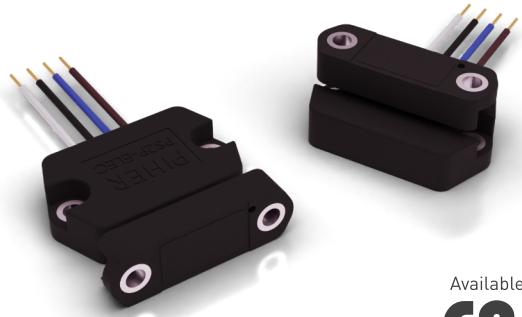


# PS2P-LIN

## Touchless Hall-Effect Linear Position Sensor



Available with  
**CAN**

### KEY FEATURES



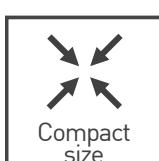
#### True touchless operation

Without any internal or external gears or linkages the sensor is easily assembled and calibrated and free from wear and tear over lifetime.



#### Unlimited mechanical life

The separation of electronics and magnet module allows for a virtually unlimited lifetime independent of number of revolutions.



#### Compact and low profile package

Without the need for a shaft the sensor is provided in a exceptionally compact and low profile package that fits in space constraint applications.



#### Made for harsh environments

IP69K sealing, high operating temperature range as well as shock and vibration resistance allow the use in the most demanding environments.



#### Adaptable to your requirements

Custom mechanical design, programmable transfer function and switch outputs as well as different output protocols and redundancy levels available.



#### Configurable measurement range

Accurate linear displacement feedback of up to 25mm. Other/higher ranges are available upon request.

### DESCRIPTION

Piher Sensing Systems' PS2P-LIN compact linear position sensor delivers true touchless sensing for harsh industrial and vehicle environments in a low profile and robust magnetic design.

Magnet and sensor module are placed in separate housings without the need for any gears, bearings or linkages and can be placed anywhere on the moving object. This allows for easy mounting, thereby delivering additional cost reduction on the production line. Furthermore, without wear and tear of radial forces product reliability and lifetime are increased significantly.

The PS2P-LIN measures changes in linear position relative to the sensor by detecting the movement of a magnetized magnet that is located in a separate housing and is only sensitive to the flux density co-planar with the IC surface.

The PS2P series is complemented by touchless rotary (PS2P-CON) and variable airgap arc (PS2P-ARC) position sensors. All sensors of the series are absolute sensors and will deliver the same level of precision and stability throughout their lifetime as on the first day they are installed - despite extremes of vibration, shock, temperature and contamination.

### APPLICATIONS

#### Off-Highway

- ▶ Bucket position
- ▶ Pedal / throttle position
- ▶ Hitch position
- ▶ Bus suspension / kneeling position
- ▶ Transmission systems

#### Automotive

- ▶ Transmission systems
- ▶ Gear shift position
- ▶ Park lock sensor

#### Home & Building Automation

- ▶ HVAC damper actuator monitoring

#### Marine

- ▶ Trim / tilt position

#### Industrial

- ▶ Machinery
- ▶ Monitoring of hydraulic valves and controls
- ▶ IoT modules

# PS2P-LIN

## Touchless Hall-Effect Linear Position Sensor

### MECHANICAL SPECIFICATIONS

|                                |                     |
|--------------------------------|---------------------|
| Life                           | Virtually unlimited |
| Nominal air gap                | 3mm                 |
| Maximum air gap <sup>1</sup>   | 5mm                 |
| Maximum allowed lateral offset | ±1mm                |

<sup>1</sup>For higher air gap please contact Piher Sensing Systems.

### ELECTRICAL SPECIFICATIONS

|                                |  |                                      |
|--------------------------------|--|--------------------------------------|
| Linearity <sup>1</sup>         | ±1% absolute (±0.5% upon request)                                    |                                      |
| Measurement range <sup>2</sup> | 0 mm to 12 mm<br>0 mm to 25 mm                                       |                                      |
| Output protocol                | Analog (Ratiometric), CAN, PWM<br>Serial Protocol (SPI) upon request |                                      |
| Output                         | Simple<br>Redundant<br>Full-redundant                                |                                      |
| Switch                         | On request   |                                      |
| Resolution                     | Analog, CAN, PWM<br>SPI  | Up to 12 bit<br>Up to 14 bit         |
| Supply voltage <sup>3</sup>    | 5V ±10%<br>7V to 15V<br>7V to 32V                                    |                                      |
| Supply current                 | Single version<br>Redundant version<br>CAN version                   | Typ 8.5 mA<br>Typ 17 mA<br>Typ 47 mA |
| Voltage protection             | ±10V   |                                      |
| Self-diagnostic features       | Yes  |                                      |

<sup>1</sup>Ferromagnetic materials close to the sensor (i.e. mounting surface) may affect the sensor's linearity.

<sup>2</sup>For other/higher linear range please contact Piher Sensing Systems.

<sup>3</sup>Voltages up to 25 V possible on request.

### ENVIRONMENTAL SPECIFICATIONS

|  |   |  |
|--|---|--|
| Operating and storage temperature <sup>1</sup> | -40° to +125°C                                |  |
| Shock  | 50g   |  |
| Vibration                                      | 5Hz to 2000 Hz; 20g; A <sub>max</sub> 0,75 mm |  |
| Sealing <sup>2</sup>                           | IP67, IP69K                                   |  |
| Approval                                       | CE <sup>2</sup>                               |  |

<sup>1</sup>Other specifications available

<sup>2</sup>CE-approval applies to analogic models.

### EMI/EMC Testing

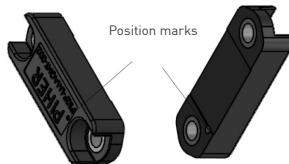
| Characteristic                         | Standard             | Level  |
|--|----------------------|--|
| Radiated emissions                     | CISPR 16-2-3 class B | 30 MHz to 230 MHz, max. 30dB (µV/m)<br>230 MHz to 1000 MHz, max. 37dB (µV/m) |
| ESD on housing and connections         | EN 61000-4-2:2009    | ±4 kV contact<br>±8 kV air   |
| Burst (on supply lines / signal lines) | EN 61000-4-4:2012    | ±1kV   |
| Surge (on supply lines / signal lines) | EN 61000-4-5:2014    | ±1kV   |
| Immunity HF radiated (80 ... 2000 MHz) | EN 61000-4-3:2006    | 10 V/m   |
| Immunity HF conducted (0,15 ... 80MHz) | EN 61000-4-6:2014    | 10 Vemk  |
| Immunity magnetic field (50 Hz)        | EN 61000-4-8:2010    | 30 A/m   |

# PS2P-LIN

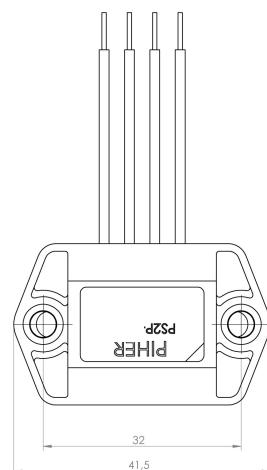
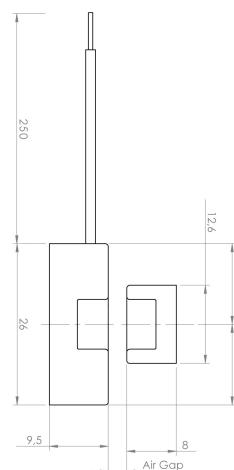
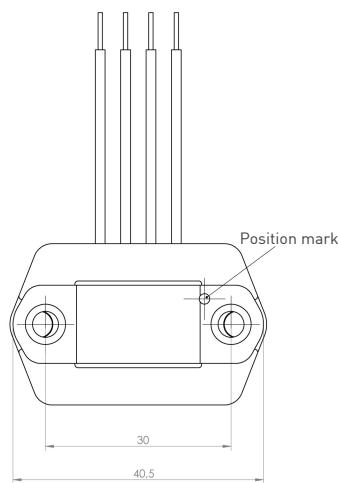
## Touchless Hall-Effect Linear Position Sensor

### DIMENSIONS (MM)

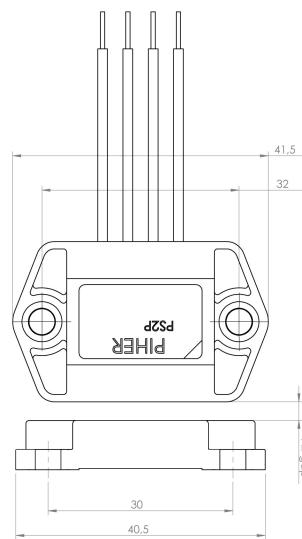
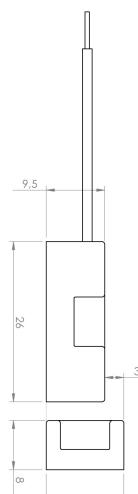
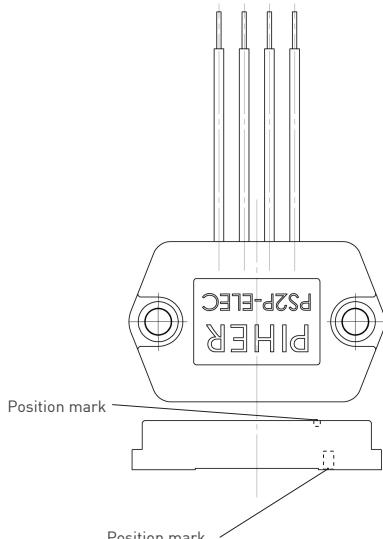
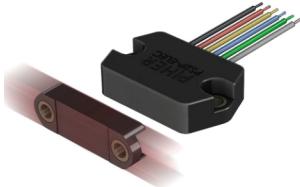
#### PS2P-LIN-CE (magnet positioned on top)



Download the STEP file here:  
[www.piher.net](http://www.piher.net)



#### PS2P-LIN-LA (magnet positioned laterally)



Magnet shown on 50% position. Nominal air gap: 3mm, higher on request

Drawings may not be to scale. Number and function of wires pictured in this datasheet may vary according to output configuration.

# PS2P-LIN

## Touchless Hall-Effect Linear Position Sensor

### HOW TO ORDER (Example: PS2P-LIN-CE-M002-1A0-L0000-ELS120-05)

#### Simple Output

|          |                 |              |      |                     |                              |                                     |                             |                               |     |   |   |   |
|----------|-----------------|--------------|------|---------------------|------------------------------|-------------------------------------|-----------------------------|-------------------------------|-----|---|---|---|
| PS2P-LIN | —               | —            | M002 | —                   | 1                            | —                                   | L                           | —                             | ELS | — | — | — |
| Series   | Magnet position | Magnet model | Type | Output <sup>1</sup> | Output function <sup>2</sup> | Electric linear stroke <sup>3</sup> | Voltage supply <sup>4</sup> | PWM Frequency Hz <sup>5</sup> |     |   |   |   |

CE = on top  
LA = lateral

M002

1 = simple

A0 = analogic  
P0 = PWM  
J0 = CAN SAE J1939  
O0 = CAN OPEN

L0000  
L0001  
L0021  
L0025

ELS120 = 12mm  
ELS250 = 25mm  
ELSXYZ = XY,Zmm

05 = 5V ±10%  
RE = 7V-15V  
[empty] = 200Hz  
F100 = 100Hz  
F101 = 101Hz  
...  
F999 = 999Hz

05 = 5V ±10%  
RE = 7V-15V  
[empty] = 200Hz  
F100 = 100Hz  
F101 = 101Hz  
...  
F999 = 999Hz

#### Redundant output

|          |                 |              |      |                     |                              |                                     |                             |                                   |                                   |   |   |   |
|----------|-----------------|--------------|------|---------------------|------------------------------|-------------------------------------|-----------------------------|-----------------------------------|-----------------------------------|---|---|---|
| PS2P-LIN | —               | —            | M002 | —                   | 2                            | —                                   | L                           | —                                 | ELS                               | — | — | — |
| Series   | Magnet position | Magnet model | Type | Output <sup>1</sup> | Output function <sup>2</sup> | Electric linear stroke <sup>3</sup> | Voltage supply <sup>4</sup> | PWM Frequency Hz [1] <sup>5</sup> | PWM Frequency Hz [2] <sup>5</sup> |   |   |   |

CE = on top  
LA = lateral

M002

2 = redundant

AA = analogic  
PP = PWM

L0002  
L0016

ELS120 = 12mm  
ELS250 = 25mm  
ELSXYZ = XY,Zmm

05 = 5V ±10%  
RE = 7V-15V  
[empty] = 200Hz  
F100 = 100Hz  
F101 = 101Hz  
...  
F999 = 999Hz

05 = 5V ±10%  
RE = 7V-15V  
[empty] = 200Hz  
F100 = 100Hz  
F101 = 101Hz  
...  
F999 = 999Hz

#### Full-redundant output

|          |                 |              |      |                     |                              |                                     |                             |                                   |                                   |   |    |   |
|----------|-----------------|--------------|------|---------------------|------------------------------|-------------------------------------|-----------------------------|-----------------------------------|-----------------------------------|---|----|---|
| PS2P-LIN | —               | —            | M002 | —                   | 3                            | —                                   | L                           | —                                 | ELS                               | — | 05 | — |
| Series   | Magnet position | Magnet model | Type | Output <sup>1</sup> | Output function <sup>2</sup> | Electric linear stroke <sup>3</sup> | Voltage supply <sup>4</sup> | PWM Frequency Hz [1] <sup>5</sup> | PWM Frequency Hz [2] <sup>5</sup> |   |    |   |

CE = on top  
LA = lateral

M002

3 = full-redundant

AA = analogic  
PP = PWM

L0002  
L0016

ELS120 = 12mm  
ELS250 = 25mm  
ELSXYZ = XY,Zmm

05 = 5V ±10%  
RE = 7V-15V  
[empty] = 200Hz  
F100 = 100Hz  
F101 = 101Hz  
...  
F999 = 999Hz

05 = 5V ±10%  
RE = 7V-15V  
[empty] = 200Hz  
F100 = 100Hz  
F101 = 101Hz  
...  
F999 = 999Hz

1 The analog output is ratiometric, proportional:

- for supply voltage "5V" to input voltage;
- for supply voltage "RE" to 5V.

2 Other output functions available, please check availability. Enter LXXXX as long as the new output function is not defined.

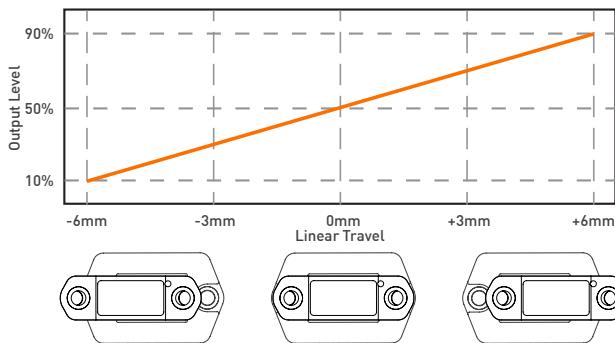
3 ELS is measured in steps of 0.1mm, min. ELS050 = 5mm effective electrical stroke, max. ELS250 = 25mm effective electrical stroke. Larger strokes available on request.

4 Voltages up to 25V possible on request.

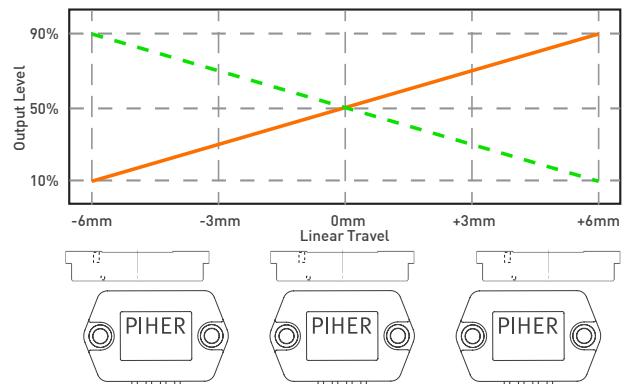
5 Leave empty if not applicable. Default frequency is 200 Hz

#### OUTPUT VOLTAGE DEPENDING ON MAGNET POSITION

PS2P-LIN-CE-M002-1A0-L0000-ELS120-05



PS2P-LIN-LA-M002-2AA-L0002-ELS120-05

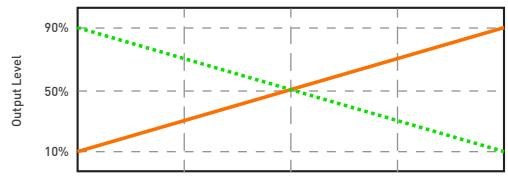


Custom output functions with up to 4 programmable points on request.

# PS2P-LIN

## Touchless Hall-Effect Linear Position Sensor

### OUTPUT FUNCTIONS

|  | ELS | Standard | Inverted | Redundant |
|--|-----|----------|----------|-----------|
| <br>ELS<br>120 → -6      0      6<br>250 → -12.5      0      12.5 | 120 | L0000    | L0001    | L0002     |
|  | 250 | L0021    | L0025    | L0016     |

Custom output functions on request

### CONNECTION SCHEME

| Color  | Simple 5V     | 7V to 15V     | Redundant 5V    | 7V to 15V       | Full-redundant  | CAN          |
|--------|---------------|---------------|-----------------|-----------------|-----------------|--------------|
| Brown  | Power supply  | Power supply  | Power supply    | Power supply    | Power supply 1  | Power supply |
| Blue   | Ground        | Ground        | Ground          | Ground          | Ground 1        | Ground       |
| Black  | Signal output | Signal output | Signal output 1 | Signal output 1 | Ground 2        | CAN High     |
| White  | n/a           | n/a           | Signal output 2 | Signal output 2 | Signal output 2 | CAN Low      |
| Red    | n/a           | n/a           | n/a             | n/a             | Power supply 2  | n/a          |
| Yellow | n/a           | n/a           | n/a             | n/a             | Signal output 1 | n/a          |
| Grey   | n/a           | Not used      | n/a             | Not used        | n/a             | n/a          |

More instructions of use on [www.piher.net](http://www.piher.net). Connector assembly available on request.



Please always use the latest updated datasheets and 3D models published on our website.

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