

## Single Turn 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)
- Very long life: Greater than 50M cycles
- Non contacting technology: Hall effect
- Model dedicated to high quality applications
- 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	Wires
Market appliance	Professional
Dimensions	7/8" (22.2 mm)

### ELECTRICAL SPECIFICATIONS

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

### MECHANICAL SPECIFICATIONS

PARAMETER	
Mechanical travel	$360^\circ$ continuous, stops upon request
Bearing type	2 ball bearings
Standard	IP 50; other on request

### ORDERING INFORMATION/DESCRIPTION

78 SHE	1	A	1	W	A	1S16	XXXX	BO 1	e1
MODEL	NUMBER OF CUPS	LINEARITY	ELECTRICAL ANGLE	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST	PACKAGING	LEAD FINISH
	1: 1 Cup 2: 2 Cups 3: 3 Cups 4: 4 Cups	A: $\pm 1\%$ B: $\pm 0.5\%$	1: $90^\circ$ 2: $180^\circ$ 3: $270^\circ$ 4: $360^\circ$ 9: Other angles	T: Turrets W: Wires Z: Custom	A: Analog CW B: Analog CCW C: PWM CW D: PWM CCW Z: Other output	0: 6 mm 1: 6.35 mm 2: 3.175 mm 9: Special P: Plain S: Slotted Z: Other type		Box of 1 piece	
Shaft length from mounting face standard: 16 mm									

### SAP PART NUMBERING GUIDELINES

78 SHE	4	B	9	T	C	2P22	XXXX
MODEL	NUMBER OF CUPS (Signals)	LINEARITY	ELECTRICAL ANGLE	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST

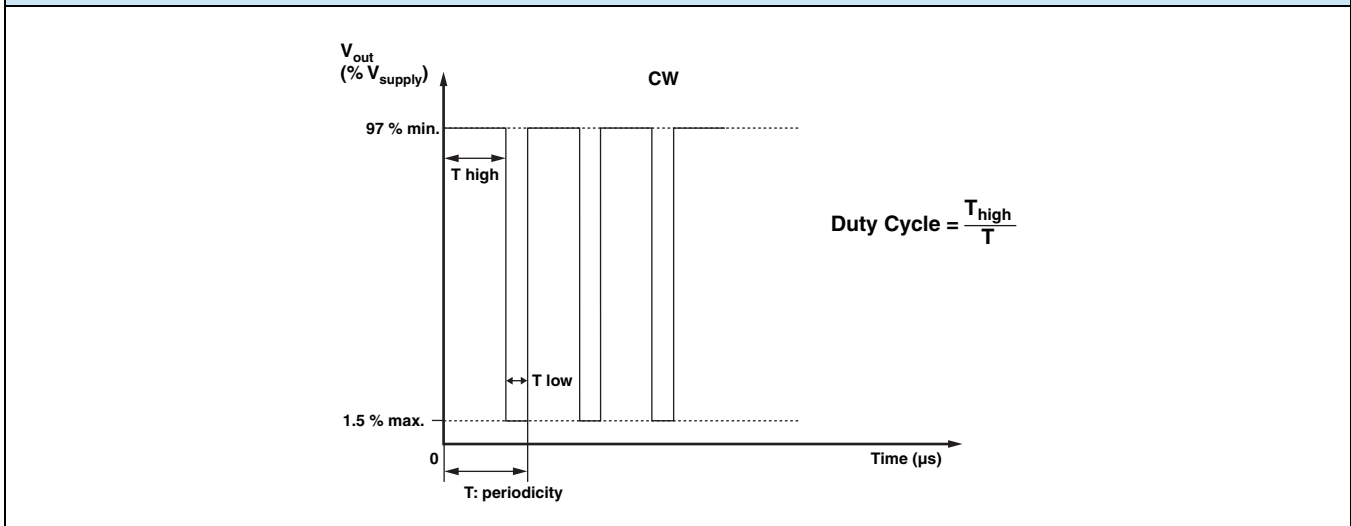


### V<sub>OUT</sub> ANALOG

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>V<sub>out</sub> ANALOG R<sub>pull-up</sub></b>	<b>V<sub>out</sub> ANALOG R<sub>pull-down</sub></b>	<b>V<sub>out</sub> PWM R<sub>pull-up</sub> = 1 kΩ V<sub>pull-up</sub> = V<sub>supply</sub> = 5 V</b>
1: Broken GND	Diagnostic high area	Diagnostic low area	> 97 % V <sub>supply</sub> without modulation
2: Broken V <sub>out</sub>	Diagnostic high area	Diagnostic low area	> 97 % V <sub>supply</sub> without modulation
3: Broken V <sub>supply</sub>	Diagnostic high area	Diagnostic low area	> 97 % V <sub>supply</sub> without modulation
Over voltage V <sub>supply</sub> > 7 V	Diagnostic high area	Diagnostic low area	> 97 % V <sub>supply</sub> without modulation
Under voltage V <sub>supply</sub> < 2.7 V	Diagnostic high area	Diagnostic low area	> 97 % V <sub>supply</sub> without modulation

$\times$  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	> 50M 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 Air discharges: ± 8 kV, EN 61000-4-2
<b>MATERIALS</b>	
Housing	Thermoplastic housing
Shaft	Stainless steel
Output	3 turrets or 3 lead wires (AWG 22)

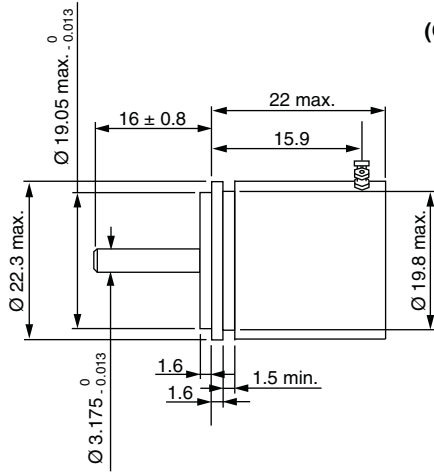
**Note**

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



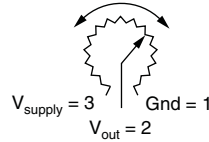
### DIMENSIONS in millimeters

#### MODEL 78 SHE ...T (OUTPUT BY TURRETS)



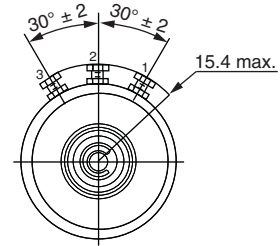
General tolerance: ± 0.5 mm

CW or CCW according to output mode choice

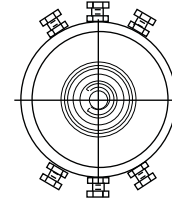


View from shaft side

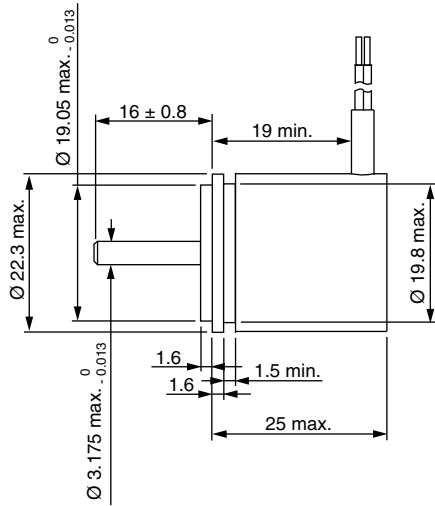
78 SHE (1 signal)



78 SHE (Redundant: 2 signals)

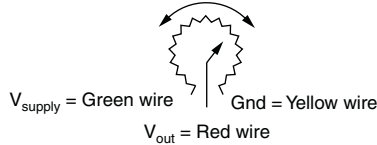


#### MODEL 78 SHE ...W (OUTPUT BY WIRES)



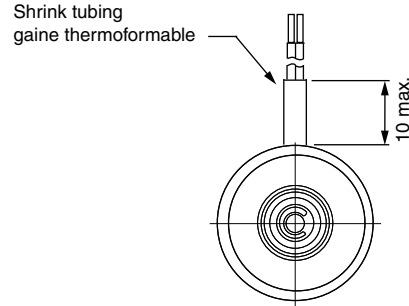
General tolerance: ± 0.5 mm

CW or CCW according to output mode choice

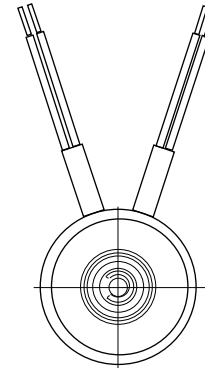


View from shaft side

78 SHE (1 signal)



78 SHE (Redundant: 2 signals)





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