


RIPS® X500 ROTARY SENSOR

INTRINSICALLY SAFE FOR HAZARDOUS GAS/VAPOUR ATMOSPHERES

- Intrinsically safe for Gas to:
 II 1G
- Non-contacting inductive technology to eliminate wear
- Angle set to customer's requirement
- Compact, durable and reliable
- High accuracy and stability
- Sealing to IP65/IP67 as required




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 X500 RIPS® (Rotary Inductive Position Sensor) is ATEX approved for use in potentially explosive gas/vapour atmospheres. It is designed for industrial and scientific feedback applications and is ideal for OEMs seeking good sensor performance for arduous applications in hazardous areas. The X500, like all Positek sensors, is supplied with the output calibrated to the angle required by the customer, between 20 and 160 degrees and with full EMC protection built in. The sensor provides a linear output proportional with angle of rotation. There is a machined registration mark to identify the calibrated mid point.

Overall performance, repeatability and stability are outstanding over a wide temperature range. The X500 has long service life and environmental resistance with a rugged stainless steel body and shaft. The flange or servo mounting options make the sensor easy to install, it also offers a range of mechanical options. Environmental sealing is to IP65 or IP67 depending on selected cable or connector options.

SPECIFICATION


DIMENSIONS	
Body diameter	35 mm
Body Length (to seal face)	44 mm
Shaft	15mm Ø 6mm
<i>For full mechanical details see drawing X500-11</i>	
Independent linearity	< ± 0.25% FSO for 100° travel @ 20°C
Temperature coefficients	< ± 0.01%/°C Gain & < ± 0.01%FS/°C Offset
Typical overall accuracy	< ± 0.5% FSO
Frequency response	> 10 KHz (-3dB)
Resolution	Infinite
Noise	< 0.02% FSO
Torque	<20 mNm Static
Intrinsic Safety	 II 1G EEx ia IIC T4 (Ta = -40°C to +80°C)
maximum limits	Ui: 11.4V, Ii: 0.46A, Pi: 0.51W.
Environmental Temperature Limits	
Operating	-40 to +80°C
Storage	-40 to +125°C
Sealing	IP65/IP67 depending on connector / cable option
EMC Performance	EN 61000-6-2, EN 61000-6-3
Vibration	IEC 68-2-6: 10g
Shock	IEC 68-2-29: 40 g
MTBF	350,000 hrs 40°C Gf
Drawing List	
X500-11	Sensor Outline
<i>Drawings, in AutoCAD® dwg or dxf format, available on request.</i>	

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.

RIPS® X500 ROTARY SENSOR

INTRINSICALLY SAFE FOR HAZARDOUS GAS/VAPOUR ATMOSPHERES

Intrinsically safe equipment is defined as "equipment which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmosphere mixture in its most easily ignited concentration."

ATEX approved to  II 1G EEx ia IIC T4 (Ta = -40°C to +80°C)

Designates the sensor as belonging to; Group II: suitable for all areas **except mining**, Category 1 G: can be used in areas with continuous, long or frequent periods of exposure to hazardous gas (Zone 0).

Protection class ia, denotes intrinsically safe for all zones
 Apparatus group IIC: suitable for IIA to IIC explosive gas.
 Temperature class T4: maximum sensor surface temperature under fault conditions 135°C.
 Ambient temperature range extended to -40°C to +80°C.

Positek intrinsically safe sensors are designed to be used with a galvanically isolated barrier with safety parameters not exceeding:-

Ui: 11.4V, Ii: 0.46A, Pi: 0.51W.

Sensor can be installed with a cable length up to 150m maximum from the barrier, capacitance and inductance can be up to:-

Capacitance: 550 nF max, Inductance: 99 µH max.

Approved barriers are available from Positek®; there is a choice of 0.5-9.5V or 4-20mA transmission outputs.

0.5-9.5V barrier option - BX002.

4-20mA barrier option - BX003.

ATEX approved sensors suitable for dust (E series) and mining (M series) applications, are also available from Positek.

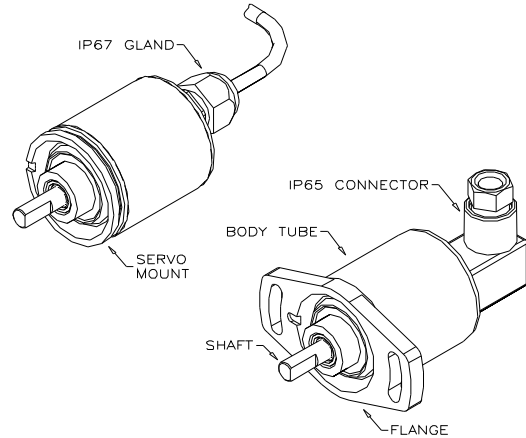


TABLE OF OPTIONS

MEASUREMENT RANGE: Factory-set to any angle from ±10° to ±80° in increments of 1 degree.
 Full 360° Mechanical rotation.

ELECTRICAL INTERFACE OPTIONS

A galvanic isolation barrier is required to meet IS approval - 0.5-9.5V or 4-20mA options, see barrier data sheet overleaf.

Option for output signal 'zero' and 'span' adjustment available.

CONNECTOR/CABLE OPTIONS

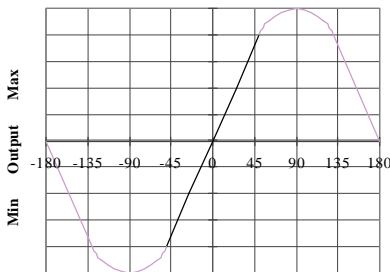
Connector - Hirschmann GD series IP65
 Cable with M12 gland or short gland IP67

Cable length >50cm – please specify length in cm up to 15000cm maximum.

MOUNTING OPTIONS

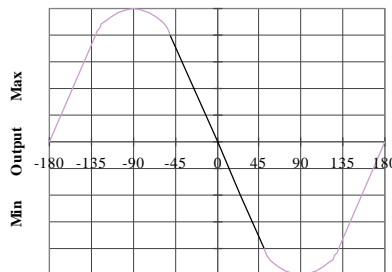
Flange 2 off 4.5 mm x 30 degree wide slots, 48 mm PCD.
 Servo 2 mm wide groove, internal diameter 31.8 mm.

Output Characteristic - Standard



Angular Rotation

Output Characteristic - Reverse option



Angular Rotation

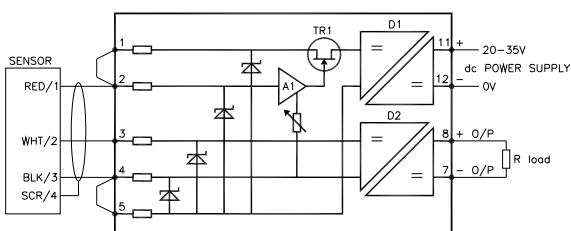
INTRINSICALLY SAFE BX002 and BX003 Sensor Barrier

Intrinsic safety means limiting the electrical energy in a system to a level incapable of causing ignition in any normal or fault condition. This can only be accomplished by installing an energy-limiting interface in the wiring between hazardous and non-hazardous areas.

Limiting the discharge of energy-stored devices in electrical equipment such as capacitors and inductors virtually eliminates the possibility of generating a spark and thus a source of ignition.

The BX002 (0.5 to 9.5V) and BX003 (4 to 20mA) Isolated Galvanic Barriers are the best choice for use with Positek Intrinsically Safe Position Sensors. The hazardous area circuits are certified intrinsically safe [EEx ia] IIC. Connections between hazardous and non-hazardous areas are transformer isolated, eliminating the requirement for a high-integrity intrinsically safe earth.

Choosing either a BX002 or BX003 barrier not only provides signal isolation but allows sensors to be calibrated to a specific barrier type before shipping, ensuring the respective barrier output corresponds to the sensor position over the calibrated range. The isolated power circuit limits the energy supply to the sensor to ensure the maximum safety parameters required for Positek sensors are not exceeded.



How it works; a 20-35V dc external power supply is connected to the dc/dc converter D1 which provides isolation. The output from D1 is regulated by A1 and TR1 to provide a nominal 5V supply for the sensor. The barrier and sensor can be connected by three wires; 5-wire connection capability is available to compensate for volts drop in long cable runs. D2 provides isolation between the sensors output and the barriers 0.5-9.5V or 4-20mA current loop output.

- ATEX approved
- Tri-port isolated
- DIN rail mounted
- Voltage and current output versions



SPECIFICATION

POWER SUPPLY
 Voltage 20-35V dc
 Power consumption ca. 0.7W for voltage output, 1.4W current output

INPUT CIRCUIT (terminals 1,2,3,4,5)
 Transformer isolated
 Intrinsically Safe [EEx ia] IIC
 BAS00ATEX7171
 U_{max} out = 10.4V
 I_{max} out = 46mA
 ca. 4.8 volts
 Lead resistance for 15mA 12Ω maximum (all connections)
 Input resistance terminal 3 17MΩ min

OUTPUT CIRCUIT (terminals 7/8)
 Output options
 Voltage BX002 0.5 to 9.5V
 Output resistance < 30Ω
 Current loop BX003 4 to 20mA
 Load resistance 0 - 1kΩ

TRANSFER CHARACTERISTICS
 Non-linearity: < ± 5mV for voltage outputs
 < ± 10μ A for current outputs
 Temperature drift: < 0.5mV/°C for voltage outputs
 < 1μA/°C for current outputs
 Settling time to 1% of span: < 25ms for 10-90% step change
 Rise time: < 8ms 10-90% of step change
 Bandwidth dc to 100Hz (-3dB)
 Isolation: 2500V between safe area terminals and hazardous area terminals, 50V between power rail terminals and output terminals (7 and 8)

ELECTROMAGNETIC COMPATIBILITY
 Emissions: to EN50081-2
 Immunity: to EN50082-2
 Ambient temperature range: -20° to 60°C working, -40°C to +100°C storage
 Protection class IP20