➢ *This makes it easier to install the sensor in your application.*

Reduced outer diameter and bending radius
- The outer diameter of the flexible sensor rod has been reduced to 6.4 mm
- This now allows a minimum bending radius of the flexible sensor rod of 100 mm.
- ➢ *This makes it easier to install the sensor, especially in confined spaces.*

Increased ingress protection
- The RF5-B base unit meets the ingress protection IP68 (3 d/3 m) (connectors and flange correctly fitted).
- Therefore, the internal waveguide is protected against the ingress of water.
- ➢ *This improves the longevity of the sensor in your application.*

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	≤ 7620 mm	≤ 10,000 mm	≤ 20,000 mm
	Update time	0.25 ms	0.333 ms	0.5 ms	1.0 ms	2.0 ms	5.0 ms	7.5 ms	15.0 ms

Linearity deviation [1]	< ±0.02 % F.S. (minimum ±100 µm)
Repeatability	< ±0.001 % F.S. (minimum ±2.5 µm) typical
Hysteresis	< 4 µm typical
Temperature coefficient	< 30 ppm/K typical
Velocity/speed 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	IP68 (3 d/3 m) (connectors and flange correctly fitted)
Shock test	100 g/6 ms IEC standard 60068-2-27 (when guided in a support tube, e.g. sensor rod HD/HL/HP)
Vibration test	5 g/10…2000 Hz, IEC standard 60068-2-6 (excluding resonant frequencies) (when guided in a support tube, e.g. sensor rod HD/HL/HP)
EMC test	Electromagnetic emission according to EN 61000-6-3 Electromagnetic immunity according to EN 61000-6-2 With EMC-compliant installation, the RF5 sensors fulfill the requirements of EMC directives 2014/30/EU, UKSI 2016 No. 1091 and TR ZU 020/2011. [2]
Magnet movement velocity	Any

Design/Material	
Sensor electronics housing	Aluminum (painted), zinc die cast
Sensor flange	Stainless steel 1.4305 (AISI 303)
Sensor rod	Stainless steel conduit with PU coating
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	150…20,000 mm (6…787 in.)

Mechanical mounting	
Mounting position	Any
Mounting instruction	Please consult the technical drawings on page 6 and page 7 and the operation manual (document part number: 552063)

1/ With position magnet # 251 416-2
2/ The flexible sensor element must be mounted in an appropriately shielded environment

Electrical connection	
Connection type	1 × M16 male connector (6 pin) or 1 × M12 male connector (5 pin) or cable outlet
Operating voltage	+12…30 VDC ±20 % (9.6…36 VDC); the RF5 sensors must be power supplied via an external Class 2 power source in accordance with the UL approval
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

TECHNICAL DRAWING

RF5-B – RF5 base unit (without flange & rod assembly), example: Connection type D60 (connector outlet)
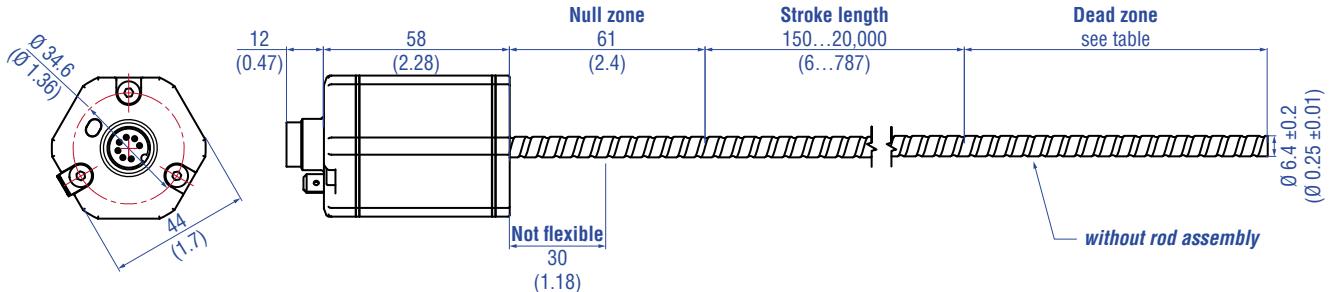
Stroke length	Tolerance of total length	Dead zone
Up to 7620 mm (300.00 in.)	±5 mm (0.20 in.)	94 mm (3.70 in.)
Up to 10,000 mm (393.70 in.)	±10 mm (0.39 in.)	100 mm (3.94 in.)
Up to 15,000 mm (590.55 in.)	±15 mm (0.59 in.)	120 mm (4.72 in.)
Up to 20,000 mm (787.00 in.)	±20 mm (0.79 in.)	140 mm (5.51 in.)

Note: Tolerance of total length has no influence on the stroke length.

RF5-B – RF5 base unit (without flange & rod assembly), example: Connection type D34 (connector outlet)
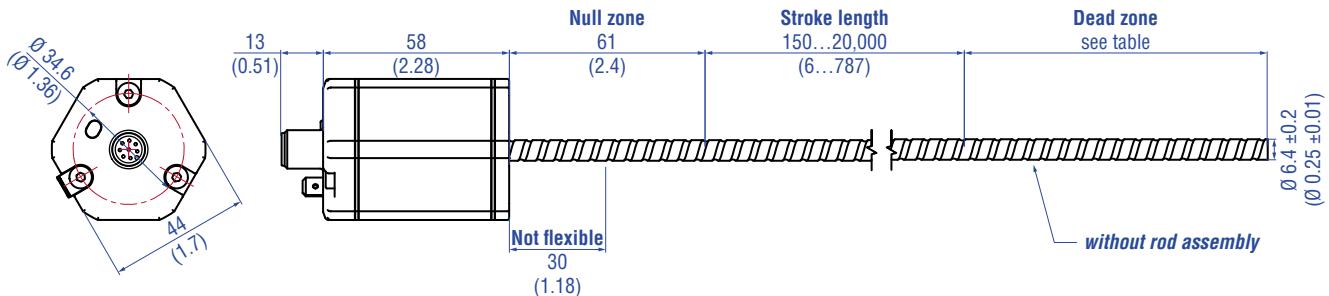
Stroke length	Tolerance of total length	Dead zone
Up to 7620 mm (300.00 in.)	±5 mm (0.20 in.)	94 mm (3.70 in.)
Up to 10,000 mm (393.70 in.)	±10 mm (0.39 in.)	100 mm (3.94 in.)
Up to 15,000 mm (590.55 in.)	±15 mm (0.59 in.)	120 mm (4.72 in.)
Up to 20,000 mm (787.00 in.)	±20 mm (0.79 in.)	140 mm (5.51 in.)

Note: Tolerance of total length has no influence on the stroke length.

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

*Fig. 2: Temposonics® RF5, part 1*

RF5-B – RF5 base unit (without flange & rod assembly), example: Connection type EXX/GXX/LXX/UXX (angled cable outlet)
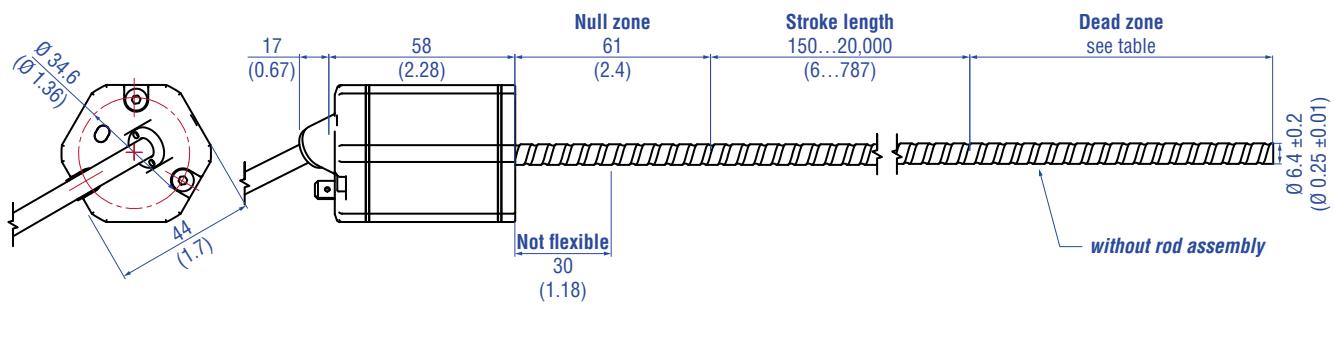
Stroke length	Tolerance of total length	Dead zone
Up to 7620 mm (300.00 in.)	±5 mm (0.20 in.)	94 mm (3.70 in.)
Up to 10,000 mm (393.70 in.)	±10 mm (0.39 in.)	100 mm (3.94 in.)
Up to 15,000 mm (590.55 in.)	±15 mm (0.59 in.)	120 mm (4.72 in.)
Up to 20,000 mm (787.00 in.)	±20 mm (0.79 in.)	140 mm (5.51 in.)

Note: Tolerance of total length has no influence on the stroke length.

RF5-B – RF5 base unit (without flange & rod assembly), example: Connection type HXX/RXX/TXX (straight cable outlet)
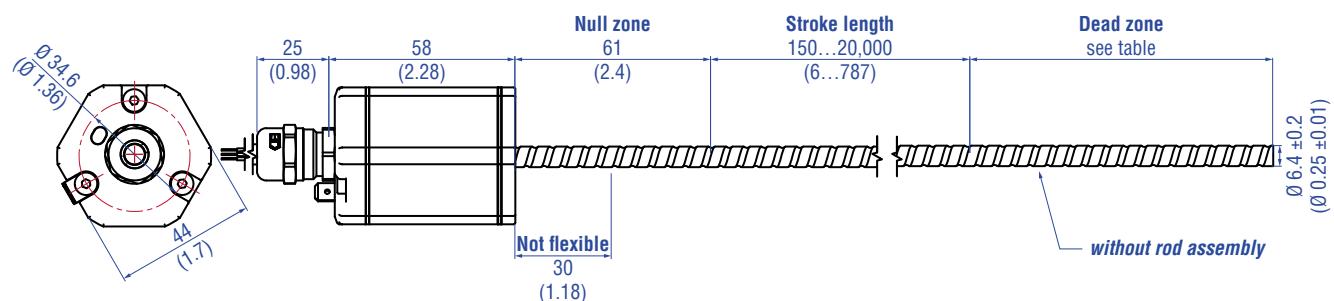
Stroke length	Tolerance of total length	Dead zone
Up to 7620 mm (300.00 in.)	±5 mm (0.20 in.)	94 mm (3.70 in.)
Up to 10,000 mm (393.70 in.)	±10 mm (0.39 in.)	100 mm (3.94 in.)
Up to 15,000 mm (590.55 in.)	±15 mm (0.59 in.)	120 mm (4.72 in.)
Up to 20,000 mm (787.00 in.)	±20 mm (0.79 in.)	140 mm (5.51 in.)

Note: Tolerance of total length has no influence on the stroke length.

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

Fig. 3: Temposonics® RF5, part 2

CONNECTOR WIRING
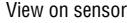
D34			
Signal + power supply			
M12 male connector	**Output**	**Pin**	**Function**
	1	1	+12…30 VDC (±20 %)
		2	Position (magnet 1)
		3	DC Ground (0 V)
View on sensor	**2***	4	Position (magnet 2) or reverse position (magnet 1) or speed or velocity (magnet 1) or temperature inside the sensor electronics housing
		5	Signal Ground
			* order dependent

Fig. 4: Connector wiring D34
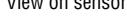
D60			
Signal + power supply			
M16 male connector	**Output**	**Pin**	**Function**
	1	1	Position (magnet 1)
		2	Signal Ground
View on sensor	**2***	3	Position (magnet 2) or reverse position (magnet 1) or speed or velocity (magnet 1) or temperature inside the sensor electronics housing
		4	Signal Ground
		5	+12…30 VDC (±20 %)
		6	DC Ground (0 V)
			* order dependent

Fig. 5: Connector wiring D60
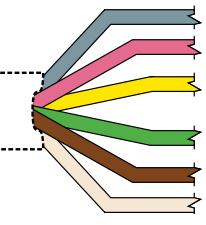
| HXX or LXX / RXX or EXX / TXX or GXX / UXX			
Signal + power supply			
Cable	**Output**	**Color**	**Function**
	1	GY	Position (magnet 1)
		PK	Signal Ground
	2*	YE	Position (magnet 2) or reverse position (magnet 1) or speed or velocity (magnet 1) or temperature inside the sensor electronics housing
		GN	Signal Ground
		BN	+12…30 VDC (±20 %)
		WH	DC Ground (0 V)
			* order dependent
For cable type TXX, the extra red & blue wires are not used.			

Fig. 6: Connector wiring cable outlet

Straight cable outlet				Cable type	Angled cable outlet			
H	X	X	Part no. 530 052	PUR →	L	X	X	Part no. 530 052
R	X	X	Part no. 530 032	PVC →	E	X	X	Part no. 530 032
T	X	X	Part no. 530 112	FEP →	G	X	X	Part no. 530 157

Fig. 7: Cable types assignment

FREQUENTLY ORDERED ACCESSORIES – Additional options available in our Accessories Catalog 📖 551444

Position magnets
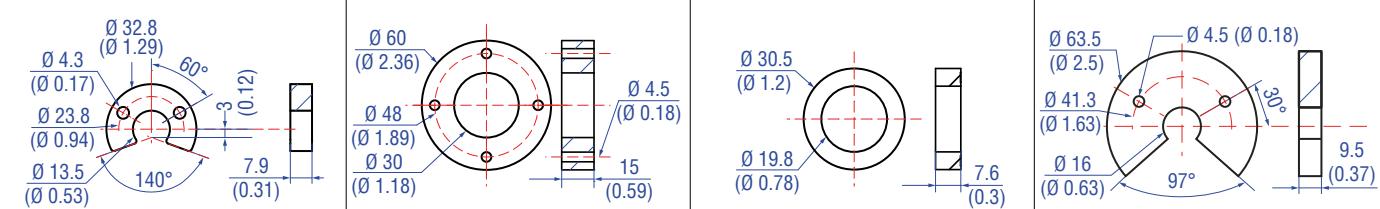
U-magnet OD33
Part no. 251 416-2

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 OD60
Part no. MT0162

Material: AlCuMgPb,
magnets compound-filled
Weight: Approx. 90 g
Surface pressure: Max. 20 N/mm²
Fastening torque for M4 screws: 1 Nm
Operating temperature:
–40…+75 °C (–40…+167 °F)

Ring magnet
Part no. 402 316

Material: PA ferrite coated
Weight: Approx. 13 g
Surface pressure: Max. 20 N/mm²
Operating temperature:
–40…+100 °C (–40…+212 °F)

U-magnet OD63.5
Part no. 201 553

Material: PA 66-GF30,
magnets compound-filled
Weight: Approx. 26 g
Surface pressure: 20 N/mm²
Fastening torque for M4 screws: 1 Nm
Operating temperature:
–40…+75 °C (–40…+167 °F)

O-rings | Mounting accessories
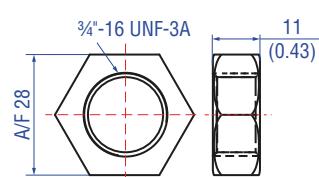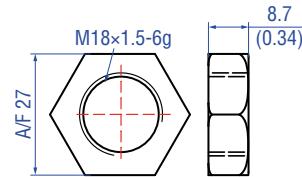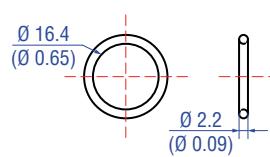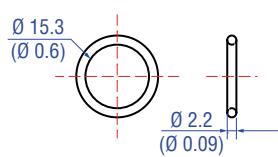
O-ring for threaded flange
M18×1.5-6g
Part no. 401 133

Material: Fluoroelastomer
Durometer: 75 ±5 Shore A
Operating temperature:
–40…+204 °C (–40…+400 °F)

O-ring for threaded flange
¾"-16 UNF-3A
Part no. 560 315

Material: Fluoroelastomer
Durometer: 75 ±5 Shore A
Operating temperature:
–40…+204 °C (–40…+400 °F)

Hex jam nut M18×1.5-6g
Part no. 500 018

Material: Steel, zinc plated

Hex jam nut ¾"-16 UNF-3A
Part no. 500 015

Material: Steel, zinc plated

Mounting accessories

Threaded flange M18×1.5-6g
Part no. 404 874

Material: Stainless steel 1.4305
(AISI 303)
Order O-rings separately:
O-ring 15×2: Part no. 560 853
O-ring 15.3×2.2: Part no. 401 133
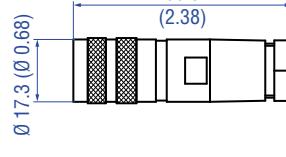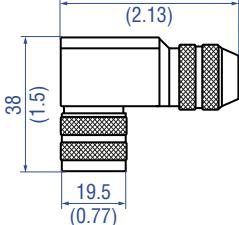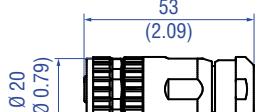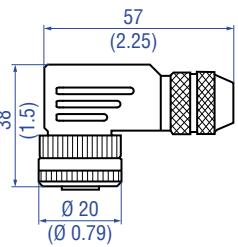
Threaded flange ¾"-16 UNF-3A
Part no. 404 875

Material: Stainless steel 1.4305
(AISI 303)
Order O-rings separately:
O-ring 15×2: Part no. 560 853
O-ring 16.4×2.2: Part no. 560 315

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

Temposonics® R-Series V RF5 Analog
Data Sheet
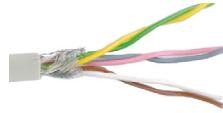
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<tr><td colspan="4" style="background:#c8102e;color:white">Mounting accessories</td></tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor rod with threaded flange with flat-face (M18×1.5-6g) and O-ring
HD [length mm: XXXX] M
HD [length in.: XXX.X] U</td>
<td>Sensor rod with threaded flange with flat-face (¾"-16 UNF-3A) and O-ring
HL [length mm: XXXX] M
HL [length in.: XXX.X] U</td>
<td>Sensor rod with threaded flange with raised-face (¾"-16 UNF-3A) and O-ring
HP [length mm: XXXX] M
HP [length in.: XXX.X] U</td>
<td>Profile with flange
HFP [length mm: XXXXX] M
HFP [length in.: XXXX.X] U</td>
</tr>
<tr>
<td>Pressure rod Ø: 12.7 mm (0.5 in.)
Length: 100…7500 mm (4…295 in.)
Operating pressure: 350 bar (5076 psi)
Material flange:
Stainless steel 1.4305 (AISI 303)
Material rod:
Stainless steel 1.4301 (AISI 304)</td>
<td>Pressure rod Ø: 12.7 mm (0.5 in.)
Length: 100…7500 mm (4…295 in.)
Operating pressure: 350 bar (5076 psi)
Material flange:
Stainless steel 1.4305 (AISI 303)
Material rod:
Stainless steel 1.4301 (AISI 304)</td>
<td>Pressure rod Ø: 12.7 mm (0.5 in.)
Length: 100…7500 mm (4…295 in.)
Operating pressure: 350 bar (5076 psi)
Material flange:
Stainless steel 1.4305 (AISI 303)
Material rod:
Stainless steel 1.4301 (AISI 304)</td>
<td>Length: Max. 20,000 mm (max. 787 in.)
Ingress protection: IP30
Material: Aluminum</td>
</tr>
</table>

Cable connectors*

M16 female connector (6 pin), straight
Part no. 370 423

Material: Zinc nickel plated
Termination: Solder
Cable Ø: 6…8 mm (0.24…0.31 in.)
Operating temperature:
–40…+100 °C (–40…+212 °F)
Ingress protection: IP65/IP67
(correctly fitted)
Fastening torque: 0.6 Nm

M16 female connector (6 pin), angled
Part no. 370 460

Material: Zinc nickel plated
Termination: Solder
Cable Ø: 6…8 mm (0.24…0.31 in.)
Wire: 0.75 mm² (20 AWG)
Operating temperature:
–40…+95 °C (–40…+203 °F)
Ingress protection: IP67 (correctly fitted)
Fastening torque: 0.6 Nm

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 mm² (16 AWG)
Operating temperature:
–30…+85 °C (–22…+185 °F)
Ingress protection: IP67 (correctly fitted)
Fastening torque: 0.6 Nm

M12 A-coded female connector (5 pin), angled
Part no. 370 678

Material: GD-Zn, Ni
Termination: Screw
Contact insert: CuZn
Cable Ø: 5…8 mm (0.2…0.31 in.)
Wire: max 0.75 mm² (18 AWG)
Operating temperature:
–25…+85 °C (–13…+185 °F)
Ingress protection: IP67 (correctly fitted)
Fastening torque: 0.4 Nm
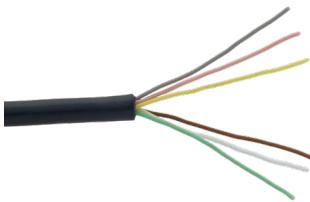
Cables

PVC cable
Part no. 530 032

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
(fixed installation)
Operating temperature:
–40…+105 °C (–40…+221 °F)

PUR cable
Part no. 530 052

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
(fixed installation)
Operating temperature:
–20…+80 °C (–4…+176 °F)

FEP cable
Part no. 530 112

Material: FEP jacket; black
Features: Twisted pair, shielded, flexible,
high thermal resistance, mostly oil &
acid resistant
Cable Ø: 7.6 mm (0.3 in.)
Cross section: 4 × 2 × 0.25 mm²
Bending radius: 8 – 10 × D
(fixed installation)
Operating temperature:
–100…+180 °C (–148…+356 °F)

FEP cable
Part no. 530 157

Material: FEP jacket; black
Features: Twisted pair, shielded
Cable Ø: 6.7 mm (0.26 in.)
Cross section: 3 × 2 × 0.14 mm²
Operating temperature: –40…+180 °C
(–40…+356 °F)

*/ 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

Temposonics® R-Series Ⅴ RF5 Analog
Data Sheet

Cable	Cable sets	
Silicone cable **Part no. 530 176**	**Cable with M12 A-coded female connector (5 pin), straight – pigtail** **Part no. 370 673**	**Cable with M12 A-coded female connector (5 pin), angled – pigtail** **Part no. 370 675**
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)	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)	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)

Programming tools		
Hand programmer for analog output **Part no. 253 124**	**Cabinet programmer for analog output** **Part no. 253 408**	**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)**
Easy teach-in-setups of stroke length and direction on desired zero/span positions. For sensors with 1 magnet.	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.	• 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

PVC cable with M12 female connector (6 pin), straight – pigtail

PVC cable (part no. 530 032) with M12 female connector, straight (part no. 370 677)

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

PUR cable with M12 female connector (6 pin), straight – pigtail

PUR cable (part no. 530 052) with M12 female connector, straight (part no. 370 677)

Order code:
K2-A-370677-xxxxyy-530052-0
(where xxxx = cable length and yy = unit in centimeters "CM" or feet "FT")

FEP cable with M12 female connector (6 pin), straight – pigtail

FEP cable (part no. 530 112) with M12 female connector, straight (part no. 370 677)

Order code:
K2-A-370677-xxxxyy-530112-0
(where xxxx = cable length and yy = unit in centimeters "CM" or feet "FT")

Extension cables M16

Notice for extension cables M12/M16

PVC cable with M16 female connector (6 pin), straight – pigtail

PVC cable (part no. 530 032) with M16 female connector, straight (part no. 370 423)

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

PUR cable with M16 female connector (6 pin), straight – pigtail

PUR cable (part no. 530 052) with M16 female connector, straight (part no. 370 423)

Order code:
K2-A-370423-xxxxyy-530052-0
(where xxxx = cable length and yy = unit in centimeters "CM" or feet "FT")

FEP cable with M16 female connector (6 pin), straight – pigtail

FEP cable (part no. 530 112) with M16 female connector, straight (part no. 370 423)

Order code:
K2-A-370423-xxxxyy-530112-0
(where xxxx = cable length and yy = unit in centimeters "CM" or feet "FT")

Standard cable lengths

Meters	Feet	Code
1.5	5.0	0150
2.0	6.6	0200
4.6	15.0	0460
5.0	16.4	0500
7.6	25.0	0760
10.0	32.8	1000
15.2	50.0	1520

For additional extension cables reference the accessories 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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
R	F	5													1					▨	▨	▨
a			**b**	**d**						**e**		**f**			**g**	**h**	**i**	**j**	**k**	**l**		
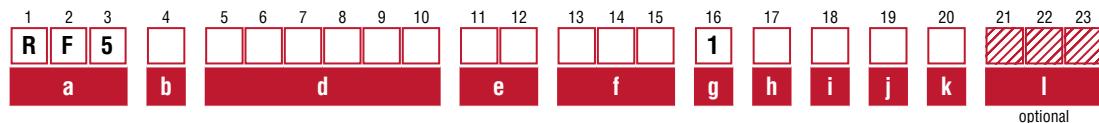
optional

a	**Sensor model**
R **F** **5**	Improved flexible rod

b	**Design**
B	Base unit (without flange & rod assembly)

Section **c** is intentionally omitted.

d	**Stroke length**
X **X** **X** **X** **X** **M**	00150…20000 mm

Stroke length (mm)	Ordering steps
150… 1000 mm	50 mm
1000… 5000 mm	100 mm
5000…10000 mm	250 mm
10000…15000 mm	500 mm
15000…20000 mm	1000 mm

X **X** **X** **X** **.** **X** **U**	0006.0…0787.0 in.

Stroke length (in.)	Ordering steps
6… 40 in.	2 in.
40…197 in.	4 in.
197…394 in.	10 in.
394…591 in.	20 in.
591…787 in.	40 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. 530 052) 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**
1	Standard

h	**Output**
A	Current
V	Voltage

i	**Function**
1	Position (1 or 2 magnets/outputs)
2	Position and speed (1 magnet and 2 outputs) Specify the maximum speed value in section **l**
3	Position and velocity (1 magnet and 2 outputs) Specify the maximum velocity value in section **l**
4	Position and reverse position (1 magnet and 2 outputs)
5	Position and temperature inside the sensor electronics housing (1 magnet and 2 outputs)
6	Differential (2 magnets and 1 output)

j	**Options**
0	Standard
3	Over range output mode

k	**Output range**
0	0…10 VDC or 4…20 mA
1	10…0 VDC or 20…4 mA
2	−10…+10 VDC or 0…20 mA
3	+10…−10 VDC or 20…0 mA
V	0…10 VDC for position, −10…+10 VDC for velocity

l	**Max. speed or velocity value**
(optional: use when i "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.

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.
- The sensor is without rod assembly. Always insert the flexible sensor rod in a support tube (e.g. sensor rod HD/HL/HP or HFP profile).

DELIVERY

RF5-B:
- Base unit (without flange & rod assembly)
- 3 × socket screws M4×59

Accessories have to be ordered separately.

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 **D**igital to **A**nalog **C**onverter (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)

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