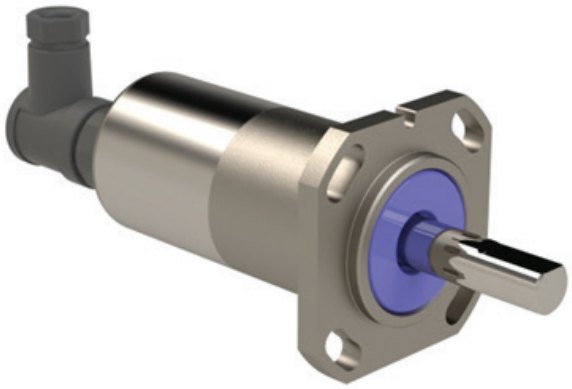
α P510

APPLICATION

- Radial Loads of up to 350N and axial loads of up to 250N
- Non-contacting inductive technology to eliminate wear
- High accuracy and stability
- Sealing to IP67



The P510 Rotary Inductive Position Sensor is an affordable, durable, high-accuracy rotary sensor designed for industrial and scientific feedback applications where the rotating shaft could be subjected to both axial and radial loading. The P510, like all Positek® sensors, is supplied with the output calibrated to the exact angle required by the customer, between 11 and 160 degrees.

The sensor provides a linear output proportional with input shaft rotation, which has full 360 degree rotational freedom. 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. The P510 has long service life and environmental resistance with a rugged stainless steel body and shaft. Environmental sealing is to IP67

SPECIFICATIONS

Dimensions[1]	
Body diameter	35 mm
Body Length (to seal face)	75 mm standard, 81.5 mm buffered
Mounting Flange	50 mm square
Shaft	32 mm Ø 10 mm g6
Independent Linearity	≤ ± 0.25% FSO @ 20°C - 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
Resolution	Infinite
Noise	< 0.02% FSO
Torque	< 50 mNm Static
Environmental Temperature Limits	
Operating	-40°C to +125°C standard -20°C to +85°C buffered
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
Shock	IEC 68-2-29: 40 g

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SPECIFICATIONS (CONTINUED)

MTBF	350,000 hrs 40°C Gf
Drawing List[2] **P510-11**	Sensor Outline

[1] *For full mechanical details see drawings P510-11*
[2] *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.

P510	.	a Displacement	b Output	c Adjustments	d Connections	e Option	f Z-code

a Displacement	**Value**
Factory set to any angle from 0-11° (±5.5°) to 0-160° (±80°) (e.g. 0-54 mm)	**54**

b Output		
Supply V_{dc} (tolerance)	**Output**	**Code**
+5V (4.5 - 5.5V)	0.5 - 4.5V (ratiometric with supply)	**A**
±15V nom. (±9 - 28V)	±5V	**B**
+24V nom. (13 - 28V)	0.5 - 9.5V	**C**
±15V nom. (±13.5 - 28V)	±10V	**D**
+24V nom. (18 - 28V)	4 - 20mA (2 wire)	**E**
+24V nom. (13 - 28V)	4 - 20mA (3 wire Sink)	**F**
+24V nom. (9 - 28V)	0.5 - 4.5V	**G**
+24V nom. (13 - 28V)	4 - 20mA (3 wire Source)	**H**

c Calibration Adjustments	**Code**
Accessible default	**blank**
Sealed	**Y**

d Connections	**Code**
Connector IP67 4 pin M12 IEC 61076-2-101, nylon	**J**
Connector IP67 4 pin M12 IEC 61076-2-101, nylon pre-wired	**Jxx**
Cable gland IP67 Pg9 metal	**Lxx**
Cable gland, short† IP67, metal	**Mxx**

Specify required cable length **'xx'** in cm. e.g. L2000 specifies axial cable gland with 20 m of cable, 50 cm supplied as standard.
†Nb: restricted cable pull strength.

e Shaft	**Code**
with Flat	**N**
with Key	**P**

f Z-code (optional)	**Code**
≤± 0.1% Independent Linearity FSO @20°C 0 - 100° max.	**Z650**

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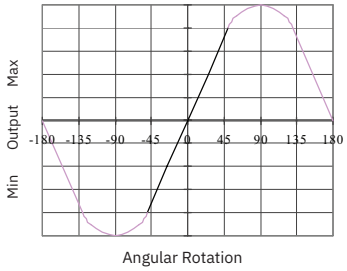
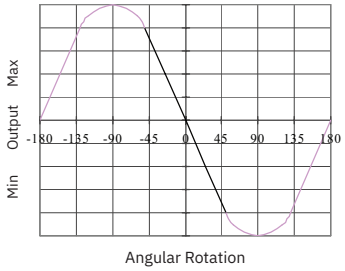
Output Characteristic - Standard



Output Characteristic - Reverse option



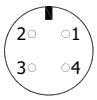
INSTALLATION INFORMATION

Output Option	Output Description	Supply Voltage: V_s (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
A	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	≥ 5kΩ
B	±5V	±15V nom. (±9 - 28V)	≥ 5kΩ
C	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^{-3}}
F	4 - 20mA 3 wire Sink	+24V nom. (13 - 28V)	≈ 0 - 950Ω max. @24V ~ 3.8 to 19V across 950Ω {RL max. = (V_s - 5) / 20^{-3}}
G	0.5 - 4.5V	+24V nom. (9 - 28V)	≥ 5kΩ
H	4 - 20mA 3 wire Source	+24V nom. (13 - 28V)	≈ 0 - 300Ω max. ~ 1.2 to 6V across 300Ω

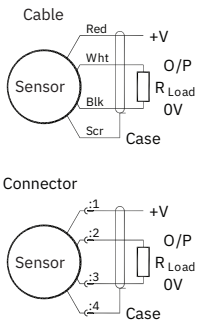
Not all output options available - see product datasheet for full options list

Connector Pinout (Front View)

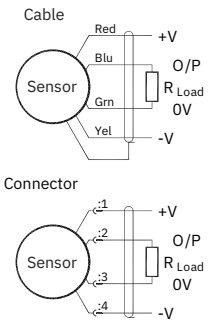
M12 IEC



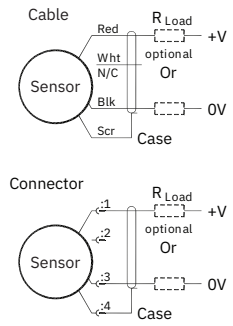
'A', 'C', 'G' & 'H'



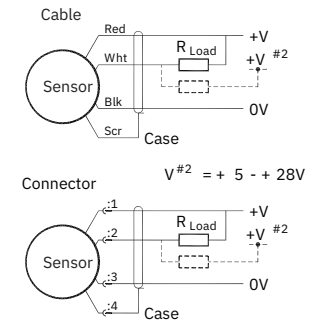
'B' & 'D'



'E'



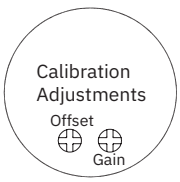
'F'



GAIN AND OFFSET ADJUSTMENT

(Where accessible - Typically ± 10% Min available)

To adjust the gain or offset use a small potentiometer adjuster or screwdriver 2mm across. Do not apply too much force on the potentiometers. The offset is set at mid span at the mid point, within ±5°, of rotation.



MECHANICAL MOUNTING

Flange mounted - see drawing P510-11. The maximum axial shaft loading of 250N and radial loading of 350N. Tests indicate that life in excess of 80 million cycles can be achieved at maximum side and end loading.

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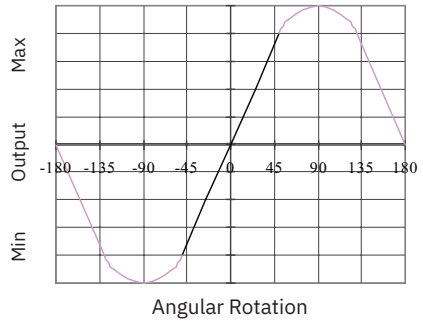
OUTPUT CHARACTERISTIC

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, and the flat / key on the shaft is aligned with the registration mark in the flange. In the calibrated range the output increases as the shaft is rotated in an anti-clockwise direction viewed from the shaft. The calibrated output is factory set to be between 11 and 160°.

Standard Output Characteristic



WARNING

The M12 IEC connector may be rotated for purposes of convenient orientation of the connector and cable, however rotating the connector more than one complete revolution is not recommended. **Repeated rotation of the connector will damage the internal wiring!**

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 ± 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.

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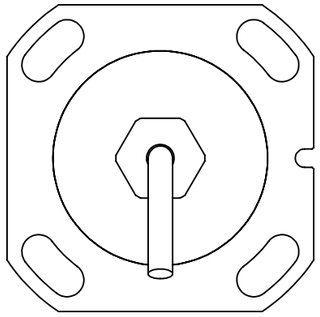
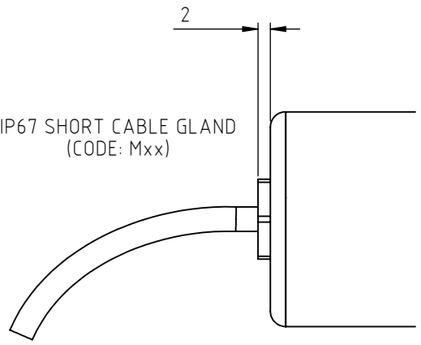
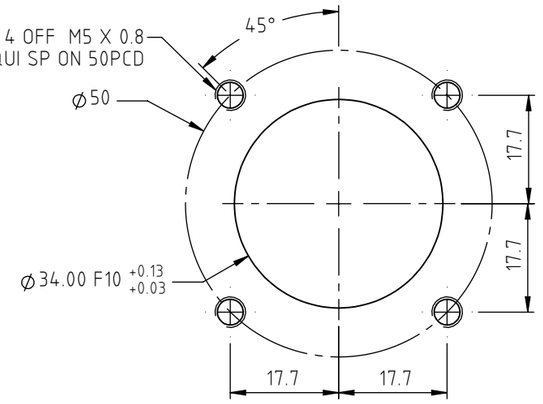
GAIN AND OFFSET ADJUSTMENTS
SEALED (CODE:Y)







MOUNTING INFORMATION

ELECTRICAL OPTIONS/ SPECIFICATIONS

OUTPUT	SUPPLY (NOM.)	
'A' 0.5 - 4.5V RATIOMETRIC	5V	— STANDARD
'B' ±5V	±15V	
'C' 0.5 - 9.5V	24V	
'D' ±10V	±15V	
'G' 0.5 - 4.5V	24V	
SUPPLY CURRENT 12mA TYP. 20mA MAX.		
'E' 4 TO 20mA 2-WIRE	24V (18V MIN.)	
'F' 4 TO 20mA SINK†	24V	
'H' 4 TO 20mA SOURCE‡	24V	

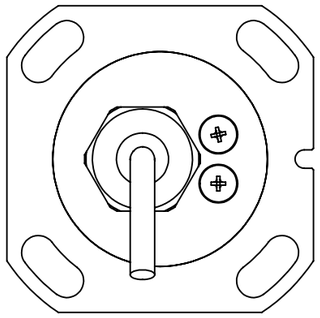
† OUTPUT COMPLIANCE 5-28V
‡ DRIVE 300Ω MAXIMUM TO 0V

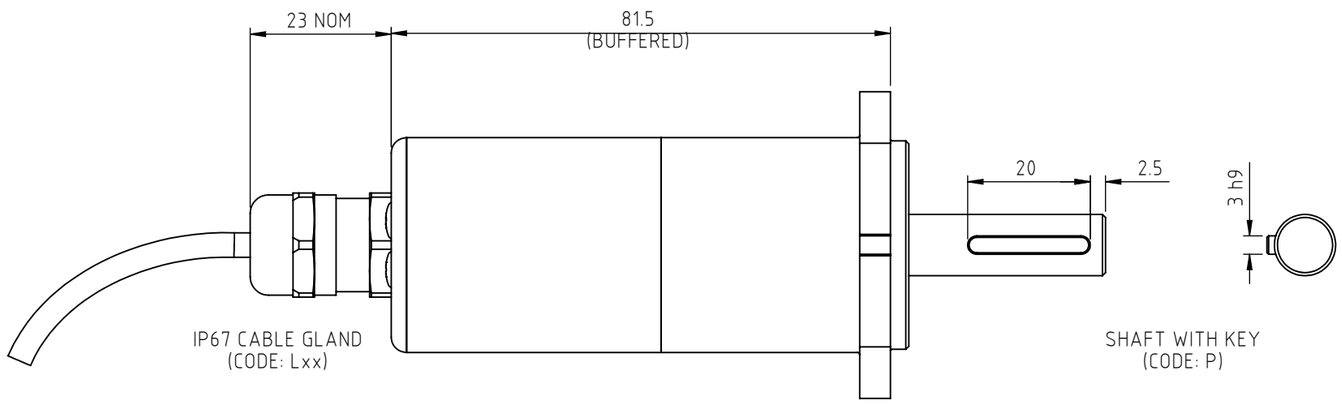
CONNECTIONS;	CABLE 3-CORE	CABLE 4-CORE	CONNECTOR
+Ve	RED	RED	:1
0V	BLACK	GREEN	:3
-Ve	-	YELLOW	:4 O/P 'B' & 'D'
OUTPUT	WHITE	BLUE	:2
BODY	SCREEN	SCREEN	:4 NOT O/P 'B' & 'D'

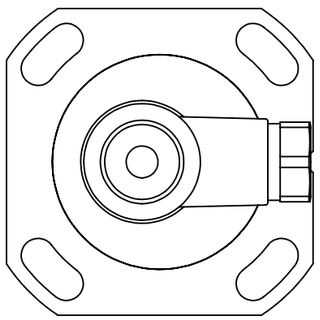
CABLE; 0.2mm², O/A SCREEN, PUR JACKET. O/D; 3-CORE: Ø4mm, 4-CORE: Ø4.6mm,
SUPPLIED WITH 50cm OR REQUIRED LENGTH IN cm. e.g. 'L50'
CONNECTORS; MAXIMUM CONDUCTOR CROSS SECTION 0.25mm²

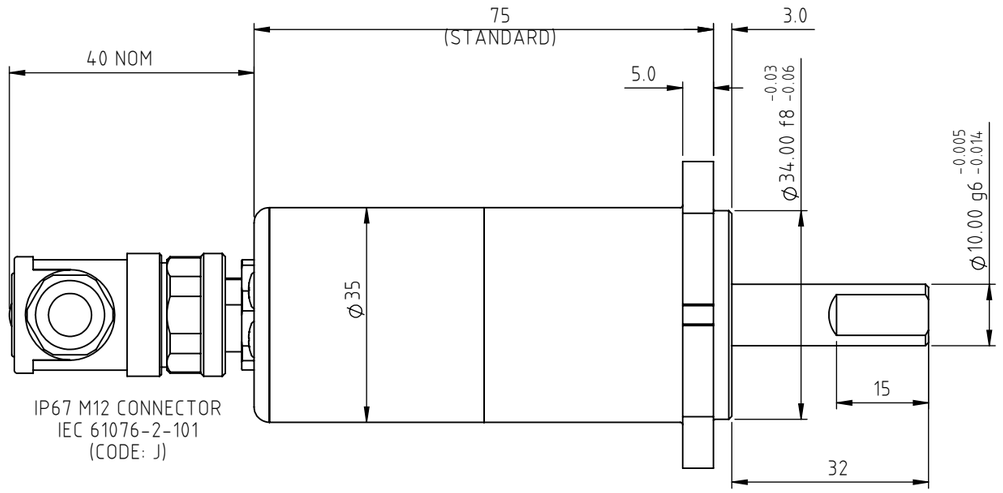
RANGE OF DISPLACEMENT FROM 0-16° TO 0-160° e.g.76°
IN INCREMENTS OF 1°
BODY MATERIAL:- STAINLESS STEEL.

MAXIMUM SHAFT LOAD: AXIAL 250N, RADIAL 350N

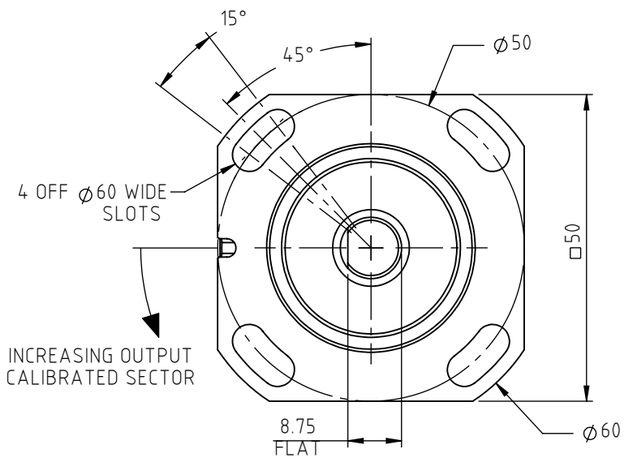








SHAFT FLAT/KEY ALIGNED WITH REFERENCE
MARK IN BASE AT MID TRAVEL ±5°



DRAWINGS NOT TO BE CHANGED WITHOUT REFERENCE TO THE CHANGE PROCEDURE.
CHANGES TO PARTS USED IN INTRINSICALLY SAFE PRODUCT MUST BE APPROVED BY THE AUTHORISED PERSON.
THIS IS AN UNCONTROLLED PRINT AND WILL NOT BE UPDATED.

REV	CHANGE HISTORY	DR'WN	DATE	CHK'D
A	FIRST RELEASE	ASC	13/01/2022	ASC

APPROVED BY	REV		
RDM	A		X ±0.4 X.X ±0.2 X.XX ±0.1 DIMS mm

DESCRIPTION
HIGH SHAFT LOADING ROTARY SENSOR

SCALE	DRAWING NUMBER
1:1 A3	P510-11 SHEET 1 OF 1