# 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: ± 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

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 | ± 1 % | ± 0.5 % |
| Supply voltage | 5 $V_{DC}$ ± 10 % | Other upon request |
| Supply current | < 16 mA for single | < 32 mA for redundant |
| Output signal | Analog ratiometric 1 % to 99 % of $V_{supply}$ (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 $V_{DC}$ | |
| Reverse voltage protection | - 10 $V_{DC}$ | |
| Load resistance recommended | Min. 1 kΩ 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**: ± 1 %<br>**B**: ± 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 (1)<br>**F**: SPI CCW (1)<br>**G**: Analog inverted slope<br>**H**: PWM inverted slope<br>**K**: SPI inverted slope (1)<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**

(1) 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: ± 0.5 % | | | | |

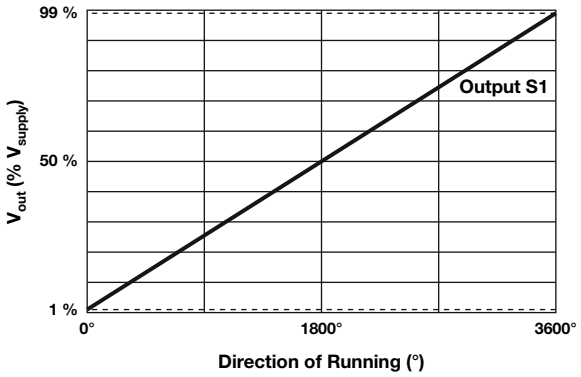


For technical questions, contact: sferprecisionpot@vishay.com

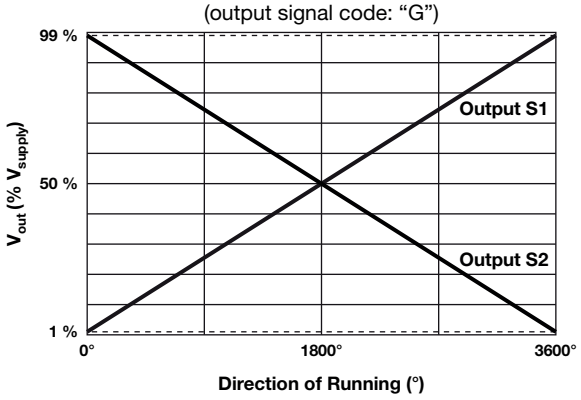
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## $V_{OUT}$ ANALOG

**Single Output** (output signal code: “A”)

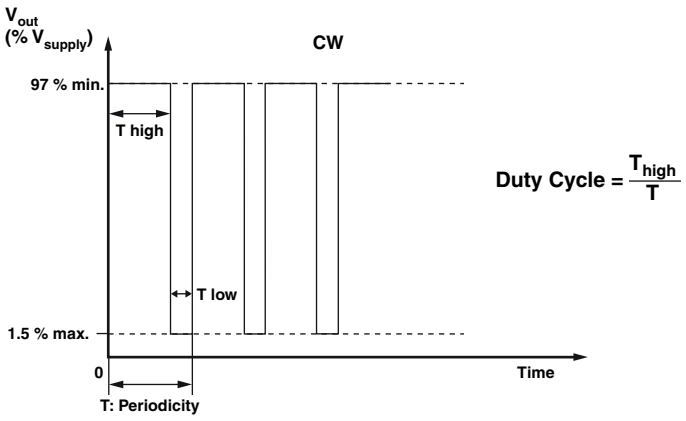



**Redundant Output: with inverted slope**
(output signal code: “G”)




## $V_{OUT}$ PWM

**Single Output:** (output signal code: “C”)




## $V_{OUT}$ 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)



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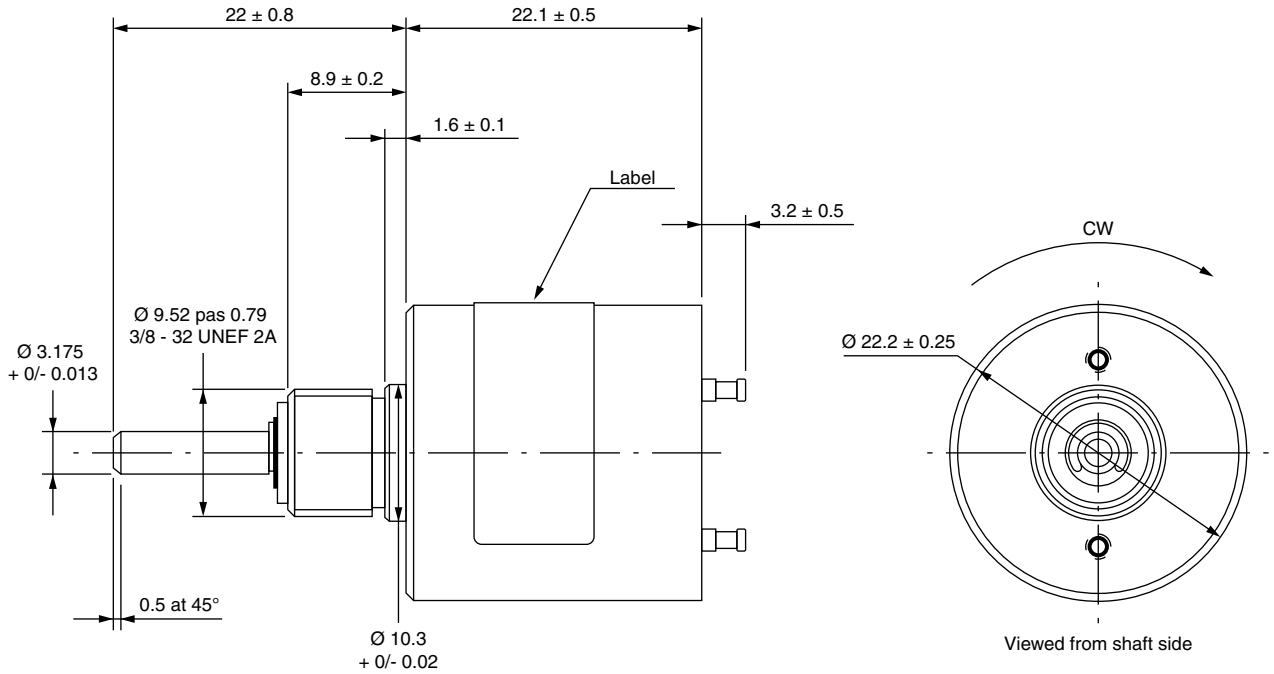
| MECHANICAL SPECIFICATIONS | | |
|---|---|---|
| **PARAMETER** | **STANDARD** | **SPECIAL** |
| Mounting type | Servo mounting type or bushing mount<br>(delivered with nut and washer) | |
| Housing | Anodized aluminum | |
| Shaft guiding | 2 ball bearings for servo and sleeve bearing for bushing | |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

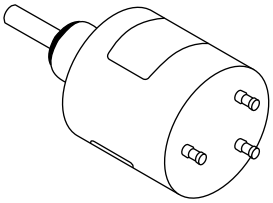
| ENVIRONMENTAL SPECIFICATIONS | |
|---|---|
| Operating temperature range | - 40 °C; + 85 °C |
| Life | > 10M of cycles for bushing<br>> 50M of cycles for servo |
| Rotational speed (max.) | 1200 rpm |
| Immunity to radiated electromagnetic disturbances | 200 V/m 150 kHz/1 GHz, IEC 62132-2 part 2 (level 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 |

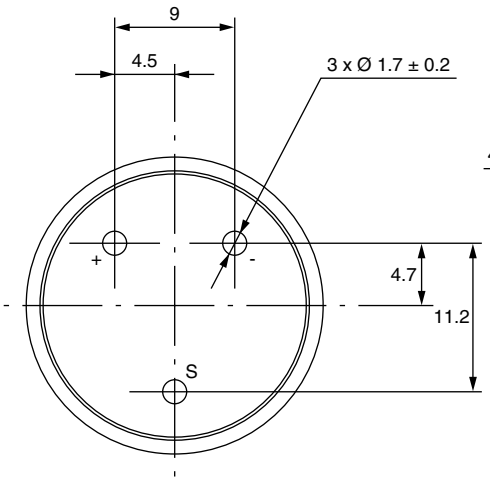

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**DIMENSIONS** in millimeters

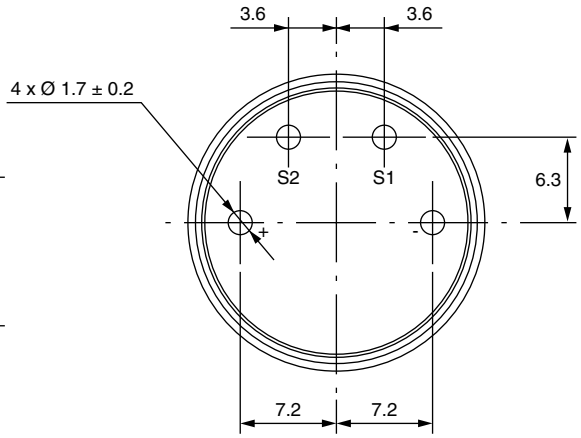
Drawing for bushing mount type: 34THEB...






Single output




Redundant output

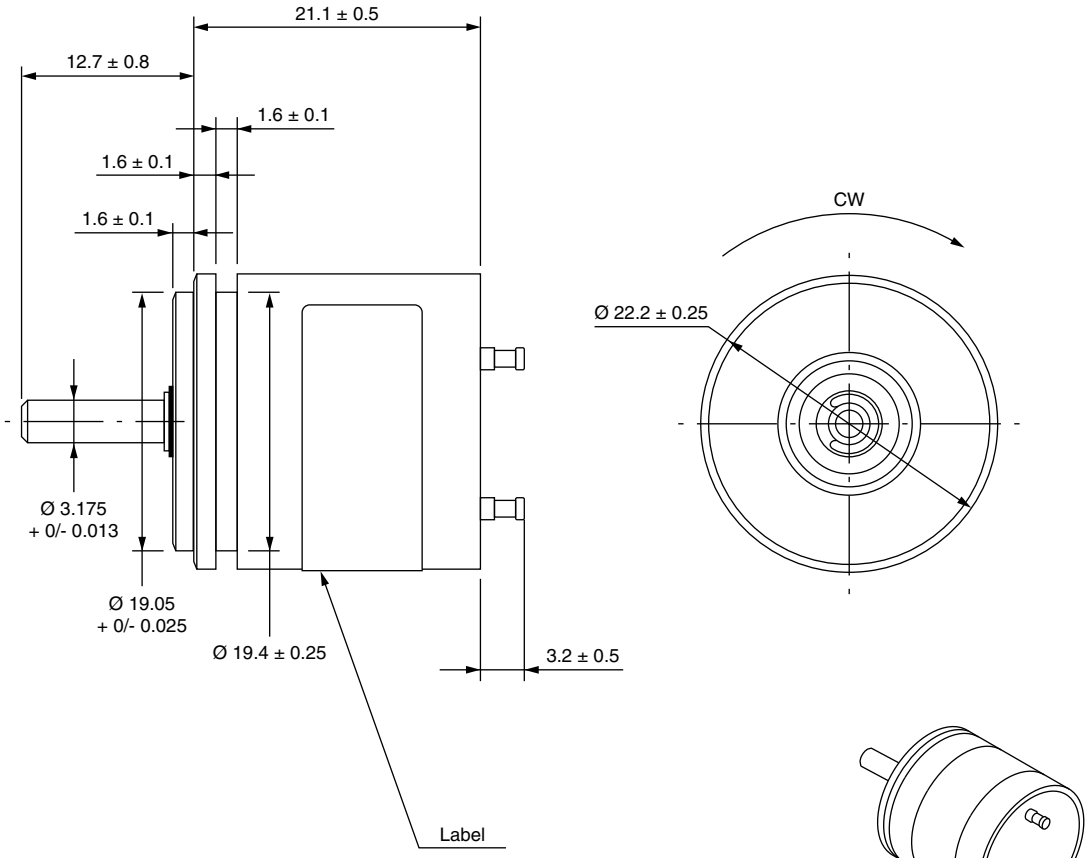


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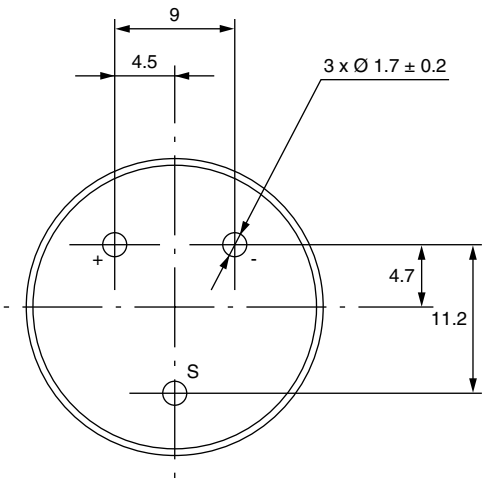
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**DIMENSIONS** in millimeters

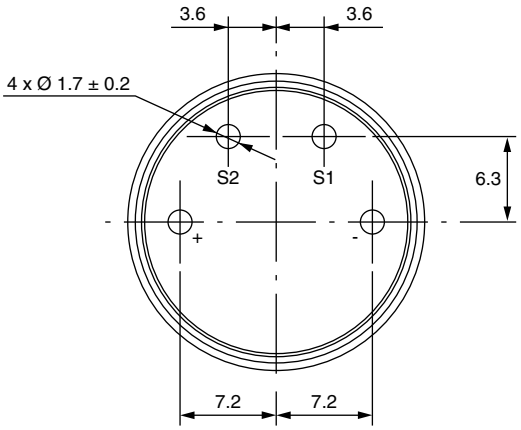
Drawing for servo mount type: 34THES...






Single output




Redundant output

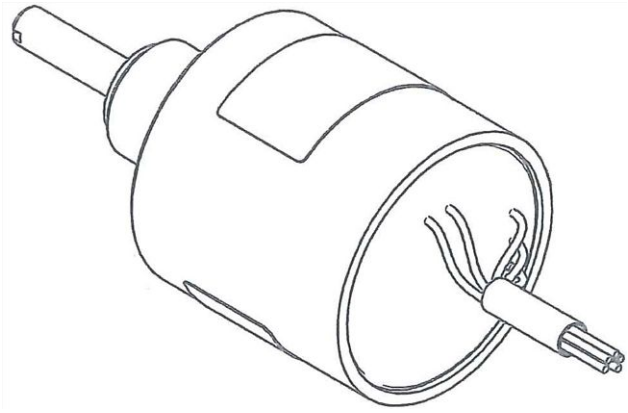


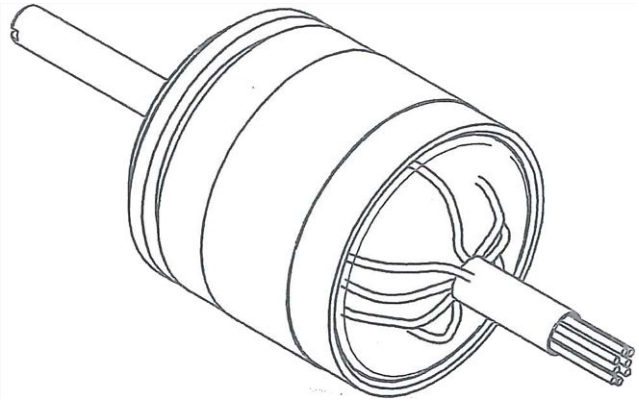
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## BUSHING AND SERVO TYPES

Output by wires for output signal “SPI” single and redundant





| **SINGLE SPI OUTPUT** (servo and bushing) | |
|---|---|
| **WIRE COLOR** | **OUTPUT** |
| Yellow | GND (-) |
| Red | MOSI |
| Green | $V_{CC}$ (+) |
| 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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