



mm X106



Description

Internally Mounted Cylinder Sensor with External Electronics,
Intrinsically Safe for Hazardous Gas/Vapour Atmospheres

- Measurement Range from 0 ... 20 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 X106 LIPS® (Linear Inductive Position Sensor) is designed for demanding hydraulic or pneumatic cylinder position feedback applications where service life, environmental resistance and cost are important and is ideal for OEMs seeking good sensor performance for arduous applications in hazardous areas.

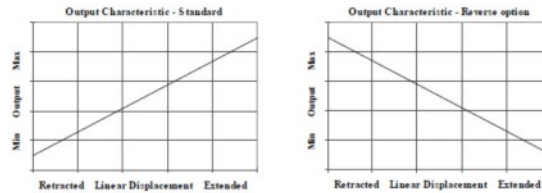
Overall performance, repeatability and stability are outstanding over a wide temperature range. The unit is highly compact and space-efficient, being responsive along almost its entire length. Like all LIPS® sensors it provides a linear output proportional to displacement, each unit is supplied with the output calibrated to the travel required by the customer, from 20 to 600 mm and with full EMC protection built in. The X106 is very rugged, being made of stainless steel with an inert fluoropolymer-sheathed probe with a stainless steel target tube. The probe and target are easy to install, as is the electronics module which has a range of mounting options. Environmental sealing is to IP65 or IP67 depending on selected cable or connector options.

Sensor must be used in conjunction with Galvanic Isolation Amplifier X005!
Sensor and Galvanic Isolation Amplifier X005 have to be calibrated altogether at factory!

Specifications

Measurement Ranges:	0 ... 20 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:	$< \pm 0.25$ % up to 450 mm $< \pm 0.5$ % for ranges over 450 mm
Temperature Coefficient Gain:	$< \pm 0.01$ % / K
Temperature Coefficient Offset:	$< \pm 0.01$ % 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, li = 0.20 A, Pi = 0.51 W Connector: Ci = 1.16 μ F, Li = 50 μ H Cable: 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:	IP65 or IP67 depending on connector/cable option
Hydraulic Pressure:	350 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:	Connector or 0.5 m cable



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:	
-J	Hirschmann connector, axial, IP65
-L50	Cable with axial gland, IP67, 50 cm
-M50	Cable with short gland, axial, IP67, 50 cm
	other cable lengths available up to max. 15000 cm

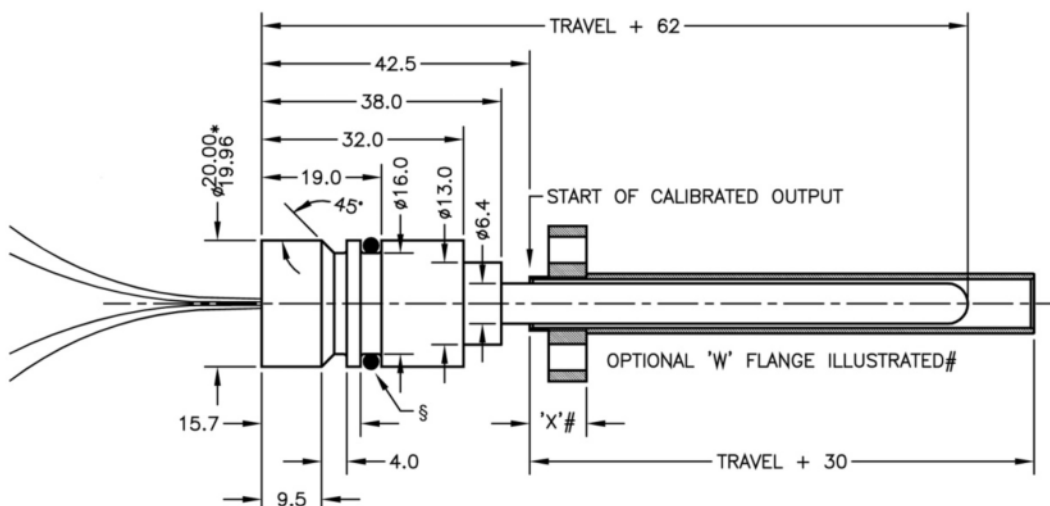
Mounting Options (Electronics Module):	
-T	Flange (Standard)
-P	Thread M18 x 1.5

Flange Options:	
-U	no flange
-V	Penny & Giles HLP100
-W	Temposonics (M4 fixing)
-X	Parker Hannifin cylinders

Potentiometer Option:	
-Y	Sealed trim potentiometers for zero and span

Dimensions

Probe Assembly (with optional Temposonic flange, Code -W):

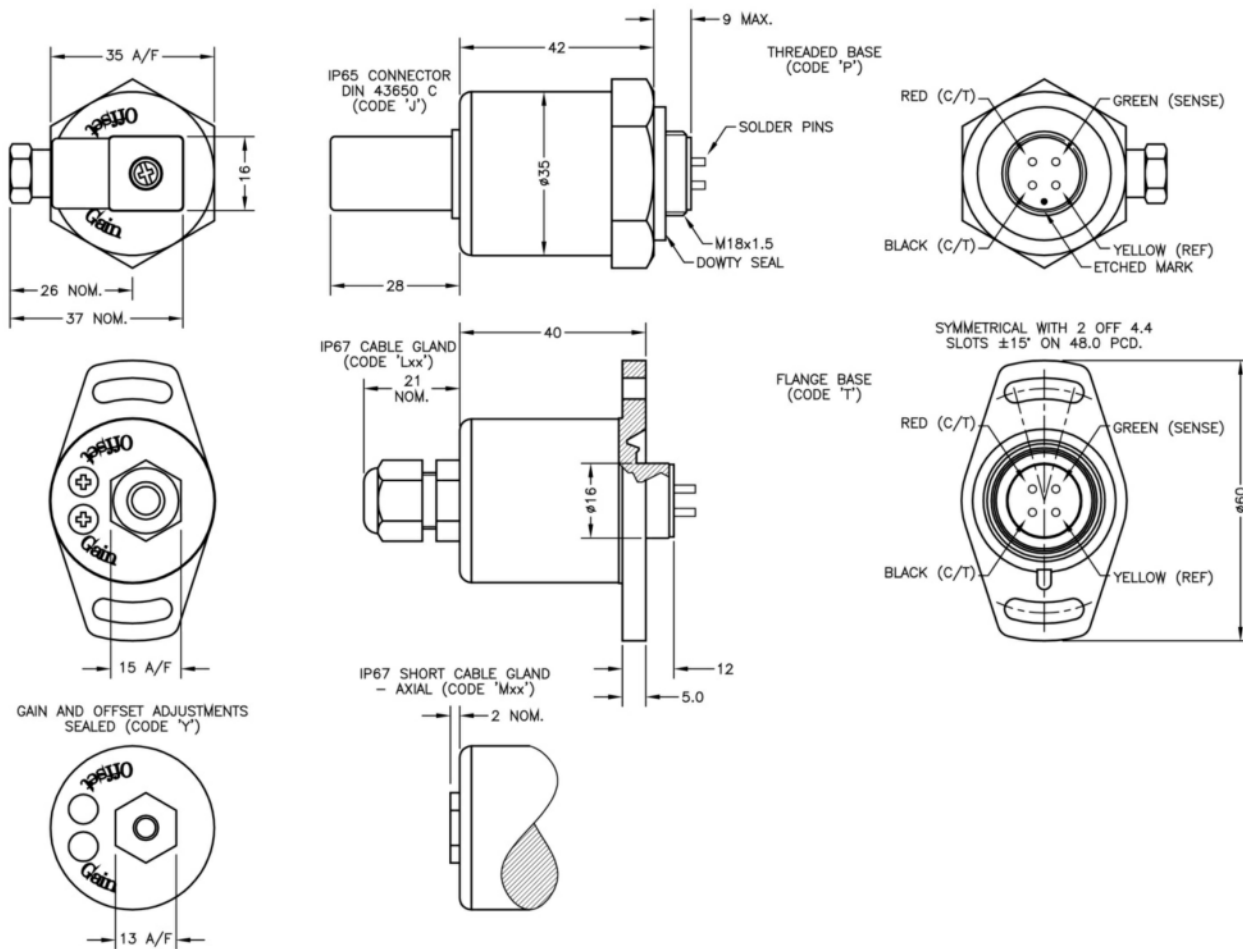


Target material stainless steel (Code -R): \varnothing 7.7 mm ID, \varnothing 9.45 mm OD

All dimensions in mm, approx. values.

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

Electronics Module:



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

Connector: maximum conductor cross section 0.75 mm²

Connections		
Cable	Connector	
Red	Pin 1	+ supply voltage
Black	Pin 3	0 V
White	Pin 2	Output signal
Screen	Pin 4	Body

It is imperative position sensor LIPS X106 be used in conjunction with a galvanic barrier X005.

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)

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

■ 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 X106 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:

U_i: 11.4 V, I_i: 0.20 A, P_i: 0.51 W
C_i = 1.36 µF* L_i = 710 µH* (cable version)
C_i = 1.16 µF L_i = 50 µH (connector version)

*Figures for 1 km cable C_i = 200 pF/m and L_i = 660 nH/m

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

Capacitance: ≤ 200 pF/m for max. total of: 200 nF.
Inductance: ≤ 660 nH/m for max. total of: 660 µH

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