

HALL-EFFECT ROTARY POSITION SENSORS FOR MARINE APPLICATIONS

Application Brief



Honeywell

The RTY Series Hall-Effect Rotary Position Sensors provide angle monitoring 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 shaft over a set operating range. Rotation of the actuator shaft changes a 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, and the permanent magnet, is sealed in an IP67 and IP69K qualified rugged package for durability in most harsh environments.



RTY Series Dual Hall-effect Rotary Position Sensor

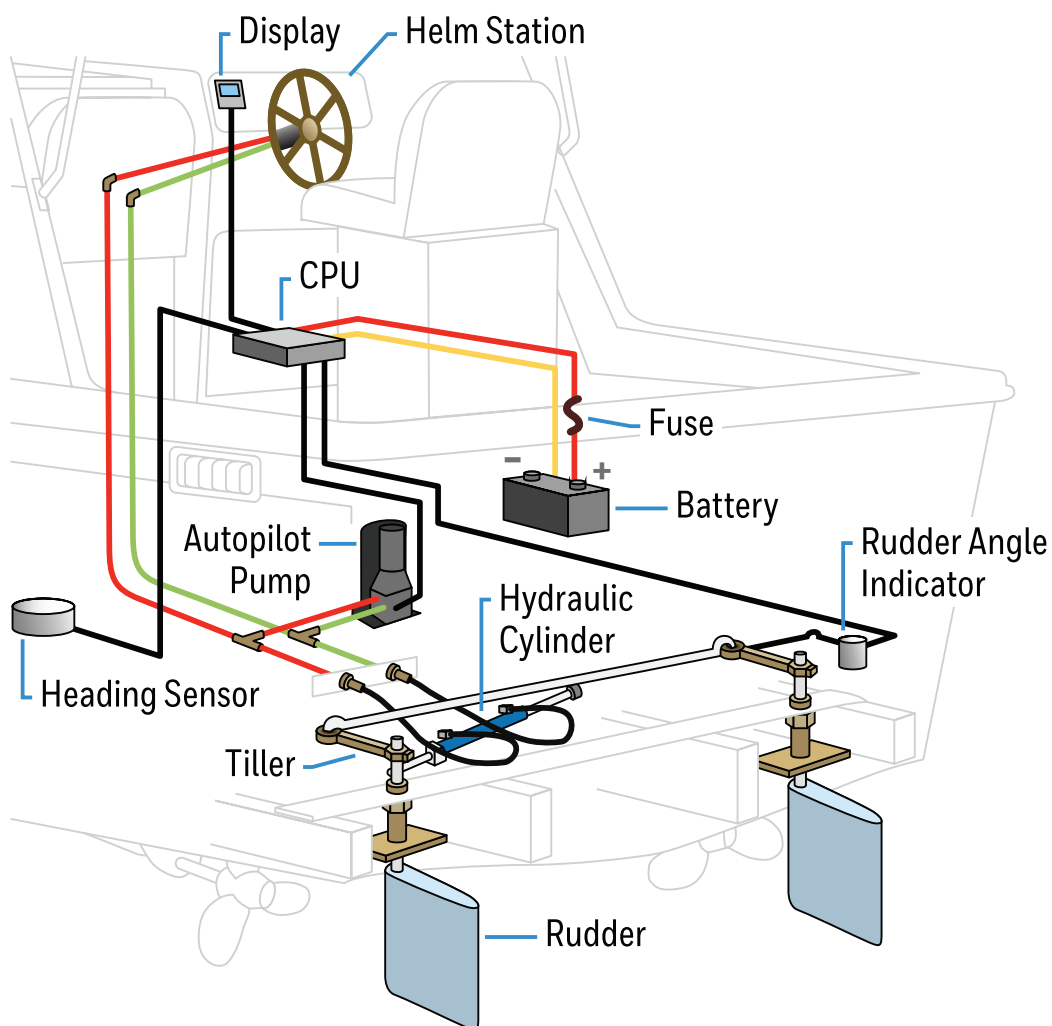
APPLICATION NEED

Add rudder position detection systems to boats and recreational watercrafts.

Application Detail

The RTY sensor is attached to the steering linkage and the position is feedback to a digital display on the dash to help operators understand the position of the rudder.

The RTY Series' feedback can also be utilized to help with autopilot application to provide rudder position detection for better control of the craft.



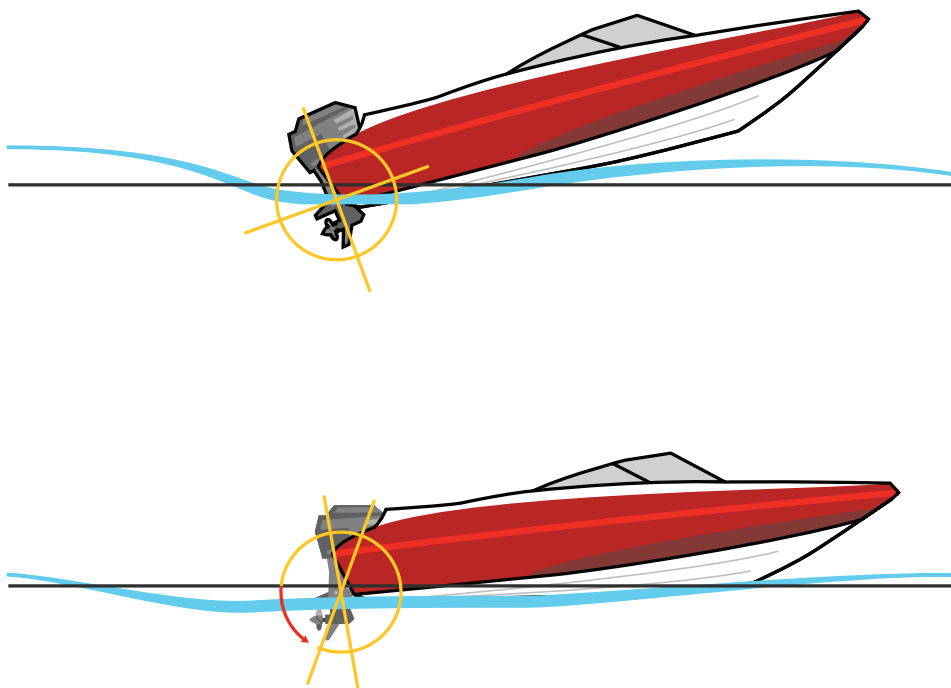


What Went Well

Honeywell worked to certify the RTY low-voltage (5 Vdc) sensor to SAE J1171 compliance.

SAE J1171 refers to a standard set by the Society of Automotive Engineers (SAE) that defines the requirements for “External Ignition Protection of Marine Electrical Devices,” meaning it specifies the design criteria for electrical components intended for use in marine engine compartments and fuel tank areas where flammable vapors may be present, ensuring they are safe from igniting due to sparks or heat generated by the device; essentially, it certifies a component as “ignition protected”

All Honeywell RTY low-voltage sensors are marked with the SAE-J1171 details.



APPLICATION NEED

The RTY sensor can also be utilized to help detect the trim position of boats.

Trim tabs help to stabilize the boat and allow it to plane out faster for greater speed and efficiency.

By adjust the pitch of the trim the operator can bring the nose of the boat down to correct the angle and keep the craft moving faster and under more control on the water.

Customer Benefits

Accurate position reporting helps the operator to maintain peak performance of the boat and protects against propeller damage.

Operators need to know the position of the trim-tabs in order to properly adjust and compensate for speed. They can also control craft listing from port to starboard.

APPLICATION NEED

Hand lever position sensor in drive-by-wire systems

Honeywell solid-state Hall-effect Rotary Position Sensors

may potentially be used to replace the mechanical cable connection between the hand lever and the engine in marine vessels and other vehicles. For example, an RTY Series sensor can be mounted adjacent to the lever to measure how far the hand lever is depressed or released by the operator. The sensor senses the change in hand lever position and sends a signal to the engine control unit to either increase or reduce the flow of gasoline and air across the throttle plate, as needed. This type of drive-by-wire system can be safer and less expensive than cable-connected systems.



VALUE TO CUSTOMER

Long Application Life

- Rated for 35 million product cycles (RTY Series); rated for infinite rotation (RTP Series)
- Provides non-contact operation, long service life, low torque actuation and reduces worn-out mechanisms (RTP Series)

Wide Sensing Range

- Eight operating ranges up to 360° allow the customer the ability to select the range of travel needed for the application.
- Available in 50°, 60°, 70°, 90°, 120°, 180°, 270° and 360° factory-set configurations.

Enhanced Design Flexibility

- Industry-standard AMP termination with North American and European pin-out styles
- IP67/IP69K rated when used with mating connector
- Conductive to applications with exposure to harsh environments (RTP Series)
- An installation location protected from environmental conditions can accommodate the RTY Series
- Supply voltage options: Low voltage (LV) 5.0 Vdc
- Output voltages of 0.5 Vdc to 4.5 Vdc for the standard option, and 4.5 Vdc to 0.5 Vdc for the inverted option

Enhanced Durability

- EMI/EMC tested, integrated reverse polarity and short circuit protection against installation errors and frequencies in the installed environment
- Media-compatible with heavy-duty transportation fluids, such as diesel and gasoline fuels, engine oils and coolants
- Shock-rated to 50 G peak (RTP Series)
- Vibration-tested to 20 G peak (RTP Series)
- Salt fog-tested: -To concentration 5% \pm 1% for 240 hr per SAE J1455 Section 4.3.3.1 (at 5.0 Vdc, 38°C [100°F]) (RTY Series)
- Customers requiring redundancy in their systems can consider the RTY Dual, available with a 2-channel output options
- RTY low voltage (5 Vdc) sensor certified to SAE J1171 compliance

CE Approvals

Honeywell Assurance

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



RTY Series Features and Benefits

- ★ **35 M cycle product life** delivers long life in the application
- **Solid-state Hall-effect technology** provides non-contact operation, long service life, low torque actuation and reduces worn-out mechanisms
- **Rugged IP67& IP69K sealed package** with integral connector allows for use in harsh environments
- Stable performance over temperature range
- Vibration immunity and diagnostic functions
- Automotive-grade EMI/EMC testing, integrated reverse polarity, and short circuit provides protection against installation errors and frequencies in the environment
- Industry-standard six position AMPSEAL-16 connector
- **Eight operating ranges up to 360°** to deliver flexibility in multiple applications, allowing OEMs the range of travel needed for the application
- Linearity: $\pm 1\%$
- Accuracy: $\pm 1.6\%$
- Sensor provides two provides two analog output signals for enhanced system integrity
- 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

★ = Competitive differentiator

OTHER APPLICATIONS

Transportation

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

Industrial

- HVAC damper control
- Irrigation equipment pivot control



⚠ WARNING IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

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 acknowledgement 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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