

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



DESIGN SUPPORT TOOLS

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3D
Models
Available

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



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 _{DC} $\pm 10\%$	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 _{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 Ω 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 ± 2 g hollow shaft model/22 g ± 2 g D-shaft model

ORDERING INFORMATION/DESCRIPTION

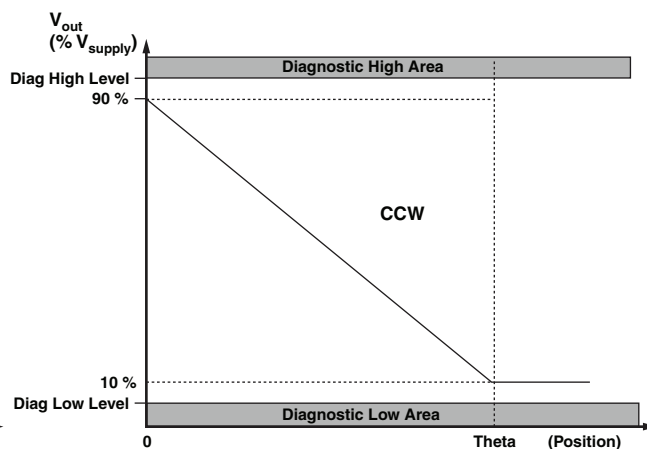
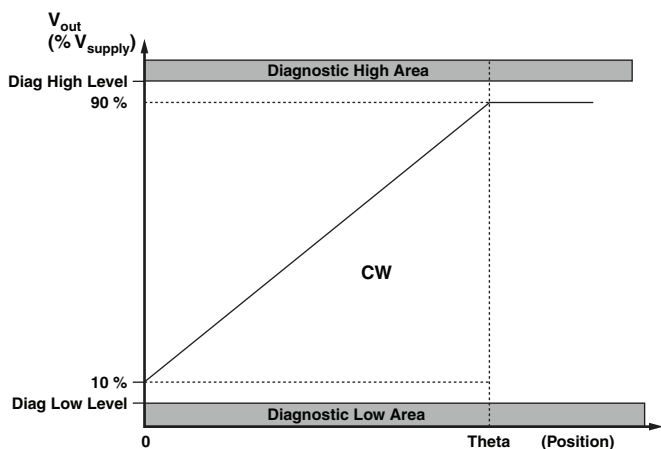
981HE	0	A	1	W	A	1F16	XXXX	BO 10	e1
MODEL	FEATURES	LINEARITY	ELECTRICAL ANGLE	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST	PACKAGING	LEAD FINISH
0:	continuous rotation	A: $\pm 1\%$	1: 90°	W: wires	A: analog CW	1: 6.35 mm		Box of 10 pieces	
1:	mechanical stops	B: $\pm 0.5\%$	2: 180°	Z: custom	B: 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: flattened			
			5: 120°		Z: other output	S: slotted			
	For 1, 2, 3: max. electrical angle is: 120°		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

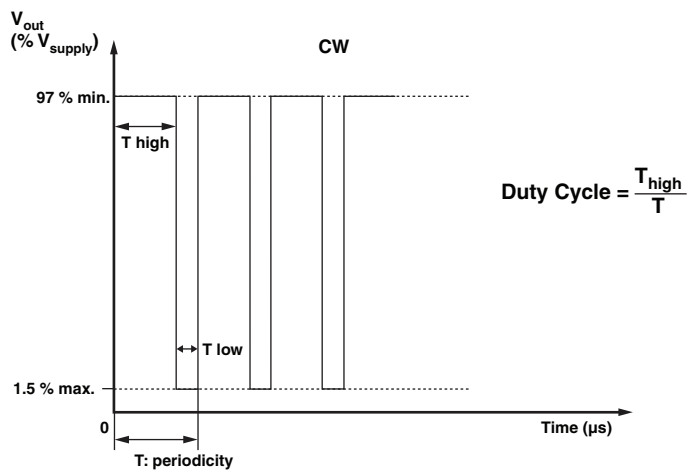
981HE	1	B	9	Z	C	8H01	XXXX
MODEL	MECHANICAL FEATURES	LINEARITY	ELECTRICAL ANGLE	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST



V_{OUT} ANALOG

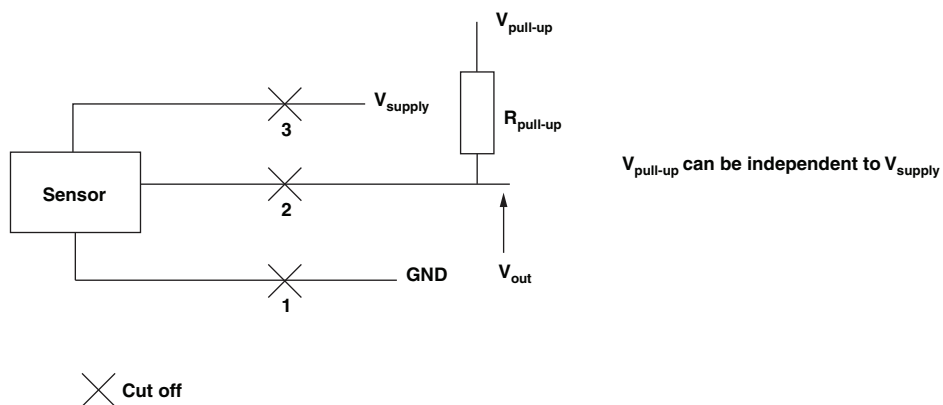


V_{OUT} PWM



**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)	$> 5\text{M}$ for hollow shaft model / $> 10\text{M}$ 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

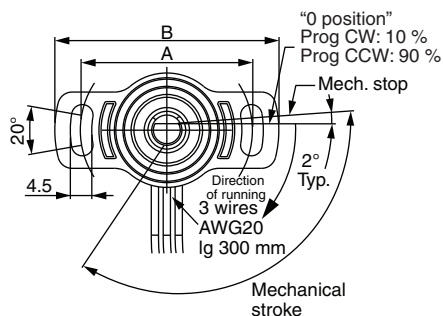
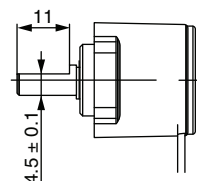
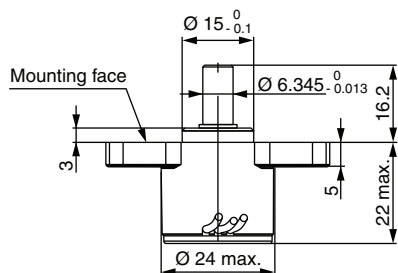
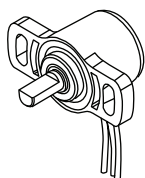
- Nothing stated herein shall be construed as a guarantee of quality or durability



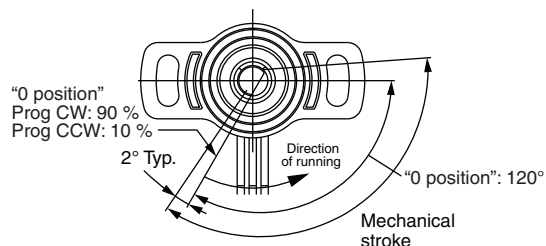
DIMENSIONS in millimeters

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

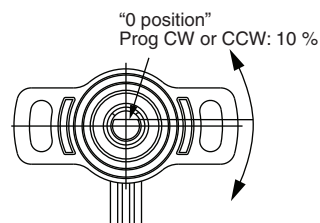
- ① 981 HE D-Shaft
Spring return CCW
Shaft: $\varnothing$ 6.35 flattened length 16 mm FMF
Model: 981HE-3-x-x-W-x-1F16



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



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

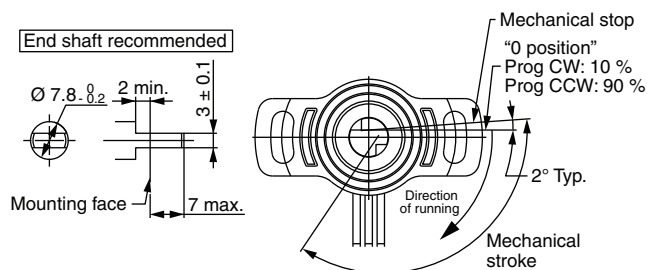


Dimension	Standard	Option	Wires
A	36	38	Yellow GND (-)
B	47	48	Red Signal
			Green V _{CC} (+)

DIMENSIONS in millimeters

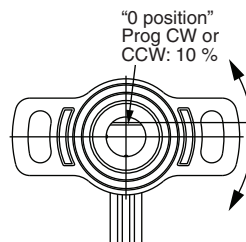
VARIOUS POSSIBLE TYPES OF MODEL 981 HE IN HOLLOW SHAFT VERSION

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



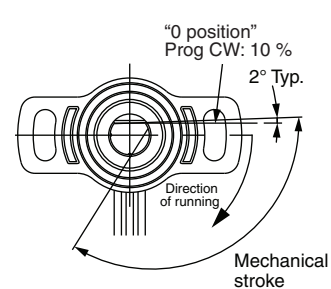
- ⑥ 981 HE Hollow D-Shaft
Continuous rotation
Shaft: Ø 8

Model: 981HE-0-x-x-W-x-8H01

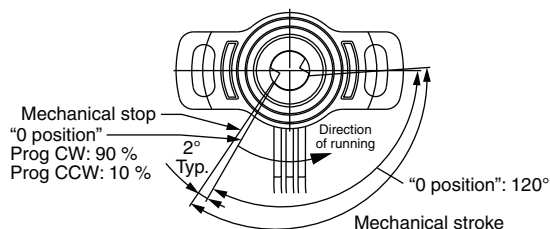
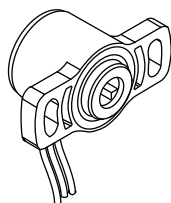


- ⑦ 981 HE Hollow D-Shaft
CW
Shaft: Ø 8

Model: 981HE-1-x-x-W-x-8H01



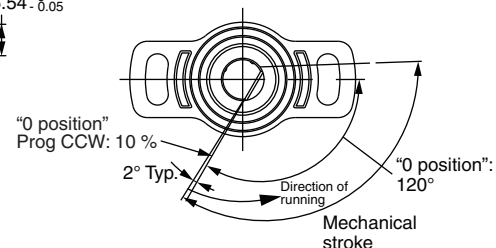
- ⑤ 981 HE Hollow shaft
Spring return CW
Shaft: Ø 8
- Model: 981HE-2-x-x-W-x-8H00



- End shaft recommended**
-
- Technical drawing of a shaft with the following dimensions and tolerances:
- Outer diameter: $\varnothing 8 \text{ h9}_{-0.036}^0$
 - Inner diameter: $\varnothing 6.54_{-0.05}^0$
 - Length: 7 max. (maximum)
 - Minimum length: 2 min. (minimum)
 - Mounting face: Indicated by a dimension line and arrow.

- ⑧ 981 HE Hollow D-Shaft
CCW
Shaft: Ø 8

Model: 981HE-1-x-x-W-x-8H01





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