



mm X114



Description

Submersible Stand-Alone Linear Position Sensor,
Intrinsically Safe for Hazardous Gas/Vapour Atmospheres

- Measurement Range from 0 ... 50 mm to 0 ... 600 mm
- Linearity ± 0.25 % (ranges over 450 mm: ± 0.5 %)
- Supply voltage and output signal via Galvanic Isolation Amplifier X005
- Intrinsically Safe for Gas to: Ex II 1G

This intrinsically safe X114 LIPS® (Linear Inductive Position Sensor) is an affordable, durable, high-accuracy position sensor derived from the X101. Designed for applications where the sensor would be completely submerged during normal operation, it retains desirable features such as compact size, good sensor performance yet capable of working in pressures up to 10 bar.

The X114, like all LIPS® sensors, provides a linear output proportional to displacement. Each unit is supplied with the output calibrated to the travel required by the customer, from 50 to 600 mm and with full EMC protection built in. The sensor is very robust, the body and push rod being made of stainless steel for long service life and environmental resistance.

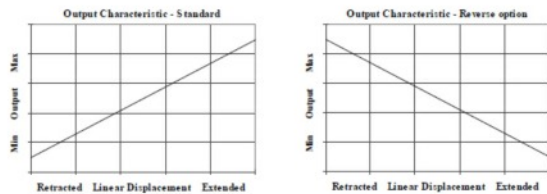
Overall performance, repeatability and stability are outstanding over a wide temperature range. The sensor is easy to install with mounting options including M5 stainless steel rod eye bearings and body clamps. The push rod can be supplied free or captive, with female M5 thread, or an M5 stainless steel rod eye. The X114 also offers a selection of mechanical and electrical options, environmental sealing is to IP68 10 bar.

Sensor must be used in conjunction with Galvanic Isolation Amplifier X005!

Specifications

Measurement Ranges:	0 ... 50 mm to 0 ... 600 mm, factory-set, in increments of 1 mm
Power Supply (via Galvanic Isolation Amplifier X005):	+5 VDC nom. ± 0.5 V, 10 mA typ, 20 mA max.
Output Signal (to Galvanic Isolation Amplifier X005):	0.5 ... 4.5 V ratiometric, load min. 5 k Ω
Independent Linearity at 20 °C:	< ± 0.25 % for ranges up to 450 mm < ± 0.5 % for ranges >450 mm
Temperature Coefficient Gain:	< ± 0.01 %/K
Temperature Coefficient Offset:	< ± 0.01 % FS/K
Frequency Range:	0 ... >10 kHz (-3 dB)
Resolution:	Infinite
Noise:	<0.02 % FSO
Intrinsic Safety:	Ex II 1G Ex ia IIC T4 Ga (Ta = -40 ... +80 °C)
Sensor Input Parameters:	Ui = 11.4 V, Ii = 0.20 A, Pi = 0.51 W Ci = 1.36 μ F, Li = 860 μ H, cable length max. 1000 m
Operating Temperature Range:	-40 ... +80 °C
Storage Temperature Range:	-40 ... +125 °C

Environmental Sealing:	IP68 10 bar
EMC Performance:	EN61000-6-2, EN61000-6-3
Vibration, max.:	IEC 68-2-6: 10 g
Shock, max.:	IEC 68-2-29: 40 g
MTBF:	350000 hours, 40 °C, Gf
Electrical Connection:	Cable 0.5 m



Sensor and Galvanic Isolation Amplifier X005 have to be calibrated altogether at the factory!

Options

Galvanic Isolation Amplifier	Output
X005-425	4 ... 20 mA
X005-426	20 ... 4 mA
X005-525	0.5 ... 9.5 V
X005-526	9.5 ... 0.5 V

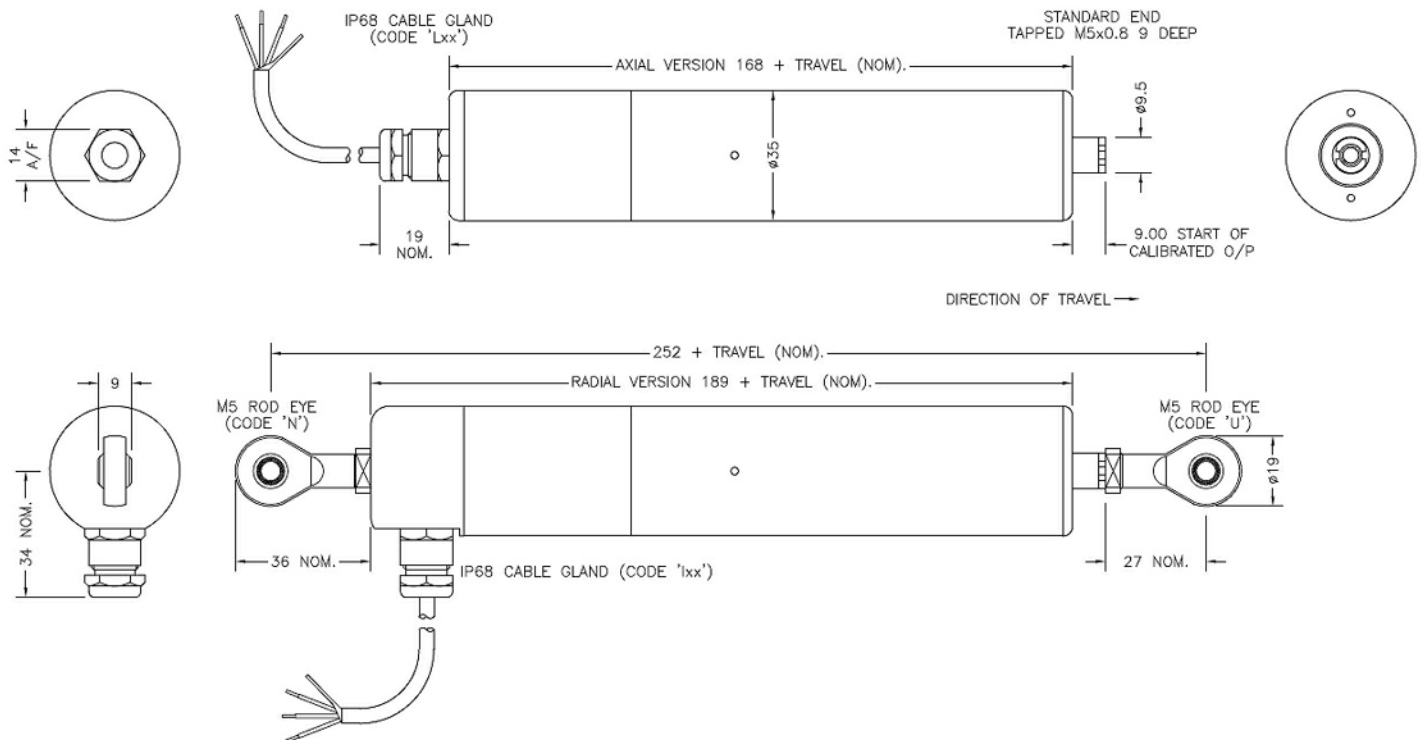
Connector/Cable Options:	
-L50	Cable with axial gland, IP68, 50 cm
-I50	Cable with radial gland, IP68, 50 cm

other cable lengths available up to max. 15000 cm

Body Mounting Options:	
-N	M5 eye rod bearing (radial versions only)
-P/-P2	Body tube clamps

Push Rod Options:	
-U	M5 eye rod bearing
-V	Free
blank	M5 x 0.8 female thread (standard)

Dimensions



All dimensions in mm, approx. values.

These drawings are for information only and not intended for construction purpose. Please ask for detailed drawings.

Electrical Connection

Cable (Options Lxx or Ixx):

3-core screened PUR cable, 0.2 mm², Ø 4 mm, standard length 50 cm, max 150 m

Connections	
Cable	
Red	+ supply voltage
Black	0 V
White	Output signal
Screen	Body

It is imperative position sensor LIPS X114 be used in conjunction with a galvanic barrier X005.

The Galvanic Isolation Amplifier X005 will compensate for up to 15 Ohms resistance in each conductor, this imposes the following minimum cable sizes:

Cross Section	Cable Length
0.25 mm ²	Up to 150 m
0.5 mm ²	150 ... 300 m
0.75 mm ²	300 ... 450 m
1.0 mm ²	450 ... 600 m
1.5 mm ²	600 ... 900 m
2.0 mm ²	900 ... 1000 m

Note: The maximum cable length as specified in the sensor's certification takes precedence and must not be exceeded.

For cable lengths exceeding 10 m a 5-wire connection is recommended to eliminate errors introduced by cable resistance and associated temperature coefficients. (see data sheet Amplifier X005)

Intrinsic Safety

Intrinsically safe equipment is defined as "equipment which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmosphere mixture in its most easily ignited concentration."

ATEX / IECEx approved to: Ex II 1G
Ex ia IIC T4 Ga (Ta = -40 ... +80 °C)

Designates the sensor as belonging to:

Group II:	suitable for all areas except mining
Category 1G:	can be used in areas with continuous, long or frequent periods of exposure to hazardous gas (Zone 0)
Protection class ia:	intrinsically safe for all zones
Apparatus group IIC:	suitable for IIA to IIC explosive gas
Temperature class T4:	maximum surface temperature under fault conditions 135 °C
Ambient temperature range Ta:	extended to -40 ... +80 °C

It is imperative LIPS X114 intrinsically safe sensors be used in conjunction with a galvanic barrier X005 to meet the requirements of the product certification. The X005 Galvanic Isolation Amplifier is purpose made for LIPS and RIPS sensors. Refer to the X005 datasheet for product specification and output configuration options.

Safety Parameters:

Ui: 11.4 V, Ii: 0.20 A, Pi: 0.51 W

Ci = 1.36 µF* Li = 860 µH*

*Figures for 1 km cable Ci = 200 pF/m and Li = 810 nH/m

Sensors can be installed with a maximum of 1000 m of cable. Cable characteristics must not exceed:

Capacitance: ≤810 pF/m for max. total of: 200 nF.

Inductance: ≤810 nH/m for max. total of: 810 µH

For cable lengths exceeding 10 metres a five wire connection is recommended to eliminate errors introduced by cable resistance and associated temperature coefficients.

ATEX / IECEx approved sensors suitable for **dust (E series)** and **mining (M series)** applications, are also available.