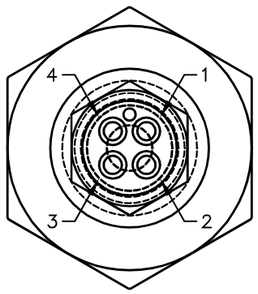
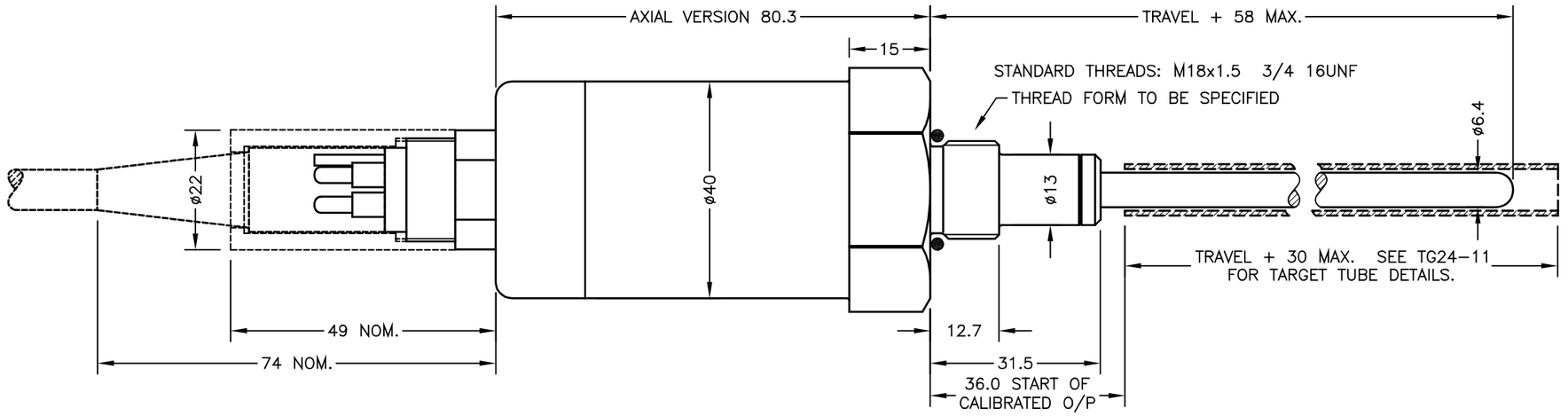
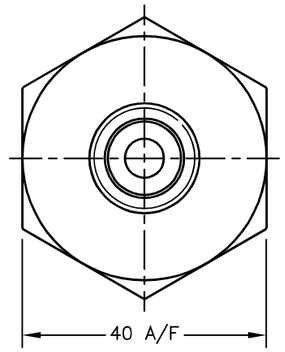
CONNECTORS; MICRO MINI WETMATE, 4–POLE.
BULKHEAD; MCBH–4–MP–SS, STAINLESS STEEL/MOLDED NEOPRENE, SEALING; 340 BAR OPEN FACE, 600 BAR MATED.
IN–LINE; MCIL–4–FS, MOLDED NEOPRENE WITH CABLE. LOCKING SLEEVE; MCDLS–F, DELRIN.

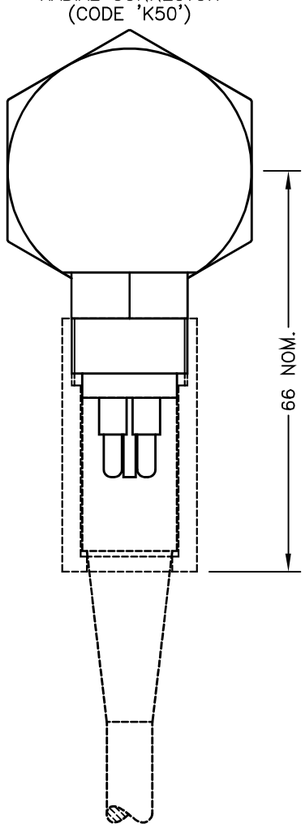
AXIAL CONNECTOR
(CODE 'J50')

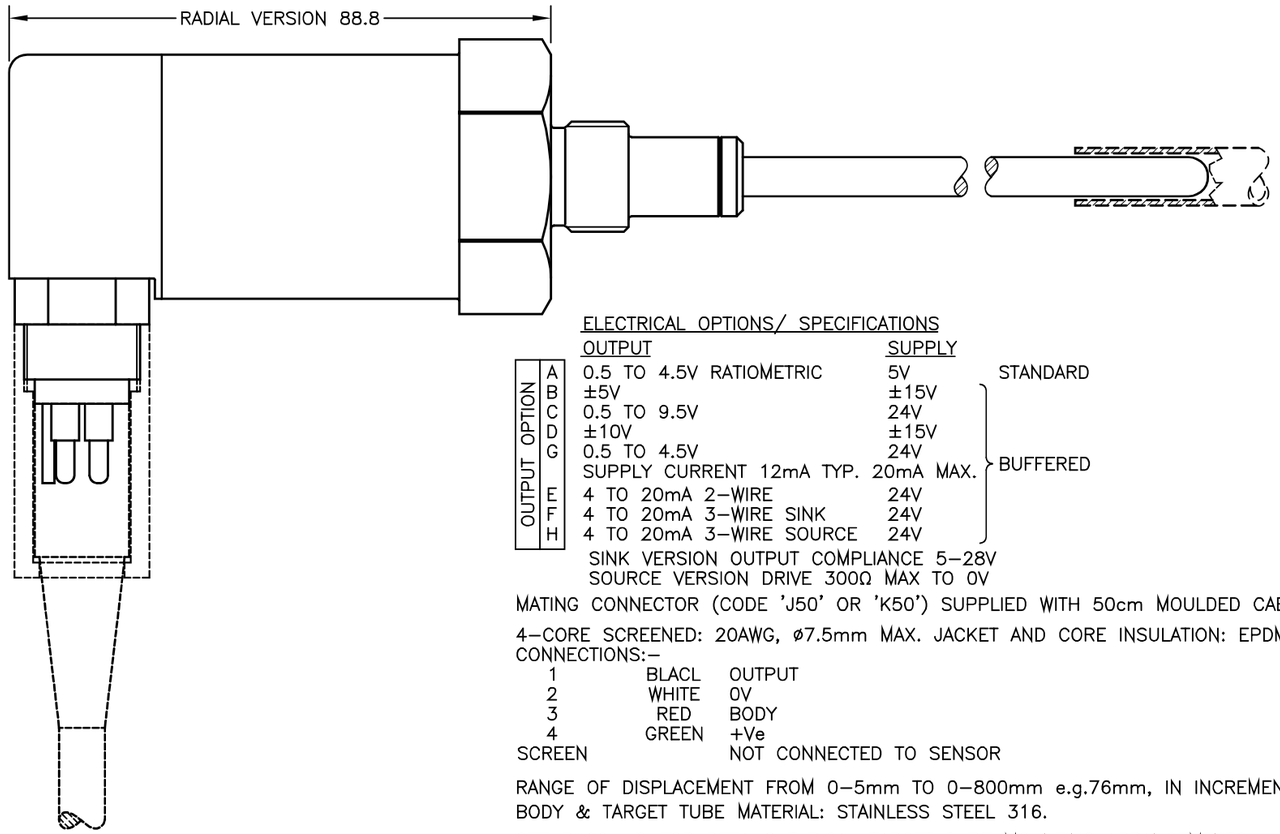


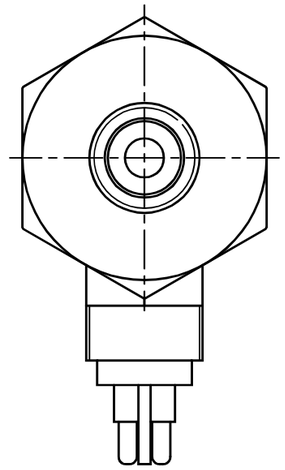




RADIAL CONNECTOR
(CODE 'K50')







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	BUFFERED
D	±10V	±15V	BUFFERED
G	0.5 TO 4.5V SUPPLY CURRENT 12mA TYP. 20mA MAX.	24V	BUFFERED
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 (CODE 'J50' OR 'K50') SUPPLIED WITH 50cm MOULDED CABLE AS STANDARD.

4–CORE SCREENED: 20AWG, ø7.5mm MAX. JACKET AND CORE INSULATION: EPDM.
CONNECTIONS:–

1	BLACL	OUTPUT
2	WHITE	0V
3	RED	BODY
4	GREEN	+Ve
SCREEN		NOT CONNECTED TO SENSOR

RANGE OF DISPLACEMENT FROM 0–5mm TO 0–800mm e.g.76mm, IN INCREMENTS OF 1mm.
BODY & TARGET TUBE MATERIAL: STAINLESS STEEL 316.

SEE P100–12 FOR DETAILS TYPICAL TARGET TUBE MOUNTING ARRANGEMENTS

MAXIMUM WORKING PRESSURE; HYDRAULIC / PNEUMATIC CYLINDER AND EXTERNAL WATER PRESSURE MUST NOT EXCEED 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.

A	FIRST ISSUE ~ RAN1219	PDM

CE

POSITEK LIMITED

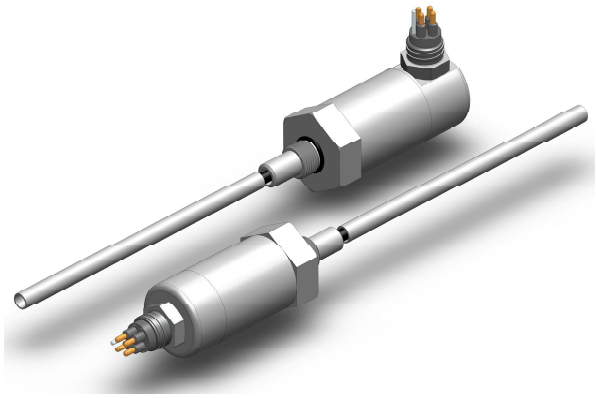
A	23/11/17		CHECKED BY RDS	X ±0.4 X.X ±0.2 X.XX ±0.1 DIMS mm
		DESCRIPTION: S120 350 BAR SUBMERSIBLE LIPS CYLINDER LINEAR POSITION SENSOR		
		SCALE 10mm	DRAWING NUMBER S120-11	REV A
				SHEET 1 OF 1

POSITEK LIMITED

LIPS® S120 350 BAR SUBMERSIBLE CYLINDER – LINEAR POSITION SENSOR

High-resolution position feedback for hydraulic and pneumatic cylinders

- **Non-contacting inductive technology to eliminate wear**
- **Travel set to customer's requirement**
- **Compact and self-contained**
- **High durability and reliability**
- **High accuracy and stability**
- **Sealing to IP68 350 Bar**



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 S120 LIPS® (Linear Inductive Position Sensor) is an affordable, durable, high-accuracy position sensor designed for arduous underwater hydraulic or pneumatic cylinder position feedback applications where service life, environmental resistance and cost are important. It is particularly suitable for OEMs seeking good sensor performance for arduous applications such as industrial machinery.

Overall performance, repeatability and stability are outstanding over a wide temperature range. The unit is highly compact and space-efficient, being responsive along almost its entire length. Like all Positek® sensors it provides a linear output proportional to travel. Each unit is supplied with the output calibrated to the travel required by the customer, any stroke from 0-5mm to 0-800mm and with full EMC protection built in.

The sensor is very rugged, being made of stainless steel with an inert fluoropolymer-sheathed probe with a stainless steel target tube. The sensor is easy to install in cylinders and has a wide range of mechanical and electrical options.

Environmental sealing is to IP68 350 Bar. The maximum system pressure is limited to 350 Bar (Water pressure plus hydraulic pressure).

SPECIFICATION

Dimensions	
Body diameter	40 mm
Body Length (to seal face)	80.3 mm (axial), 88.8 mm (radial)
Probe Length (from seal face)	calibrated travel + 58 mm
Target Tube Length	calibrated travel + 30 mm
For full mechanical details see drawing S120-11	
Independent Linearity	≤ ± 0.25% FSO @ 20°C - up to 450 mm ≤ ± 0.5% FSO @ 20°C - over 450 mm ≤ ± 0.1% FSO @ 20°C* available upon request.
*Sensors with calibrated travel from 10 mm up to 400 mm.	
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
Environmental Temperature Limits	
Operating	-4°C to +50°C
Storage	-4°C to +50°C
Sealing	IP68 350 Bar
Hydraulic Pressure	350Bar Absolute Limit of 350 Bar for water pressure + hydraulic pressure
EMC Performance	EN 61000-6-2, EN 61000-6-3
Vibration	IEC 68-2-6: 10 g
Shock 40 g	IEC 68-2-29:
MTBF	350,000 hrs 40°C
Gf	
Drawing List	
S120-11	Sensor Outline
P100-12	Typical Target Installation details
P100-15	Mounting Thread details
TG24-11	Optional Target Tube Flange details
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.

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LIPS® S120 350 BAR SUBMERSIBLE CYLINDER – LINEAR POSITION SENSOR

High-resolution position feedback for hydraulic and pneumatic cylinders

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 length from 0-5mm to 0-800mm (e.g. 254mm)

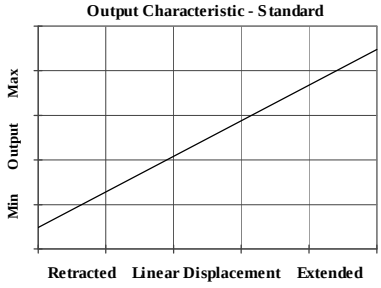
ELECTRICAL INTERFACE OPTIONS

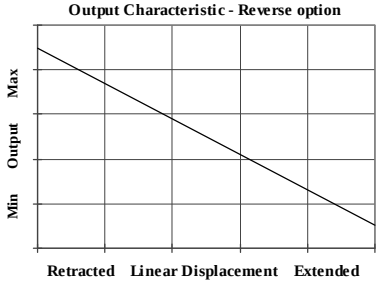
OUTPUT SIGNAL	SUPPLY INPUT	OUTPUT LOAD
Standard:		
0.5-4.5V dc ratiometric	+5V dc nom. ± 0.5V.	5kΩ min.
Buffered:		
0.5-4.5V dc	+24V dc nom. + 9-28V.	5kΩ min.
±5V dc	±15V dc nom. ± 9-28V.	5kΩ min.
0.5-9.5V dc	+24V dc nom. + 13-28V.	5kΩ min.
±10V dc	±15 V dc nom. ± 13.5-28V.	5kΩ min.
Supply Current	10mA 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 (axial or radial)
Supplied with a connector and 0.5 m, 4x0.5mm^2 cable assembly as standard.
Mating connector with longer lengths available.

MOUNTING THREAD OPTIONS
M18 or ¾ UNF 40 mm hex A/F, Ø 40 mm seal face.
Supplied with O-ring seal.

FLANGE OPTIONS
Penny & Giles HLS120, Temposonics (M4 fixing) and Parker Hannifin cylinders versions available.





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S120-17b

LIPS® SERIES S120 350 Bar Submersible Cylinder – Linear Position Sensor

	a	b	c	d	e	f
S120	. Displacement	Output	Connections	Option	Option	Z-code

a **Displacement** (mm)		**Value**
Displacement in mm	e.g. 0 - 254 mm	**254**

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** Cable* or Connector		**Code**
Connector - Radial	IP68 350 Bar Wet mate 4 pin MC BH-4-M plus pre-wired mating connector with 50 cm 4-core cable.	**I50**
Connector - Axial		**L50**

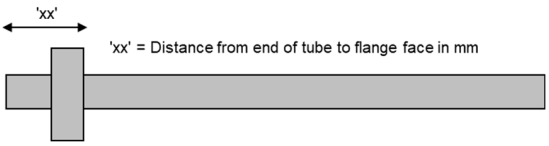
d **Mounting Thread**		**Code**
3/4 16 UNF	Hex. 40 mm A/F, Ø 40 mm seal face.	**P**
M18 x 1.5	Supplied with O-ring seal.	**T**

See P100-15 Drawing for Mating Thread Details.

e **Target Tube Mounting Flange**		**Code**
None		**U**
Penny & Giles HLP100	Please specify flange position in mm.	**Vxx**
Temposonics (M4 fixing)	eg. W17.5 specifies a Tempo style flange fitted 17.5 mm from the front face	**Wxx**
Parker Hannifin		**Xxx**

See TG24-11 Drawing for Target Details.

f **Z-code**	**Code**
≤± 0.1% @20°C Independent Linearity displacement between 10mm & 400mm only!	**Z650**



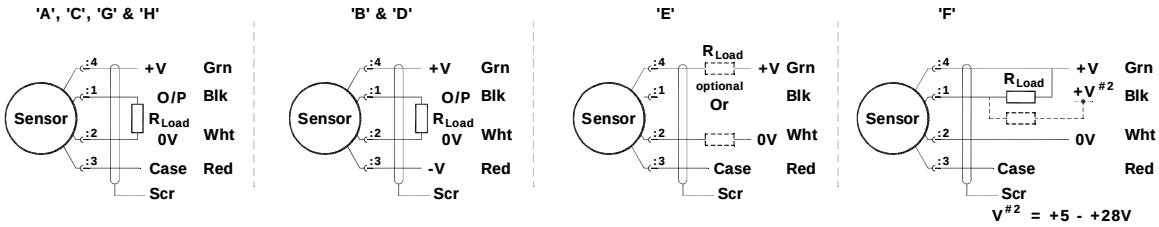
POSITEK LIMITED

Installation Information

LIPS® S120 350 BAR SUBMERSIBLE CYLINDER – LINEAR POSITION SENSOR

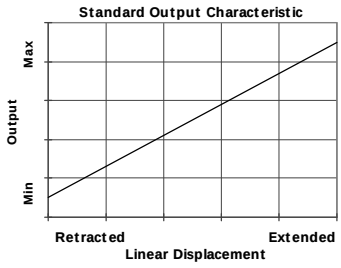
Output Option	Output Description:	Supply Voltage: V_s (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
A	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	≥ 5kΩ
B	±5V	±15V nom. (±9 - 28V)	≥ 5kΩ
C	0.5 - 9.5V	+24V nom. (13 - 28V)	≥ 5kΩ
D	±10V	±15V nom. (±13.5 - 28V)	≥ 5kΩ
E	4 - 20mA 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: Via mounting thread, maximum tightening torque: 100Nm. See drawing P100-15, Installation Details Mounting Threads & Seals. An O ring seal is provided, size BS908 for 3/4 UNF thread or 14.3 x 2.4 for M18 thread. Install the target tube using the flange provided or fix directly into the piston rod using adhesive for instance, the end of the target tube can be proud or flush with the piston end face as required.

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.



Output Characteristic: Target position at start of normal travel is 36.0 mm from seal face. The output increases as the target is moved away from the sensor body, the calibrated stroke is between 5 mm and 800 mm.

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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CE

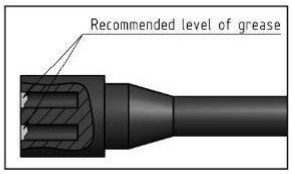
Installation Information

LIPS® S120 350 BAR SUBMERSIBLE CYLINDER – LINEAR POSITION SENSOR

Handling

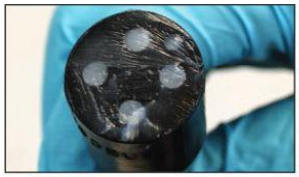
- Always apply grease before mating
- Disconnect by pulling straight, not at an angle
- Do not pull on the cable and avoid sharp bends at cable entry
- When using a bulkhead connector, ensure that there are no angular loads
- Do not over-tighten the bulkhead nuts
- SubConn® connectors should not be exposed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

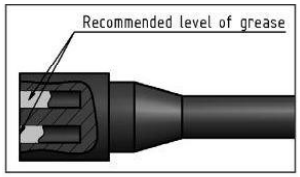
Greasing and mating above water (dry mate)



- 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

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