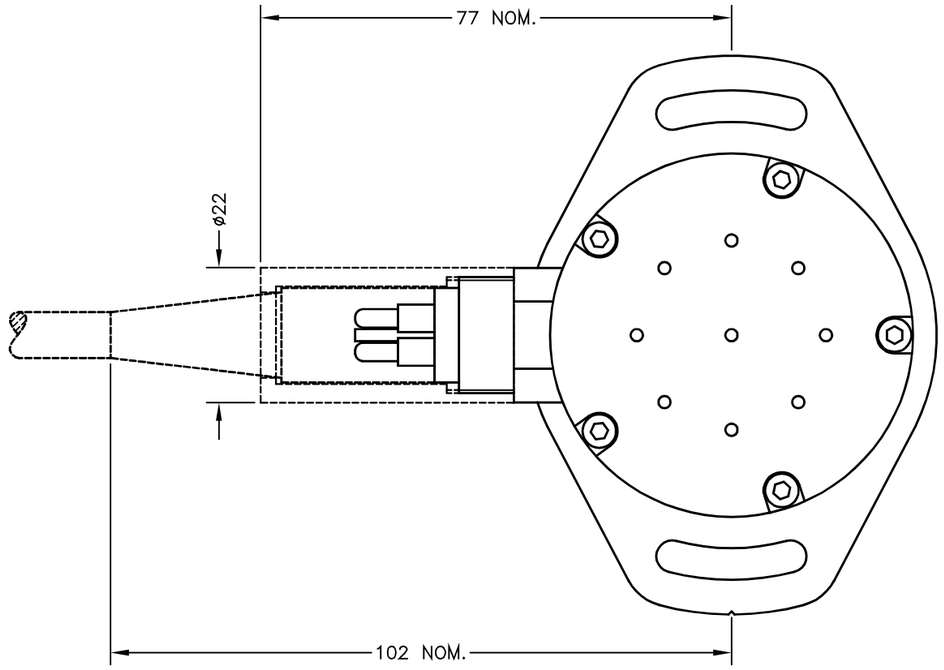
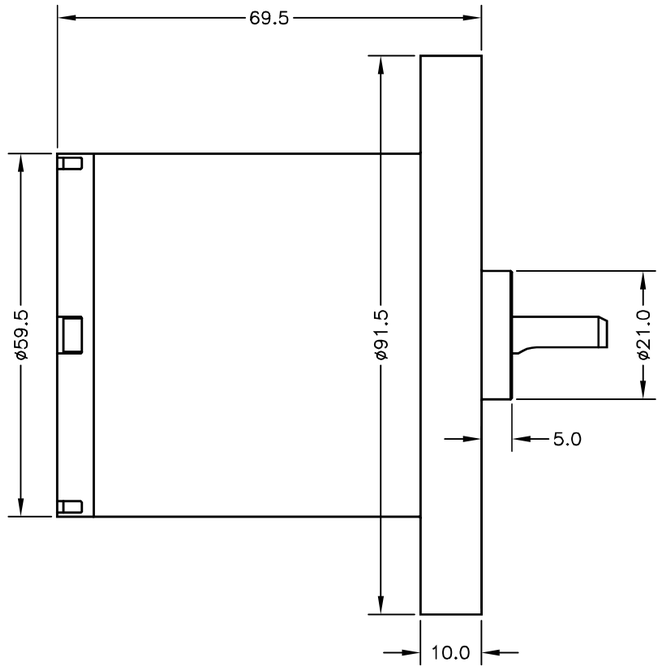
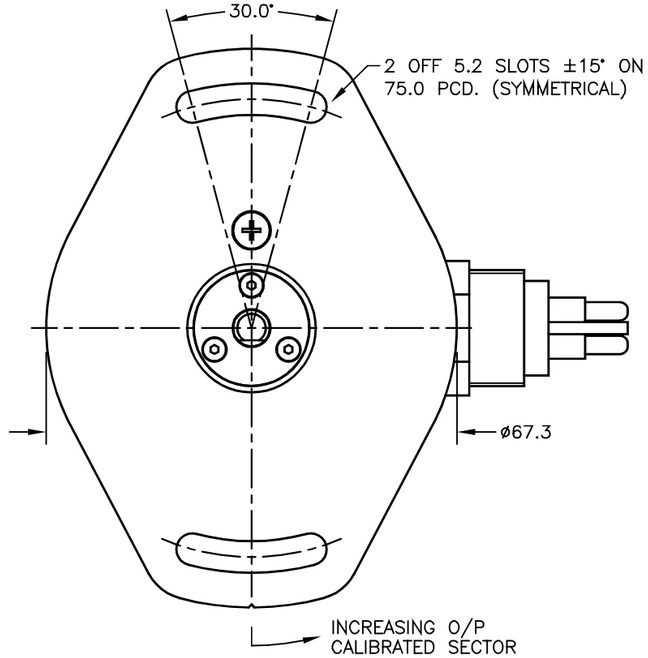
CONNECTORS; WETMATE, 4–POLE.
BULKHEAD: MC–BH–4–M–SS, STAINLESS STEEL/MOLDED NEOPRENE, SEALING; 340 BAR OPEN FACE, 600 BAR MATED.
IN–LINE: MC–IL–4–F, MOLDED NEOPRENE WITH CABLE. LOCKING SLEEVE; MCDLS–F, DELRIN.







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

ELECTRICAL OPTIONS/ SPECIFICATIONS

OUTPUT OPTION		OUTPUT	SUPPLY	
	A	0.5 TO 4.5V RATIOMETRIC	5V	STANDARD
	B	±5V	±15V	BUFFERED
	C	0.5 TO 9.5V	24V	
	D	±10V	±15V	
	G	0.5 TO 4.5V	24V	
		SUPPLY CURRENT 12mA TYP. 20mA MAX.		
	E	4 TO 20mA 2–WIRE	24V	
	F	4 TO 20mA 3–WIRE SINK	24V	
	H	4 TO 20mA 3–WIRE SOURCE	24V	

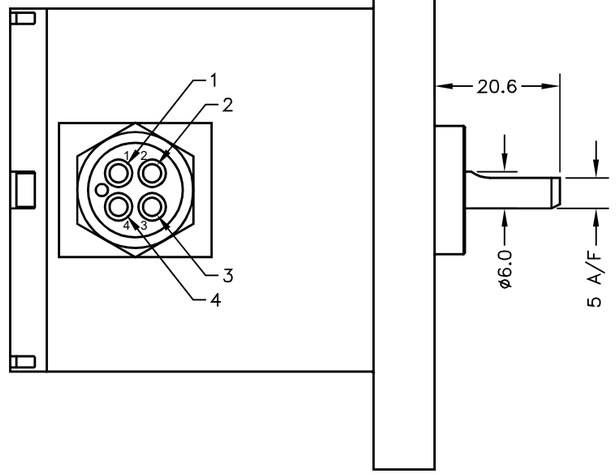
SINK VERSION OUTPUT COMPLIANCE 5–28V
SOURCE VERSION DRIVE 300Ω MAX TO 0V

MATING CONNECTOR SUPPLIED WITH 50cm MOULDED CABLE AS STANDARD.
4–CORE SCREENED: 0.5mm^2, ø7.5mm MAX. JACKET / CORE INSULATION: EPDM.
CONNECTIONS:–

1	BLACK	OUTPUT
2	WHITE	0V
3	RED	BODY (OPTIONS: A, C, E–H) –Ve (OPTIONS: B OR D)
4	GREEN	+Ve
	SCREEN	NOT CONNECTED TO SENSOR

RANGE OF DISPLACEMENT FROM 0–15° TO 0–160° e.g. 76°, IN INCREMENTS OF 1°.
BODY MATERIAL:– STAINLESS STEEL 316.

N.b. CONNECTOR ORIENTATION NOT GUARANTEED.



A	FIRST ISSUE.	PDM
B	DISP. FROM 15° WAS 16° - RAN1146	PDM
C	CABLE COLOURS CORECTED - RAN1190	PDM
D	RANGE NOTE AMENDED ~ RAN1200	PDM

CE

MAXIMUM WORKING DEPTH: 3500 METRES 350 BAR. WHERE THE FREE END OF THE CABLE IS TO BE TERMINATED IN A SUBMERGED POSITION, ADEQUATE SEALING MUST BE PROVIDED TO PROTECT CONNECTIONS.
SENSOR IS OIL FILLED AND PRESSURE BALANCED. PRESSURE SENSITIVITY <1%FS TO 350 BAR

DSPM Industria®
sensori & trasduttori
Via Paolo Uccello 4 - 20148 Milano
Tel +39 02 48 009 757 Fax +39 02 48 002 070 info@dspmindustria.it www.dspmindustria.it

POSITEK LIMITED

A	27/10/16		CHECKED BY	X ±0.4
B	12/12/16		RDS	X.X ±0.2
C	14/06/17			X.XX ±0.1
D	12/09/17			DIMS mm
		DESCRIPTION		
		S520 350 BAR SUBMERSIBLE ROTARY SENSOR		
SCALE 10mm		DRAWING NUMBER S520-11		REV D
				SHEET 1 OF 1

POSITEK LIMITED

RIPS® S520 SUBMERSIBLE ROTARY SENSOR

High-resolution angle feedback for industrial and scientific applications

- **Non-contacting inductive technology to eliminate wear**
- **Angle set to customer's requirement**
- **Durable and reliable**
- **High accuracy and stability**
- **Pressure balanced for use to 350 Bar in under water applications**

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 S520 RIPS® (Rotary Inductive Position Sensor) is an affordable, durable, high-accuracy rotary sensor designed for arduous underwater applications such as ROVs. The S520, 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 characteristic proportional with the rotation of the input shaft. 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 S520 has long service life and environmental resistance with a rugged 316 stainless steel body and shaft. The flange mounting makes the sensor easy to install. There are a range of electrical options. Environmental sealing is to IP68 350Bar

SPECIFICATION

Dimensions	
Body Diameter	60 mm, Flange 92 mm
Body Length	70 mm to mounting face
Shaft	15 mm Ø 6 mm
For full mechanical details see drawing S520-11	
Independent Linearity	≤ ± 0.25% FSO @ 20°C - up to 100° travel
	≤ ± 0.1% FSO @ 20°C* available upon request.
*Sensors with calibrated travel up to 100°.	
Pressure Effects	Output changes with pressure < 1°
Temperature Coefficients	< ± 0.01%/°C Gain &
	< ± 0.01%FS/°C Offset
Frequency Response	> 10 kHz (-3dB) (Electrical)
	> 300 Hz (-3dB) 2 wire 4 to 20 mA
Resolution	Infinite
Noise	< 0.02% FSO
Torque	< 20 mNm Static
Environmental Temperature Limits (Non Icing)	
Operating	-4°C to +50°C
Storage	-4°C to +50°C
Sealing	Sealed to 350 Bar
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	
S520-11	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.

DSPM Industria® sensori & trasduttori
Via Paolo Uccello 4 - 20148 Milano
Tel +39 02 48 009 757 Fax +39 02 48 002 070 info@dspmindustria.it www.dspmindustria.it

POSITEK LIMITED

RIPS® S520 SUBMERSIBLE ROTARY SENSOR

High-resolution angle feedback for industrial and scientific applications

How Positek's PIPS® technology eliminates wear for longer life

Positek's **PIPS®** technology (Positek Inductive Position Sensor) 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 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.

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.

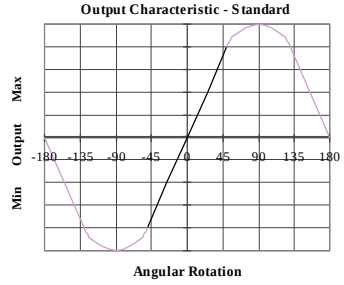
TABLE OF OPTIONS

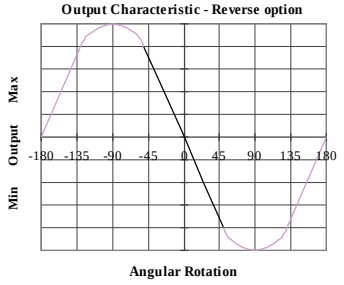
CALIBRATED TRAVEL: Factory-set to any angle from ±7.5° to ±80° in increments of 1 degree.
Full 360° Mechanical rotation.

ELECTRICAL INTERFACE OPTIONS

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

CONNECTOR Wet mate 4 pin MC BH-4-M
Supplied with a connector and 0.5 m, 4x0.5mm^2 cable assembly as standard.
Mating connector with longer lengths available.





ISO 9001 UKAS MANAGEMENT SYSTEMS

CE

S520-17d

DSPM Industria® sensori & trasduttori
Via Paolo Uccello 4 - 20148 Milano
Tel +39 02 48 009 757 Fax +39 02 48 002 070 info@dspmindustria.it www.dspmindustria.it

RIPS® SERIES S520 Submersible Rotary Sensor

	a	b	c	d
S520	. Displacement	Output	K50	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 **Connections**		**Code**
Connector	IP68 350 Bar Wet mate 4 pin MC BH-4-M plus pre-wired mating connector with 50 cm 4-core cable.	**K50**

d **Z-code**	**Code**
≤± 0.1% @20°C Independent Linearity displacement up to 100 degrees only!	**Z650**

DSPM Industria® sensori & trasduttori
Via Paolo Uccello 4 - 20148 Milano
Tel +39 02 48 009 757 Fax +39 02 48 002 070 info@dspmindustria.it www.dspmindustria.it

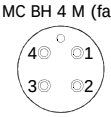
POSITEK LIMITED

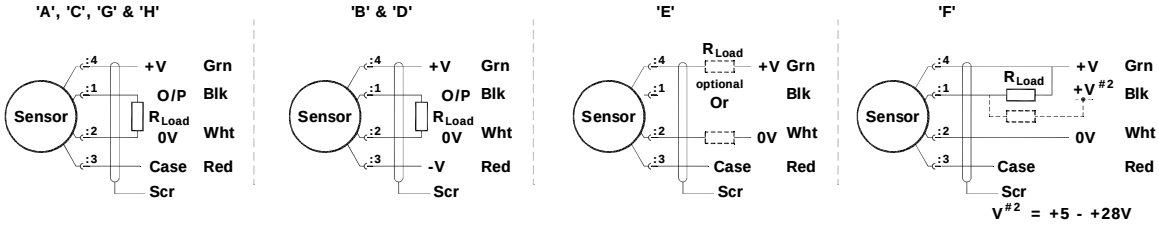
Installation Information

RIPS® S520 350 BAR SUBMERSIBLE ROTARY 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 Pin Layout:
MC BH 4 M (face view)





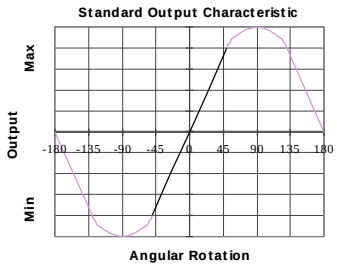
Mechanical Mounting: Flange mounted with two M5 screws through slots which allow +/- 15° angular adjustment. The sensor should be mounted with minimal axial and radial loading on the shaft for optimum life. It is recommended that the shaft is coupled to the drive using a flexible coupling. Tests indicate that life in excess of 16 million cycles can be achieved with 1kg side and end load.

N.b. cable free end must be appropriately terminated to prevent water ingress into the cable. **See page 2 for connector handling instructions.**

The sensor is sealed to IP68 350 Bar.

Warning Do not tamper with any of the case screws; the oil fill will be compromised.

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 15° 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 ± 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.

DSPM Industria sensori & trasduttori
Via Paolo Uccello 4 - 20148 Milano
Tel +39 02 48 009 757 Fax +39 02 48 002 070 info@dspmindustria.it www.dspmindustria.it

POSITEK LIMITED

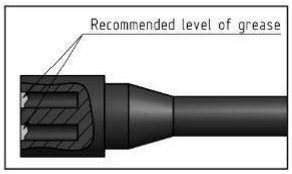
Installation Information

RIPS® S520 350 BAR SUBMERSIBLE ROTARY SENSOR

Handling

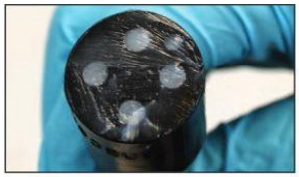
- Always apply grease before mating
- Disconnect by pulling straight, not at an angle
- Do not pull on the cable and avoid sharp bends at cable entry
- When using a bulkhead connector, ensure that there are no angular loads
- Do not over-tighten the bulkhead nuts
- SubConn® connectors should not be exposed to extended periods of heat or direct sunlight. If a connector becomes very dry, it should be soaked in fresh water before use

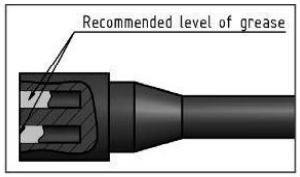
Greasing and mating above water (dry mate)



- Connectors must be greased with Molykote 44 Medium before every mating
- A layer of grease corresponding to minimum 1/10 of socket depth should be applied to the female connector
- The inner edge of all sockets should be completely covered, and a thin transparent layer of grease left visible on the face of the connector
- After greasing, fully mate the male and female connector in order to secure optimal distribution of grease on pins and in sockets
- To confirm that grease has been sufficiently applied, de-mate and check for grease on every male pin. Then re-mate the connector

Greasing and mating under water (wet mate)





- Connectors must be greased with Molykote 44 Medium before every mating
- A layer of grease corresponding to approximately 1/3 of socket depth should be applied to the female connector
- All sockets should be completely sealed, and transparent layer of grease left visible on the face of the connector
- After greasing, fully mate the male and female connector and remove any excess grease from the connector joint

Cleaning

- General cleaning and removal of any accumulated sand or mud on a connector should be performed using spray based contact cleaner (isopropyl alcohol)
- New grease must be applied again prior to mating

DSPM Industria® sensori & trasduttori
Via Paolo Uccello 4 - 20148 Milano
Tel +39 02 48 009 757 Fax +39 02 48 002 070 info@dspmindustria.it www.dspmindustria.it