INSTALLATION INSTRUCTIONS FOR THE HALL-EFFECT ROTARY POSITION SENSORS, RTP SERIES

32307666
Issue B

GENERAL INFORMATION

The RTP Series Hall-effect Rotary Position Sensors provide non-contact sensing in harsh transportation and industrial applications at a competitive cost.

These products use a magnetically biased, Hall-effect integrated circuit (IC) to sense rotary movement of the actuator over a set operating range. Rotation of the actuator changes the magnet's position relative to the IC. The resulting flux density change is converted to a linear output.

MOUNTING INFORMATION (see Figures 1 and 2)

Housed magnet actuator

1. Locate the sensor and the magnet in the desired position. Ensure the air gap between the sensor and the magnet will not exceed that noted in Table 2.
2. Clamp the sensor on the customer-provided mounting plate and place the magnet on the customer-provided mounting shaft. Ensure the orientation arrow on the magnet points toward the connector end of the sensor.
3. Apply the supply voltage to the sensor and monitor the output voltage. When the output voltage is at the midpoint as shown in Table 4, tighten the set screws on the magnet. The sensor angle is 0°.
5. If needed for harsh applications, apply a suitable thread locking compound to all screw threads.

Bare magnet actuator

1. Locate the sensor and the magnet in the desired position. Ensure the air gap between sensor and magnet will not exceed that noted in Table 2.
2. Clamp the sensor on the customer-provided mounting plate and place the magnet on the desired actuator. Ensure the orientation hole on the magnet points towards the connector end of the sensor.
3. Apply the supply voltage to the sensor and monitor the output voltage. When the output voltage is at the midpoint as shown in Table 4, mount the magnet. The sensor angle is 0°.
5. If needed for harsh applications, apply a suitable thread locking compound to all screw threads.

TABLE 1. ELECTRICAL SPECIFICATIONS

Characteristic	LV (Low Voltage)	HV (High Voltage)
Supply voltage:	5 ±0.5 Vdc	10 Vdc to 30 Vdc
Supply current: normal during output to ground short	 20 mA max. 25 mA max.	 32 mA max. 47 mA max.
Output: standard inverted	 0.5 Vdc to 4.5 Vdc ratiometric 4.5 Vdc to 0.5 Vdc ratiometric	 0.5 Vdc to 4.5 Vdc non-ratiometric 4.5 Vdc to 0.5 Vdc non-ratiometric
Output signal delay	4 ms typ.	
Overvoltage protection	10 Vdc	—
Reverse polarity protection	-10 Vdc	-30 Vdc
Output to ground short circuit protection	continuous	
Resolution	12 bit	
Output load resistance (pull down to ground)	10 kOhm typ.	
EMI: radiated immunity	 100 V/m per ISO11452-2 from 200 MHz to 1000 MHz	
conducted immunity	100 mA BCI per ISO11452-4 from 1 MHz to 200 MHz	100 mA BCI per ISO11452-4 from 1 MHz to 400 MHz
EMC	exceeds CE, UKCA requirements	

TABLE 2. MECHANICAL SPECIFICATIONS

Characteristic	LV (Low Voltage)	HV (High Voltage)
Expected life	infinite rotation	
Air gap: bare magnet actuator housed magnet actuator misalignment	 3,00 mm ±0,5 mm [0.12 in ±0.02 in] 2,00 mm ±0,5 mm [0.08 in ±0.02 in] 2,00 in [0.08 in]	
Material: magnet sensor housing housed magnet overmold sensor/housed magnet bushing	 NdFeB PBT plastic PPS plastic brass	
Mating connector	AMP Superseal 282087-1	
Mechanical end stop	no	
Mounting screw sizes: sensor to mounting surface housed magnet actuator to customer-provided mounting pin	 non-magnetic, stainless steel M4 X 0,7 screws and 8 mm [0.39 in] OD washers non-magnetic, stainless steel, M3 X 0.5 plain cup point set screws	
Approvals	CE, UKCA	

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TABLE 3. ENVIRONMENTAL SPECIFICATIONS

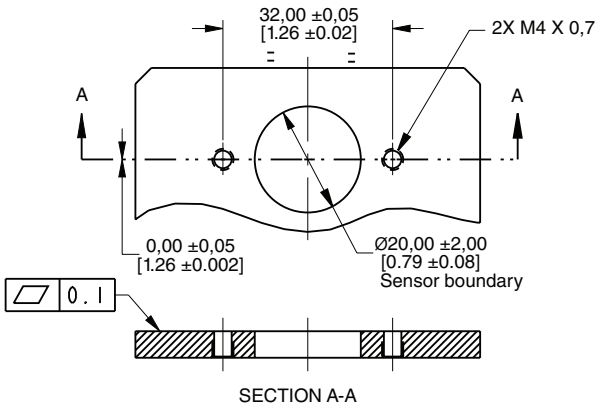
Characteristic	LV (Low Voltage)	HV (High Voltage)
Operating temperature range	-40 °C to 125 °C [-40 °F to 257 °F]	
Ingress protection	IP69K	
Media compatibility	heavy transportation fluids	
Shock	50 G peak	
Vibration	20 G peak	
Salt fog	bare magnet: 96 hr for as per ASTM B117 housed magnet: 240 hr per ASTM B117	

CAUTION
ELECTROSTATIC SENSITIVE DEVICES
DO NOT OPEN OR HANDLE EXCEPT AT A STATIC FREE WORKSTATION
ESD SENSITIVITY: CLASS 2

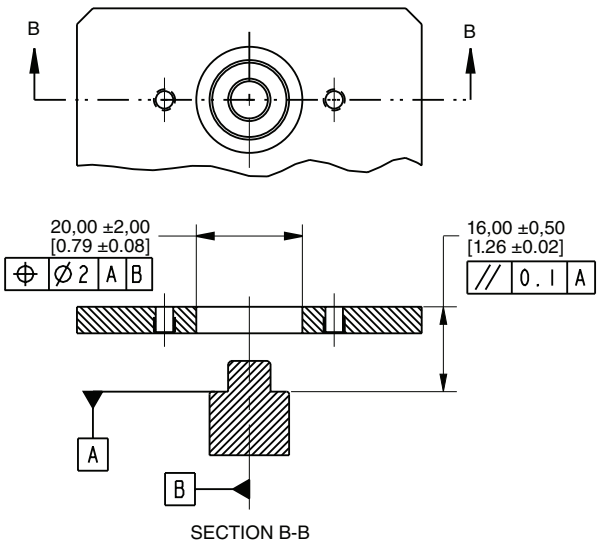
NOTICE
Ferrous material or magnet material more than 300 Gauss within 10 mm [0.39 in] from sensor boundary may impact sensor performance.

FIGURE 1. SENSOR AND HOUSED MAGNET ACTUATOR MOUNTING INFORMATION (FOR REFERENCE ONLY: IN/[MM].)

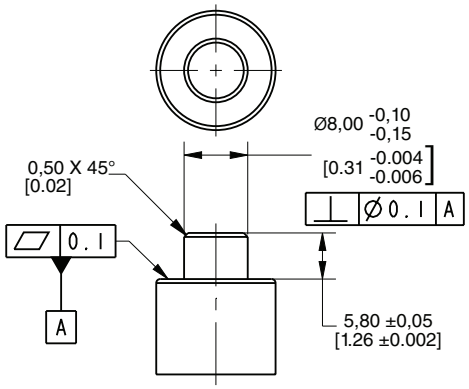
Customer Provided Sensor Mounting Plate Details



Installation Details



Customer Provided Housed Magnet Actuator Details



Sensor and Housed Magnet Actuator on Mounting Plate

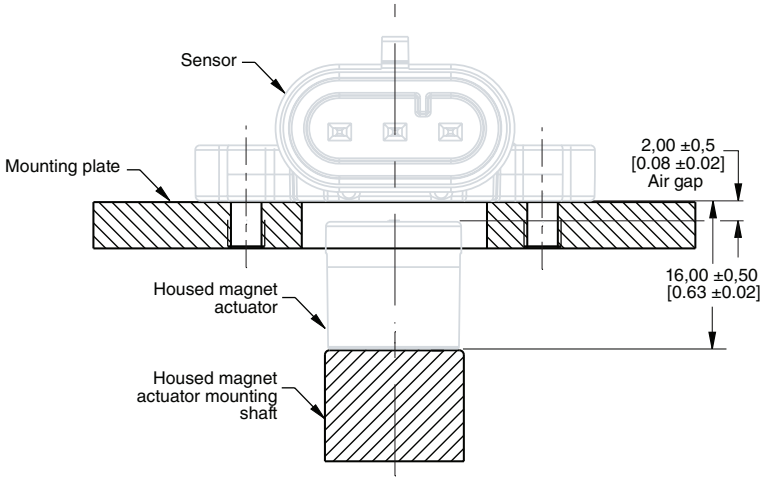
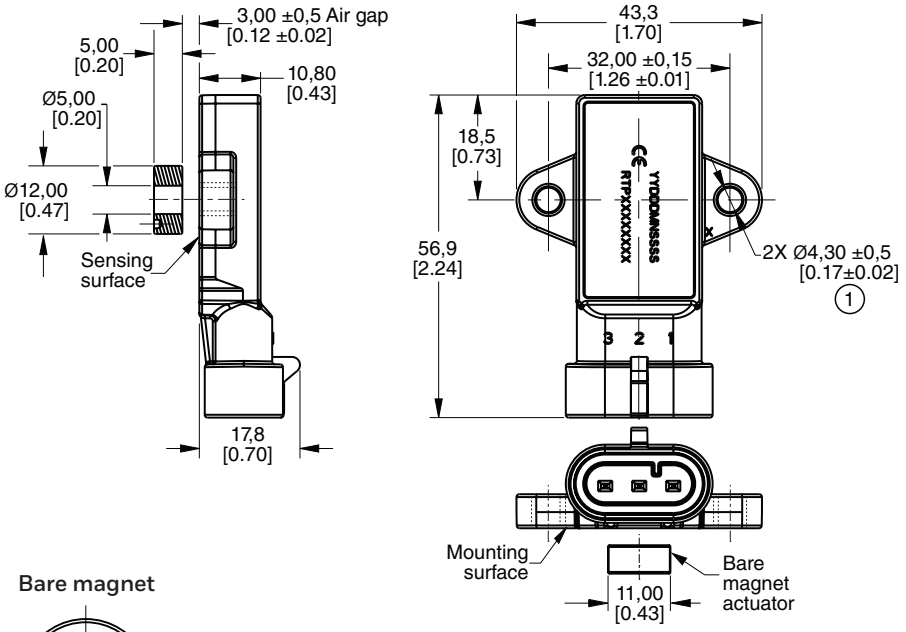
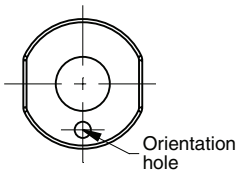


FIGURE 2. MOUNTING DIMENSIONS (FOR REFERENCE ONLY: MM [IN].)

Sensor with bare magnet

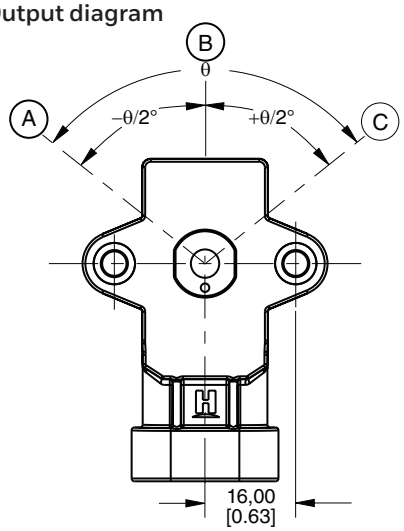


Bare magnet



1 Non-magnetic, stainless steel M4 X 0.7 screws and 8 mm [0.39 in] OD washers, torque is 2,0 ±0,2 N m [17.7 ±1.8 in-lb].

Output diagram



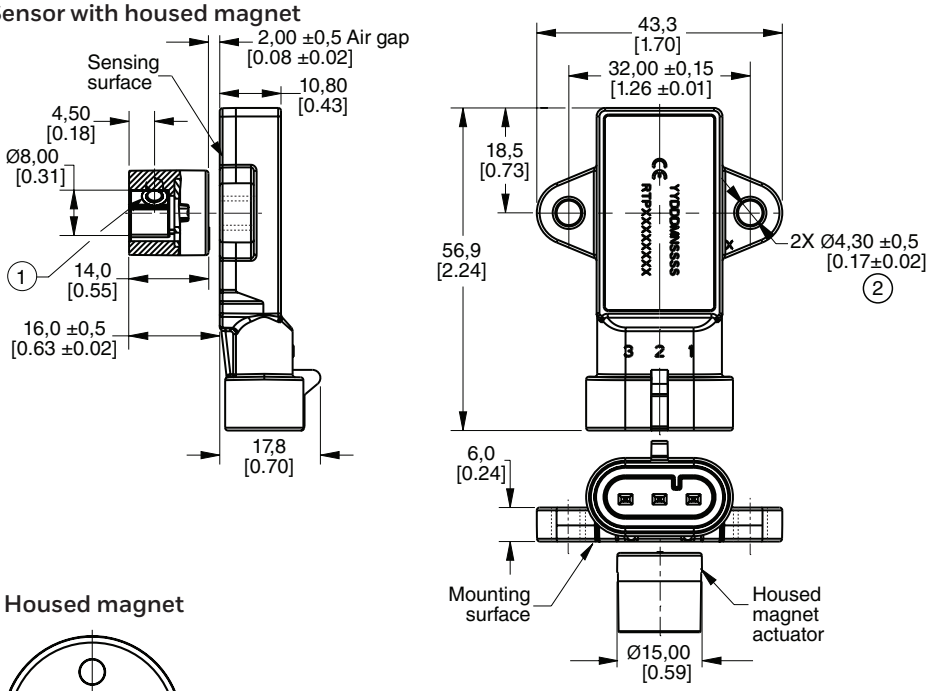
Standard Output

(A) = Left output: 0.5 Vdc
(B) = Zero reference
(C) = Right output: 4.5 Vdc

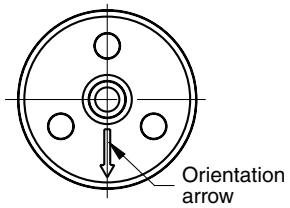
Inverted Output

(A) = Left output: 4.5 Vdc
(B) = Zero reference
(C) = Right output: 0.5 Vdc

Sensor with housed magnet

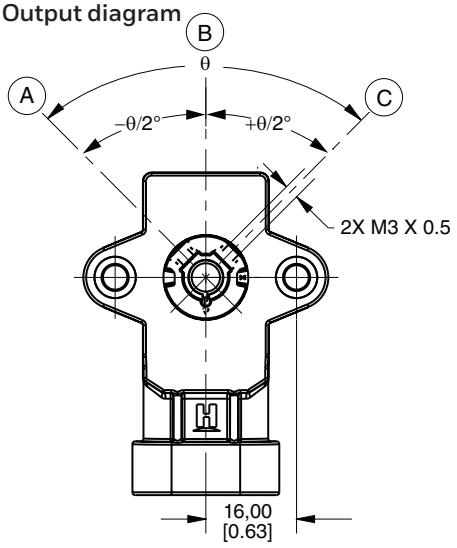


Housed magnet



1 Non-magnetic, stainless steel M3 X 0.5 plain cup point set screws, torque is 0,5 N m to 0,6 N m [4.42 in-lb to 5.31 in-lb]
2 Non-magnetic, stainless steel M4 X 0.7 screws and 8 mm [0.31 in] OD washers, torque is 2,0 ±0,2 N m [17.7 ±1.8 in-lb].

Output diagram



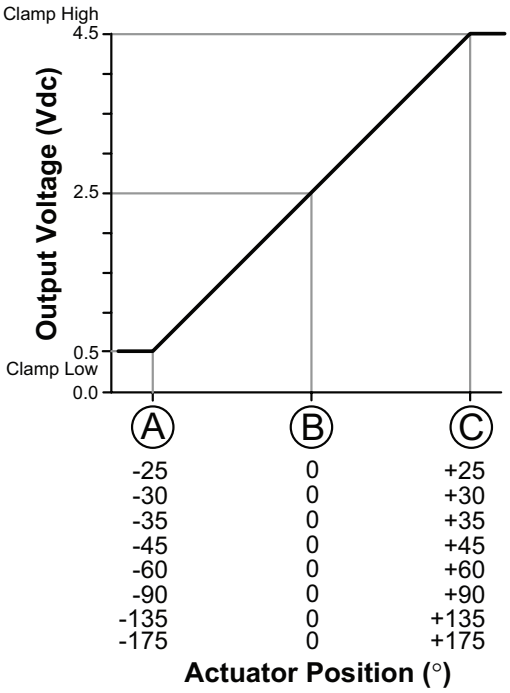
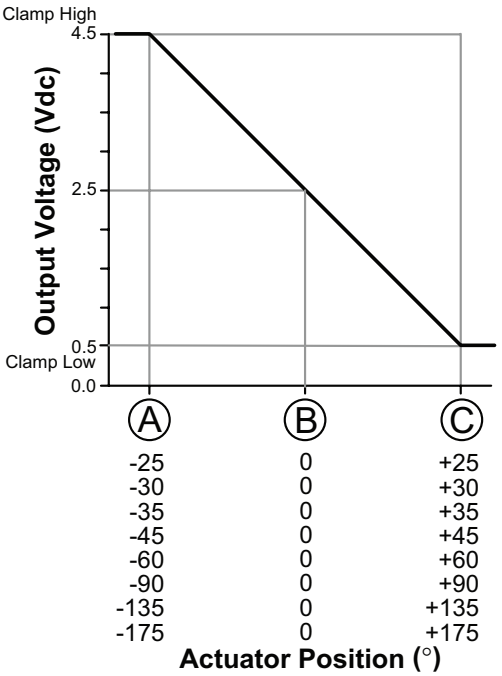
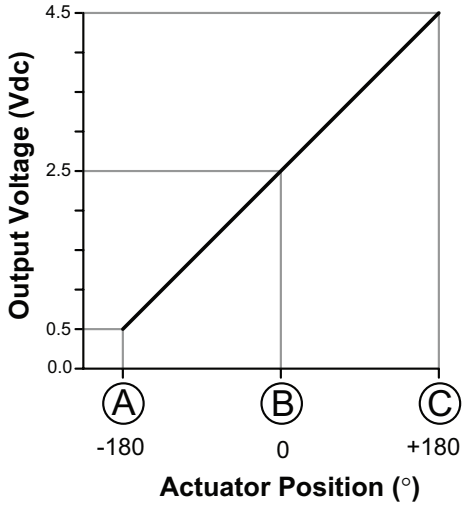
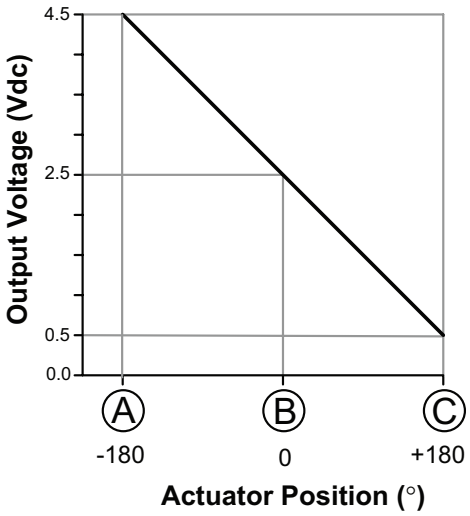
Standard Output

(A) = Left output: 0.5 Vdc
(B) = Zero reference
(C) = Right output: 4.5 Vdc

Inverted Output

(A) = Left output: 4.5 Vdc
(B) = Zero reference
(C) = Right output: 0.5 Vdc

TABLE 4. FUNCTIONAL CHARACTERISTICS[1]

Characteristic			Standard Output	Inverted Output
Sensing Angle	Linearity Error[2]	Accuracy Error		
50° (±25°)	±2.0%	—		
60° (±35°)				
70° (±35°)				
90° (±45°)				
120° (±60°)				
180° (±90°)				
270° (±135°)				
350° (±175°)				
360° (±180°)				

Notes:
1. See Figure 2 for references to Ⓐ Ⓑ Ⓒ
2. Linearity error is the deviation of the measured value from the best fit line and is the quotient of the measured output ratio deviation from the best fit line at the measured temperature to the best fit line output ratio span at the measured temperature.

⚠ WARNING
PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING
MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

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