

## Ten Turns Servo or Bushing Mount Hall Effect Sensor in Size 09 (22.2 mm)


**FEATURES**

- All electrical angles available up to: 3600°
- Accurate linearity down to:  $\pm 0.5\%$
- Very long life: 50M cycles for servo, 10M cycles for bushing
- Non contacting technology: Hall effect; true power on sensor
- Model dedicated to applications requiring long life
- 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          | Multi Turn ROTATIONAL, hall effect |
| Output type          | Wires or rear turrets              |
| Market appliance     | Industrial                         |
| Dimensions           | 7/8" (22.2 mm)                     |

| ELECTRICAL SPECIFICATIONS   |  |                              |
|-----------------------------|--|------------------------------|
| PARAMETER                   | STANDARD   | SPECIAL                      |
| Electrical angle            | 10 turns 3600°   | 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              | < 16 mA for single   | < 32 mA for redundant        |
| Output signal               | Analog ratiometric 1 % to 99 % of V <sub>supply</sub> (other on request) or PWM 1 kHz, 10 % to 90 % duty cycle or SPI binary on 5 V or binary on 3.3 V |                              |
| 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           | 10° on drive shaft   |                              |

| MECHANICAL SPECIFICATIONS |  |
|---------------------------|--|
| PARAMETER                 |  |
| Mechanical travel         | 3600° continuous   |
| Bearing type              | A sleeve bearing for bushing model/2 ball bearings for servo model |
| Standard                  | IP 50; other on request  |
| Resolution                | 12 bits for analog and PWM, 14 bits for SPI                        |

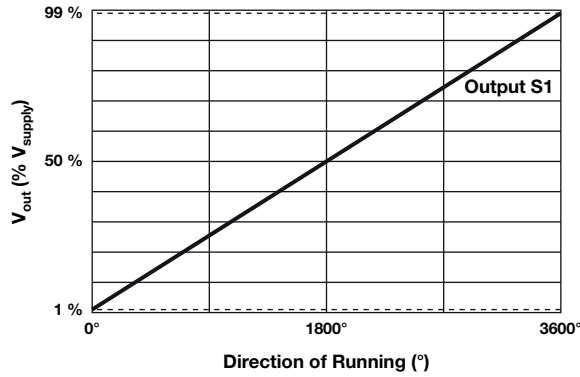
| ORDERING INFORMATION/DESCRIPTION                |                        |                           |                                |                                     |   |  |                 |                |             |
|---|------------------------|---------------------------|--------------------------------|-------------------------------------|---|--|-----------------|----------------|-------------|
| 34 THE  | B                      | 1                         | A                              | T                                   | A   | 2S22   | XXXX            | BO 1           | e1          |
| MODEL   | MOUNTING TYPE          | NUMBER OF SIGNALS         | LINEARITY                      | OUTPUT TYPE                         | OUTPUT SIGNAL   | SHAFT TYPE   | SPECIAL REQUEST | PACKAGING      | LEAD FINISH |
|   | B: Bushing<br>S: Servo | 1: Single<br>2: Redundant | A: $\pm 1\%$<br>B: $\pm 0.5\%$ | T: Turrets<br>Z: Custom<br>W: Wires | A: Analog CW<br>B: Analog CCW<br>C: PWM CW<br>D: PWM CCW<br>E: SPI CW <sup>(1)</sup><br>F: SPI CCW <sup>(1)</sup><br>G: Analog inverted slope<br>H: PWM inverted slope<br>K: SPI inverted slope <sup>(1)</sup><br>Z: Other output | 2: 3.175 mm<br>9: Special<br>P: Plain<br>S: Slotted<br>Z: Other type |                 | Box of 1 piece |             |
| Shaft length from mounting face standard: 22 mm |                        |                           |                                |                                     |   |  |                 |                |             |

**Note**
<sup>(1)</sup> SPI output → output type: Wires

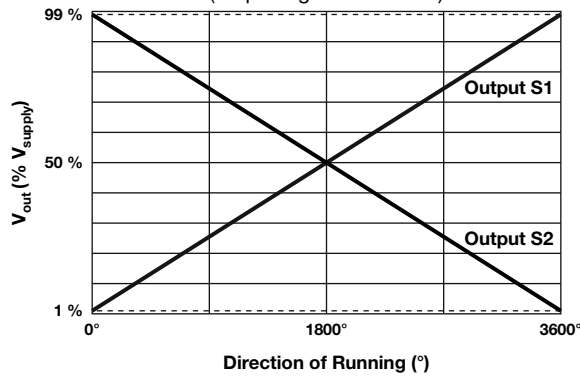
| SAP PART NUMBERING GUIDELINES |            |                  |                |             |               |            |                 |
|-------------------------------|------------|------------------|----------------|-------------|---------------|------------|-----------------|
| 34 THE                        | S          | 2                | B              | T           | C             | 2P12       | XXXX            |
| MODEL                         | SERVO TYPE | 2 OUTPUT SIGNALS | LINEARITY      | OUTPUT TYPE | OUTPUT SIGNAL | SHAFT TYPE | SPECIAL REQUEST |
|                               |            |                  | B: $\pm 0.5\%$ |             |               |            |                 |

**V<sub>OUT</sub> ANALOG**

**Single Output** (output signal code: "A")

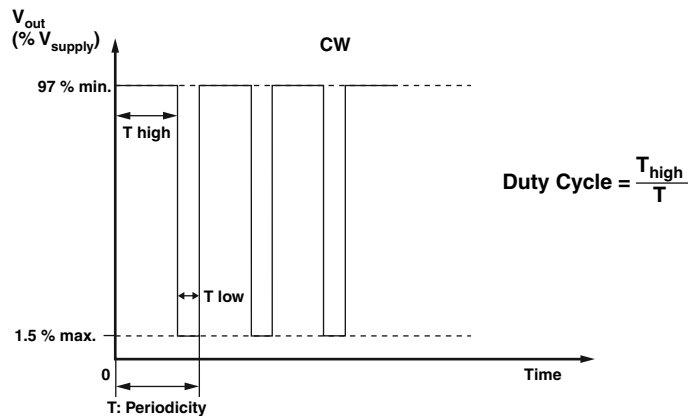


**Redundant Output: with inverted slope**  
(output signal code: "G")



**V<sub>OUT</sub> PWM**

**Single Output**: (output signal code: "C")



**V<sub>OUT</sub> SPI**

Notice on demand

Output signal code: "E" if CW (single or redundant identical)

Output signal code: "F" if CCW (single or redundant identical)

Output signal code: "K" if CW (if redundant but inverted slope)

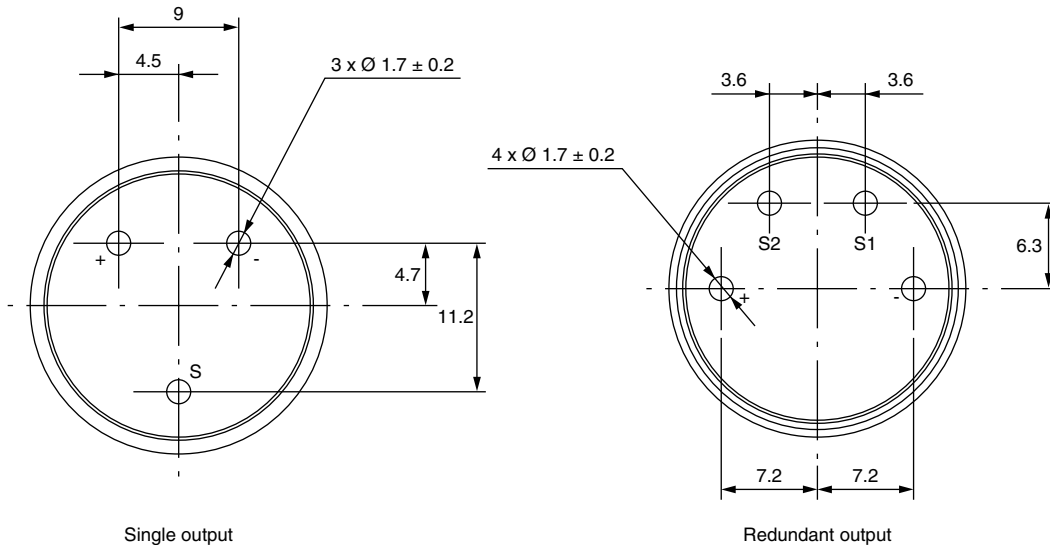
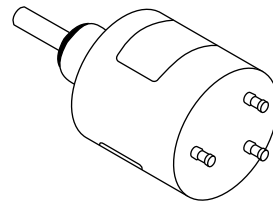
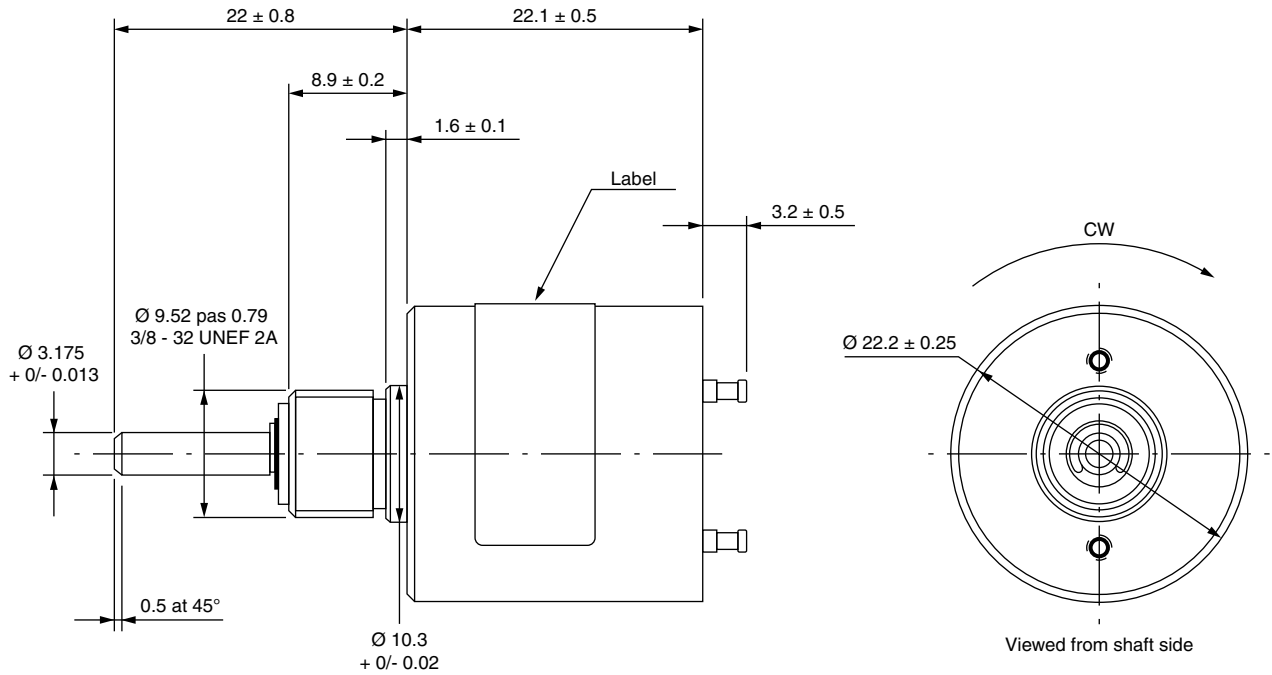


| MECHANICAL SPECIFICATIONS |  |                  |
|---------------------------|--|------------------|
| PARAMETER                 | STANDARD   | SPECIAL          |
| Mounting type             | Servo mounting type or bushing mount (delivered with nut and washer) |                  |
| Housing                   | Anodized aluminum  |                  |
| Shaft guiding             | 2 ball bearings for servo and sleeve bearing for bushing             |                  |
| Shaft                     | Stainless steel Ø 3.175  | Other on request |
| Outputs                   | Turrets  | Other on request |
| Mechanical travel         | 3600° and no stop  |                  |

| ENVIRONMENTAL SPECIFICATIONS                      |  |
|---|--|
| Operating temperature range                       | - 40 °C; + 85 °C   |
| Life  | > 10M of cycles for bushing<br>> 50M of cycles for servo           |
| Rotational speed (max.)                           | 1200 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 |
| Sine vibration on 3 axes                          | 1.5 mm or 20 g from 10 Hz to 2000 Hz                               |
| Mechanical shocks on 3 axes                       | 50 g, 11 ms, half sine   |

**DIMENSIONS** in millimeters

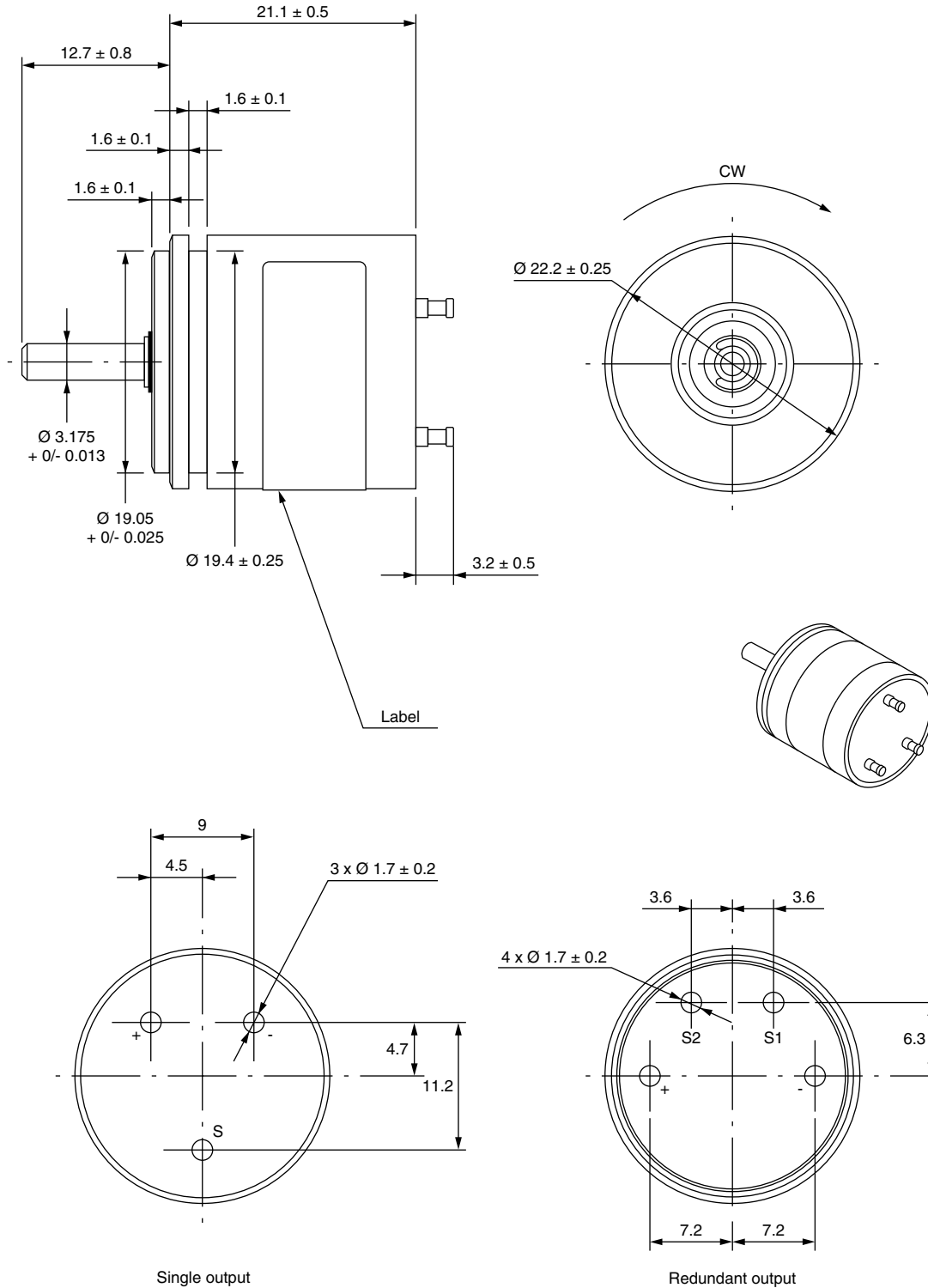
Drawing for bushing mount type: 34THEB...





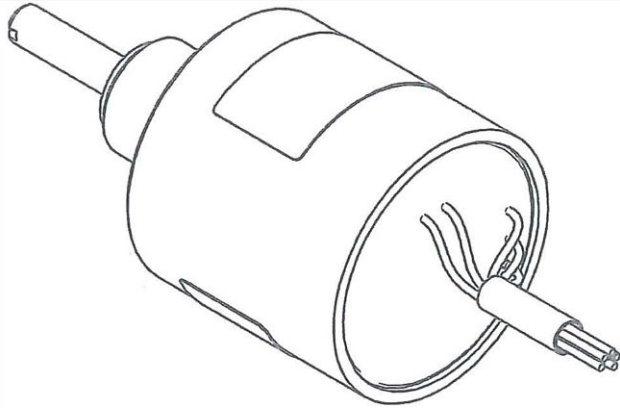
**DIMENSIONS** in millimeters

Drawing for servo mount type: 34THES...

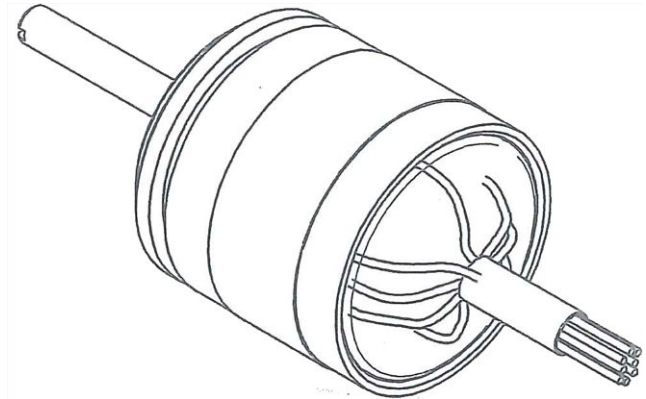


**BUSHING AND SERVO TYPES**

Output by wires for output signal "SPI" single and redundant



| SINGLE SPI OUTPUT (servo and bushing) |                     |
|---------------------------------------|---------------------|
| WIRE COLOR                            | OUTPUT              |
| Yellow                                | GND (-)             |
| Red                                   | MOSI                |
| Green                                 | V <sub>CC</sub> (+) |
| White                                 | SS                  |
| Blue                                  | SCLK                |



| REDUNDANT SPI OUTPUT (servo and bushing) |        |
|--|--------|
| WIRE COLOR                               | OUTPUT |
| Black                                    | V-     |
| Red                                      | V+     |
| Yellow                                   | O/I 1  |
| Blue                                     | CLK 1  |
| White                                    | /SS 1  |
| Green                                    | O/I 2  |
| Violet                                   | CLK 2  |
| Grey                                     | /SS 2  |



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