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Hall-effect Rotary Position
Sensors
HRS Series



HRS Series Hall-Effect Rotary Position Sensors

The HRS Series uses Hall-effect technology to supply reliable and repeatable angular position information. The use of this magnetically coupled information, in place of a mechanical wiper assembly, provides long life and a cost-effective solution for harsh environments that include temperature, vibration, shock, dither, moisture and dirt.

The HRS Series is packaged in a stainless steel metal housing with a 9,5 mm [0.375 in] diameter unthreaded or threaded bushing and a 6,35 mm [0.25 in] diameter stainless steel shaft. A variety of termination types are available. Mounting hardware is available on some catalog listings.

Key Features and Benefits

- **Solid state Hall-effect technology provides non-contact operation for:**
 - Long service life
 - Low torque actuation
 - Enhanced performance in harsh environments, especially those with vibration, shock and extreme temperatures
 - Reduces mechanical wear concerns
- **10 M cycle product life (typical):** Promotes extended life in the application
- **Choice of termination types:** Contributes to design flexibility in the application
- **Voltage output allows direct connection to the control system:** Can reduce external circuitry and overall system complexity, lowering overall installation cost to the customer
- **Choice of anti-rotation locating pins:** Limits rotation of the device in the application, preventing over-travel on levers and throttles
- **Rotary potentiometer package form factor:** Designed to provide direct replacement for potentiometers, often allowing drop-in conversion to Hall-effect technology

Potential Applications

TRANSPORTATION

Position and movement detection in off-road vehicles and construction/agricultural vehicles/equipment:

- Gear shifter, joystick, and throttle position
- Pedal position
- Hitch location
- Bucket/loader position
- Steering position
- Auto-pilot/drive-by-wire system feedback

INDUSTRIAL

Position and movement detection in material handling equipment:

- Industrial vehicle attachment position (e. g. forklift truck forks)
- Machine control joystick position
- Robotic arm position
- Valve actuator position

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Table 1. Electrical Specifications

Characteristic	Parameter			
	HRS100SSAB090	HRS100SSAB180	HRS100SWAB090	HRSRES05A090
	Solder Lugs, Unformed		Flying Wire Leads	Solder Lugs, Formed 90° Down
				
Electrical angle	90° ±2° CW	180° ±2° CW	90° ±2° CW	
Output voltage	CW: 4.750 V min., 4.850 V max. CCW: 0.150 V min., 0.250 V max.	CW: 4.750 V min., 4.850 V max. CCW: 0.050 V min., 0.150 V max.	CW: 4.750 V min., 4.850 V max. CCW: 0.150 V min., 0.250 V max.	CW: 2.095 V min., 2.205 V max. CCW: 0.245 V min., 0.294 V max.
Linearity (% of span)	±2% typ.	±4% typ.	±2% typ.	
Output current	2 mA max.			
Output type	sink/source			
Overvoltage protection	18 Vdc. max.			
Supply voltage	5 Vdc			
Supply current	5 mA typ.			

Table 2. Mechanical Specifications

Characteristic	Parameter			
	HRS100SSAB090	HRS100SSAB180	HRS100SWAB090	HRSRES05A090
Mechanical angle of rotation	90° ±2°	180° ±2°	90° ±2°	
Rotational cycles	10 million typ.			
Rotational torque	0.014 N m [2.0 in-oz] max. at 25 °C [77 °F]			
Stop torque	0,56 N m [5 in-lb] min.			
Push out	89 N m [20 in lb] min.			
Pull out	44 N m [10 in lb] min.			
Shaft:				
diameter	6,35 mm [0.25 in]			
material	stainless steel			
Bushing:				
diameter	9,5 mm [0.375 in]			
material	nickel-plated brass			
Housing material	stainless steel			
Terminal material:				
solder lug terminals	tin-plated brass, SAC305 solder dip	—		tin-plated brass, SAC305 solder dip
flying wire leads	—	XL insulated, 20 AWG stranded		—
Terminal support material	thermoplastic			
Mounting hardware material:				
mounting nut	nickel-plated brass			
lock washer	nickel-plated brass			

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Table 3. Environmental Specifications

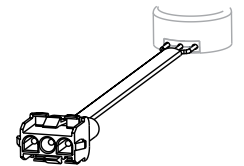
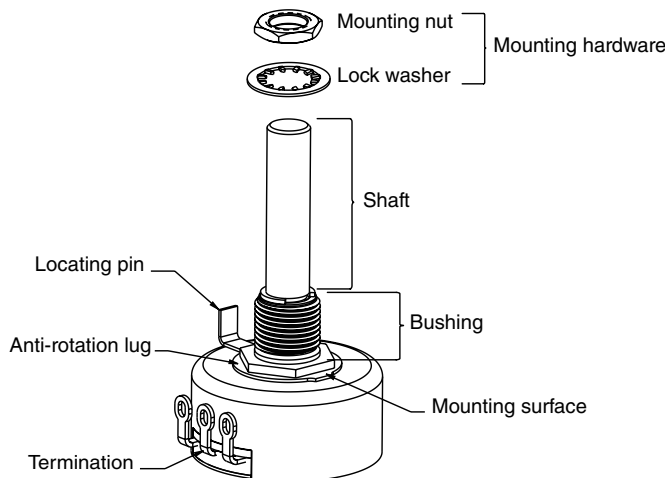
Characteristic	Parameter
Operating temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Storage temperature	105 °C [221 °F] max.
Shock	50 g, 11 ms
Vibration	15 G, 10 Hz to 2000 Hz
ESD sensitivity	±7 kV max. (human body model)
EMI	30 V/m, 10 kHz to 1000 MHz at 3 m

Figure 1. General HRS Series Configuration Guide

This figure shows possible HRS Series configurations. Not all combinations may be available, please contact Honeywell. See the Order Guide (Figure 4) for currently available catalog listings.

Product Series	Bushing Type	Shaft Type	Shaft Length	Mechanical Rotation/ Electrical Rotation	Anti-Rotation (AR) Locating Pin	Termination Type
HRS Series Hall-Effect Rotary Position Sensors	Threaded (3/8-32 UNEF-2A)	Ø6,32 mm [0.25 in]: Flatted	22,23 mm [0.875 in] 23,62 mm [0.930 in] 23,62 mm [0.931 in] 24,21 mm [0.953 in]	80°/80°: CW CCW	One locating pin: Unformed	Solder lugs: Unformed
	Unthreaded (Ø9,5 mm [0.375 in])	Round	25,40 mm [1.000 in] 30,48 mm [1.200 in] 32,89 mm [1.295 in]	90°/90°: CW CCW Special	Formed 90° up	Formed: 90° Up
		Slotted	35,10 mm [1.382 in] 36,35 mm [1.431 in]	Two locating pins: Formed 90° up	90° Down	
						Flying wire leads
						Cable and connector (AMP CAP 1-480701-0)

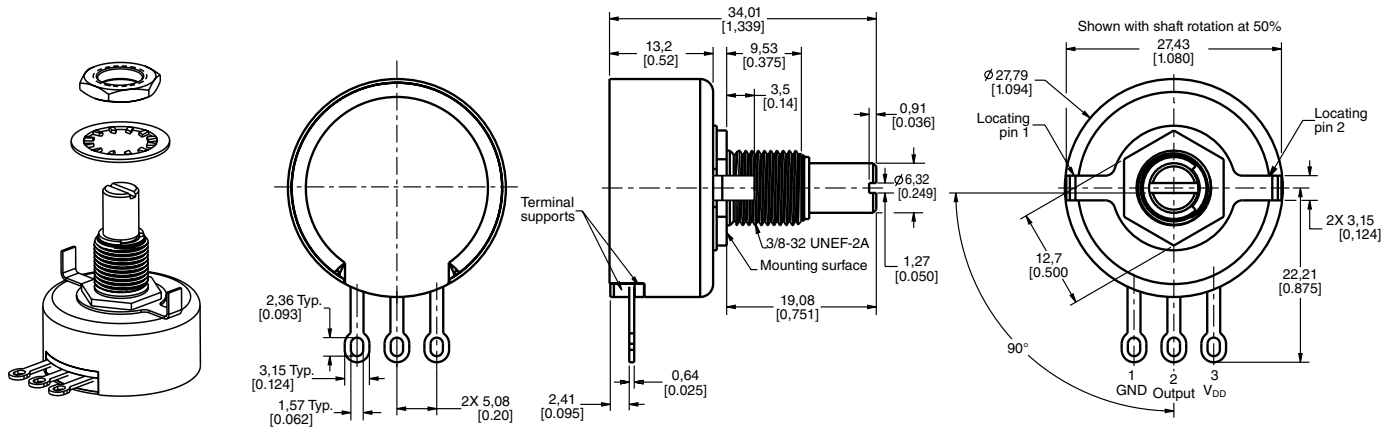
General HRS Series Terminology



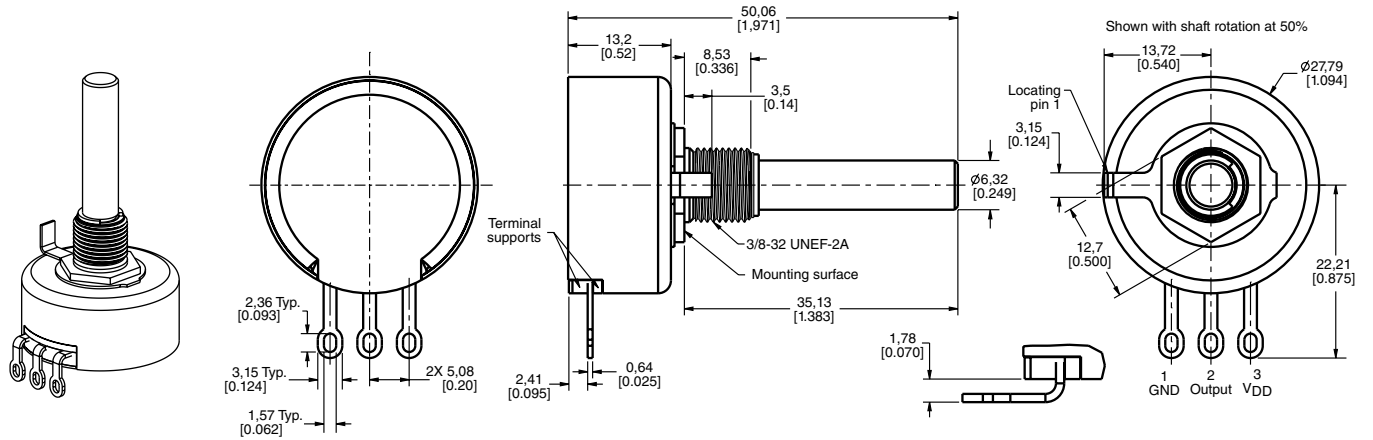
Hall-Effect Rotary Position Sensors, HRS Series

Figure 2. Dimensional Drawings (For reference only: mm [in.])

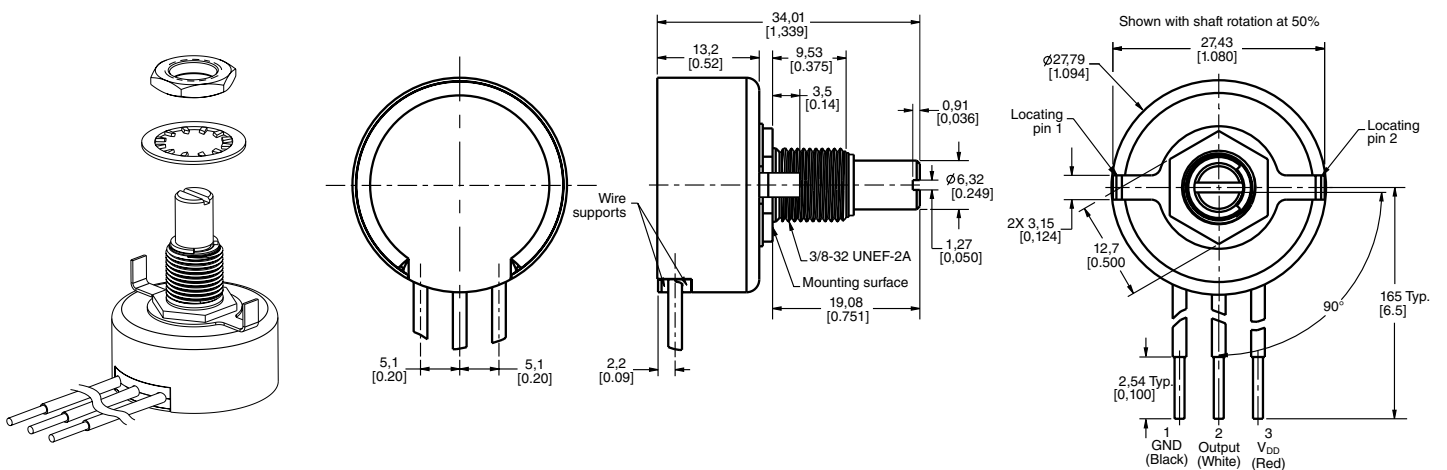
HRS100SSAB090, HRS100SSAB180: Solder lugs, unformed



HRSRES05A090C: Solder lugs, formed 90° down (formed per detail; unformed dimensions for reference only)



HRS100SWAB09: Flying wire leads



Hall-Effect Rotary Position Sensors, HRS Series

Figure 3. Mounting Hardware


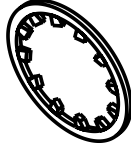
<p>Mounting Nut 9,5 mm [0.375 in], 3/8-32 UNEF-2A</p> 	<p>Lock Washer 17,8 mm [0.70 in] internal diameter 1,59 mm [0.0625 in] thick</p> 
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Figure 4. Order Guide

Catalog Listing	Description
HRS100SSAB090	HRS Series Hall-effect rotary position sensor, slotted shaft, solder lug terminals unformed, 90° electrical angle, unassembled mounting hardware included
HRS100SSAB180	HRS Series Hall-effect rotary position sensor, slotted shaft, solder lug terminals unformed, 180° electrical angle, unassembled mounting hardware included
HRS100SWAB090	HRS Series Hall-effect rotary position sensor, slotted shaft, flying wire leads, 90° electrical angle, unassembled mounting hardware included
HRSRES05A090C	HRS Series Hall-effect rotary position sensor, round shaft, solder lug terminals formed 90° down, 90° electrical angle, mounting hardware not included

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ADDITIONAL INFORMATION

The following associated literature is available at sensing.honeywell.com:

- Product Line Guide
- Product Range Guide
- Installation Instructions

Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell's sensing and control products, call **+1-815-235-6847** or **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

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⚠ 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. 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 it 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.**

While we provide application assistance personally, through our literature and the Honeywell website, it is up to the customer to determine the suitability of the product in the application.

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

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