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# 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 (magneto-resistive) 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 [ $0.078 \pm 0.098$  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 [ $0.403 \pm 0.004$ ] 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<br>(SPS-L035-LATS)          | analog<br>(SPS-L075-HALS)                         | analog<br>( SPS-L075-HALS)          | digital<br>(SPS-L225-HDLS) |                     |
| Sensing range                             | sensor only  | 0 mm to 35 mm<br>[0 in to 1.38 in] | 0 mm to 75 mm<br>[0 in to 32.95 in]               | 0 mm to 225 mm<br>[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 <sup>1</sup>                    |  | ±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<br>282087-1<br>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<br>[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:<br>screws<br>recommended torque | ¼-20 or M6<br>6 N m to 10 N m [53.1 in lb to 88.5 in lb] |                                    |   |                                     |                            |                     |
| Material                                  | magnet ac-<br>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.

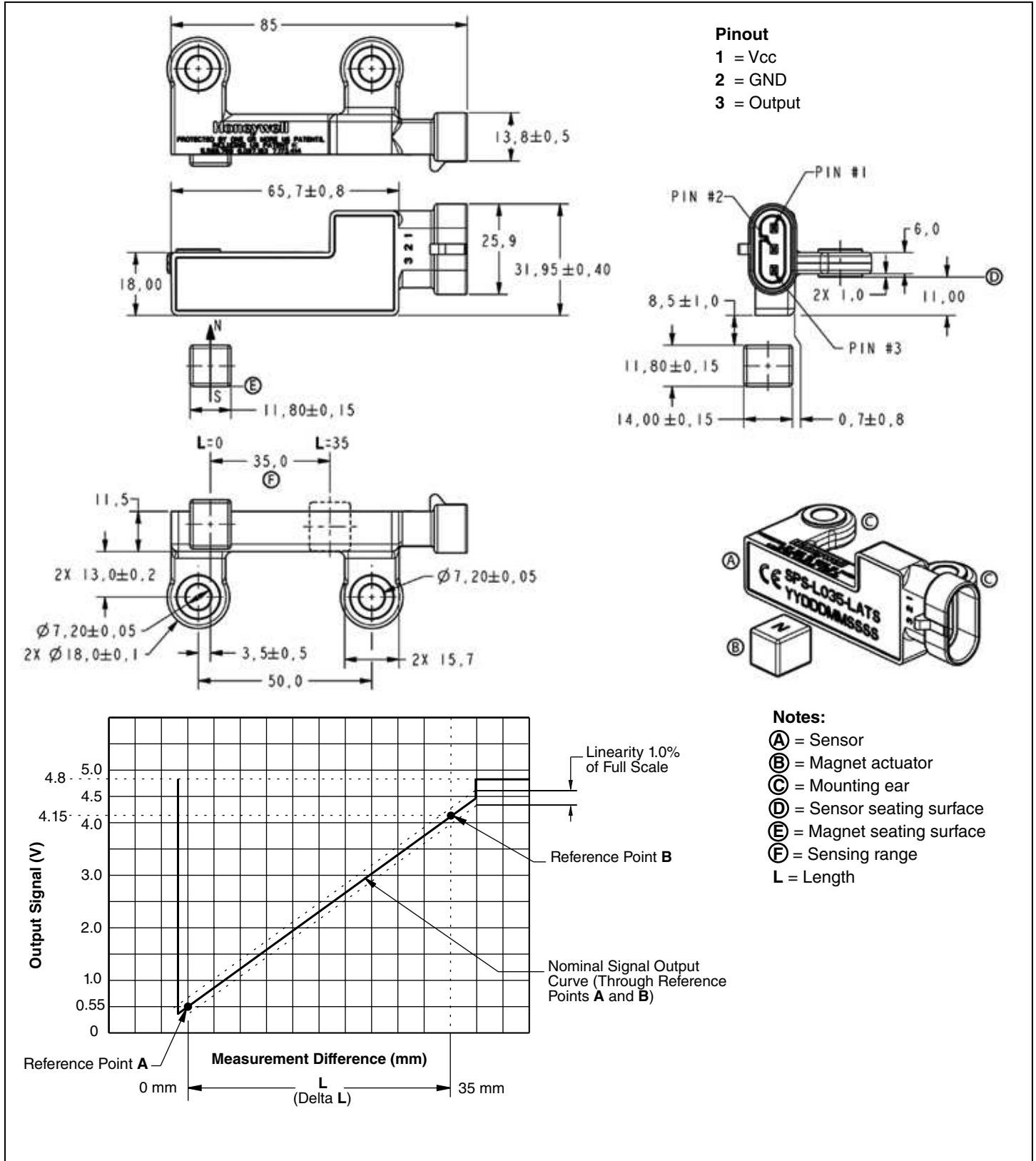
**NOTICE**

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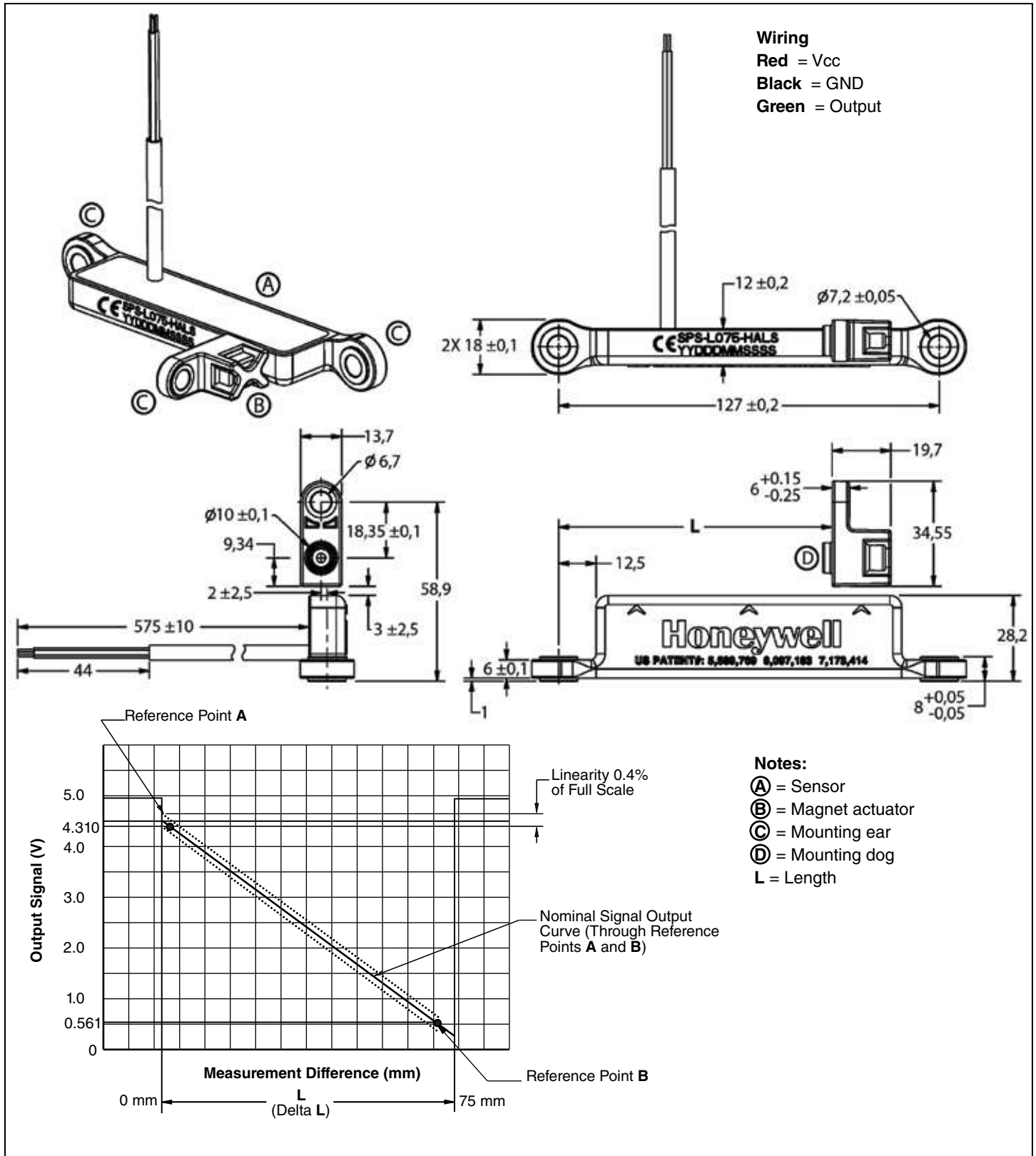
Figure 1. SPS-L035-LATS Dimensional Drawing (for reference only: mm) and Sensor Output Performance Graph



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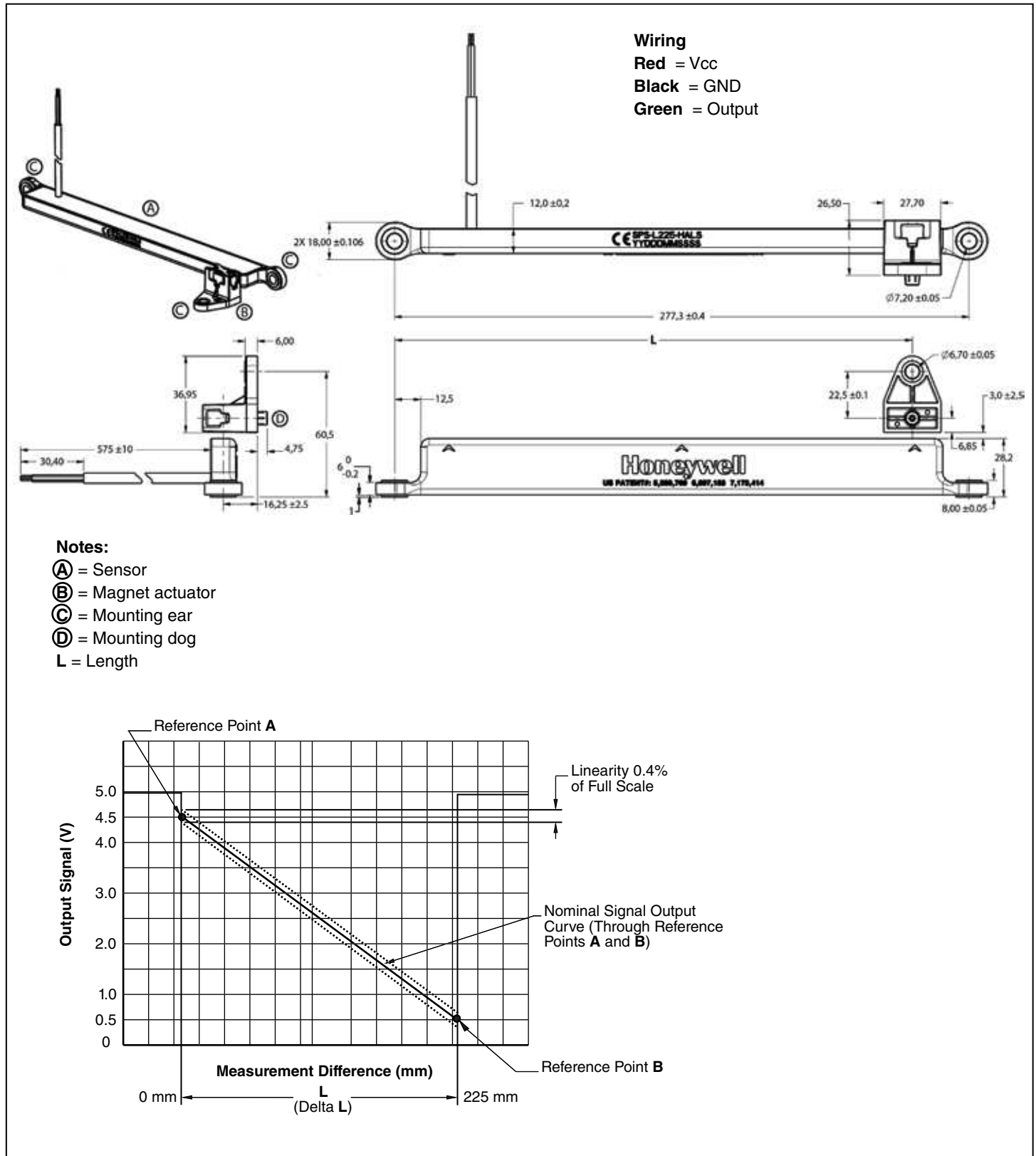
Figure 2. SPS-L075-HALS Dimensional Drawing (for reference only: mm) and Sensor Output Performance Graph



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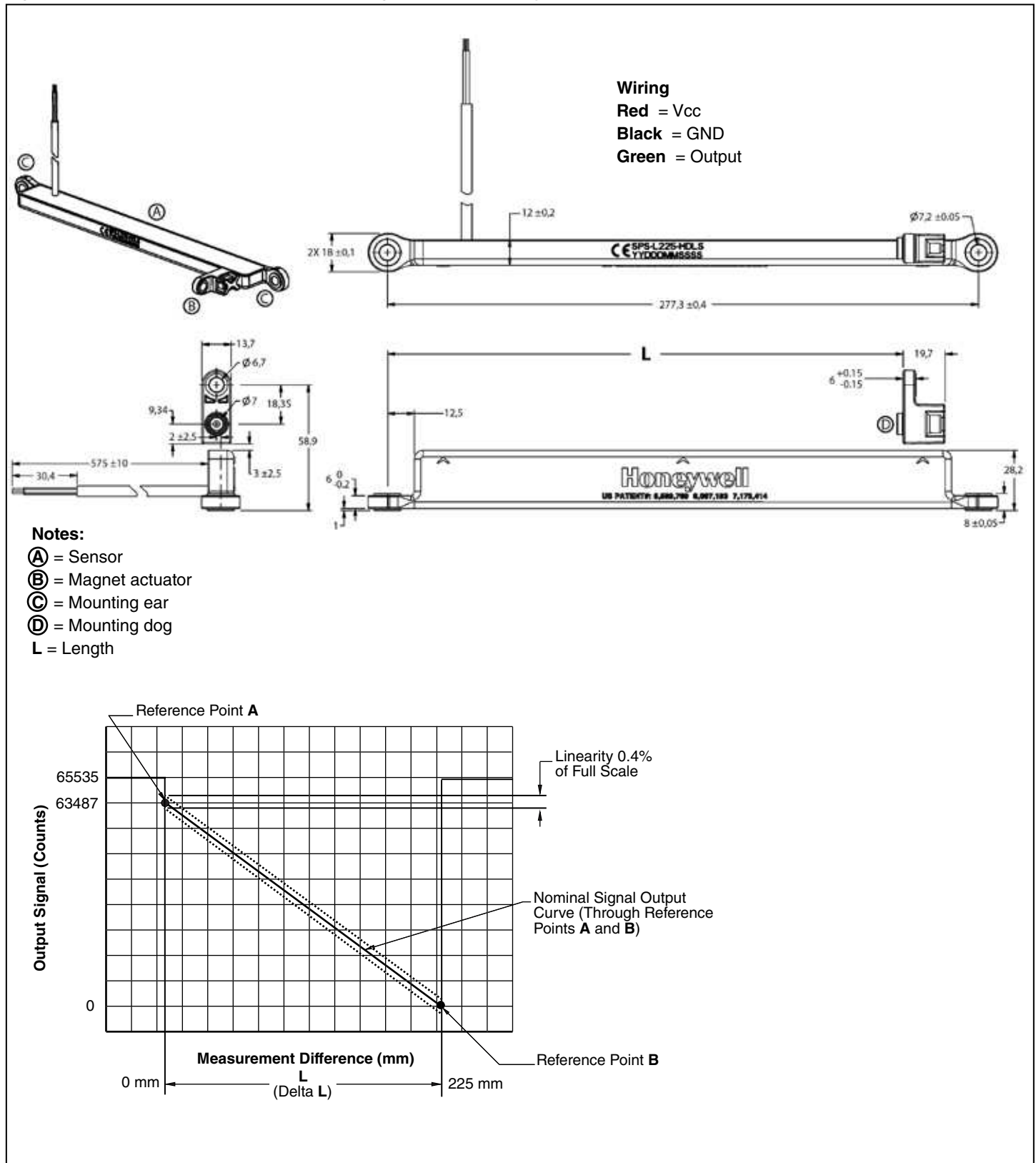
Figure 3. SPS-L225-HALS Dimensional Drawing (for reference only: mm) and Sensor Output Performance Graph



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Figure 4. SPS-L225-HDLS Dimensional Drawing (for reference only: mm) and Sensor Output Performance Graph



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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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