

Installation Instructions for the **SMART Position Sensor,** **35 mm, 75 mm and 225 mm Linear** **Configurations**

GENERAL INFORMATION

Why is the SMART Position Sensor smart? SMART means that this is a sensor that can essentially think for itself. The SMART Position Sensor has the ability to self-calibrate because it 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 (e.g., elevator, valve, machinery, etc.) so that the object's position can be determined.

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. With this sensor, Honeywell has utilized MR technology through the ASIC at a level never before accomplished.

MOUNTING AND WIRING INFORMATION (See Fig. 2.)

1. Locate sensor and magnet in desired position. Ensure:
 - Air gap between sensor and magnet does not exceed that given in Table 1.
 - Alignment of magnet along length of sensor does not exceed $2,0 \pm 2,5$ mm [0.078 ± 0.098 in] from the center line of each component.
2. Mount sensor:
 - Drill two holes, one for each mounting ear.
 - Secure sensor using two ¼-20 or M6 screws through each mounting ear.
 - Torque screws to 6 N m to 10 N m [53.1 in lb to 88.5 in lb].
3. Mount magnet (Does not apply to 35 mm version.):
 - Drill two holes:
 - One for the single mounting ear.
 - One at $10,25 \pm 0.10$ mm [0.403 ± 0.004] dia., and at least 3 mm [0.118 in] deep, for the mounting dog (helps stabilize magnet).
 - While ensuring the mounting dog is seated in its hole, secure magnet using one ¼-20 or M6 screw through the mounting ear.
 - Torque screws to 6 N m to 10 N m [53.1 in lb to 88.5 in lb].
4. Wire sensor according to the lead colors given in Table 1. (Does not apply to 35 mm version.)

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Table 1. Specifications

Characteristic	Component	Parameter				
		35 mm	75 mm	225 mm		
		analog (SPS-L035-LATS)	analog (SPS-L075-HALS)	analog (SPS-L075-HALS)	digital (SPS-L225-HDLS)	
Sensing range	sensor only	0 mm to 35 mm [0 in to 1.38 in]	0 mm to 75 mm [0 in to 32.95 in]	0 mm to 225 mm [0 in to 8.86 in]		
Resolution		0.04 mm [0.0016 in]	0,05 mm [0.002 in]	0,14 mm [0.0055 in]	0,0035 mm [0.000137 in]	
Supply voltage		4.75 Vdc to 5.25 Vdc	6 Vdc to 24 Vdc			
Output		0.55 Vdc to 4.15 Vdc	0 Vdc to 5 Vdc		RS 232-type digital	
Supply current		20 mA max.	32 mA max.	34 mA max.	88 mA max.	
Linearity ¹		±1.0% full scale output	±0.4% full scale output			
Reverse polarity		-5 V	26.4 V at 125 °C [257 °F]			
Sensitivity		103 mV/mm typ.	50 mV/mm typ.	17.78 mV/mm typ.	282.16 counts/mm typ.	
Update rate		476 µs	400 µs		3200 µs	
Baud rate			–		57.6 kbits/s	
Initial startup time			5 ms	30 ms		
Termination			TYCO Super Seal 282087-1 integral connector	flying leads		
Cable bend radius			–	40 mm [1.6 in] min.		
Operating temperature	sensor and magnet actuator	-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 ±1,0 mm [0.334 ±0.039 in]	3,0 ±2,5 mm [0.118 ±0.098 in]			
Sealing		IP67, IP69K				
Radiated immunity		100 V/m per ISO 11452-2	–			
Conducted immunity		100 mA BCI per ISO 11452-4	–			
Shock		50 G half sine wave with 11 ms duration				
Vibration		20 G from 10 Hz to 2000 Hz		10 G from 10 Hz to 2000 Hz		
Housing material		thermoplastic				
Approvals		CE				
Mounting: screws recommended torque		¼-20 or M6 6 N m to 10 N m [53.1 in lb to 88.5 in lb]				
Material		magnet ac- tuator only	neodymium iron boron			
Strength			13,500 Gauss	10,000 Gauss		

Note:

1. Percent linearity is the quotient of the measured output deviation from the best fit line at the measured temperature to the full scale output span.

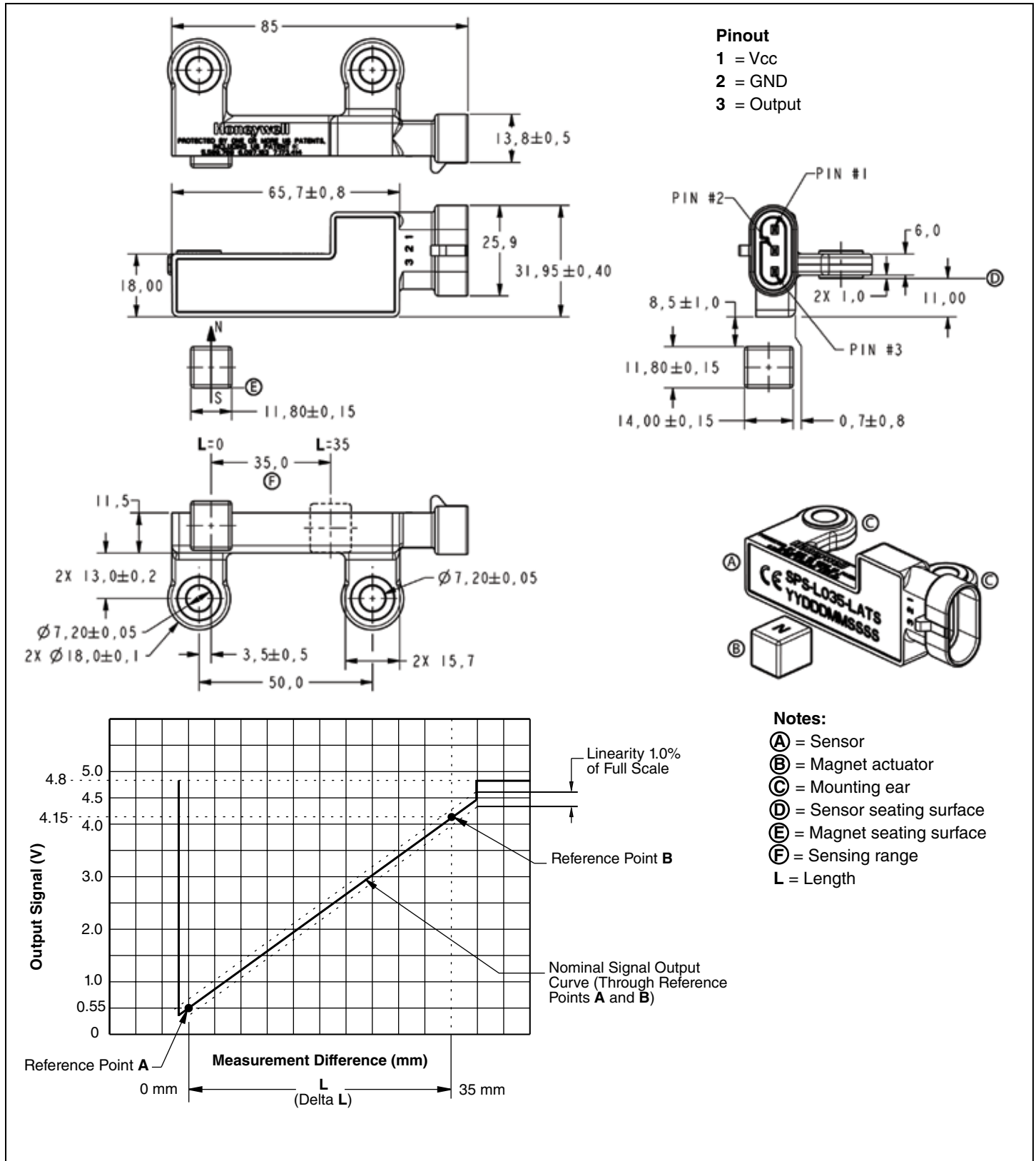
NOTICE

- Ferrous metal within a 100 mm [3.9 in] radius of the magnet actuator may affect sensor performance.
- Always use fresh, non-magnetic stainless steel washers when mounting the sensor.

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



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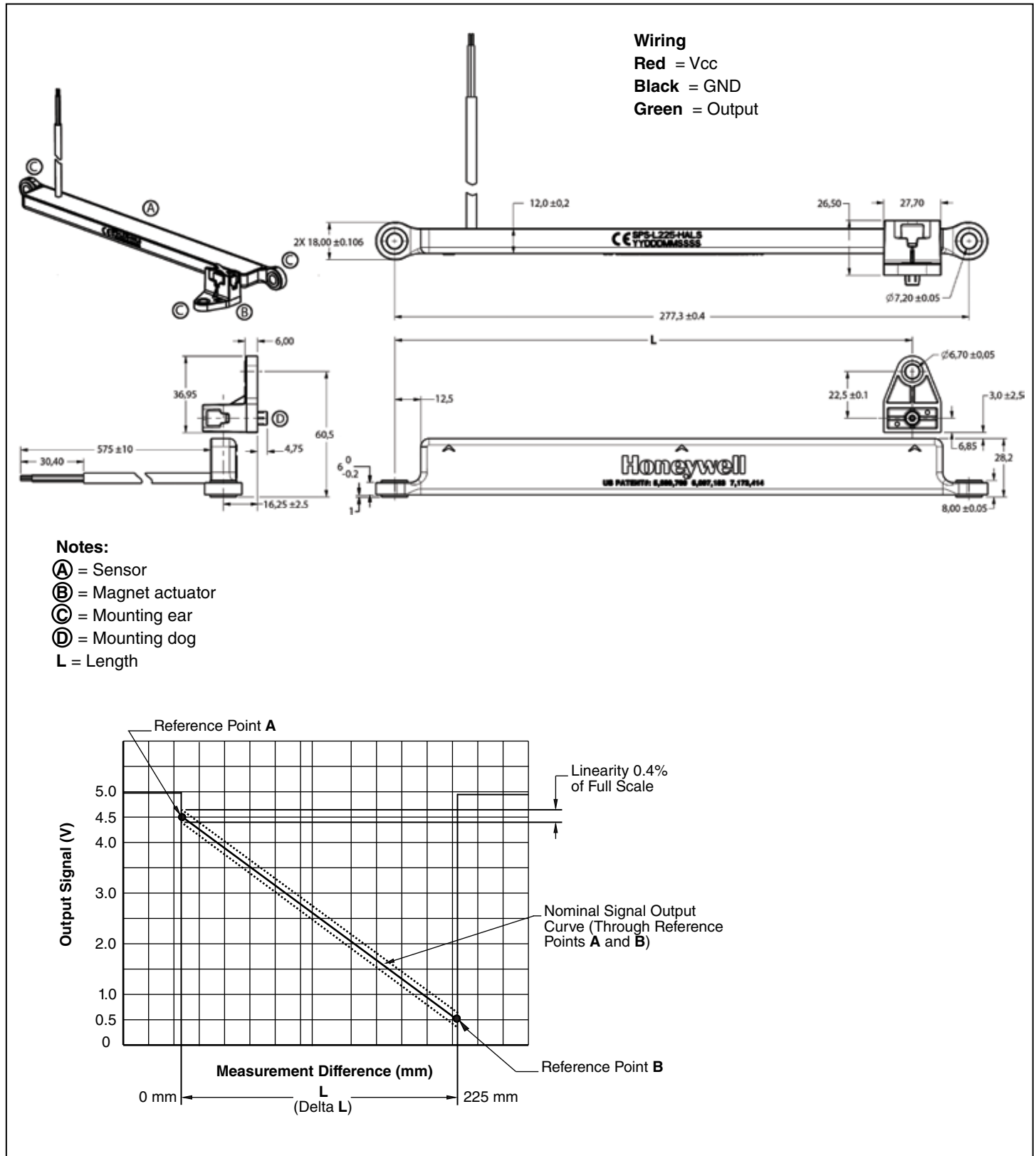
Wiring
 Red = Vcc
 Black = GND
 Green = Output

Notes:
 (A) = Sensor
 (B) = Magnet actuator
 (C) = Mounting ear
 (D) = Mounting dog
 L = Length

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



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Wiring
Red = Vcc
Black = GND
Green = Output

Notes:
 (A) = Sensor
 (B) = Magnet actuator
 (C) = Mounting ear
 (D) = Mounting dog
 L = Length

Output Signal (Counts) vs. Measurement Difference (mm)

Measurement Difference (mm)	Output Signal (Counts)
0 mm	63487
225 mm	65535

Linearity 0.4% of Full Scale

Nominal Signal Output Curve (Through Reference Points A and B)

Reference Point A

Reference Point B

Measurement Difference (mm) L (Delta L)

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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.

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