

## Throttle Position Sensor in Hall Effect Technology Hollow and D-Shaft Versions


**FEATURES**

- Accurate linearity down to:  $\pm 0.5\%$
- Easy mounting principle
- Non contacting technology: Hall effect
- Model dedicated to all applications in harsh environments
- Spring loaded types available
- 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	Industrial
Dimensions	47 mm x 22 mm

ELECTRICAL SPECIFICATIONS		
PARAMETER	STANDARD	SPECIAL
Electrical angle	90°, 120°, 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 (D-shaft version)	< 0.3°	

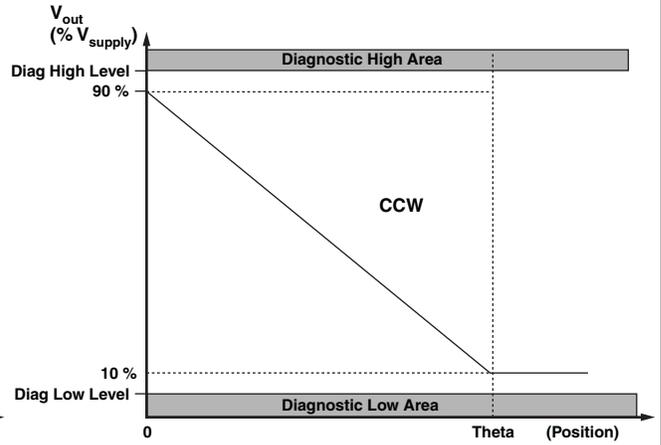
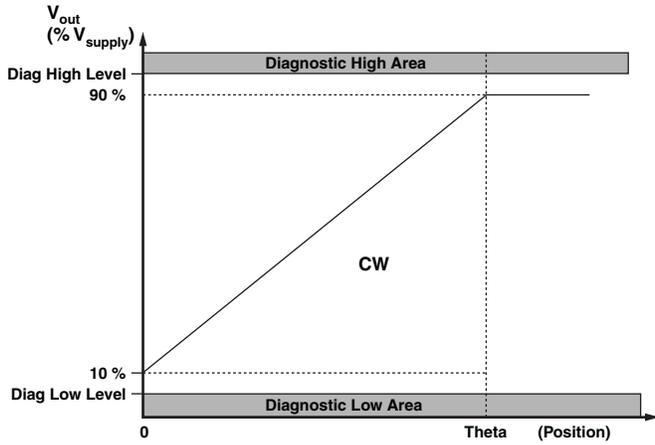
MECHANICAL SPECIFICATIONS	
PARAMETER	
Mechanical travel	360° continuous, stops upon request: 124° $\pm 3^\circ$
Bearing type	Sleeve bearing
Standard	IP 50; other on request
Weight	19 g $\pm 2$ g hollow shaft model/22 g $\pm 2$ g D-shaft model

ORDERING INFORMATION/DESCRIPTION									
981HE	0	A	1	W	A	1F16	XXXX	BO 10	e1
MODEL	FEATURES	LINEARITY	ELECTRICAL ANGLE	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST	PACKAGING	LEAD FINISH
0:	Continuous rotation	A: $\pm 1\%$	1: 90°	W: Wires	A: Analog CW	1: 6.35 mm		Box of 10 pieces	
1:	Mechanical stops	B: $\pm 0.5\%$	2: 180°	Z: Custom	B: Analog CCW	9: Special			
2:	Spring return CW		3: 270°		C: PWM CW	P: Plain			
3:	Spring return CCW		4: 360°		D: PWM CCW	F: Flatted			
	For 1, 2, 3: Max. electrical angle is: 120°		5: 120°		Z: Other output	S: Slotted			
			9: Other angles			Z: Other type			
							Shaft length from mounting face (standard: 16 mm)		
							8H00 hollow shaft		
							8H01 hollow D-shaft		

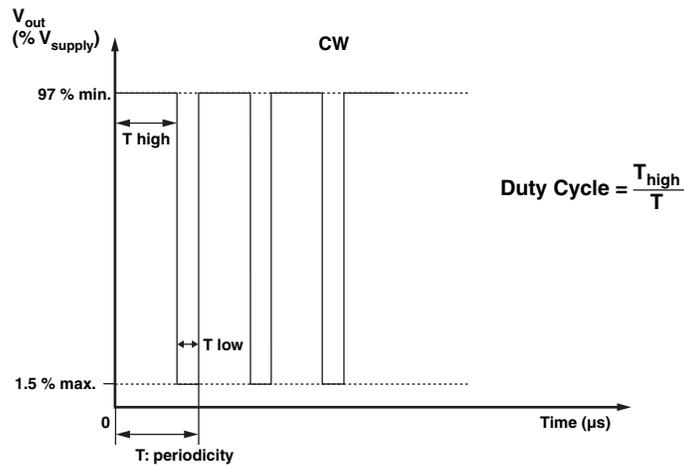
SAP PART NUMBERING GUIDELINES							
981HE	1	B	9	Z	C	8H01	XXXX
MODEL	MECHANICAL FEATURES	LINEARITY	ELECTRICAL ANGLE	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST



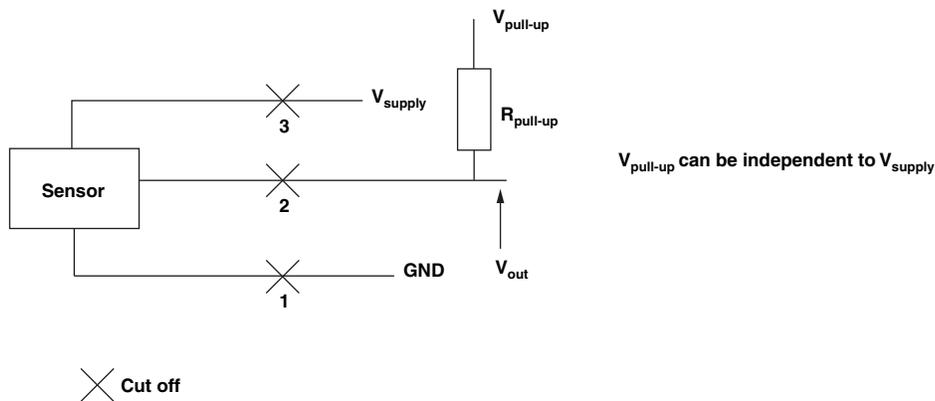
**V<sub>OUT</sub> ANALOG**



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



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



ENVIRONMENTAL SPECIFICATIONS	
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 to +125 °C
Life (in cycles)	$> 5M$ for hollow shaft model/ $> 10M$ for D-shaft model
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 $< 30\text{ dB}\mu\text{V/m}$ , EN 61000-6-4 (level A)
Electrostatic discharges	Contact discharges: $\pm 8\text{ kV}$ Air discharges: $\pm 15\text{ kV}$ , EN 61000-4-2
MATERIALS	
Housing	Thermoplastic housing
Shaft	Stainless steel
Output	3 lead wires

**Note**

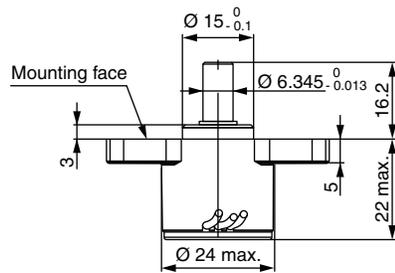
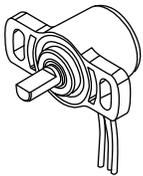
- Nothing stated herein shall be construed as a guarantee of quality or durability.



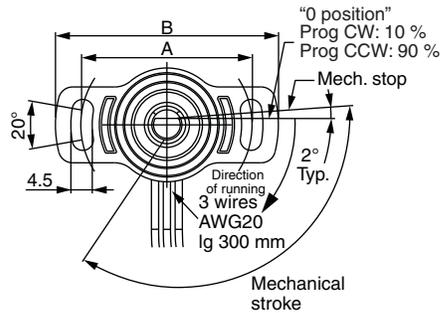
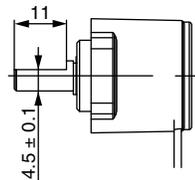
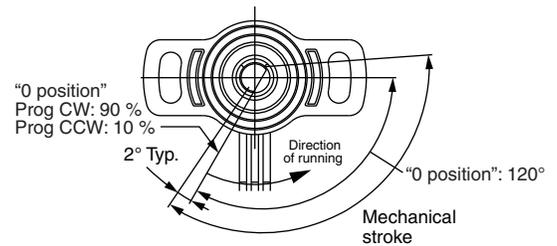
**DIMENSIONS** in millimeters

**VARIOUS POSSIBLE TYPES OF MODEL 981 HE  
IN D-SHAFT VERSION**

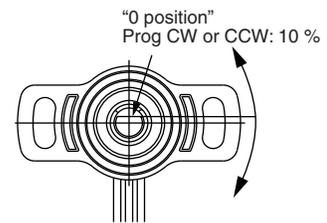
① 981 HE D-Shaft  
Spring return CCW  
Shaft:  $\varnothing$  6.35 flatted length 16 mm FMF  
Model: 981HE-3-x-x-W-x-1F16



② 981 HE D-Shaft  
Spring return CW  
Shaft:  $\varnothing$  6.35 flatted 16 mm FMF  
Model: 981HE-2-x-x-W-x-1F16



③ 981 HE D-Shaft  
Continuous rotation  
Shaft:  $\varnothing$  6.35 flatted 16 mm FMF  
Model: 981HE-0-x-x-W-x-1F16



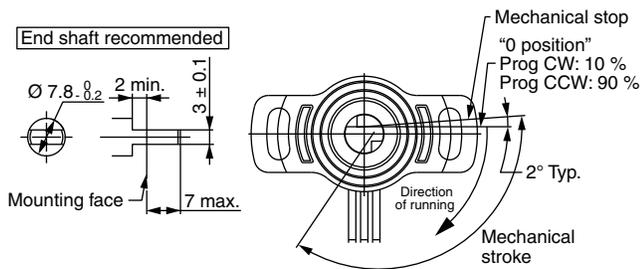
Dimension	Standard	Option	Wires
A	36	38	Yellow GND (-) Red Signal
B	47	48	Green V <sub>CC</sub> (+)



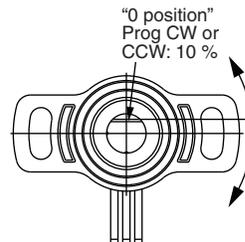
### DIMENSIONS in millimeters

#### VARIOUS POSSIBLE TYPES OF MODEL 981 HE IN HOLLOW SHAFT VERSION

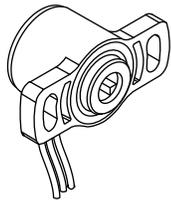
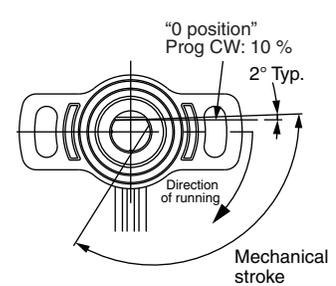
④ 981 HE Hollow shaft  
Spring return CCW  
Shaft:  $\varnothing 8$   
Model: 981HE-3-x-x-W-x-8H00



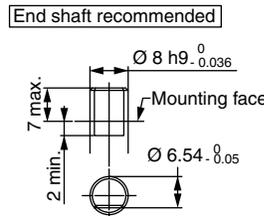
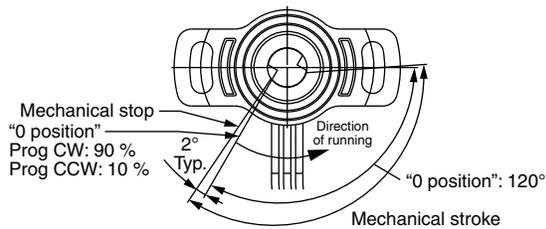
⑥ 981 HE Hollow D-Shaft  
Continuous rotation  
Shaft:  $\varnothing 8$   
Model: 981HE-0-x-x-W-x-8H01



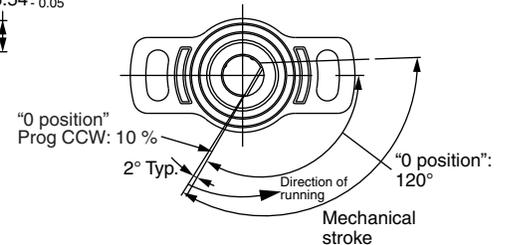
⑦ 981 HE Hollow D-Shaft  
CW  
Shaft:  $\varnothing 8$   
Model: 981HE-1-x-x-W-x-8H01



⑤ 981 HE Hollow shaft  
Spring return CW  
Shaft:  $\varnothing 8$   
Model: 981HE-2-x-x-W-x-8H00



⑧ 981 HE Hollow D-Shaft  
CCW  
Shaft:  $\varnothing 8$   
Model: 981HE-1-x-x-W-x-8H01





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