N.B. CONNECTOR ORIENTATION NOT GUARENTEED

ELECTRICAL OPTIONS/ SPECIFICATIONS

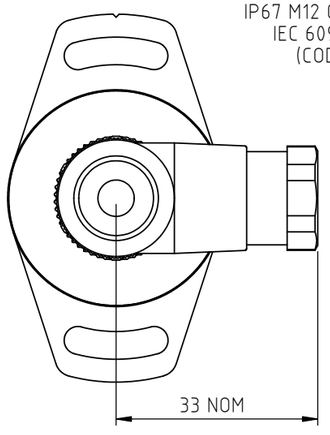
OUTPUT	SUPPLY (NOM.)	
'A' 0.5 - 4.5V RATIOMETRIC	5V	STANDARD
'B' ±5V	±15V	BUFFERED
'C' 0.5 - 9.5V	24V	
'D' ±10V	±15V	
'G' 0.5 - 4.5V	24V	
SUPPLY CURRENT 12mA TYP. 20mA MAX.		
'E' 4 TO 20mA 2-WIRE	24V (18V MIN.)	
'F' 4 TO 20mA SINK[1]	24V	
'H' 4 TO 20mA SOURCE[2]	24V	

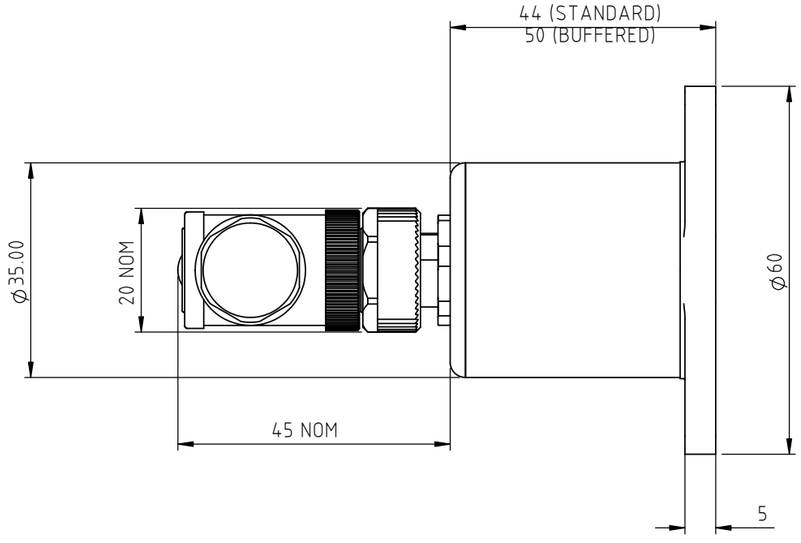
[1] OUTPUT COMPLIANCE 5-28V
[2] DRIVE 300Ω MAXIMUM TO 0V

CONNECTOR (MAXIMUM CONDUCTOR CROSS SECTION 0.75mm²)
:1 +Ve
:3 0V
:4 -Ve (OPTIONS B & D)
:2 OUTPUT
:4 BODY (OPTIONS A,C,E,F,G & H)

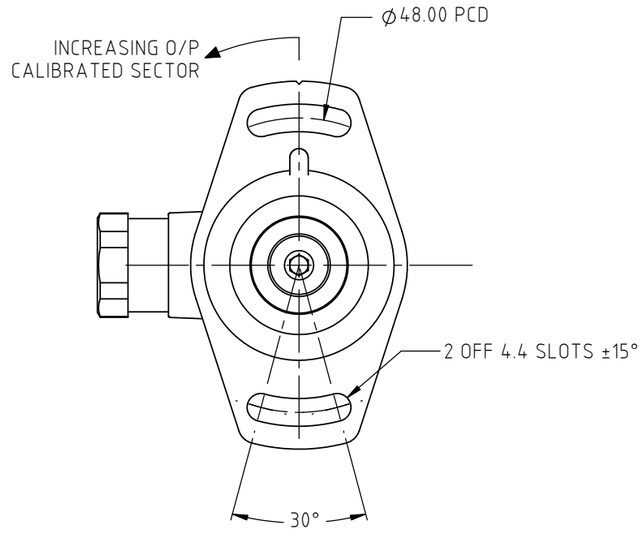
RANGE OF DISPLACEMENT: 0-10° TO 0-160° IN INCREMENTS OF 1°

BODY MATERIAL:- STAINLESS STEEL.
FLANGE BASE MATERIAL:- ALUMINIUM





MID TRAVEL, ±5° WITH REFERENCE MARK
IN BASE IN VERTICAL POSITION



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
H	MEASURING RANGE TO INCLUDE LOW ANGLE 0-10° RAN1343	ASC	10/08/2021	-

Positek

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

DESCRIPTION
TIPS 603 TILT SENSOR

SCALE	DRAWING NUMBER
1:1	P603-11
A3	SHEET 1 OF 1

P603 LARGE ANGLE TILT SENSOR

High-resolution tilt feedback for industrial and scientific applications

- **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**



As a leading designer and manufacturer of linear, rotary, tilt and intrinsically safe position sensors, Positek® 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 Positek® 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.

SPECIFICATION

Dimensions	
Body Diameter	35 mm
Flange Diameter	60 mm
Body Length (to seal face)	44 mm standard, 50 mm buffered
For full mechanical details see drawing P603-11	
Independent Linearity/Hysteresis (combined error)	< ± 0.25° - up to 100°
Temperature coefficients	< ± 0.01%/°C Gain & < ± 0.01%FS/°C Offset
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
Shock	IEC 68-2-29: 40 g
MTBF	350,000 hrs 40°C Gf
Drawing List	
P603-11	Sensor Outline

3D models, step or .igs format, available on request.

Do you need a position sensor made to order to suit a particular installation requirement or specification? We'll be happy to modify any of our designs to suit your needs - please contact us with your requirements.

For further information please contact:
www.positek.com sales@positek.com
Tel: +44(0)1242 820027 fax: +44(0)1242 820615
Positek, Andoversford Industrial Estate, Cheltenham GL54 4LB. U.K.

P603 LARGE ANGLE TILT SENSOR

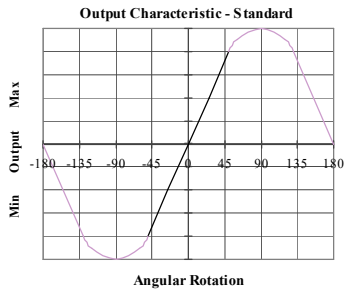
High-resolution tilt feedback for industrial and scientific applications

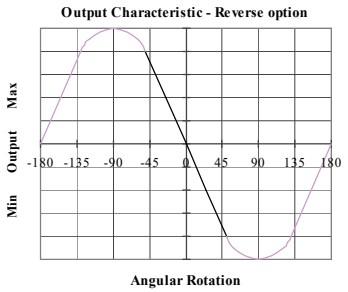
How Positek's technology eliminates wear for longer life

Positek'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. A Positek sensor, based on simple inductive coils using Positek'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.

P603 .	a	b	c	d
	Displacement	Output	J	Z-code

a **Displacement**		**Value**
Factory set to any angle from 0-16° (±8°) to 0-160° (±80°) (e.g. 0-54°)		**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**
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**		**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**
Specify required cable length **'xx'** in cm. e.g. J2000 specifies connector with 20 m of cable.		
d **Z-code** (optional)		**Code**





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Positek, Andoversford Industrial Estate, Cheltenham GL54 4LB. U.K.

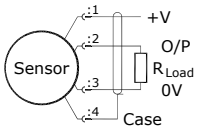
Installation Information
P603 LARGE ANGLE TILT SENSOR

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 {R_L 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 {R_L 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

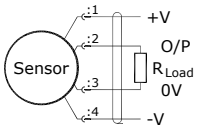
Connector Pinout
(Front View)



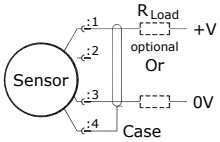
'A', 'C', 'G' & 'H'



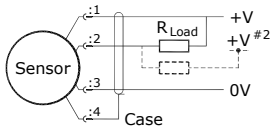
'B' & 'D'



'E'

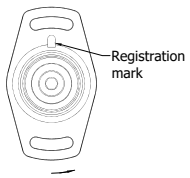


'F'

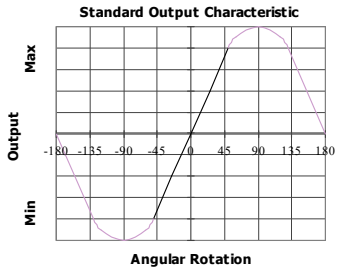


$V^{\#2}$ = +5 - +28V

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



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.

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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