

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


**DESIGN SUPPORT TOOLS**
[click logo to get started](#)
**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](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°   |

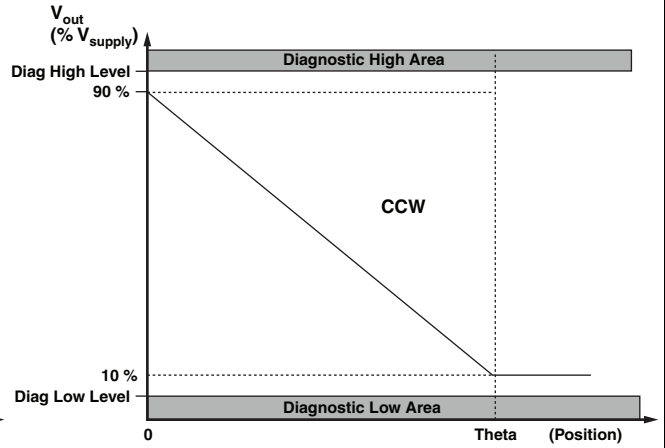
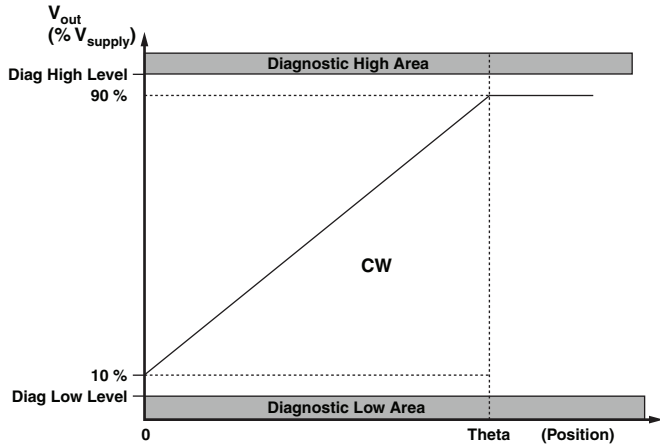
| MECHANICAL SPECIFICATIONS |  |
|---------------------------|--|
| PARAMETER                 |  |
| Mechanical travel         | 360° continuous, stops upon request: 124° $\pm 3^\circ$        |
| Bearing type              | Sleeve bearing   |
| Standard                  | IP 50; other on request  |
| 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    |   |                  |             |
|                                  |   |                | 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 |
|                               |                     |           |                  |             |               |            |                 |



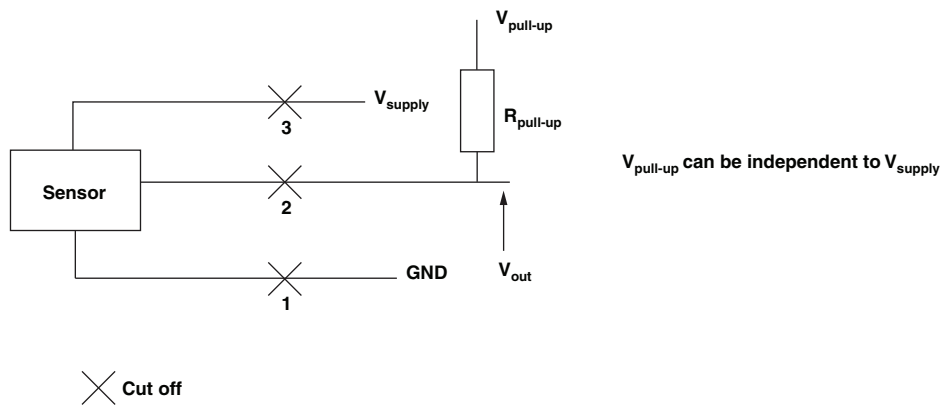
**V<sub>OUT</sub> ANALOG**



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



| DIAGNOSTIC MODES                          |                                   |                                     |  |
|---|-----------------------------------|-------------------------------------|--|
| FAILURE                                   | $V_{out}$ ANALOG<br>$R_{pull-up}$ | $V_{out}$ ANALOG<br>$R_{pull-down}$ | $V_{out}$ PWM<br>$R_{pull-up} = 1\text{ k}\Omega$<br>$V_{pull-up} = V_{supply} = 5\text{ V}$ |
| 1: Broken GND                             | Diagnostic high area              | Diagnostic low area                 | $> 97\% V_{supply}$<br>without modulation  |
| 2: Broken $V_{out}$                       | Diagnostic high area              | Diagnostic low area                 | $> 97\% V_{supply}$<br>without modulation  |
| 3: Broken $V_{supply}$                    | Diagnostic high area              | Diagnostic low area                 | $> 97\% V_{supply}$<br>without modulation  |
| Over voltage $V_{supply} > 7\text{ V}$    | Diagnostic high area              | Diagnostic low area                 | $> 97\% V_{supply}$<br>without modulation  |
| Under voltage $V_{supply} < 2.7\text{ V}$ | Diagnostic high area              | Diagnostic low area                 | $> 97\% V_{supply}$<br>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: $\pm 8\text{ kV}$<br>Air discharges: $\pm 15\text{ kV}$ , EN 61000-4-2 |
| MATERIALS   |  |
| Housing   | Thermoplastic housing  |
| Shaft   | Stainless steel  |
| Output  | 3 lead wires   |

**Note**

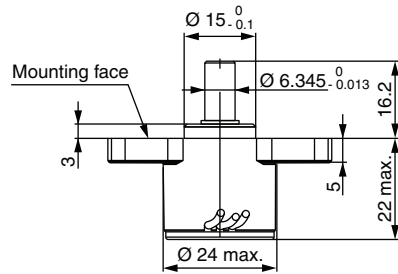
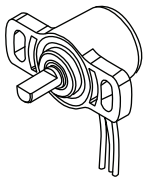
- Nothing stated herein shall be construed as a guarantee of quality or durability



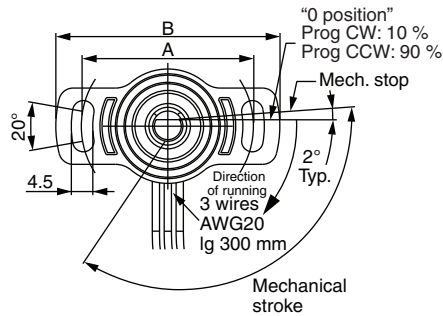
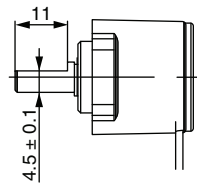
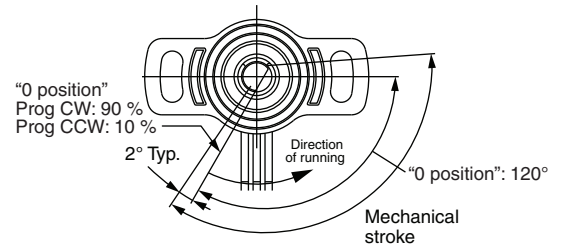
**DIMENSIONS** in millimeters

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

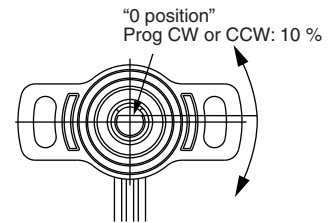
① 981 HE D-Shaft  
Spring return CCW  
Shaft:  $\varnothing$  6.35 flatted length 16 mm FMF  
Model: 981HE-3-x-x-W-x-1F16



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



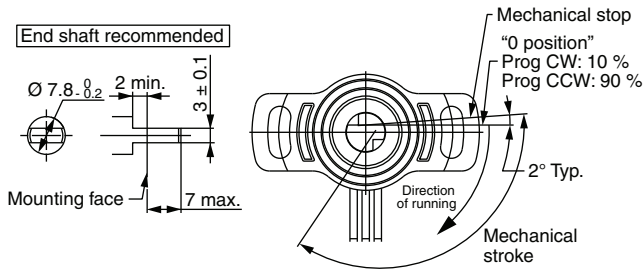
| Dimension | Standard | Option | Wires                        |
|-----------|----------|--------|------------------------------|
| A         | 36       | 38     | Yellow GND (-)<br>Red Signal |
| B         | 47       | 48     | Green V <sub>CC</sub> (+)    |



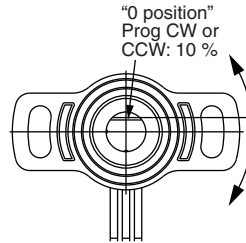
### DIMENSIONS in millimeters

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

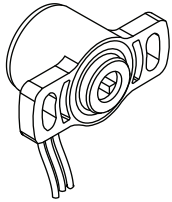
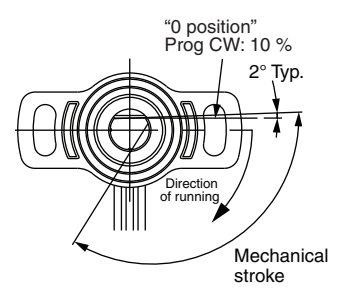
④ 981 HE Hollow shaft  
Spring return CCW  
Shaft:  $\varnothing 8$   
Model: 981HE-3-x-x-W-x-8H00



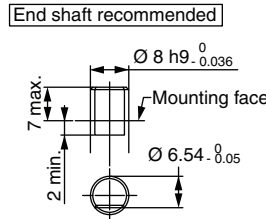
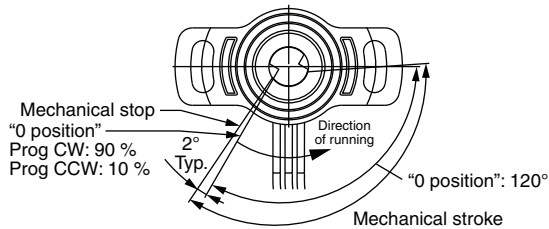
⑥ 981 HE Hollow D-Shaft  
Continuous rotation  
Shaft:  $\varnothing 8$   
Model: 981HE-0-x-x-W-x-8H01



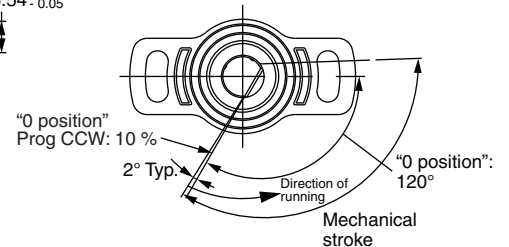
⑦ 981 HE Hollow D-Shaft  
CW  
Shaft:  $\varnothing 8$   
Model: 981HE-1-x-x-W-x-8H01



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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