



# Industrial Servo Mount Hall Effect Sensor in Size 09 (22.2 mm)



### FEATURES

- Accurate linearity down to:  $\pm 0.5\%$
- All electrical angles available up to:  $360^\circ$  (no dead band)
- Long life: greater than 10M cycles
- Non contacting technology: Hall effect
- Model dedicated to all applications in harsh environments
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

| QUICK REFERENCE DATA |                                     |
|----------------------|-------------------------------------|
| Sensor type          | ROTATIONAL, single turn hall effect |
| Output type          | Output by turrets                   |
| Market appliance     | Industrial                          |
| Dimensions           | 7/8" (22.2 mm)                      |

| ELECTRICAL SPECIFICATIONS   |  |  |
|-----------------------------|--|--|
| PARAMETER                   | STANDARD   | SPECIAL  |
| Electrical angle            | 90°, 180°, 270°, 360°  | Any other angle upon request                       |
| Linearity                   | $\pm 1\%$  | $\pm 0.5\%$  |
| Supply voltage              | 5 V <sub>DC</sub> $\pm 10\%$   | Other upon request                                 |
| Supply current              | 10 mA typical/16 mA max.   | 16 mA for PWM output                               |
| Output signal               | Analog ratiometric 10 % to 90 % of V <sub>supply</sub> or PWM 1 kHz, 10 % to 90 % duty cycle | Other upon request                                 |
| Over voltage protection     |  | +20 V <sub>DC</sub>                                |
| Reverse voltage protection  |  | -10 V <sub>DC</sub>                                |
| Load resistance recommended |  | Min. 1 k $\Omega$ for analog output and PWM output |
| Hysteresis static           |  | < 0.2°   |

| MECHANICAL SPECIFICATIONS |                         |
|---------------------------|-------------------------|
| PARAMETER                 |                         |
| Mechanical travel         | 360° continuous         |
| Bearing type              | 2 ball bearings         |
| Standard                  | IP 50; other on request |

| ORDERING INFORMATION/DESCRIPTION                                     |   |                                |  |                         |   |  |                 |                  |             |
|--|---|--------------------------------|--|-------------------------|---|--|-----------------|------------------|-------------|
| 151HE  | 1   | A                              | 1  | T                       | A   | 2S12   | XXXX            | BO 10            | e1          |
| MODEL  | FEATURES                                    | LINEARITY                      | ELECTRICAL ANGLE   | OUTPUT TYPE             | OUTPUT SIGNAL   | SHAFT TYPE   | SPECIAL REQUEST | PACKAGING        | LEAD FINISH |
| 1:   | Continuous rotation and no antirotation pin | A: $\pm 1\%$<br>B: $\pm 0.5\%$ | 1: 90°<br>2: 180°<br>3: 270°<br>4: 360°<br>9: Other angles | T: Turrets<br>Z: Custom | A: Analog CW<br>B: Analog CCW<br>C: PWM CW<br>D: PWM CCW<br>Z: Other output | 2: 3.175 mm<br>9: Special<br>P: Plain<br>S: Slotted<br>Z: Other type |                 | Box of 10 pieces |             |
| Shaft length from mounting face 12 mm to 72 mm max. per step of 5 mm |   |                                |  |                         |   |  |                 |                  |             |

| SAP PART NUMBERING GUIDELINES |                     |           |                  |             |               |            |                 |
|-------------------------------|---------------------|-----------|------------------|-------------|---------------|------------|-----------------|
| 151HE                         | 1                   | B         | 9                | Z           | C             | 2P22       | XXXX            |
| MODEL                         | MECHANICAL FEATURES | LINEARITY | ELECTRICAL ANGLE | OUTPUT TYPE | OUTPUT SIGNAL | SHAFT TYPE | SPECIAL REQUEST |

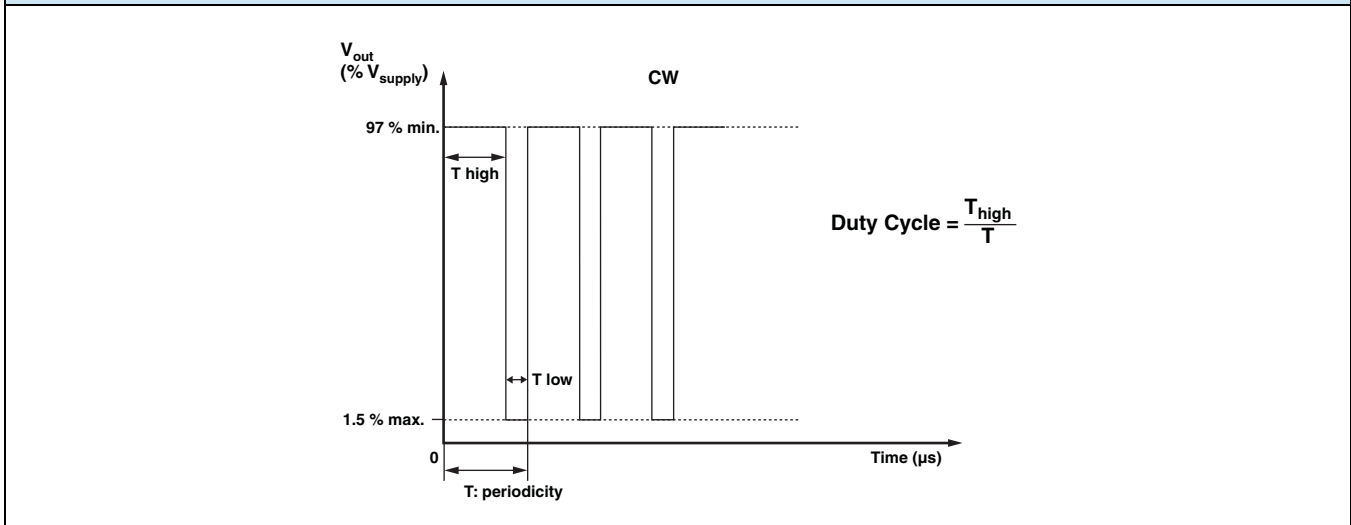


### V<sub>OUT</sub> ANALOG

|                       |           |           |
|-----------------------|-----------|-----------|
| Operating temperature | 85 °C     | 125 °C    |
| Diagnostic high level | 96 % min. | 96 % min. |
| Diagnostic low level  | 2 % max.  | 4 % max.  |



### V<sub>OUT</sub> PWM



| <b>DIAGNOSTIC MODES</b>                   |   |   |  |
|---|---|---|--|
| <b>FAILURE</b>                            | <b><math>V_{out}</math> ANALOG<br/><math>R_{pull-up}</math></b> | <b><math>V_{out}</math> ANALOG<br/><math>R_{pull-down}</math></b> | <b><math>V_{out}</math> PWM<br/><math>R_{pull-up} = 1\text{ k}\Omega</math><br/><math>V_{pull-up} = V_{supply} = 5\text{ V}</math></b> |
| 1: Broken GND                             | Diagnostic high area  | Diagnostic low area   | > 97 % $V_{supply}$<br>without modulation  |
| 2: Broken $V_{out}$                       | Diagnostic high area  | Diagnostic low area   | > 97 % $V_{supply}$<br>without modulation  |
| 3: Broken $V_{supply}$                    | Diagnostic high area  | Diagnostic low area   | > 97 % $V_{supply}$<br>without modulation  |
| Over voltage $V_{supply} > 7\text{ V}$    | Diagnostic high area  | Diagnostic low area   | > 97 % $V_{supply}$<br>without modulation  |
| Under voltage $V_{supply} < 2.7\text{ V}$ | Diagnostic high area  | Diagnostic low area   | > 97 % $V_{supply}$<br>without modulation  |

$V_{pull-up}$  can be independent to  $V_{supply}$

X Cut off

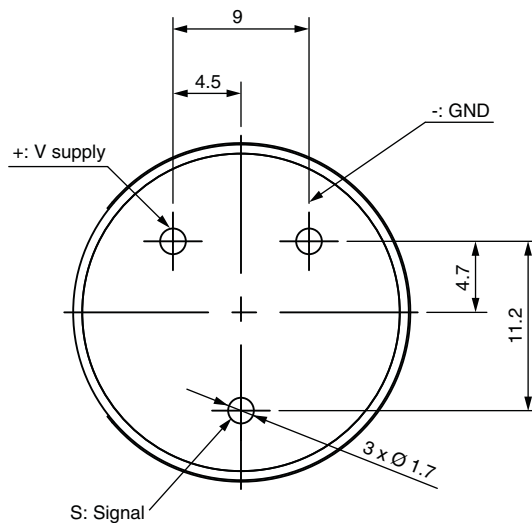
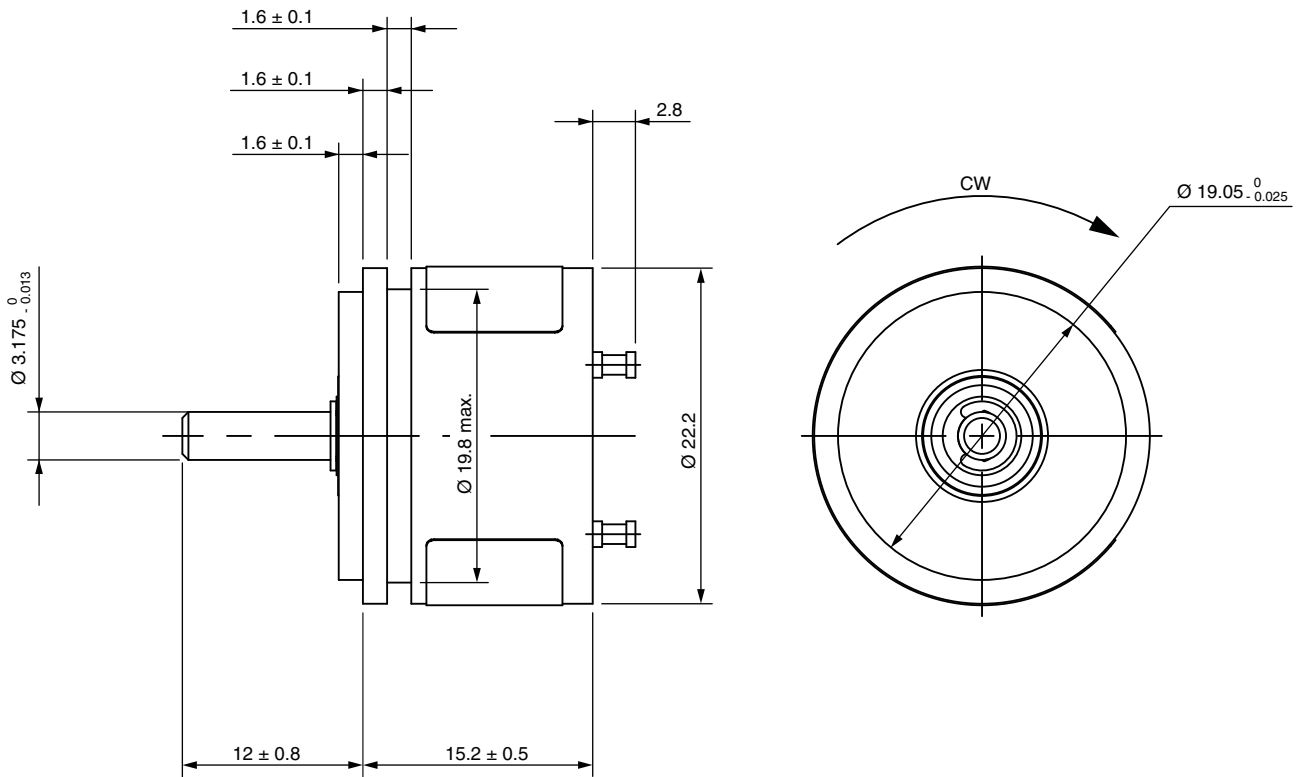
| <b>ENVIRONMENTAL SPECIFICATIONS</b>               |  |
|---|--|
| Vibrations  | 20 g from 10 Hz to 2000 Hz, EN 60068-2-6                           |
| Shocks  | 3 shocks/axis; 50 g half a sine 11 ms, EN 60068-2-7                |
| Operating temperature range                       | -45 °C; +125 °C  |
| Life  | > 10M of cycles  |
| Rotational speed (max)                            | 120 rpm  |
| Immunity to radiated electromagnetic disturbances | 200 V/m 150 kHz/1 GHz, IEC 62132-2 part 2 (level A)                |
| Immunity to power frequency magnetic field        | 200 A/m 50 Hz/60 Hz, EN 61000-4-8 (level A)                        |
| Radiated electromagnetic emissions                | 30 MHz/1 GHz < 30 dBμV/m, EN 61000-6-4 (level A)                   |
| Electrostatic discharges                          | Contact discharges: ± 4 kV<br>Air discharges: ± 8 kV, EN 61000-4-2 |
| <b>MATERIALS</b>                                  |  |
| Housing   | Anodized aluminum  |
| Mounting type                                     | Servo  |
| Shaft   | Stainless steel  |
| Output  | Standard: 3 turrets (other on request)                             |

**Note**

- Nothing stated herein shall be construed as a guarantee of quality or durability.



## DIMENSIONS in millimeters



Dimensions in mm  
General tolerances:  $\pm 0.5\text{mm}$



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