

LIPS[®] P133 MID STROKE LINEAR POSITION SENSOR

Position feedback for industrial and scientific applications

- **Non-contacting inductive technology to eliminate wear**
- **Travel set to customer's requirement**
- **Short body length**
- **High durability and reliability**
- **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 P133 LIPS[®] (Linear Inductive Position Sensor) is an affordable, durable, accurate position sensor designed for a wide range of industrial applications. It is particularly suitable for OEMs seeking good sensor performance in situations where a short-bodied sensor is needed and cost is important. The unit is compact and space-efficient, being responsive along almost its entire length, and like all Positek[®] sensors provides a linear output proportional to travel. Each unit is supplied with the output calibrated to the travel required by the customer, from 51 to 100mm and with full EMC protection built in.

Overall performance, repeatability and stability are outstanding over a wide temperature range.

The sensor has a rugged stainless steel body and plunger. It is easy to install and set up, mounting options include flange and body clamps. The plunger can be supplied free or captive, with female M4 thread, or spring-loaded with a ball end. The P133 also offers a wide range of mechanical and electrical options, environmental sealing is to IP65 or IP67 depending on selected cable or connector options.



SPECIFICATION

Dimensions		35 mm
Body diameter		
Body Length:		Dependant on calibrated travel & mounting option
Calibrated Travel	Standard	Flange mounted
51 mm to 70 mm	125 mm	141.3 mm
71 mm to 100 mm	155 mm	171.3 mm
Plunger		Ø 6mm
For full mechanical details see		drawing P133-11
Power Supply		+5V dc nom. ± 0.5V, 10mA typ 20mA max
Output Signal		0.5-4.5V dc ratiometric, Load: 5kΩ min.
Independent Linearity		≤ ± 0.25% FSO @ 20°C
		≤ ± 0.1% FSO @ 20°C available upon request.
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		-40°C to +125°C standard
		-20°C to +85°C buffered
Storage		-40°C 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: 10 g
Shock		IEC 68-2-29: 40 g
MTBF		350,000 hrs 40°C Gf
Drawing List		
P133-11		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 0-51mm to 0-100mm (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.
±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.

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

CONNECTOR/CABLE OPTIONS

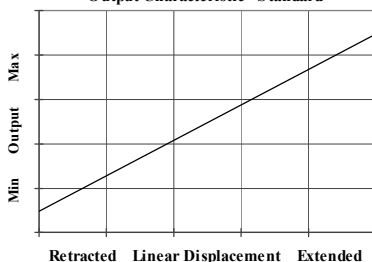
Connector - Hirschmann GD series IP65
 Cable with M12 gland or short gland IP67
 Cable length >50 cm – please specify length in cm

MOUNTING OPTIONS

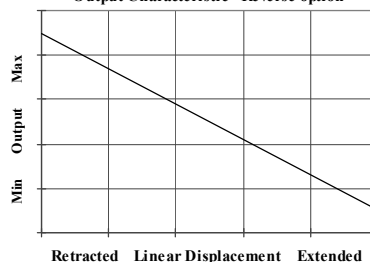
Flange, Body Tube Clamp.

PUSH ROD OPTIONS – standard retained with M4x0.7 female thread
 Sprung loaded (spring supplied loose), Dome end (sprung loaded) or Free.

Output Characteristic - Standard



Output Characteristic - Reverse option



For further information please contact:



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CE
 P133-17d

LIPS® SERIES P133 Mid Stroke Position Sensor

a	b	c	d	e	f	g	h	j	k
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P133 . Displacement Output Adjustments Connections Option Option Option Option Option Z-code

a Displacement (mm)		Value
Displacement in mm	e.g. 0 - 66 mm	66
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 Housing		Code
Standard - default		blank
Flange Mount		N
f Body Fittings		Code
None - default		blank
Body Clamps - 1 pair		P
g Sprung Plunger		Code
None - default		blank
Spring Extend	Captive plunger only.	R
h Plunger Fittings		Code
None - default	Female Thread M4x0.7x7 deep	blank
Dome end	Required for option 'R'	T
j Plunger Options		Code
Captive - default	Plunger is retained	blank
Non-captive	Plunger can depart body	V

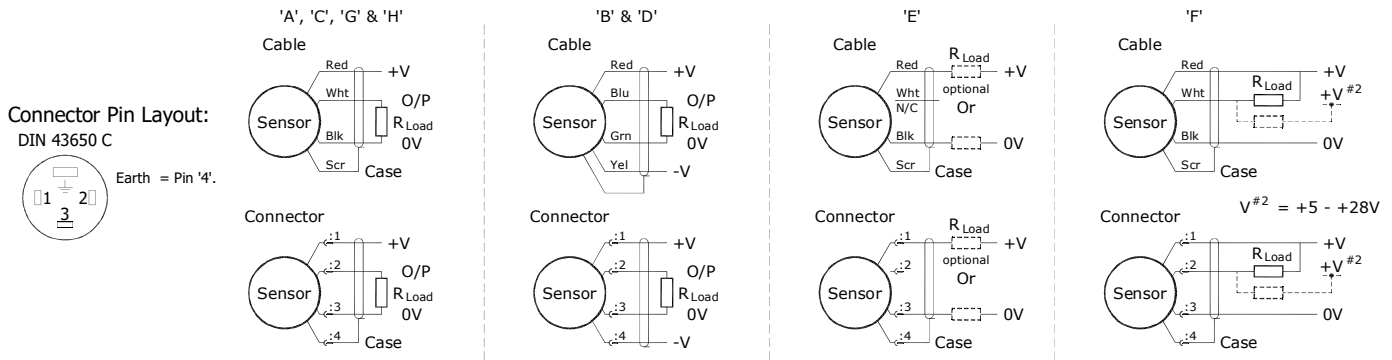
k Z-code	Code
Connector IP67 M12 IEC 60947-5-2 must have options 'Y' & 'J'	Z600
Connector IP67 M12 IEC 60947-5-2 must have option 'J'	Z601
≤± 0.1% @20°C Independent Linearity displacement between 10mm & 50mm only!	Z650
Connector with cable option 'J' with length required in cm i.e. J100 specifies connector with 100cm of cable.	Z999

Installation Information

LIPS[®] P133 MID STROKE LINEAR POSITION SENSOR

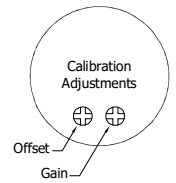
Output Option	Output Description:	Supply Voltage: V_s (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
A	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	$\geq 5k\Omega$
B	$\pm 5V$	$\pm 15V$ nom. ($\pm 9 - 28V$)	$\geq 5k\Omega$
C	0.5 - 9.5V	+24V nom. (13 - 28V)	$\geq 5k\Omega$
D	$\pm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

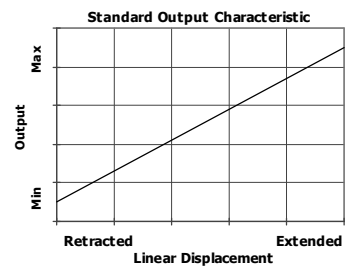


Mechanical Mounting: Flange mounted or by clamping the sensor body - body clamps are available, if not already ordered. The flange slots are 4.5 mm by 30 degrees wide on a 48 mm pitch.

Output Characteristic: Plunger extended, at start of normal travel, from mounting face by:
 Standard body : 42.5 mm*
 Flanged body : 28 mm*

*Note: where ball end option is fitted add 5 mm.

The output increases as the plunger extends from the sensor body, the calibrated stroke is between 51 mm and 100 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 $\pm 12V$.
- 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.