



**THE DATASHEET OF  
34THES2BWF2S22**



## 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

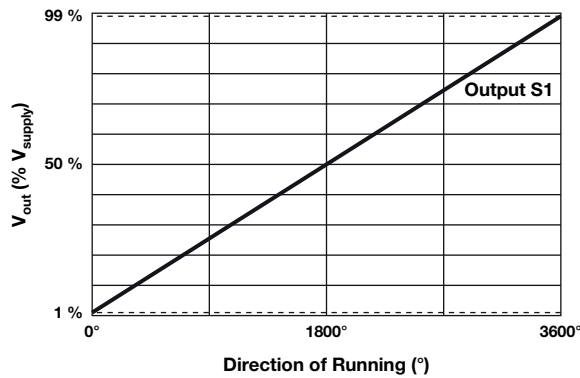
ORDERING INFORMATION/DESCRIPTION									
34 THE	B	1	A	T	A	2S22	XXXX	BO 1	e1
MODEL	MOUNTING TYPE	NUMBER OF SIGNALS	LINEARITY	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST	PACKAGING	LEAD FINISH
	B: Bushing S: Servo	1: Single 2: Redundant	A: $\pm 1\%$ B: $\pm 0.5\%$	T: Turrets Z: Custom W: Wires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

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

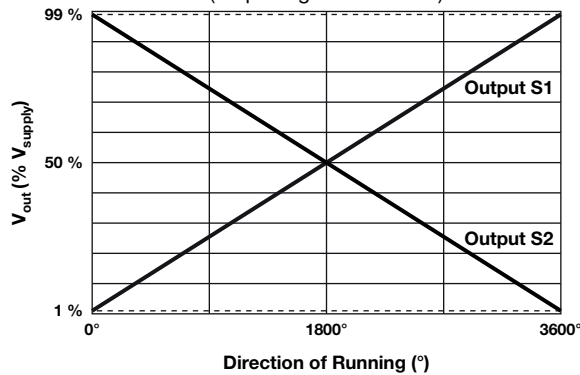
SAP PART NUMBERING GUIDELINES							
34 THE	S	2	B	T	C	2P12	XXXX
MODEL	SERVO TYPE	2 OUTPUT SIGNALS	LINEARITY	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST
			B: $\pm 0.5\%$				

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

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

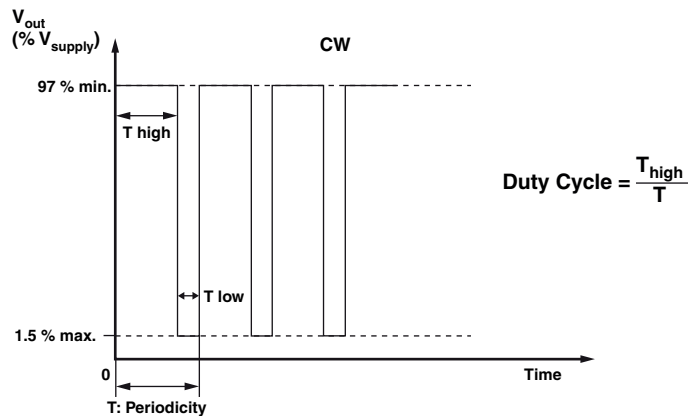


**Redundant Output: with inverted slope**  
(output signal code: "G")



**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)



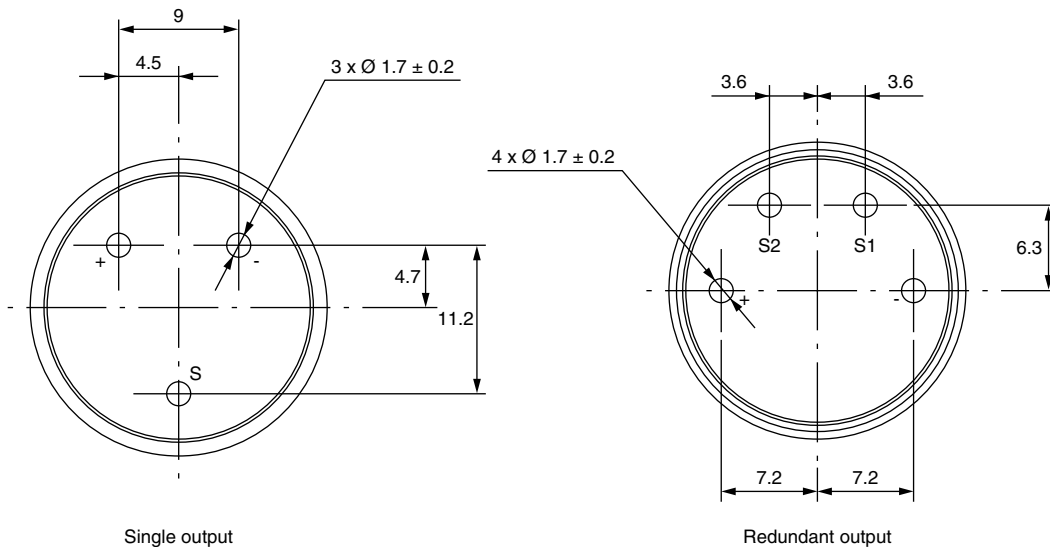
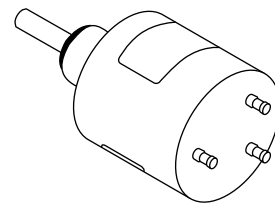
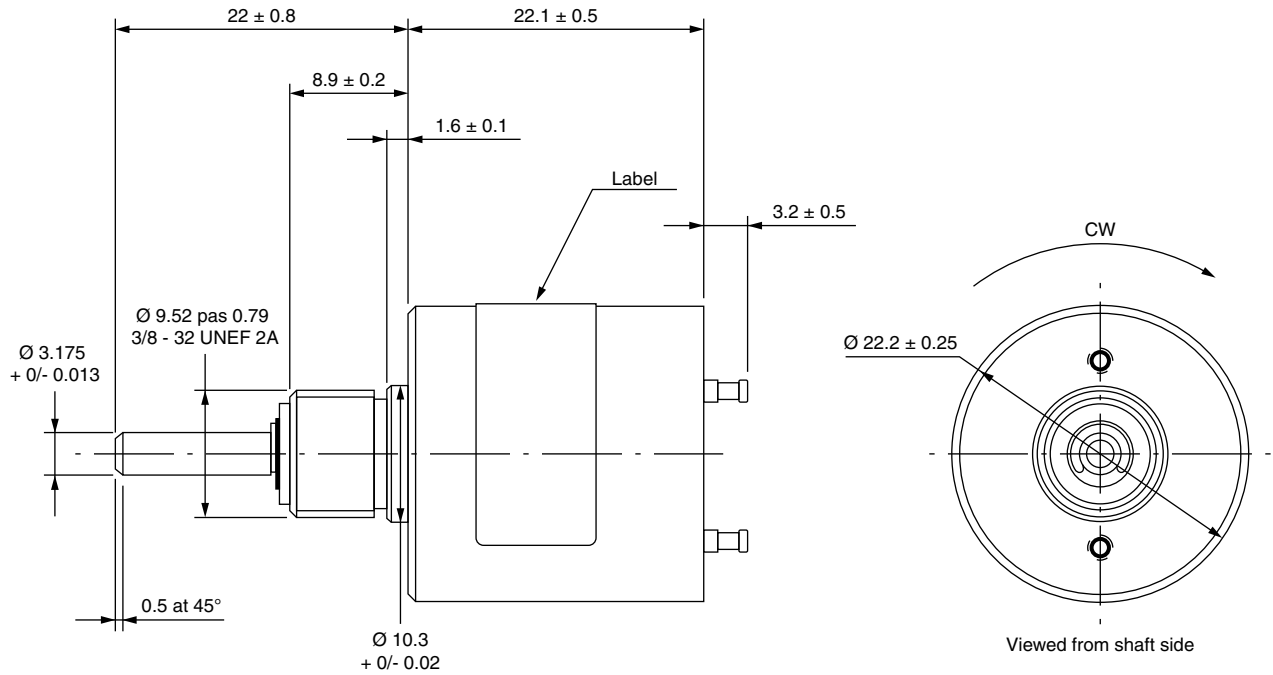
MECHANICAL SPECIFICATIONS		
PARAMETER	STANDARD	SPECIAL
Mounting type	Servo mounting type or bushing mount (delivered with nut and washer)	
Housing	Anodized aluminum	
Shaft guiding	2 ball bearings for servo and sleeve bearing for bushing	
Shaft	Stainless steel Ø 3.175	Other on request
Outputs	Turrets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

ENVIRONMENTAL SPECIFICATIONS	
Operating temperature range	- 40 °C; + 85 °C
Life	> 10M of cycles for bushing > 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 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

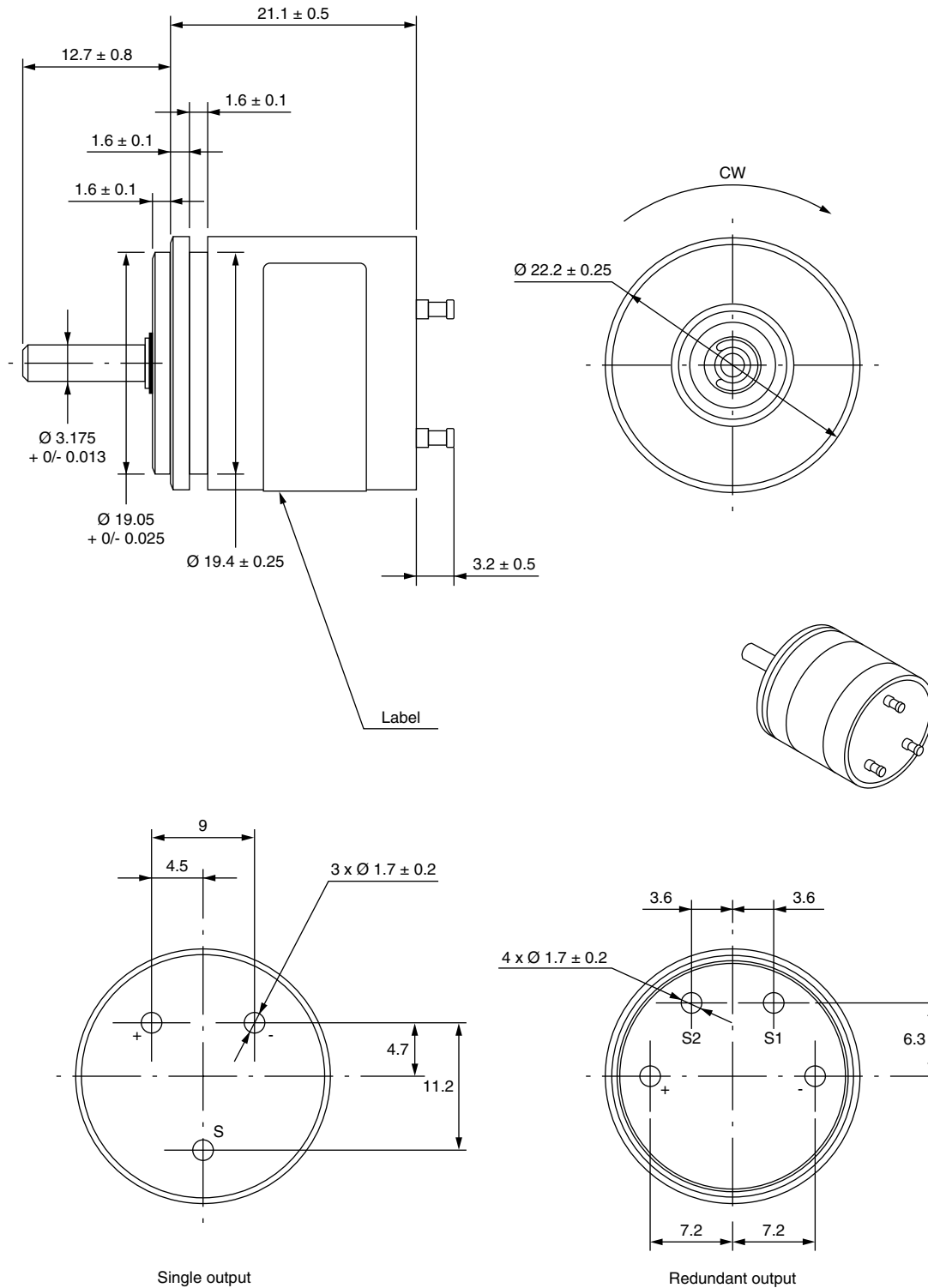
Drawing for bushing mount type: 34THEB...





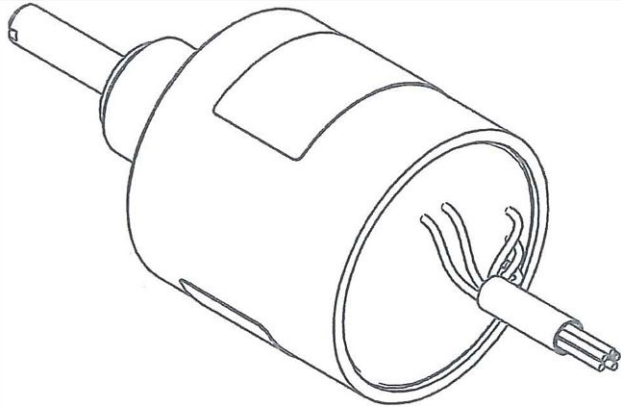
**DIMENSIONS** in millimeters

Drawing for servo mount type: 34THES...

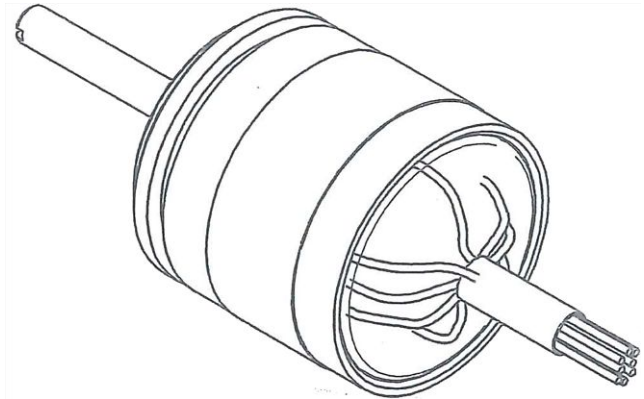


**BUSHING AND SERVO TYPES**

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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