

Data Sheet

G-Series V GT5 Analog Magnetostrictive Linear Position Sensors

- Two or three independent measuring systems in one housing
- Rod sensor for mounting on a cylinder to measure piston movement
- Field adjustments and diagnostics using the TempoLink® smart assistant



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics rely on the company's proprietary magnetostrictive technology, which can determine position with a high level of precision and robustness. Each Temposonics® position sensor consists of a ferromagnetic waveguide, a position magnet, a strain pulse converter and 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.

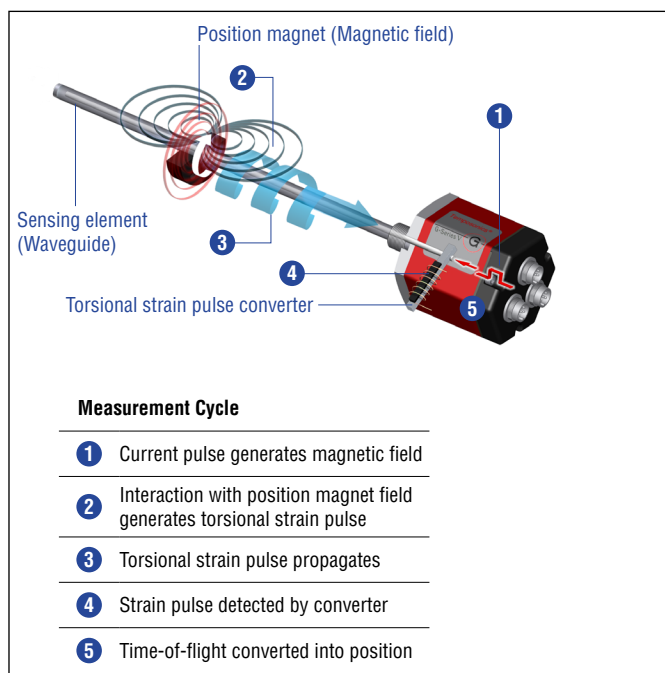
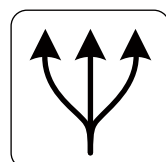


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

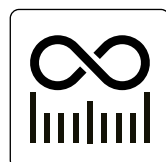
G-SERIES V GT5 Analog

The Temposonics® G-Series V brings balanced sensor performance to meet the many demands of your application. The GT5 sensor is the G-Series V with two or three independent measuring systems in one housing. The main advantages of the rod version GT5 with Analog output (current/voltage) are:



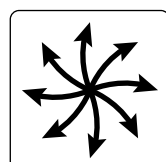
Double or triple redundancy

Depending on the configuration, the sensor housing contains two or three measuring systems that determine the magnet position independently of each other.



Infinite resolution

Due to an analog measuring method there is no quantization of the position value, therefore the resolution is infinite.



Versatile output ranges

You can configure the analog output of the sensor for different output ranges to suit your application.

All settings under control with the TempoLink® smart assistant

The TempoLink® smart assistant supports you in setup and diagnostics of the G-Series V. Among other things, you can adjust the setpoints of the sensor to your application on site or read out information about the current status of the sensor.

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 VDC (min. load controller: > 5 kΩ) Current: 4(0)...20 mA/20...4(0) mA (min./max. load: 0/500 Ω)
Measured value	Position, the position is measured separately by two or three position measuring systems
Measurement parameters	
Resolution	Analog
Cycle time	< 2.5 ms
Linearity ¹	< ±0.02 % F.S. (minimum ±50 μm)
Repeatability	< ±0.001 % F.S. (minimum ±2.5 μm)
Operating conditions	
Operating temperature	−40...+75 °C (−40...+167 °F)
Humidity	90 % relative humidity, no condensation
Ingress protection	IP67 (connectors correctly fitted)
Shock test	100 g/11 ms (single shock), IEC standard 60068-2-27
Vibration test	5 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 GT5 sensors fulfill the requirements of the EMC directives 2014/30/EU and UKSI 2016 No. 1091
Magnet movement velocity	Any
Design/Material	
Sensor electronics housing	Aluminum
Sensor rod	Stainless steel 1.4306 (AISI 304L)
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	50...3500 mm (2...138 in.)
Operating pressure	350 bar (5,076 psi)/700 bar (10,153 psi) peak (at 10 × 1 min)
Mechanical mounting	
Mounting position	Any orientation
Mounting instruction	Please consult the technical drawings on page 4 and the operation manual (document number: 552222)
Electrical connection	
Connection type	M16 male connector (6 pin) or cable outlet
Operating voltage	+24 VDC (−15/+20 %); the GT5 sensors must be power supplied via an external Class 2 power source in accordance with the UL approval
Ripple	≤ 0.28 Vpp
Current consumption	100 mA typical (each channel)
Dielectric strength	500 VDC (DC ground to machine ground)
Polarity protection	Up to −30 VDC
Overvoltage protection	Up to 36 VDC

¹/ With position magnet # 251 416-2

TECHNICAL DRAWING

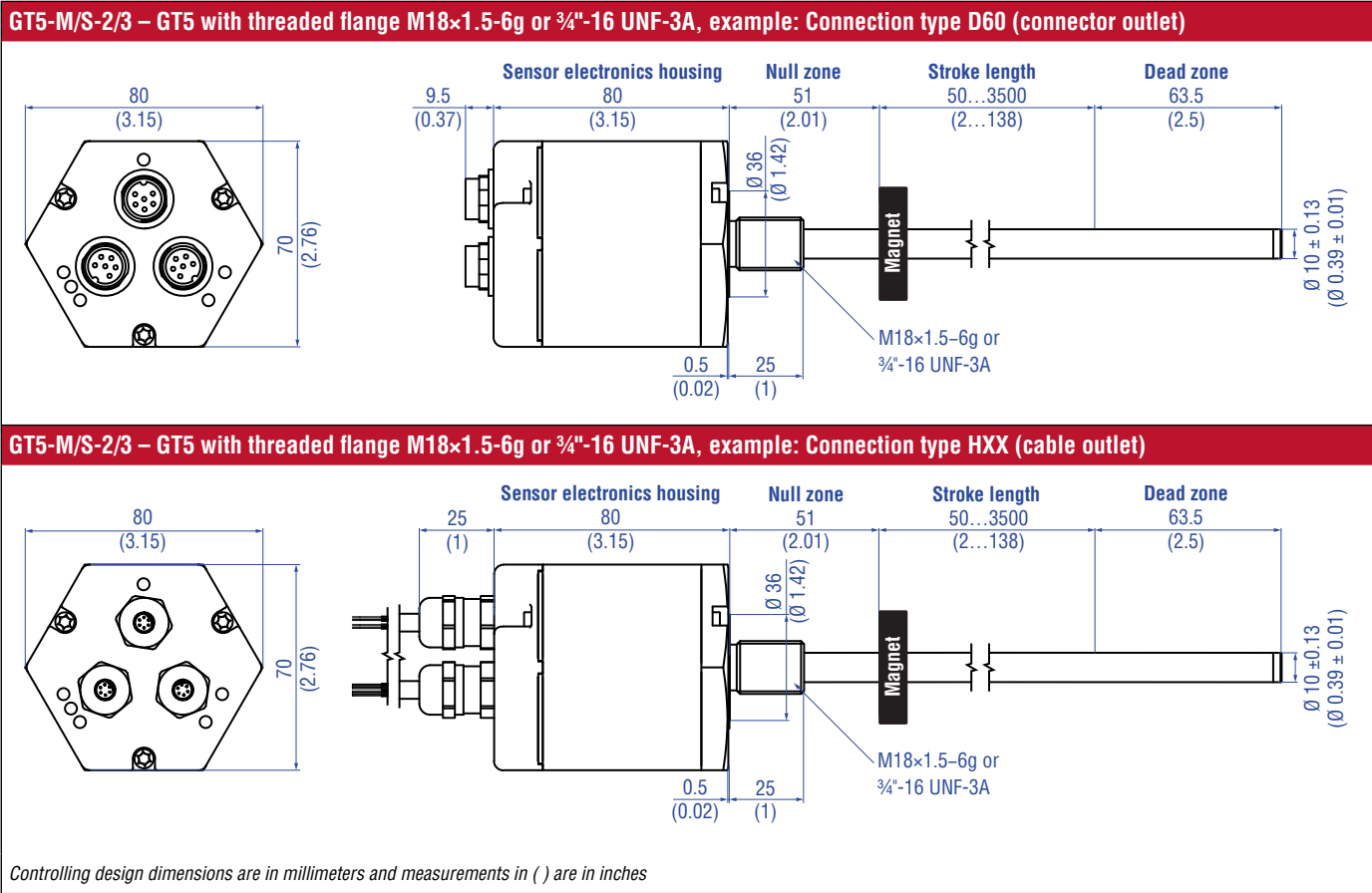


Fig. 2: Temposonics® GT5 with ring magnet

CONNECTOR WIRING

D60		
Signal + power supply		
M16 male connector	Pin	
 View on sensor	1	Position
	2	Signal Ground
	3	Do not connect
	4	Do not connect
	5	+24 VDC (–15/+20 %)
	6	DC Ground (0 V)

Fig. 3: Connector wiring D60

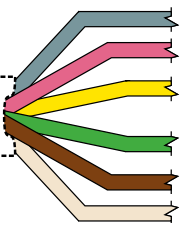
HXX		
Signal + power supply		
Cable	Color	Current
	GY	Position
	PK	Signal Ground
	YE	Do not connect
	GN	Do not connect
	BN	+24 VDC (–15/+20 %)
	WH	DC Ground (0 V)

Fig. 4: Connector wiring HXX

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/mm ² Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+120 °C (-40...+248 °F)	Ring magnet OD33 Part no. 201 542-2 Material: PA ferrite GF20 Weight: Approx. 14 g Surface pressure: Max. 40 N/mm ² Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+120 °C (-40...+248 °F)	Ring magnet OD25.4 Part no. 400 533 Material: PA ferrite Weight: Approx. 10 g Surface pressure: Max. 40 N/mm ² Operating temperature: -40...+120 °C (-40...+248 °F)	Ring magnet Part no. 402 316 Material: PA ferrite coated Weight: Approx. 13 g Surface pressure: Max. 20 N/mm ² Operating temperature: -40...+100 °C (-40...+212 °F)

Magnet spacer

O-rings

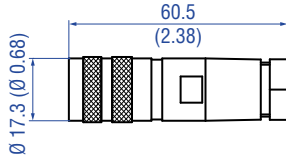
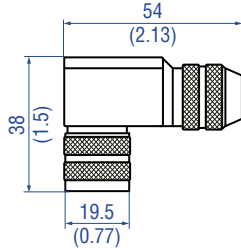
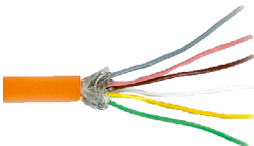
Mounting accessory

Magnet spacer Part no. 400 633 Material: Aluminum Weight: Approx. 5 g Surface pressure: Max. 20 N/mm ² Fastening torque for M4 screws: 1 Nm	O-ring for threaded flange M18x1.5-6g 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 M18x1.5-6g Part no. 500 018 Material: Steel, zinc plated

Mounting accessories

Hex jam nut ¾"-16 UNF-3A Part no. 500 015 Material: Steel, zinc plated	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

Cable connectors*	Cable	Programming tool	
 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	 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 × 0.19 mm² Bending radius: 5 × D (fixed installation) Operating temperature: -30...+80 °C (-22...+176 °F)	 TempoLink® kit for Temposonics® G-Series V Part no. TL-1-0-AS00 (for D60 and cable outlet) • 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

*/ 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

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
G	T	5								0	1				1		
a	b	c	d	e	f	g	h	i									

a	Sensor model
G T 5	Redundant rod

b	Design
M	Threaded flange M18×1.5-6g (standard)
S	Threaded flange ¾"-16 UNF-3A (standard)

c	Mechanical options
2	Dual redundant
3	Triple redundant

d	Stroke length
X X X X M	0050...3500 mm
Standard stroke length (mm) Ordering steps	
50... 500 mm	5 mm
500... 750 mm	10 mm
750...1000 mm	25 mm
1000...2500 mm	50 mm
2500...3500 mm	100 mm
X X X X U	002.0...138.0 in.
Standard stroke length (in.) Ordering steps	
2... 20 in.	0.2 in.
20... 30 in.	0.4 in.
30... 40 in.	1.0 in.
40...100 in.	2.0 in.
100...138 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 1	01 Position (1 magnet)

f	Connection type
Connector	
D 6 0	M16 male connector (6 pin)
Cable outlet	
H X X	XX m/ft. PUR cable (part no. 530 052) H01...H10 (1...10 m)/H03...H33 (3...33 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	Output range
0	0...10 VDC or 4...20 mA
1	10...0 VDC or 20...4 mA
2	0...20 mA
3	20...0 mA

DELIVERY



- Sensor
- O-ring

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.

M

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

R

Redundancy

A redundantly designed sensor features two or three measuring systems in one housing, which operate independently of each other. Each measuring system consists of a sensing element, evaluation electronics, and an electrical connection with signal output. This design serves to increase both the safety of the application by comparing the two or three output values and to increase availability, thereby maintaining operation even in the event of malfunctions.

Resolution

Due to an analog measuring method, there is no quantization of the position value, meaning that the resolution is infinite.



Temposonics

AN AMPHENOL COMPANY

UNITED STATES
Temposonics, LLC
Americas & APAC Region
3001 Sheldon Drive
Cary, N.C. 27513
Phone: +1 919 677-0100
E-mail: info.us@temposonics.com

GERMANY
Temposonics
GmbH & Co. KG
EMEA Region & India
Auf dem Schüffel 9
58513 Lüdenscheid
Phone: +49 2351 9587-0
E-mail: info.de@temposonics.com

ITALY
Branch Office
Phone: +39 030 988 3819
E-mail: info.it@temposonics.com

FRANCE
Branch Office
Phone: +33 6 14 060 728
E-mail: info.fr@temposonics.com

UK
Branch Office
Phone: +44 79 21 83 05 86
E-mail: info.uk@temposonics.com

SCANDINAVIA
Branch Office
Phone: +46 70 29 91 281
E-mail: info.sca@temposonics.com

CHINA
Branch Office
Phone: +86 21 3405 7850
E-mail: info.cn@temposonics.com

JAPAN
Branch Office
Phone: +81 3 6416 1063
E-mail: info.jp@temposonics.com

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UK
CA



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