

HB PRODUCTS LINEAR POSITION SENSORS HYDRAULICS

HBSL Split sensor

HB Products linear position sensors designed for position control on hydraulic systems.

Used for measuring of position and movement of cylinders, e.g. pitch control on wind power applications



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Introduction

HB Products linear position sensors designed for position control on hydraulic systems.

Used for measuring of position and movement of cylinders, e.g. pitch control on wind power applications.

Short body length and fast response compared to magnetostrictive and LVDT types (Linear Variable Differential Transformer) sensors.

Key features

- Works without neither magnet nor target tube due to innovative electronics developed by HB Products.
- Saving on assembly time and manufacturing costs as magnet or target tube need not be installed.
- Small transducer body length to stroke ratio.
- Rugged stainless steel construction
- Can be produced to comply with ATEX and cULus standards.
- 5 Years warranty.
- Hardened steel guide eliminating possible wear down of the sensor.

Measuring principle

Non-contact True Position Measurement with Inductive Eddy Current Technology.

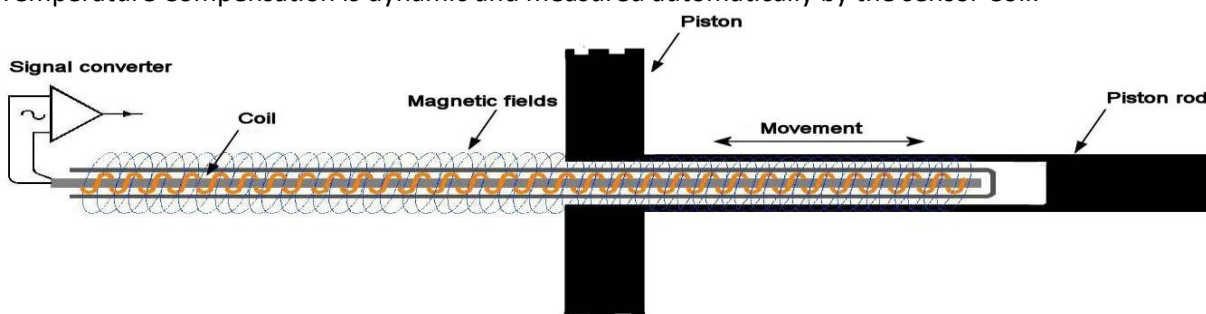
HB Products innovative electronics has made it possible to use steel as target material, which in many applications makes it possible to cut down on manufacturing costs and avoid mounting a magnet or separate target tube.

The Eddy Current non-contact measuring principle has been used for displacement and position sensing on industrial applications for more than 30 years.

Function

Eddy current transducer performance is dependent on the impedance coupling between the electromagnetic field in the sensor coil and the eddy currents in the conductive target (see illustration below). Sensor performance is related to the change in sensor coil impedance over the calibrated range of target motion.

The electrical parameters of target material resistivity and permeability determine the performance capability of inductive measuring systems. Both magnetic and nonmagnetic materials can provide high output sensitivity in terms of impedance change per unit of target displacement. Typically aluminium has been used as target material as steel has a lower output and need more accurate circuit tuning. Temperature Compensation is dynamic and measured automatically by the sensor Coil.



Technical data

Supply voltage and load:

12-30V DC
 Max 1,0W

Signal output:

SSI, Start/Stop-Impulse, RS422
 4-20 mA

Measuring range:

100 - 2000mm

Operating temperature:

-40/+100°C (-40/+212°F)

Resolution:

Infinite (digital 0,1mm)

Pressure:

Max 375 bar

Current draw:

Max 40mA

Linearity:

Better than 0,02%/FS

Repeatability:

0,003% of FS

Update time:

50m.sec ± 10m.sec

Temperature coefficient:

Better than 40ppm/deg.C



NOTE on update time!

Calculation of how fast update time should be: Max speed is execution of the emergency stop.

E.g. if the desired time is 5 sek and the stroke is 500mm, the speed is 100mm/sec. To control this, the sensor must be ten times faster, in this case 0,5 sec = 500 m.sec

Approvals

The sensor complies with the approvals below

EMC Test

EMC Emission EN61000-3-2
 EMC Immunity EN61000-4-2

Vibration resistance:

IEC 68-2-6, 10g, 10 to 2000Hz

Environmental test, incl.

Damp heat cyclic, Low storage temperature, Sinus vibration, Shock test, Dry heat test and Cooling test.

HALT

Highly Accelerated Life Test

Design and function

The sensor consists of a pressure proof stainless steel pipe (in which the sensor coil is mounted) connected to the electronic housing by a cable.

All components are fully sealed with two compound potting material. In the sensor coil this eliminates any risk of short circuit and in the electronic housing this eliminates any risk of condense. On the tip of the sensor a hardened steel guide ensures no possible wear down of the steel pipe.

The sensor has a measuring range from 100 to 2000 mm.

The signal transmitted is a Start/Stop-Impulse or a 4 - 20 mA analogue signal.

Cable connection is M12 plug.

Installation instruction

The sensor is installed by

- Mounting the electrical connection housing on the cylinder with two M4 fixing screws
- Leading the cable through the cable bore
- Pushing the sensor head to the end position, after checking o-ring and backup-ring are mounted
- Locking the sensor head with the M4 locking screw and secure the thread with Loctite
- Shortening the cable length according to the position of the electronic connection box
- Connecting the cables to the terminals inside the electrical connection box



NOTE!

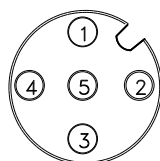
O-ring and backup-ring are to be mounted before mounting sensor head.

Electrical connection

Connecting sensor cable to electronic box:

- 1 = black coil
- 2 = white coil
- 3 = shield

M12 Conector



M12 Plug connection:

- 1 = Brown, supply +11 to 30V DC
- 2 = White, 4-20mA Output
- 3 = Blue, minus (common)
- 4 = Black, digital output (option)
- 5 = Grey, digital output (option)

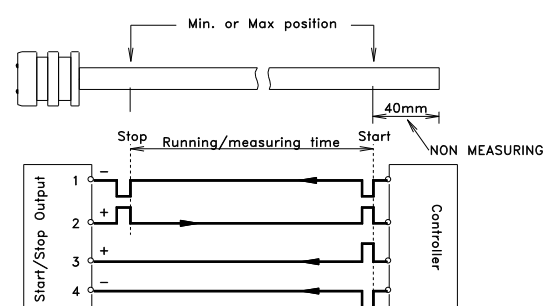
Calibration

Calibration is to be carried out according to instructions below

Output signal type: SSI, Start/Stop Interface

The sensor does **not** need to be calibrated.

The Start/Stop Interface signal is converted by the main operating controller system.

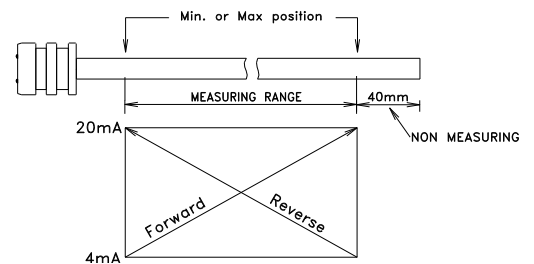


Output signal type: 4- 20 mA

Usually the min. calibration point is chosen to be 4 mA and the max. calibration point to be 20 mA. Calibration after installation and before operation is required

Adjusting the min. /max. calibration points Only for sensors with 4-20 mA output

1. Apply Supply voltage minimum 5 minutes before calibration
2. Push the calibration button for 5 seconds to get into calibration mode (the flashing of the red LED stops).
3. Move the cylinder position to 0% and pres the calibration button once (the red LED will go on for a while indicate the registration of 0% position).
4. when the red LED has gone off 100% calibration can be carried out by moving the cylinder the end position.



5. In the end position push the calibration button twice (the red LED flashes quickly to indicate the registration of 100% position).
6. When the LED flashes normally the calibration is completed.
7. The green LED indicates end position:
 - < 1% = green LED flashes quickly
 - > 99% = green LED constantly on

Please note: The current mA output is activated as soon as the flashing sequence has changed from rapid to slowly flashing.

LED indication

When voltage is applied the green LED will flash slowly.

Normal operation:

At normal operation the green LED will be flashing slowly.
 The green LED will commence flashing quickly when piston position is < 1%
 The green LED will go on constantly when piston position is > 99%

Calibration mode:

Red LED is only active during calibration.
 Se "adjusting min/max calibration points" (only valid for sensors with 4-20 mA output)

Mechanical construction



Note!

- Bore in piston rod must be min. 12 mm, max. 15mm (min 0,47 in max 0,59 in)

	Split type (S)
Measuring range, mm (in.)	100... 2000 mm (3,94... 78,74)
Total length (L), mm (in.)	...
Dead zone	40 mm (1,57)
Sensor diameter mm (in.)	10 mm (0,394)
Mechanical connection	Sealed with o-ring/backup ring Fixed with M4 locking screw
Enclosure (electronic box)	IP65
Electrical connection	M12
Material sensor	Stainless AISI 316L
Housing	Cast aluminium, with coating

Ordering code

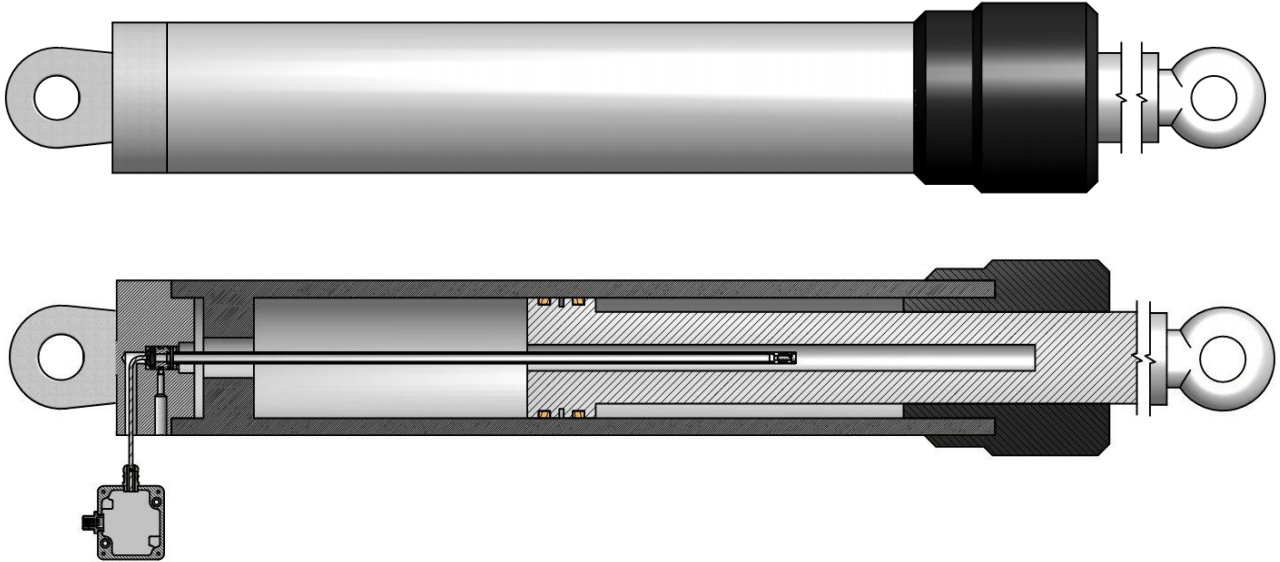
Type	Out put	Thread size	Stroke:	Housing	Connection
HBLS-	SSI	M18	100 mm	S (split)	M12
	mA	xx (custom)	...	B (bolt in)	DIN 43650
			2000 mm	E (external)	xx (custom)

Eg. ordering code for

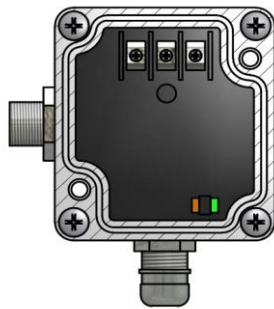
HBLS-SSI-xx-0453-S-M12

- SSI: Start/Stop Interface
- xx: M4 locking screw
- Stroke: 453 mm
- S: split version
- M12: connection

Illustrations



Position sensor in split version (S)



Connection housing (without cover)

