

RTY DUAL OUTPUT

006031
Issue 1

Hall-effect Rotary Position Sensors

DESCRIPTION

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

These shaft activated products are available in two versions: an integral shaft with or without a lever. The lever may allow customers to reduce the number of mechanical linkages required for their applications, which may reduce the cost of the overall customer solution.

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.

The IC, together with conditioning and protection circuitry, is sealed in an IP67 and IP69K-qualified rugged package for durability in most harsh environments.

Eight operating ranges from 50° to 360° are tolerant to over-travel and allow use in most common applications. Designed to operate on 5 Vdc regulated power supply. Future expansion to include low voltage and high voltage versions to cover an input voltage range of 10 Vdc to 30 Vdc.

Honeywell industry-leading capabilities in research and development provide the customer with known quality and support.

FEATURES

- True, non-contact operation
- 35 M cycle product life
- Solid-state Hall-effect technology
- Rugged IP67 and IP69K-sealed package with integral connector
- Automotive-grade EMI/EMC testing, integrated reverse polarity, and short circuit protection
- Industry-standard AMPSEAL 16 - 6 position connector
- Eight operating ranges up to 360°
- Dual signal capability: sensor delivers two voltage output signals

PORTFOLIO

The RTY Dual Output Series joins the family of rugged and reliable Hall-effect Rotary Position Sensors. To learn more about this non-contact sensing option, [click here](#).



APPLICATIONS

Transportation

- Position and movement detection (pedals, throttles, gear shift, levers, steering, linkages, and hitches) in trucks, buses, off-road vehicles, cranes, and industrial/construction/agricultural vehicles and equipment)
- Suspension/kneeling position (buses, trucks)

Industrial

- Valve control
- HVAC damper control
- Irrigation equipment pivot control

Marine

- Tilt/trim position (boat engines, tilling equipment)
- Rudder position monitoring
- Throttler position detection and control

Military

- Chassis suspension systems position height

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HALL-EFFECT ROTARY POSITION SENSORS

RTY DUAL OUTPUT SERIES

TABLE 1. ELECTRICAL SPECIFICATIONS

CHARACTERISTIC	RTY SERIES
Supply voltage*	5 Vdc $\pm$ 0.5 Vdc
Supply current: normal during output to ground short	20 mA max. 25 mA max.
Output: Channel 1, standard Channel 2, inverted	0.5 Vdc to 4.5 Vdc ratiometric 4.5 Vdc to 0.5 Vdc ratiometric
Output signal delay	4 ms typ.
Overvoltage protection	10 Vdc
Reverse polarity protection	-10 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
EMC	exceeds CE, UKCA requirements

* RTY 5 volt variants meet SAE J1171 for External Ignition Protection of Marine Electrical Devices

TABLE 2. MECHANICAL SPECIFICATIONS

CHARACTERISTIC	RTY SERIES
Expected life	35 M cycles
Material: shaft sensor housing sensor bushing	stainless steel PBT plastic stainless steel
Mating connector	AMPSEAL 16 - 6 position, P/N 776433-1
Mechanical end stop	no
Mounting screw sizes: sensor to mounting surface	non-magnetic, stainless steel M5 screws and 10 mm [0.39 in] OD washers
lever to mounting surface	non-magnetic stainless steel M6 screws
Approvals	CE, UKCA

HALL-EFFECT ROTARY POSITION SENSORS

RTY DUAL OUTPUT SERIES

TABLE 3. ENVIRONMENTAL SPECIFICATIONS	
CHARACTERISTIC	RTY SERIES
Operating temperature range	-40 °C to 125 °C [-40 °F to 257 °F]
Ingress protection	IP67 and IP69K
Media compatibility	heavy transportation fluids
Shock ¹	50 G peak
Vibration ¹	20 G peak
Salt fog	concentration 5 % ±1 % for 240 hr per SAE J1455 Section 4.3.3.1 (at 5.0 Vdc, 38°C [100°F])

¹ Does not apply RTY Series sensor shaft with lever.



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.

TABLE 4. DUAL SIGNAL			
SIGNAL 1		SIGNAL 2	
Pin 1	GND	Pin 4	GND
Pin 2	Vcc	Pin 5	Vcc
Pin 3	Output 1	Pin 6	Output 2

* Vcc and GND are common between channel 1 and 2

Figure 1. All Available Configurations

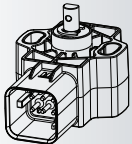


HALL-EFFECT ROTARY POSITION SENSORS

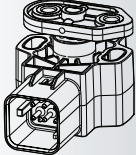
RTY DUAL OUTPUT SERIES

Figure 2. Product Nomenclature

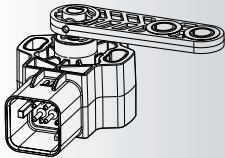
RTY Series	050 Sensing Range Angle	LV Supply Voltage	D Signal	D Output Type	A Actuator Type
RTY Series Hall-Effect Rotary Position Sensor with Integral Actuator	050 50° (±25°)	LV 5 Vdc	D Dual signal	D Dual inverse slope	X Shaft without lever
	060 60° (±30°)			E Dual positive slope	
	070 70° (±35°)				
	090 90° (±45°)				
	120 120° (±60°)				
	180 180° (±90°)				
	270 270° (±135°)				
	360 360° (±180°)				



A Shaft with lever



B Shaft with lever (non-standard)

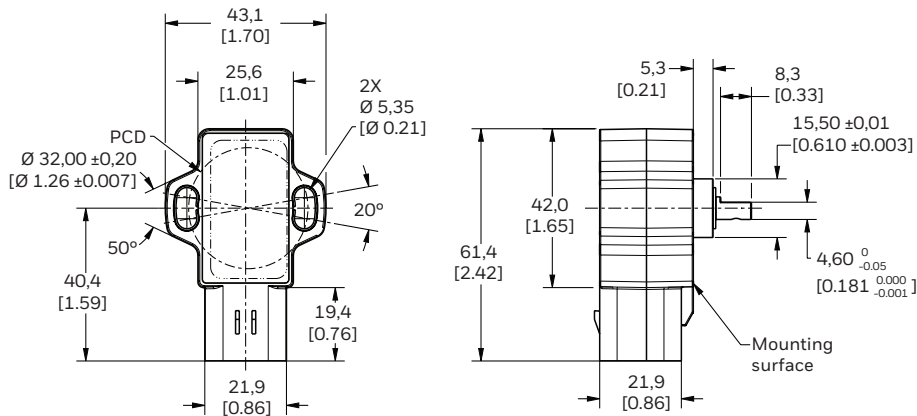


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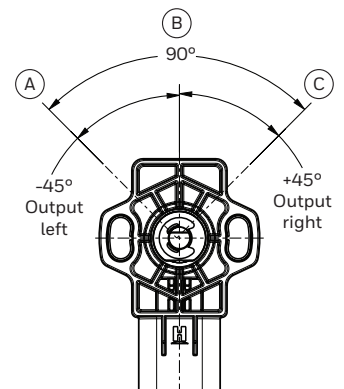
Figure 3. RTY Series Mounting Dimensions (For reference only: mm [in.])

Series without lever

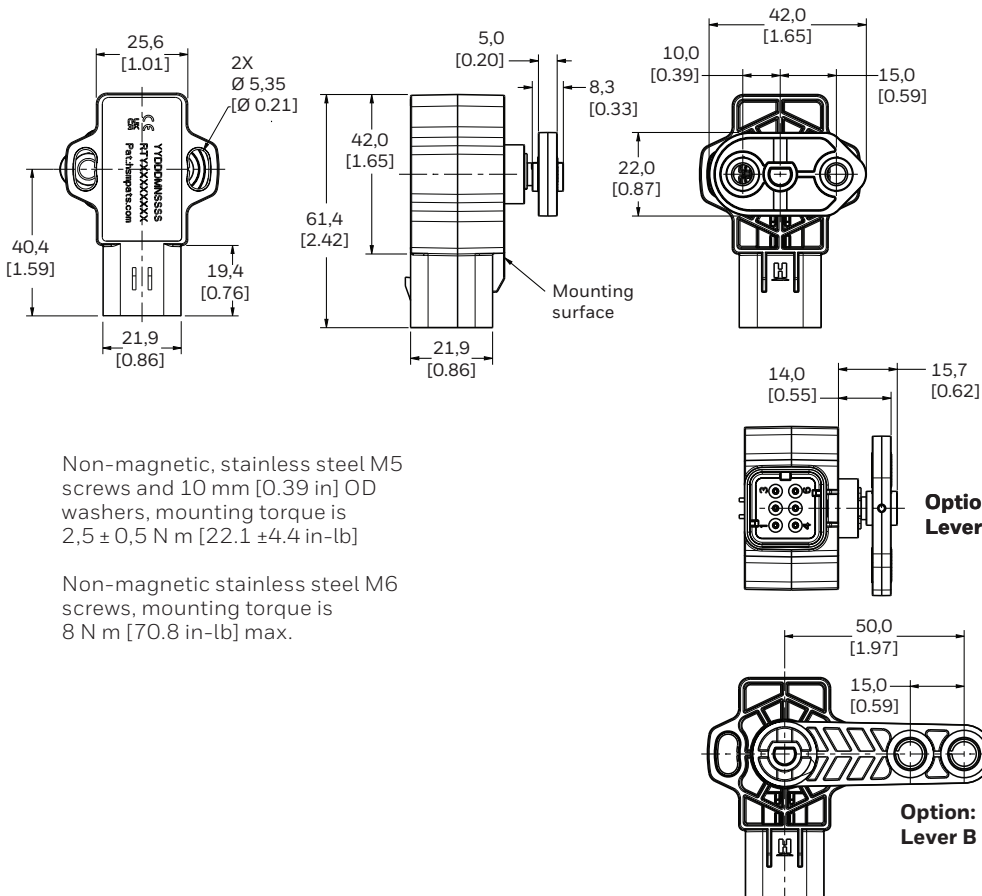


Non-magnetic, stainless steel M5 screws and 10 mm [0.39 in] OD washers, mounting torque is 2,5 ± 0,5 N m [22.1 ± 4.4 in-lb]

Output diagram



Series with lever



Non-magnetic, stainless steel M5 screws and 10 mm [0.39 in] OD washers, mounting torque is 2,5 ± 0,5 N m [22.1 ± 4.4 in-lb]

Non-magnetic stainless steel M6 screws, mounting torque is 8 N m [70.8 in-lb] max.

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

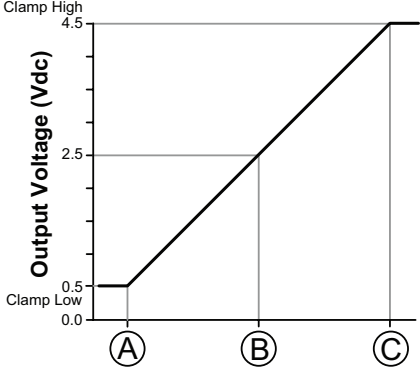
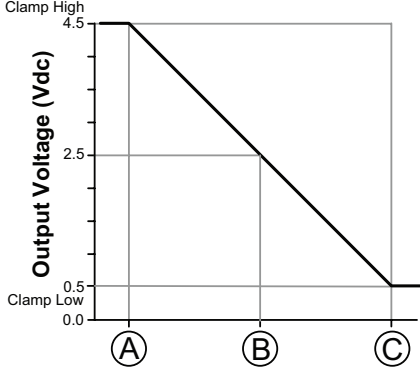
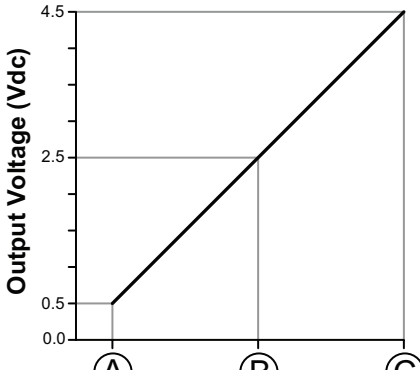
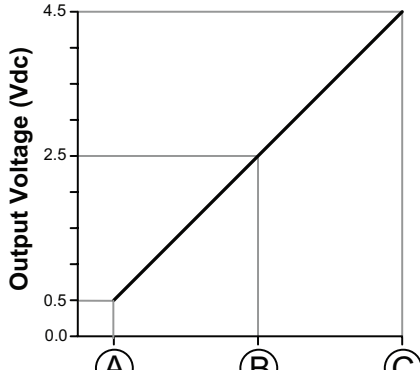
Option:
Lever A

Option:
Lever B

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TABLE 4. RTY SERIES FUNCTIONAL CHARACTERISTICS¹

CHARACTERISTIC			CHANNEL 1, OUTPUT	CHANNEL 2, OUTPUT																																																
Sensing Angle	Linearity Error ²	Accuracy Error ³																																																		
50° (±25°)	±1.0 %	±1.6 %	INVERSE SLOPE VARIANTS <table><tr><td>-25</td><td>0</td><td>+25</td></tr><tr><td>-30</td><td>0</td><td>+30</td></tr><tr><td>-35</td><td>0</td><td>+35</td></tr><tr><td>-45</td><td>0</td><td>+45</td></tr><tr><td>-60</td><td>0</td><td>+60</td></tr><tr><td>-90</td><td>0</td><td>+90</td></tr><tr><td>-135</td><td>0</td><td>+135</td></tr><tr><td>-180</td><td>0</td><td>+180</td></tr></table> <table><tr><td>-25</td><td>0</td><td>+25</td></tr><tr><td>-30</td><td>0</td><td>+30</td></tr><tr><td>-35</td><td>0</td><td>+35</td></tr><tr><td>-45</td><td>0</td><td>+45</td></tr><tr><td>-60</td><td>0</td><td>+60</td></tr><tr><td>-90</td><td>0</td><td>+90</td></tr><tr><td>-135</td><td>0</td><td>+135</td></tr><tr><td>-180</td><td>0</td><td>+180</td></tr></table>		-25	0	+25	-30	0	+30	-35	0	+35	-45	0	+45	-60	0	+60	-90	0	+90	-135	0	+135	-180	0	+180	-25	0	+25	-30	0	+30	-35	0	+35	-45	0	+45	-60	0	+60	-90	0	+90	-135	0	+135	-180	0	+180
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¹ See Figure 3 for references to (A) (B) (C)

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.

³ Accuracy is measured as a deviation from the index line, where the index line is defined as the line with the ideal slope and sensor output voltage corrected at 0° position for its ideal value at 25°C ±5°C. Accuracy is valid only when the sensor output is correct at 0° position for its ideal value in the application.

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