

# mm **P603**

### APPLICATION

- Non-contacting inductive technology to eliminate wear
- Angle set to customer's requirement
- Compact and self-contained
- High durability and reliability
- High accuracy and stability
- Sealing to IP67



SENSORS & CONTROLS

As a leading designer and manufacturer of linear, rotary, tilt and intrinsically safe position sensors, Althen has the expertise to supply a sensor to suit a wide variety of applications. Our P603 is an affordable, durable, high-accuracy tilt sensor designed for industrial and scientific feedback applications. The P603, like all Althen sensors, is supplied with the output calibrated to the angle required by the customer, between 15 and 160 degrees and with full EMC protection built in. The sensor provides a linear output proportional with the rotation of the sensor.

There is a machined registration mark to identify the calibrated mid point. It is particularly suitable for OEMs seeking good sensor performance for arduous applications such as industrial machinery where cost is important. Overall performance, repeatability and stability are outstanding over a wide temperature range.

Electrical connections to the sensor are made via an industrial standard 4-pin M12 connector, with limited rotational capability to facilitate cable routing. The sensor has a rugged stainless steel body and anodised aluminium mounting flange, the flange has two slots to simplify mounting and position adjustment. The P603 offers a range of electrical options. Environmental sealing is to IP67.

#### SPECIFICATIONS

Dimensions <sup>1</sup>	
Body diameter	35 mm
Flange Diameter	60 mm
Body Length (to seal face)	44 mm standard, 50 mm buffered
Independent Linearity /Hysteresis (combined error)	≤ ± 0.25% - up to 100°
Temperature Coefficients	< ± 0.01%/°C Gain & < ± 0.01%FS/°C Offset
Frequency Response	> 10 kHz (-3dB) > 300 Hz (-3dB) 2 wire 4 to 20 mA
Response Time	250 mS @ 20°C typ.
Resolution	Infinite
Damping Ratio	0.2 : 1 (0.6 nom. @ 25°C)
Noise	< 0.02% FSO
Environmental Temperature Limits	
Operating	-20°C to +85°C all output options
Storage	-40°C to +125°C
Sealing	IP67
EMC Performance	EN 61000-6-2, EN 61000-6-3
Vibration	IEC 68-2-6: 10 g



### SPECIFICATIONS (CONTINUED)

Shock	IEC 68-2-29: 40 g	
MTBF	350,000 hrs 40°C Gf	
Drawing List <sup>2</sup>		
P603-11	Sensor Outline	
<sup>1</sup> For full mechanical details see drawings P603-11 <sup>2</sup> 3D models, step or .igs format, available on request		

#### HOW ALTHEN'S TECHNOLOGY ELIMINATES WEAR FOR LONGER LIFE

Althen's Inductive technology is a major advance in displacement sensor design. Our displacement transducers have the simplicity of a potentiometer with the life of an LVDT/RVDT.

Our technology combines the best in fundamental inductive principles with advanced micro-electronic integrated circuit technology. An Althen sensor, based on simple inductive coils using Althen's ASIC control technology, directly measures absolute position giving a DC analogue output signal. Because there is no contact between moving electrical components, reliability is high and wear is eliminated for an exceptionally long life.

It also overcomes the drawbacks of LVDT technology – bulky coils, poor length-to-stroke ratio and the need for special magnetic materials, no requirement for separate signal conditioning.

We also offer a range of ATEX-qualified intrinsically-safe sensors.

a	b	С	d	
Displacer	nent Output	J	Z-code	
a Displacement			Value	
Factory set to any angle (e.g. 0-54°)	e from 0-16° (±8°) to	o 0-160° (±80°)	54	
b Output				
Supply V <sub>dc</sub> (tolerance	) 0	utput	Code	
+5V (4.5 - 5.5V)	+5V (4.5 - 5.5V) 0.5 - 4.5V (ratiometric with supply)			
±15V nom. (±9 - 28V)	±5V		В	
+24V nom. (13 - 28V)	0.5 - 9.5V		С	
±15V nom. (±13.5 - 28	V) ±10V		D	
+24V nom. (18 - 28V)	4 - 20mA (2 wii	re)	E	
+24V nom. (13 - 28V)	4 - 20mA (3 wii	4 - 20mA (3 wire Sink)		
+24V nom. (9 - 28V)	0.5 - 4.5V		G	
+24V nom. (13 - 28V)	4 - 20mA (3 wii	re Source)	н	
Supply Current: 'A' 10mA nominal, 12mA max. 'B', 'D' & 'G' 12mA nominal, 15mA max. 'E' 26mA max. 'F' & 'H' 32mA nominal, 35mA max.				
c Connections				
Connector IP67 4 pin M12 IEC 61076-2-101, nylon				
Connector IP67 4 pin M12 IEC 61076-2-101, nylon, pre-wired			Jxx	
Specify required cable length 'xx' in cm. e.g. J2000 specifies connecto with 20 m of cable.				
d Z-code (optional)			Code	

Output Characteristic - Standard





Output Characteristic - Reverse option





#### INSTALLATION INFORMATION

Output Option	Output Description	Supply Voltage: V <sub>s</sub> (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
А	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	≥ 5kΩ
В	±5V	±15V nom. (±9 - 28V)	≥ 5kΩ
С	0.5 - 9.5V	+24V nom. (13 - 28V)	≥ 5kΩ
D	±10V	±15V nom. (±13.5 - 28V)	≥ 5kΩ
E	4 - 20mA 2 wire Current Loop	+24V nom. (18 - 28V)	≈ 0 - 300Ω max. @24V ~ 1.2 to 6V across 300Ω {RL max. = ( $V_s$ - 18) / 20 <sup>-3</sup> }
F	4 - 20mA 3 wire Sink	+24V nom. (13 - 28V)	≈ 0 - 950Ω max. @24V ~ 3.8 to 19V across 950Ω {RL max. = (V <sub>s</sub> - 5) / 20 <sup>-3</sup> }
G	0.5 - 4.5V	+24V nom. (9 - 28V)	≥ 5kΩ
Н	4 - 20mA 3 wire Source	+24V nom. (13 - 28V)	≈ 0 - 300Ω max. ~ 1.2 to 6V across 300Ω

Connector Pinout (Front View) 'A', 'C', 'G' & 'H'













## MECHANICAL MOUNTING

Flange mounted - see drawing P603-11. **Note:** the sensor should be mounted on a vertical face.



INCORRECT CONNECTION PROTECTION LEVELS

A	Not protected – the sensor is not protected against either reverse polarity or over-voltage. The risk of damage should be minimal where the supply current is limited to less than 50mA.
B & D	Supply leads diode protected. Output must not be taken outside $\pm$ 12V.
C & G	Supply leads diode protected. Output must not be taken outside 0 to 12V.
E, F & H	Protected against any misconnection within the rated voltage.



#### OUTPUT CHARACTERISTIC

The sensor has full rotational freedom and two sectors, 180° apart, over which linear response can be achieved. At the mid point of the calibrated range the output signal will be half full scale deflection, the mounting flange will be vertical, mid point adjustment is achieved by rotating the sensor in the flange slots. In the calibrated range the output increases as the sensor is rotated in an anti-clockwise direction viewed from the flange face- see sketch above. The calibrated output is factory set to be between 15° and 160°.





**Note!** The M12 IEC connector does not rotate, the field wireable connector housing may be fitted in one of four positions for the purposes of convenient orientation of the connector and cable.

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The information provided herein is to the best of our knowledge true and accurate, it is provided for guidance only. All specifications are subject to change without prior notification. **Althen is the innovative sensor expert that creates integrated sensor and measurement solutions for the creators of tomorrow | althensensors.com** We create integrated sensor and measurement solutions. In addition we offer services such as calibration, repairs, design & engineering, training and renting of measurement equipment.

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APPROVED BY	<sup>rev</sup> H	-	Ţ	X X.X X.XX DIMS	±0.4 ±0.2 ±0.1 mm	
DESCRIPTION TIPS 603 TILT SENSOR					F	
<sup>SCALE</sup> 1:1 A3	DRAWING NU	mber • <b>] ]</b>		SHEET	1 OF 1	
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