



α P500
ROTARY SENSOR

High-resolution angle feedback for industrial and scientific applications

FEATURES

- 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



P500-17r

As a leading designer and manufacturer of linear, rotary, tilt and intrinsically safe position sensors, we have the expertise to supply a sensor to suit a wide variety of applications. Our P500 RIPS® (Rotary Inductive Position Sensor) is an affordable, durable, high-accuracy rotary sensor designed for industrial and scientific feedback applications.

The P500, sensors, is supplied with the output calibrated to the angle required by the customer, between 16 and 160 degrees and with full EMC protection built in. The sensor provides a linear output proportional with input shaft rotation. 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 P500 has long service life and environmental resistance with a rugged stainless steel body and shaft, the flange and servo mounts are anodised aluminium. The flange or servo mounting options make the sensor easy to install, it also offers a range of mechanical and electrical 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 standard, 50 mm buffered
 Shaft 15 mm Ø 6 mm
 For full mechanical details see drawing P500-11

Independent Linearity $\leq \pm 0.25\%$ FSO @ 20°C - up to 100°
 $\leq \pm 0.1\%$ FSO @ 20°C * available upon request.
 *Sensors with calibrated travel up to 100°.

Temperature Coefficients $< \pm 0.01\%$ /°C Gain &
 $< \pm 0.01\%$ FS/°C Offset

Frequency response > 10 kHz (-3dB)
 > 300 Hz (-3dB) 2 wire 4 to 20 mA

Resolution Infinite

Noise $< 0.02\%$ FSO

Torque < 20 mNm Static

Environmental Temperature Limits

Operating -40°C to +12.5°C standard
 -20°C to +85°C buffered
 Storage -40°C to +12.5°C

Sealing IP65/IP67 depending on connector / cable option

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

P500-11 Sensor Outline
 Drawings, in AutoCAD® dwg or dxf 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.



PIPS® technology eliminates wear for longer life

PIPS® technology is a major advance in displacement sensor design. PIPS®-based displacement transducers have the simplicity of a potentiometer with the life of an LVDT/RVDT.

PIPS® technology combines the best in fundamental inductive principles with advanced micro-electronic integrated circuit technology. A PIPS® sensor, based on simple inductive coils using 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.

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

Our LIPS® range are linear sensors, while RIPS® are rotary units and TIPS® are for detecting tilt position. Ask us for a full technical explanation of PIPS® technology.

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

TABLE OF OPTIONS

CALIBRATED TRAVEL: Factory-set to any angle from $\pm 8^\circ$ to $\pm 80^\circ$ in increments of 1 degree.
Full 360° Mechanical rotation.

ELECTRICAL INTERFACE OPTIONS

OUTPUT SIGNAL	SUPPLY INPUT	OUTPUT LOAD
Standard:		
0.5-4.5V dc ratiometric	+5V dc nom. \pm 0.5V.	5k Ω min.
Buffered:		
0.5-4.5V dc	+24V dc nom. + 9-28V.	5k Ω min.
\pm 5V dc	\pm 15V dc nom. \pm 9-28V.	5k Ω min.
0.5-9.5V dc	+24V dc nom. + 13-28V.	5k Ω min.
\pm 10V dc	\pm 15V dc nom. \pm 13.5-28V.	5k Ω min.
Supply Current	10 mA typical, 20mA maximum.	
4-20mA (2 wire)	+24 V dc nom. + 18-28V.	300 Ω @ 24V.
(3 wire sink)	+24 V dc nom. + 13-28V.	950 Ω @ 24V.
(3 wire source)	+24 V dc nom. + 13-28V.	300 Ω max.

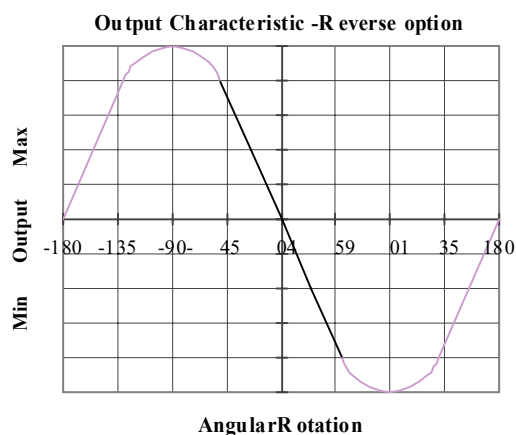
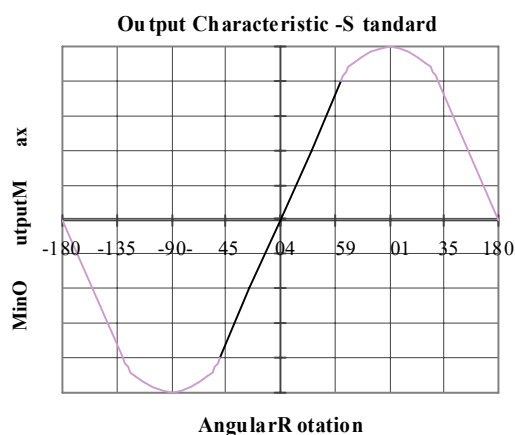
Sensors supplied with access to output 'zero' and 'span' calibration adjustments as standard. No access option available.

CONNECTOR/CABLE OPTIONS

Connector - Hirschmann GD series IP65
Cable with M12 gland or short gland IP67
Cable length >50 cm – please specify length in cm

MOUNTING OPTIONS

Flange, Servo.





HOW TO ORDER



P500 . Displacement Output Adjustments Connections Option Option Z-code

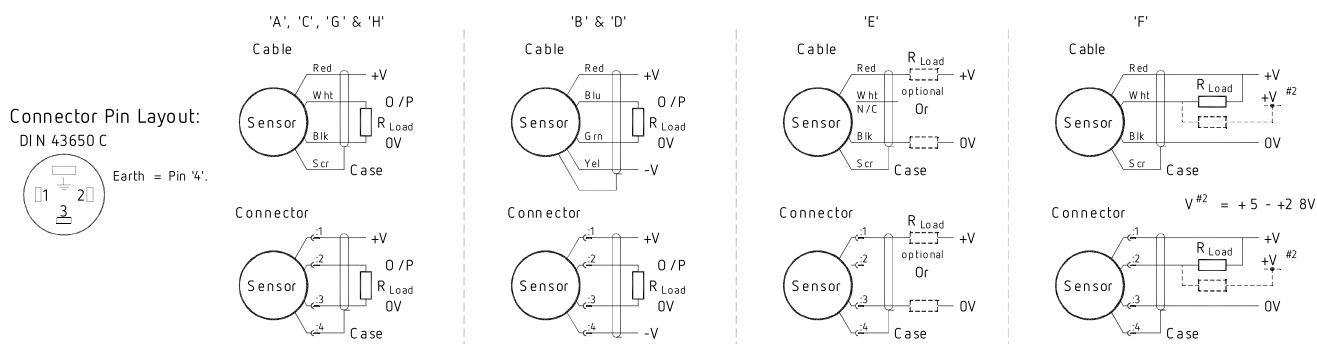
a Displacement (degrees)		Value
Displacement in degrees e.g. 0 - 54 degrees		54
b Output		
Supply V dc V _s (tolerance)	Output	Code
+5V (4.5 - 5.5V)	0.5 - 4.5V (ratiometric with supply)	A
±15V nom. (±9 - 28V)	±5V	B
+24V nom. (13 - 28V)	0.5 - 9.5V	C
±15V nom. (±13.5 - 28V)	±10V	D
+24V nom. (18 - 28V)	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 Cable* or Connector		Code
Connector	IP65 DIN 43650 'C'	J
Cable Gland	IP67 M12	Lxx
Cable Gland	IP67 Short	Mxx
*Supplied with 50 cm as standard, specify required cable length specified in cm. e.g. L2000 specifies cable gland with 20 metres of cable. Nb: restricted cable pull strength.		
e Shaft Option		Code
None		blank
Sprung to stop	Up to 100° maximum	N
f Sensor Mounting		Code
Flange - default	Aluminium	blank
Servo Mount	Aluminium	P
g Z-code		Code
Connector IP67 M12 IEC 60947-5-2 must have options 'Y' & 'J'		Z600
Connector IP67 M12 IEC 60947-5-2 must have option 'J'		Z601
≤± 0.1% @2.0°C Independent Linearity displacement up to 100 degrees only!		Z650
Connector with cable option 'J' with length required in cm i.e. J500 specifies connector with 500cm of cable.		Z999



INSTALLATION INFORMATION

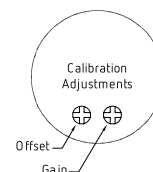
Output Option	Output Description:	Supply Voltage: V_s (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
A	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	$\geq 5k\Omega$
B	$\pm 5V$	$\pm 15V$ nom. ($\pm 9 - 28V$)	$\geq 5k\Omega$
C	0.5 - 9.5V	+24V nom. (13 - 28V)	$\geq 5k\Omega$
D	$\pm 10V$	$\pm 15V$ nom. ($\pm 13.5 - 28V$)	$\geq 5k\Omega$
E	4 - 20mA 2 wire Current Loop	+24V nom. (18 - 28V)	$\approx 0 - 300\Omega$ max. (@24V ~ 1.2 to 6V across 300 Ω { R_L max. = $(V_s - 18) / 20^{-3}$ }
F	4 - 20mA 3 wire Sink	+24V nom. (13 - 28V)	$\approx 0 - 950\Omega$ max. (@24V ~ 3.8 to 19V across 950 Ω { R_L max. = $(V_s - 5) / 20^{-3}$ }
G	0.5 - 4.5V	+24V nom. (9 - 28V)	$\geq 5k\Omega$
H	4 - 20mA 3 wire Source	+24V nom. (13 - 28V)	$\approx 0 - 300\Omega$ max. ~ 1.2 to 6V across 300 Ω

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



Gain and Offset Adjustment: (Where accessible - Typically $\pm 10\%$ 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 $\pm 5^\circ$, of rotation.

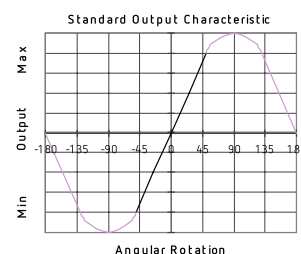


Mechanical Mounting:

Flange mounted or servo mount, with appropriate clips, options. The flange slots are 4.5mm by 30 degrees wide on a 48mm pitch. The sensor should be mounted with minimal axial and radial loading on the shaft for optimum life. It is recommended that the shaft is coupled to the drive using a flexible coupling. Tests indicate that life in excess of 16 million cycles can be achieved with 1kg side and end load.

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 on the shaft is aligned with the registration mark in the base of the sensor. 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 16 and 160°.



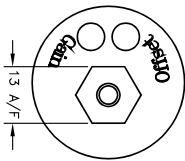
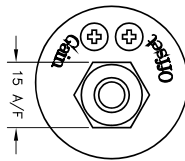
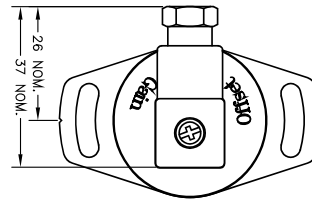
Incorrect Connection Protection levels:-

- 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 12 V.
- E, F & H Protected against any misconnection within the rated voltage.



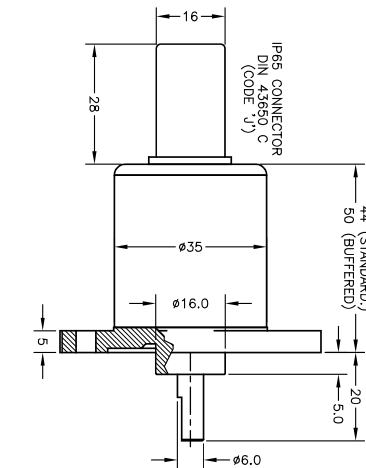
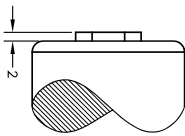


ELECTRICAL OPTIONS / SPECIFICATIONS

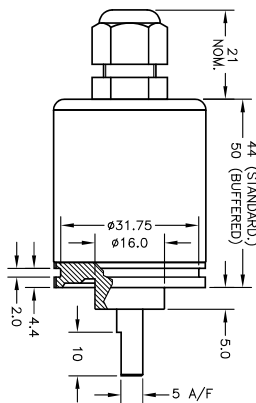


GAIN AND OFFSET ADJUSTMENTS
SEALED (CODE 'Y')

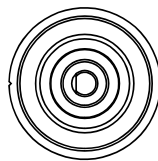
IP67 SHORT CABLE GLAND
- AXIAL (CODE 'Mx')



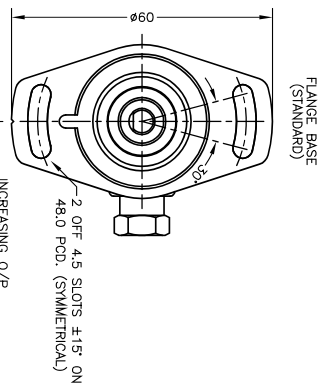
IP67 CABLE GLAND
(CODE 'Lx')



SERVO MOUNT
(CODE 'P')



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



FLANGE BASE
(STANDARD)

N	ELEC. OPTIONS AMENDED.	PDM
O	FLANGE THICKNESS ADDED.	PDM
P	ADDITIONAL DIMENSIONS ADDED.	PDM
Q	DISP. 16 TO 160° WAS 20 TO 160° RA4442	PDM
R	RANGE NOTE AMENDED - RAN1200	PDM



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

N	18/10/06	CHECKED BY	X X	±0.4
O	05/07/10	RDS	X X	±0.1
P	06/07/11			
Q	07/11/13	DESCRIPTION		
R	11/09/17	P500 HPS ROTARY SENSOR		

SCALE	10mm
DRAWING NUMBER	P500-11
SHEET	1 of 1
REV	R

ELECTRICAL OPTIONS / SPECIFICATIONS		OUTPUT OPTION	
A	0.5 TO 4.5V RATIO-METRIC	5V	STANDARD
B	±5V TO 9.5V	±1.5V	
C	±10V	2.4V	
D	±10V	±1.5V	
E	0.5 TO 4.5V	2.4V	BUFFERED
F	SUPPLY CURRENT 12mA TYP.	20mA MAX.	
G	4 TO 20mA 2-WIRE SINK	2.4V	
H	4 TO 20mA 3-WIRE SOURCE	2.4V	

SINK VERSION OUTPUT COMPLIANCE 5-28V
SOURCE VERSION DRIVE 5000 MAX TO 0V
CABLE: 0.2mm² O/A SCREEN, PUR JACKET - SUPPLIED
WITH 50cm OR REQUIRED LENGTH IN cm. e.g. 1.50
2-CORE: JACKET Ø4mm
CABLE/CONNECTORS* CONNECTORS:
3 CORE: 4 CORE
RED GREEN YELLOW
BLACK GREEN YELLOW
WHITE BLUE GREEN
SCREEN SCREEN
*CONNECTORS: MAXIMUM CONDUCTOR CROSS SECTION 0.75mm²
RANGE OF DISPLACEMENT FROM 0-16° TO 0-160° e.g. 76°
IN INCREMENTS OF 1°.
BODY MATERIAL: - STAINLESS STEEL.
FLANGE BASE MATERIAL: - ALUMINIUM.
SERVO MOUNT MATERIAL: - ALUMINIUM.
FURTHER OPTIONS:
SPRING RETURN (CODE 'N') AVAILABLE UP TO ±80°
CALIBRATED OUTPUT. PHYSICAL STOPS ±5°
NOTE STANDARD DEVICE HAS NO STOPS.

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.

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Althen stands for pioneering measurement and custom sensor solutions. In addition we offer services such as calibration, design & engineering, training and renting of measurement equipment.

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