

LIPS® P117 SLIM-LINE LINEAR POSITION SENSOR

Position feedback for industrial and scientific applications

- **Non-contacting inductive technology to eliminate wear**
- **Travel set to customer's requirement**
- **Compact 19 mm diameter body,**
- **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 P117 LIPS® (Linear Inductive Position Sensor) is an affordable, durable, high-accuracy position sensor designed for industrial and scientific feedback applications.

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 unit is very compact and space-efficient with a small 19mm diameter body. The sensor is very robust, the body and push rod being made of stainless steel. The sensor is easy to install with mounting options including M5 male stud and M5 rod eye bearing. The push rod can be supplied free or captive, with male M5 thread or M5 rod eye. Like all Positek® sensors, the P117 provides a linear output proportional to travel. Each unit is supplied with the output calibrated to the travel required by the customer, from 5 to 350mm and with full EMC protection built in. The P117 offers a range of mechanical and electrical options, environmental sealing is IP67.

SPECIFICATION

Dimensions	
Body diameter	19 mm
Body Length	
(Axial version)	calibrated travel + 109.7 mm
(Radial version)	calibrated travel + 115 mm - cable
(Radial version)	calibrated travel + 118.5 mm - connector
For full mechanical details see drawing P117-11	
Independent Linearity	≤ ± 0.25% FSO @ 20°C
	≤ ± 0.1% FSO @ 20°C* available upon request.
*Sensors with calibrated travel of 10 mm and above.	
Temperature Coefficients	< ± 0.01%/°C Gain &
	< ± 0.01%FS/°C Offset
Frequency Response	> 10 kHz (-3dB)
Resolution	Infinite
Noise	< 0.02% FSO
Environmental Temperature Limits	
Operating	-40°C to +125°C standard
	-20°C to +85°C buffered
	-40°C to +125°C
Storage	
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	
P117-11	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.



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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 0-350mm (e.g. 76mm).

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.
0.5-9.5V dc	+24V dc nom. + 13-28V.	5kΩ min.
4-20mA	+24V dc nom. + 13-28V.	300R Max.
Supply Current	10mA typical, 20mA max. plus O/P current	

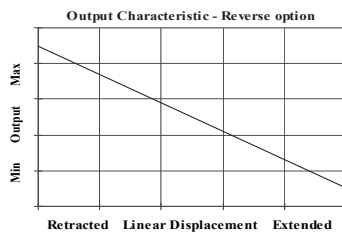
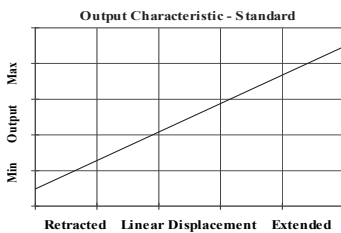
CONNECTOR/CABLE OPTIONS

Connector - Hirschmann ELWIK 4102 Axial or Radial, IP67
 Cable with Pg 9 gland Axial, IP67
 Cable with boot. Radial, IP67
 Cable length >50 cm – please specify length in cm

MOUNTING OPTIONS

M5 rod eye bearing or M5x0.8 male thread (radial versions), Body Tube Clamp/s (axial or radial versions).

PUSH ROD OPTIONS – standard retained with M5x0.8 male thread, M5 rod eye bearing or Free.



LIPS® SERIES P117 Slim-Line Linear Position Sensor

a	b	c	d	e	f	g	h
P117 . Displacement Output Connections Option Option 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
+24V nom. (13 - 28V)	0.5 - 9.5V	C
+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
Cable Boot - Radial	IP67	Ixx
Connector - Axial	IP67 M12 IEC 60947-5-2	J
Connector - Radial	IP67 M12 IEC 60947-5-2	K
Cable Gland - Axial	IP67 Pg9	Lxx
*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.		
d Body Fittings		Code
None - default	Male Thread M5x0.8x10 long - Radial body style only.	blank
M5 Rod-eye Bearing	Radial body style only	N
e Body Clamps		Code
None - default		blank
Body Clamps - 1 pair		P
f Push Rod Fittings		Code
None - default	Male Thread M5x0.8x10 long	blank
M5 Rod-eye Bearing		U
g Push Rod Options		Code
Captive - default	Push rod is retained	blank
Non-captive	Push rod can depart body	V
h Z-code		Code
≤± 0.1% @20°C Independent Linearity displacement between		Z650
Connector with cable option 'J' or 'K' with length required in cm i.e. J100 specifies connector with 100cm of cable.		Z999

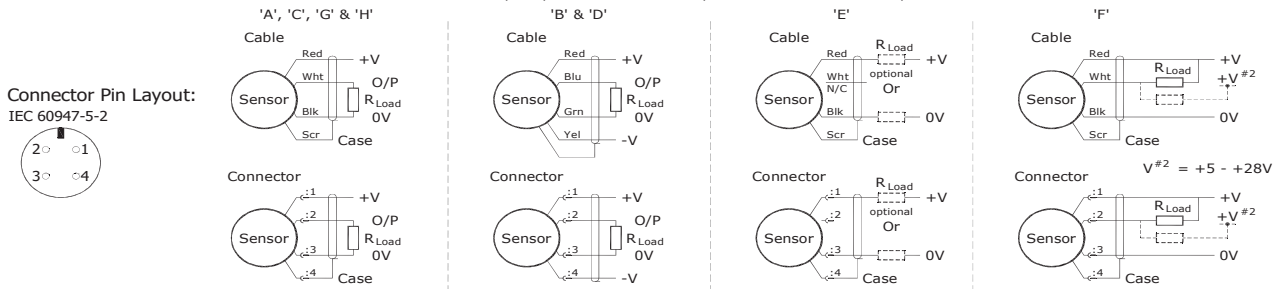


Installation Information

LIPS® P117 SLIM-LINE LINEAR POSITION SENSOR

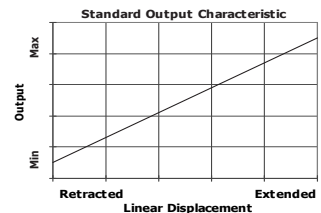
Output Option	Output Description:	Supply Voltage: V_s (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
A	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	$\geq 5k\Omega$
C	0.5 - 9.5V	+24V nom. (13 - 28V)	$\geq 5k\Omega$
G	0.5 - 4.5V	+24V nom. (9 - 28V)	$\geq 5k\Omega$
H	4 -20mA	+24V nom. (13 - 28V)	300R MAX

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



Mechanical Mounting: Depending on options; Body can be mounted by M5x0.8 male thread, M5 rod eye or by clamping the sensor body - body clamps are available, if not already ordered. Target by M5x0.8 male thread or M5 rod eye. It is assumed that the sensor and target mounting points share a common earth.

Output Characteristic: Target is extended 2 mm from end of body at start of normal travel. The output increases as the target extends from the sensor body, the calibrated stroke is between 5 mm and 350 mm.



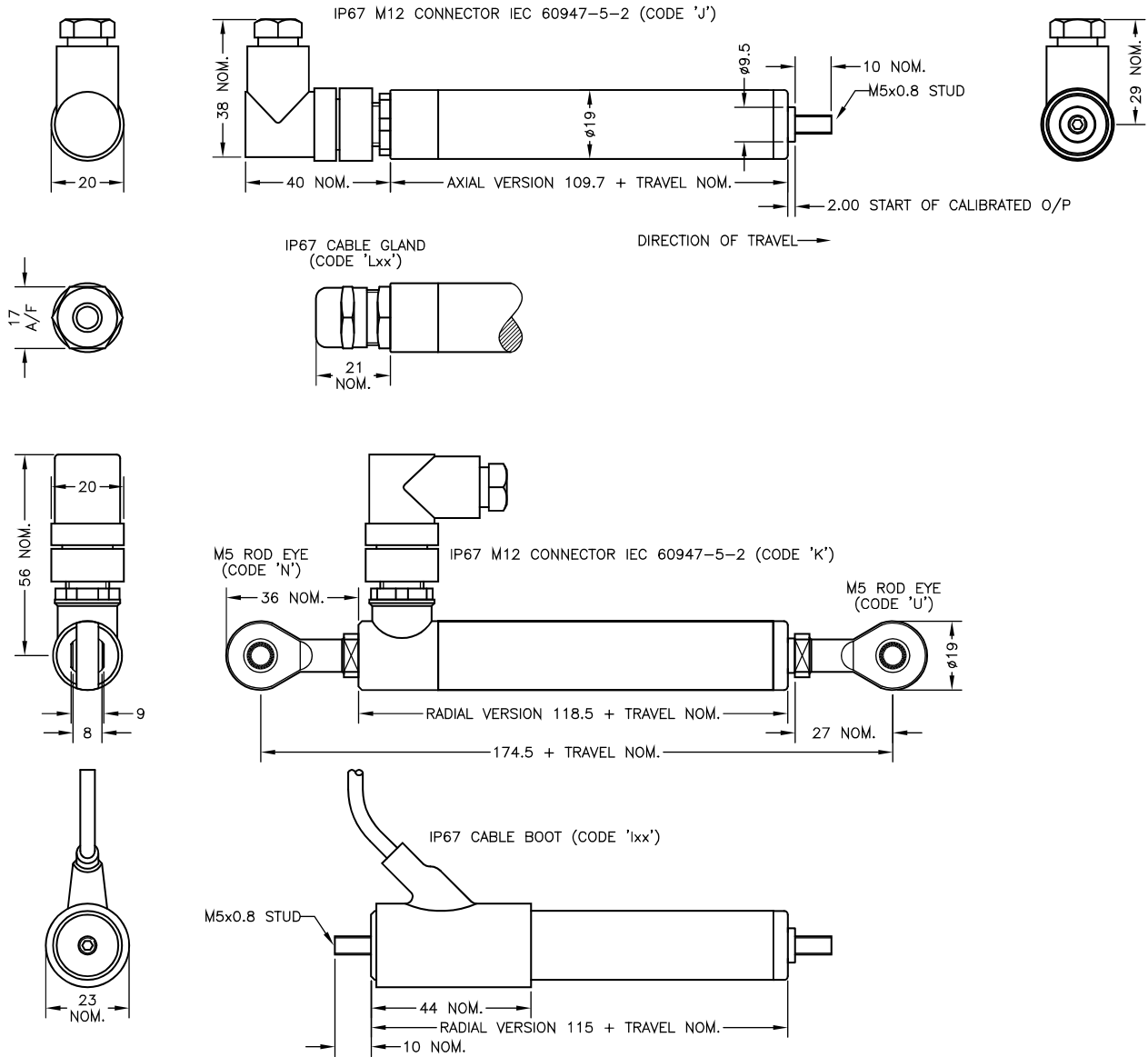
Warning - The M12 IEC 60947 connector may be rotated for purposes of convenient orientation of the connector and cable, however rotating the connector more than one complete revolution is not recommended.

Repeated rotation of the connector will damage the internal wiring!

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.
- C & G Supply leads diode protected. Output must not be taken outside 0 to 12V.
- H Supply and output lead diode protected. Do take output negative of 0 volts.

N.b. ROD-EYE ORIENTATION NOT GUARANTEED.



ELECTRICAL OPTIONS/ SPECIFICATIONS

OUTPUT OPTION	OUTPUT	SUPPLY	
A	0.5 TO 4.5V RATIOMETRIC	5V	STANDARD } BUFFERED
C	0.5 TO 9.5V	24V	
G	0.5 TO 4.5V	24V	
H	4 TO 20mA	24V	

SUPPLY CURRENT 12mA TYP. 20mA MAX. PLUS O/P CURRENT

CABLE: 0.2mm², O/A SCREEN, PUR JACKET - SUPPLIED WITH 50cm OR REQUIRED LENGTH IN cm. e.g. 'L50'

3-CORE: JACKET Ø4mm

CABLE/CONNECTOR* CONNECTIONS;
3 CORE CONNECTOR

RED	:1	+Ve
BLACK	:3	0V
WHITE	:2	OUTPUT
SCREEN	:4	BODY

*CONNECTORS; MAXIMUM CONDUCTOR CROSS SECTION 0.75mm²
RANGE OF DISPLACEMENT FROM 0-5mm TO 0-350mm e.g.76, IN INCREMENTS OF 1mm.

BODY MATERIAL: STAINLESS STEEL.
FURTHER OPTIONS:
SINGLE PAIR OF BODY CLAMPS 'P'
TWO PAIRS OF BODY CLAMPS 'P2'
PUSH-ROD FREE (CODE 'V')

D	ADDITIONAL DIMS/VIEWS ADDED.	PDM
E	OPTION J IP67 CONN.	PDM
F	BODY CLAMP OPTIONS ADDED - RAN505.	PDM
G	RANGE WAS 10-350mm RAN1056	RDS
H	PUSH-ROD DIA. ADDED ~ RAN1083	PDM
J	RANGE NOTE AMENDED ~ RAN1200	PDM
K	4 TO 20mA ADDED RAN1256	RDS



THE PUSH-ROD RETRACTS AND EXTENDS 2mm NOM. AT EITHER END OF CALIBRATED TRAVEL.
'V' CODED PUSH-ROD WILL DEPART SENSOR BODY.

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.



D	06/07/11		CHECKED BY	X	±0.4
E	04/05/12		RDS	X.X	±0.2
F	25/07/14			X.XX	±0.1
					DIMS mm
G	9/11/15	DESCRIPTION			
H	13/04/16	P117 LIPS SLIM-LINE			
J	06/09/17	LINEAR POSITION SENSOR			
K	06/09/18				
SCALE		DRAWING NUMBER		REV	
12.5mm		P117-11		K	
		SHEET		OF	
		1		1	