SPS SERIES

SMART Position Sensors

000674
Issue 10

DESCRIPTION

The SMART Position Sensor is one of the most durable, adaptable, and lightweight linear position sensors available in the industry, enabling highly accurate motion control and improving operation efficiency and safety. Its simple, non-contact design eliminates mechanical failure mechanisms, reducing wear and tear, improving reliability and durability, and minimizing downtime.

The SMART Position Sensor is a non-contacting sensing solution for absolute position sensing with enhanced accuracy. It senses the position of a magnet relative to the sensor in one of three available sensing ranges:

- 0 mm to 35 mm [0 in to 1.38 in]
- 0 mm to 75 mm [0 in to 2.95 in]
- 0 mm to 225 mm [0 in to 8.86 in]

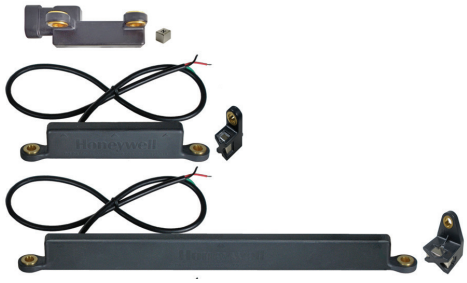
These sensors uses a patented combination of an ASIC (Application-Specific Integrated Circuit) and an array of MR (magnetoresistive) sensors to accurately and reliably determine the position of a magnet attached to a moving object so that the object's position can be determined or controlled.

The MR array measures the output of the MR sensors mounted along the magnet's direction of travel. The output and the MR sensor sequence determine the nearest pair of MR sensors to the center of the magnet location. The output of these two MR sensors is then used to determine the position of the magnet between them.

The SMART Position Sensor is available in both analog output (35 mm, 75 mm and 225 mm configurations).

FEATURES

- **Reliable:** Non-contact design reduces wear and tear, improving reliability and durability, and minimizing downtime
- Installation takes four simple steps (1: position sensor; 2: drill holes; 3: mount sensor; 4: locate magnet actuator/make electrical connection)
- **Rugged:** As there are no moving parts within the sensor, Honeywell utilizes unique packaging materials that make the sensor more resistant to vibration, shock, and extreme temperatures
- Air gap of up to 8,5 mm ±1,0 mm [0.334 in ±0.039 in] between sensor and magnet expands application opportunities; variety of output options (analog standard), expanding application opportunities
- **Accurate:** 35 mm configuration accurately measures values down to 0,04 mm [0.0016 in], 75 mm configuration accurately measures values down to 0,05 mm [0.002 in], while 225 mm configuration accurately measures value down to 0,14 mm [0.0055 in] (analog)
- **Adaptable:** Electronics on board allow for flexible packaging and component compatibility with existing systems
- More than 50 % lighter in weight than LVDT (Linear Variable Differential Transformer) technology
- Easy-to-configure sensor array fits virtually any linear movement path
- Self-diagnostics feature can reduce equipment downtime by providing predictive maintenance input
- IP67 and IP69K sealing allows use in many harsh applications
- Qualified for automotive grade EMI/EMC specification provides protection against environmental frequencies (35 mm configuration only)
- RoHS-compliant materials meet Directive 2002/95/EC



APPLICATIONS

(May not apply to all configurations.)

- Industrial: Valve position, material handling, plastic molding, cutting and slitting, wafer handling, CNC machines
- Transportation: Engine transmissions, passenger bus level position, truck-mounted crane outrigger position, heavy equipment attachment identification, hydraulic cylinders, marine motors
- Aerospace: Aircraft actuators

PORTFOLIO

In addition to the SPS Series Linear configurations, other configurations include the Arc and Rotary.

Honeywell

SMART POSITION SENSORS
SPS LINEAR SERIES

TABLE 1. 35 mm SPECIFICATIONS (Analog: SPS-L035-LATS)				
	Min.	**Typ.**	**Max.**	**Units**
Sensor Charactertistics				
Sensing range	0		35	mm
Supply voltage	4.75	5	5.25	Vdc
Supply current	–	–	20	mA
Output type	Ratiometric			
Output at min. pos	–	0.6	–	Vdc
Output at max. pos	–	4.2	–	Vdc
Full scale span	–	3.6	–	Vdc
Sensitivity	102	103	104	mV/mm
Linearity	± 1.0%			Full scale output
Resolution	40			µm
Update rate	476			µS
Reverse polarity	-5			V
Startup time	5			mS
Connector				
Termination	Tyco Super seal 282087-1 integral connector			
Cable bend radius	n/a			
Operating Environment				
Operating temperature	-40°C to 125°C [-40°F to 257°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	8,5 mm ±1,0 mm [0.334 in ±0.039 in]			
Ingress protection	IP67, IP69K			
Radiated immunity	100 V/m per ISO 11452-2			
Conducted immunity	100 mA BCI per ISO 11452-4			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz to 2000 Hz			
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 10 Nm [53.1 in-lb to 88.5 in-lb]			
Recommended Magnet				
Magnet	Neodymium Iron Boron			
Field strength	13500			Gauss

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows
a) Magnet out of range - Output ≤95 % of power rail.
b) Operational error - Output ≥5 % of power rail
Possible operational errors include a timeout while waiting for a bridge measurement, a master/slave communication error, an EEPROM checksum error, or a RAM parity error.

TABLE 2. 75 mm SPECIFICATIONS (Analog: SPS-L075-HALS)				
	Min.	**Typ.**	**Max.**	**Units**
Sensor Charactertistics				
Sensing range	0	–	75	mm
Supply voltage	6	–	24	Vdc
Supply current	–	–	32	mA
Output type	Regulated			
Output at min. pos	–	4.31	–	Vdc
Output at max. pos	–	0.561	–	Vdc
Full scale span	–	3.75	–	Vdc
Sensitivity	-48	-50	-52	mV/mm (negative slope)
Linearity	± 0.4%			Full scale output
Resolution	50			µm
Update rate	400			µS
Reverse polarity	-26.4 at 125 °C			V
Startup time	30			mS
Connector				
Termination	Flying leads			
Cable bend radius	40 mm [1.6 in] min.			
Operating Environment				
Operating temperature	-40°C to 125°C [-40°F to 257°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	3,0 mm ±2,5 mm [0.118 in ±0.098 in]			
Ingress protection	IP67, IP69K			
Radiated immunity	100 V/m per ISO 11452-2			
Conducted immunity	100 mA BCI per ISO 11452-4			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz to 2000 Hz			
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 10 Nm [53.1 in-lb to 88.5 in-lb]			
Recommended Magnet				
Magnet	Neodymium Iron Boron			
Field strength	10000			Gauss

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows
a) Magnet out of range - Output ≤95 % of power rail.
b) Operational error - Output ≥5 % of power rail
Possible operational errors include a timeout while waiting for a bridge measurement, a master/slave communication error, an EEPROM checksum error, or a RAM parity error.

Min position and max position of magnet should be represented in drawing

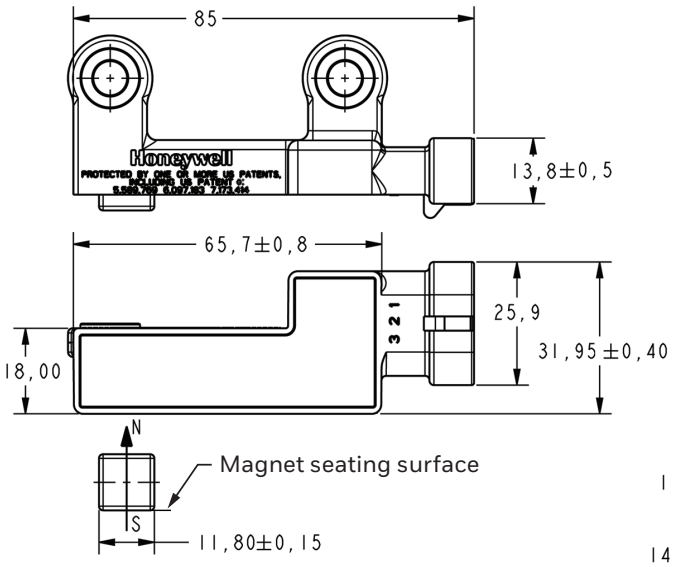
TABLE 3. 225 mm SPECIFICATIONS (Analog: SPS-L225-HALS)				
	Min.	**Typ.**	**Max.**	**Units**
Sensor Charactertistics				
Sensing range	0	–	225	mm
Supply voltage	6	–	24	Vdc
Supply current	–	–	34	mA
Output type	Regulated			
Output at min. pos	–	4.5	–	Vdc
Output at max. pos	–	0.5	–	Vdc
Full scale span	–	4	–	Vdc
Sensitivity	-17.07	-17.78	-18.49	mV/mm (negative slope)
Linearity	± 0.4%			Full scale output
Resolution	140			µm
Update rate	400			µS
Reverse polarity	-26.4 at 125 °C			V
Startup time	30			mS
Connector				
Termination	Flying leads			
Cable bend radius	40 mm [1.6 in] min.			
Operating Environment				
Operating temperature	-40°C to 125°C [-40°F to 257°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	3,0 mm ±2,5 mm [0.118 in ±0.098 in]			
Ingress protection	IP67, IP69K			
Radiated immunity	100 V/m per ISO 11452-2			
Conducted immunity	100 mA BCI per ISO 11452-4			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	10 G from 10 Hz to 2000 Hz			
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 10 Nm [53.1 in-lb to 88.5 in-lb]			
Recommended Magnet				
Magnet	Neodymium Iron Boron			
Field strength	13500			Gauss

Device used to read analog output must have input impedance greater than 100 KOhm.

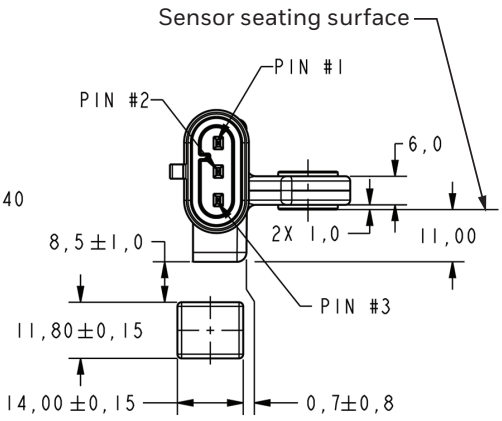
Sensor is able to output two diagnostic values as follows
a) Magnet out of range - Output ≤95 % of power rail.
b) Operational error - Output ≥5 % of power rail
Possible operational errors include a timeout while waiting for a bridge measurement, a master/slave communication error, an EEPROM checksum error, or a RAM parity error.

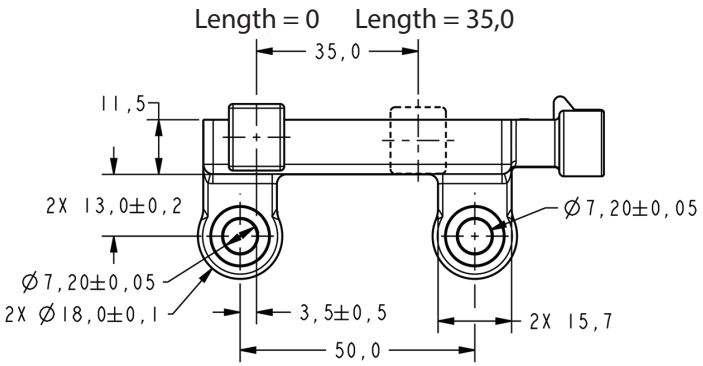
Min position and max position of magnet should be represented in drawing

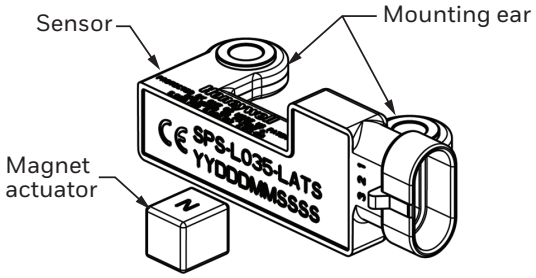
Figure 1. SPS-L035-LATS Mounting Dimensions and Sensor Output Performance Graph (for reference only: mm)



Pinout
1 = Vcc
2 = GND
3 = Output







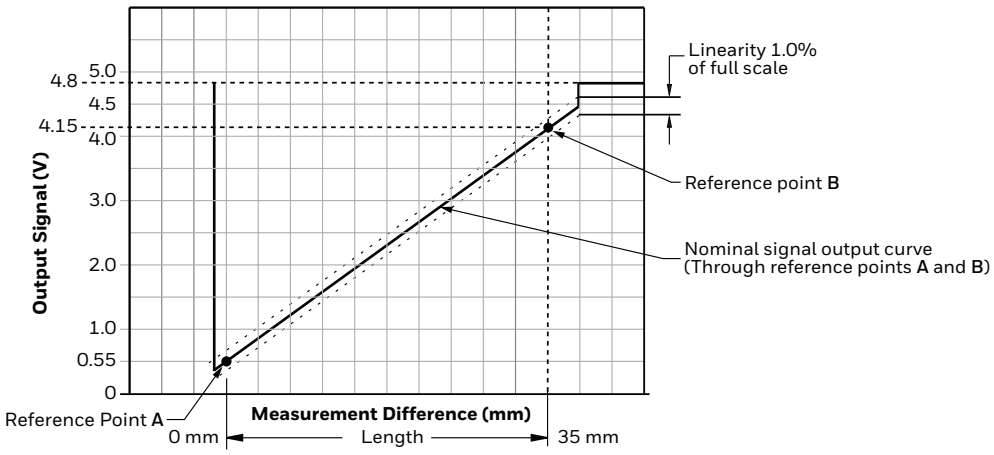
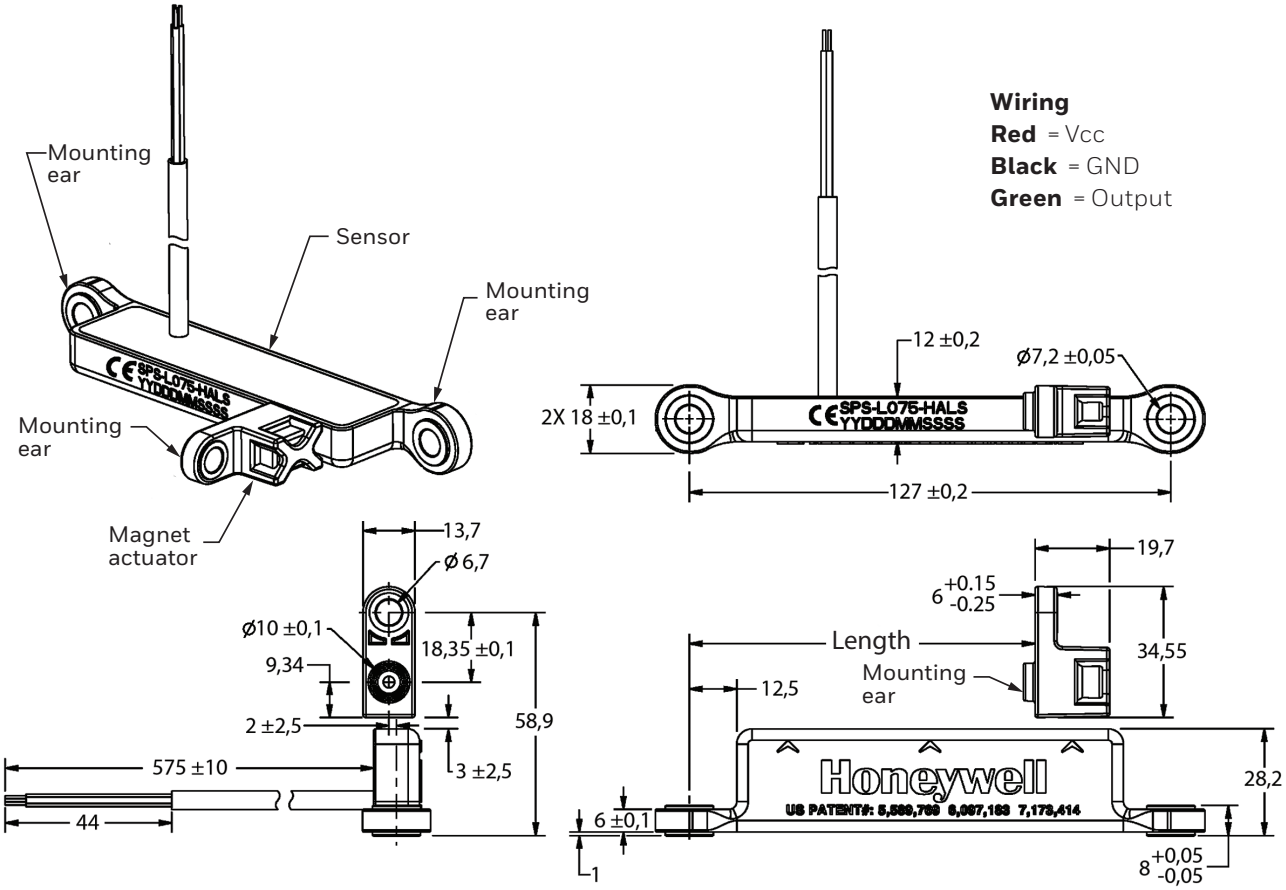


Figure 2. SPS-L075-HALS Mounting Dimensions and Sensor Output Performance Graph (for reference only: mm)



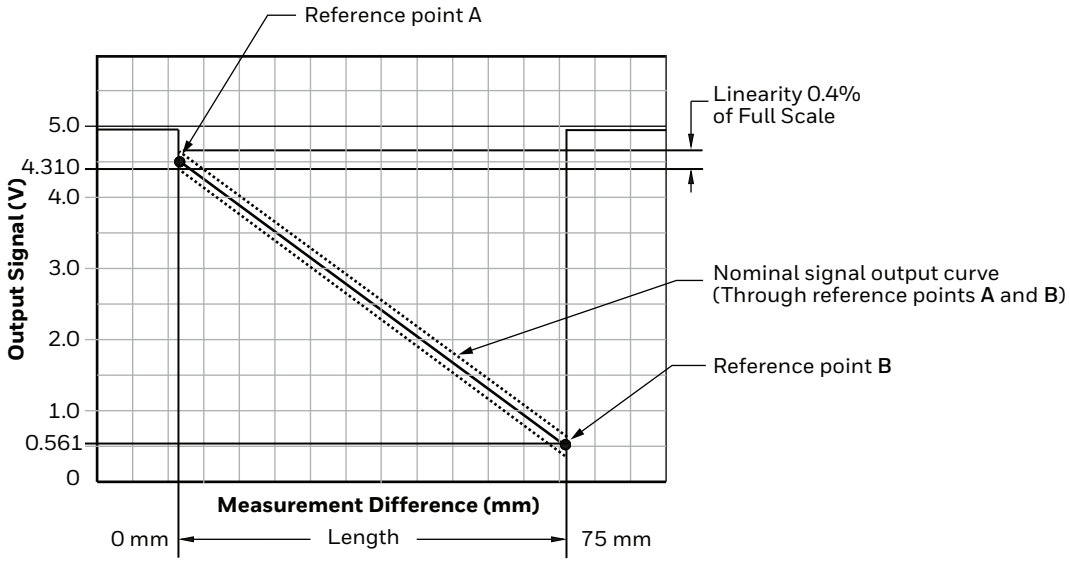
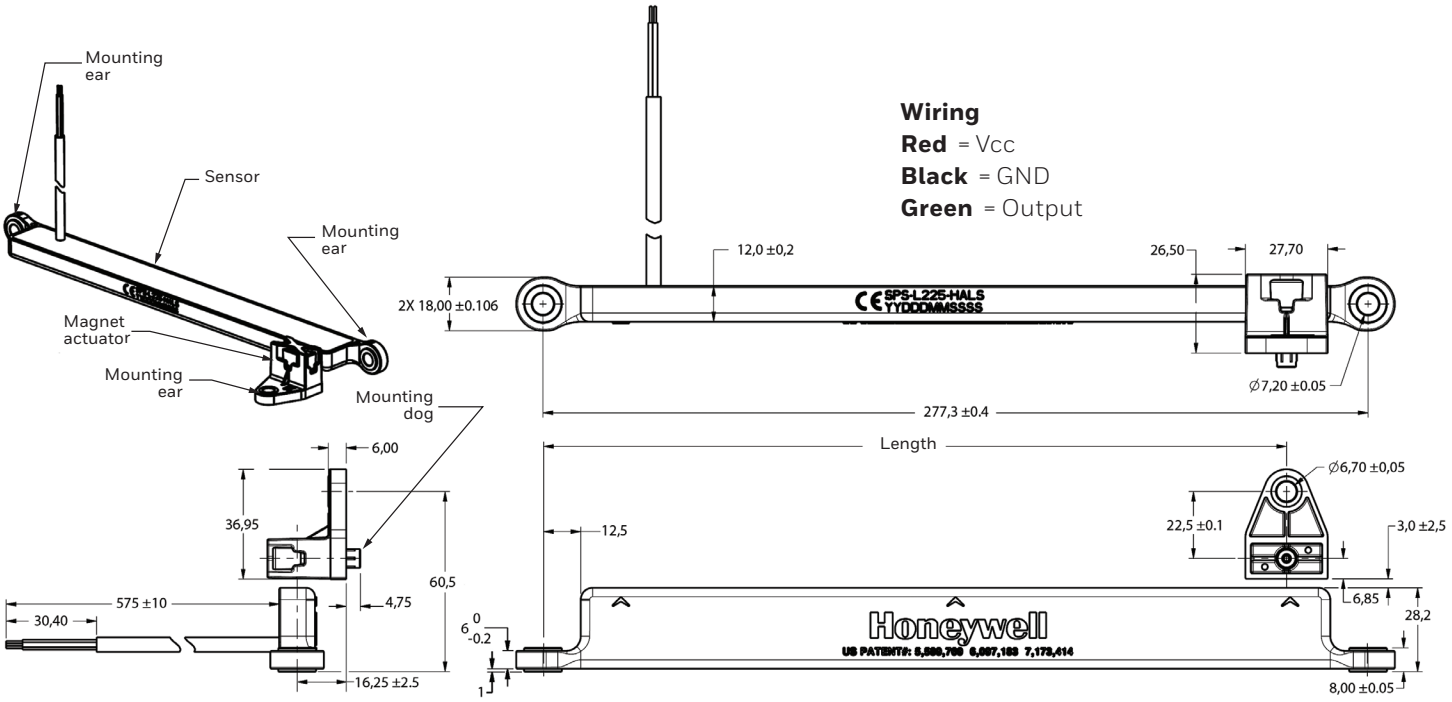


Figure 3. SPS-L225-HALS Mounting Dimensions and Sensor Output Performance Graph (for reference only: mm)



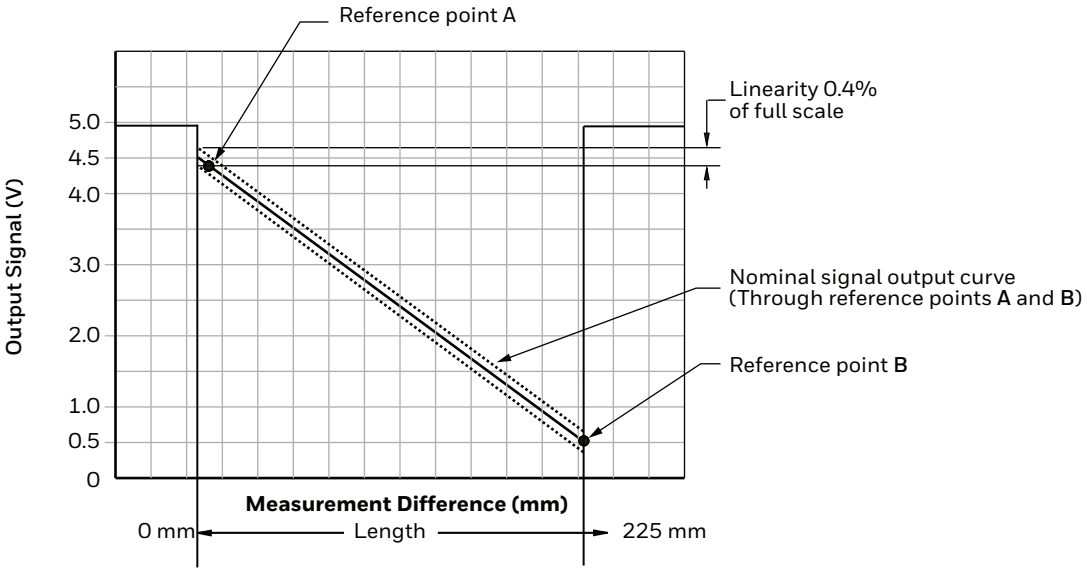


TABLE 4. ORDER GUIDE

CATALOG LISTING	DESCRIPTION
SPS-L035-LATS	SPS Series SMART Position Sensor, 35 mm linear configuration, 0 mm to 35 mm [0 in to 1.38 in] sensing range, 0.5 Vdc to 4.5 Vdc analog output, magnet actuator included (sensor also available separately)
SPS-L075-HALS	SPS Series SMART Position Sensor, 75 mm linear configuration, 0 mm to 75 mm [0 in to 2.95 in] sensing range, 0 Vdc to 5 Vdc analog output, magnet actuator included
SPS-L225-HALS	SPS Series SMART Position Sensor, 225 mm linear configuration, 0 mm to 225 mm [0 in to 8.86 in] sensing range, 0 Vdc to 5 Vdc analog output, magnet actuator included

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is buyer's sole responsibility to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

⚠ WARNING
PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING
MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

For more information

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000674-10-EN | 10 | 02/24
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