

RPN Series

Hall-Effect Rotary Position Sensors



DESCRIPTION

RPN Series Rotary Position Sensors 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 the IC's position relative to the magnets. The resulting flux density change is converted to a linear output.

The IC, together with conditioning and protection circuitry, and two permanent magnets, is sealed in a rugged package of IP67 or greater for durability in most harsh environments.

Solid-state Hall-effect technology provides non-contact operation, long service life, low torque actuation and reduced wear-out mechanisms.

Eight operating ranges (50°, 60°, 70°, 90°, 120°, 180°, 270° and 360°) are tolerant to over travel and allow use in most common applications.

FEATURES

- Solid-state Hall-effect technology
- Eight operating ranges, up to 360°
- Variety of supply voltages and output configurations
- Rugged sealed package with integral connector
- IP67 or greater
- Integrated reverse polarity, short circuit and EMC protection
- Single or dual output versions available
- Industry-standard termination

Five different supply voltages and eight different output configurations, in either mA or Vdc, improve compatibility with a variety of control systems.

Two versions provide dual outputs for use where an additional output may be desired where redundancy and backup is needed. Another potential application includes using one output for an indicator and the second for the control system.

Lever versions are available. The easy-to-mount sensor has a mounting flange with two round or oval mounting holes. All products have AMP or Deutsch receptacles.

POTENTIAL APPLICATIONS

Position and movement detection of pedals, throttle, gear shift, levers, linkages, suspension and hitches in:

- Trucks
- Off road vehicles
- Industrial vehicles and equipment
- Construction vehicles and equipment
- Agricultural vehicles and equipment
- Cranes

RPN Series

Table 1. RPNR Redundant (Dual) Output Specifications

Characteristic	Parameter
Operating ranges available	50° (±25°), 90° (±45°)
Output available	50° (±25°): Channel 1: 4 mA (left), 20 mA (right); Channel 2: 0.25 Vdc (left), 4.75 Vdc (right) 90° (±45°): Channel 1: 0.25 Vdc (left), 4.75 Vdc (right); Channel 2: 4.75 Vdc (left), 0.25 Vdc (right)
Supply voltage range(s) available	50° (±25°): Channel 1: 8.5 Vdc; Channel 2: 5 Vdc 90° (±45°): Channel 1: 10 Vdc to 30 Vdc; Channel 2: 10 Vdc to 30 Vdc
Current consumption	20 mA max.
Output signal delay	3 ms approx.
Accuracy	±1.6%
Hysteresis	none
Linearity	
RPNR050SDMEC3A21X	±0.35°
RPNR090KAAA3A11X	±0.6°
Reverse polarity protection	yes
Operating and storage temperature range	-40 °C to 125 °C [-40 °F to 257 °F]
EMC	200 V/m ISO 11452-3
Expected life	30x10 ⁶ cycles
Protection class	IP69K DIN 40050
Housing material	PA66 plastic
Shaft material	stainless steel
Termination	AMP 1-1419168-1
Mechanical end stop	no

Table 2. RPNS Single Output Specifications

Characteristic	Parameter
Operating ranges available	50° (±25°), 60° (±30°), 70° (±35°), 90° (±45°), 120° (±60°), 180° (±90°), 270° (±135°), 360° (±180°)
Outputs available	0.25 Vdc (left), 4.75 Vdc (right) 4 mA (left), 20 mA (right) 0.5 Vdc (left), 4.5 Vdc (right) 20 mA (left), 4 mA (right) 1 Vdc (left), 9 Vdc (right) 3 Vdc (left), 5 Vdc (right) 4.5 Vdc (left), 0.5 Vdc (right) 4.75 Vdc (left), 0.25 Vdc (right)
Supply voltage range(s) available	5 Vdc, 8 Vdc to 30 Vdc, 10 Vdc to 30 Vdc
Current consumption (maximum)	20 mA
Output signal delay (approx)	3 ms
Reverse polarity protection	yes
EMC	200 V/m ISO 11452-3
Operating and storage temperature range	-40 °C to 125 °C [-40 °F to 257 °F]
Protection class	IP67 DIN 40050
Accuracy	±1.6%
Hysteresis	none
Linearity	
RPNS050BB1A21X, RPNS050FA1A21X	±0.35°
RPNS060AC1A21X	±0.6°
RPNS070DD1A21X	±1°
All other listings	±2°
RPNS120AA1A21X	±5°
Housing material	PA66 plastic
Shaft material	stainless steel
Expected life	30x10 ⁶ cycles
Termination	AMP Superseal 282087-1, Deutsch DT04-3P
Mechanical end stop	no

Hall-Effect Rotary Position Sensors

Figure 1. RPNR Redundant (Dual) Output Versions (For Reference Only: mm/[in].)

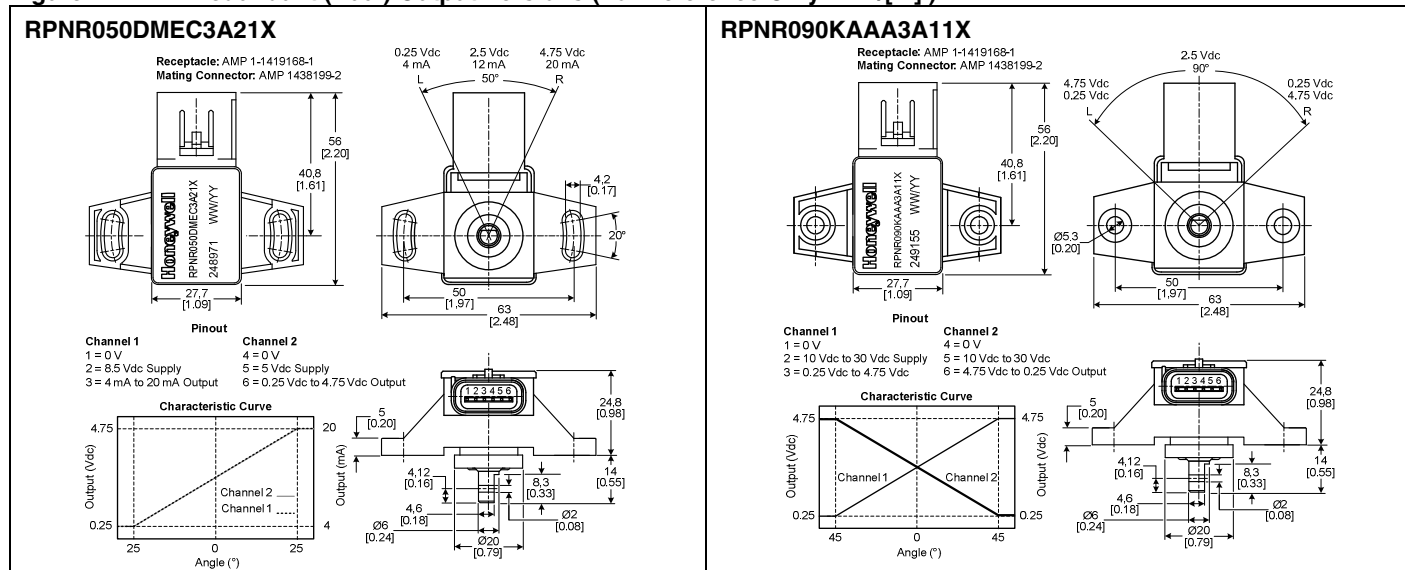


Figure 2. RPNS Single Output Versions (For Reference Only: mm/[in].)

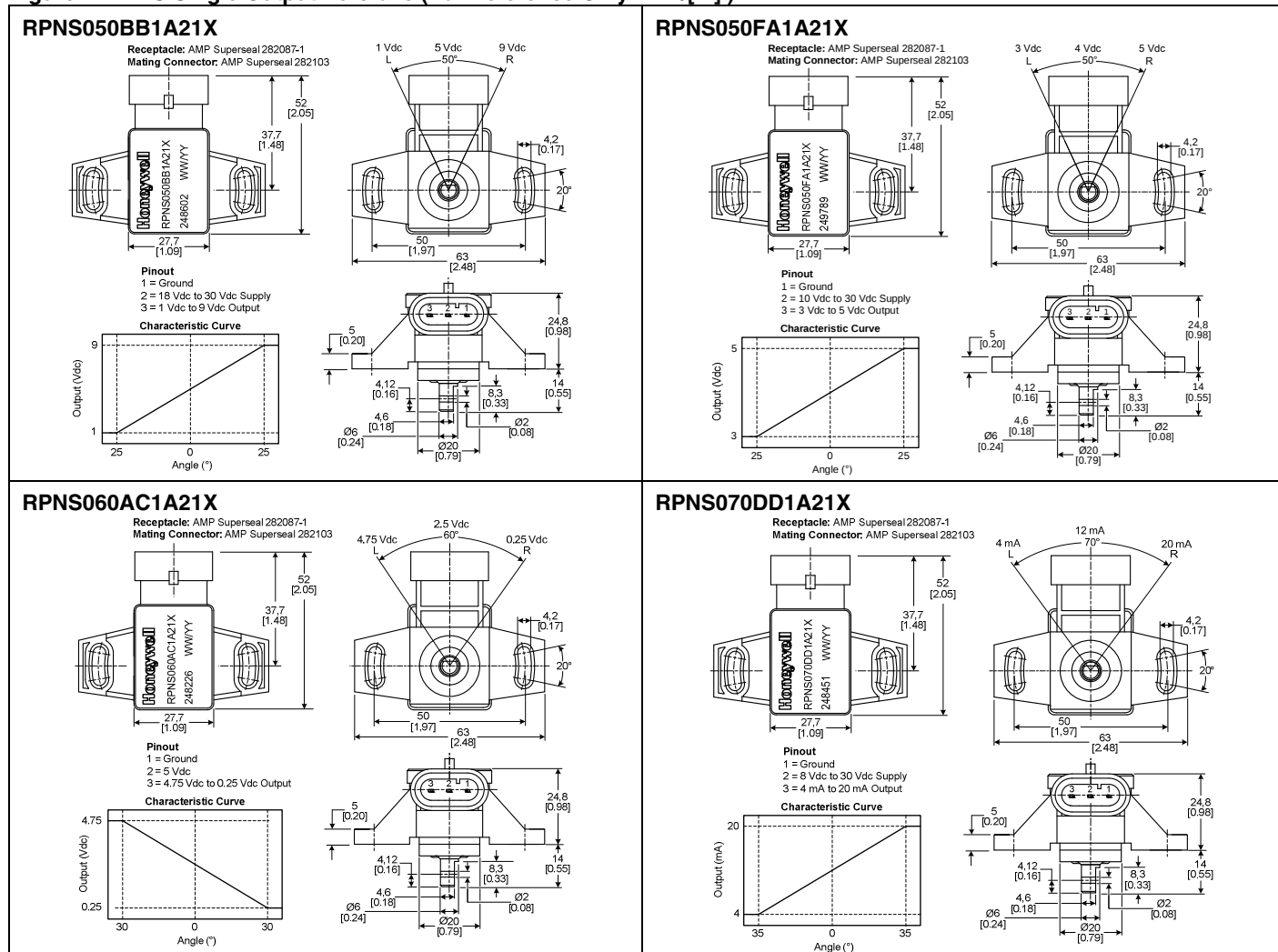
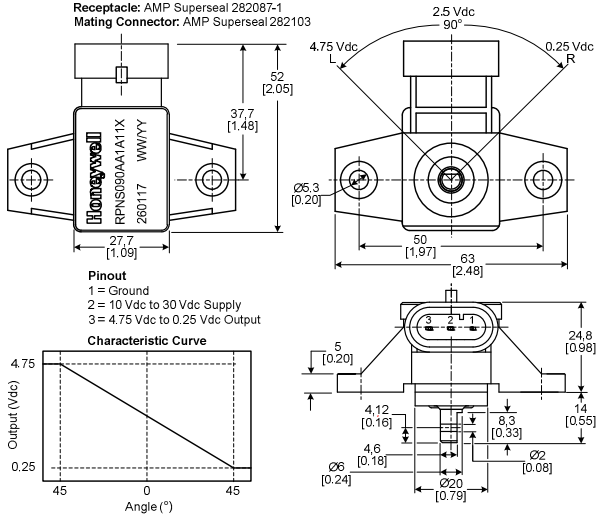


Figure 2. RPNS Single Output Versions (Continued)

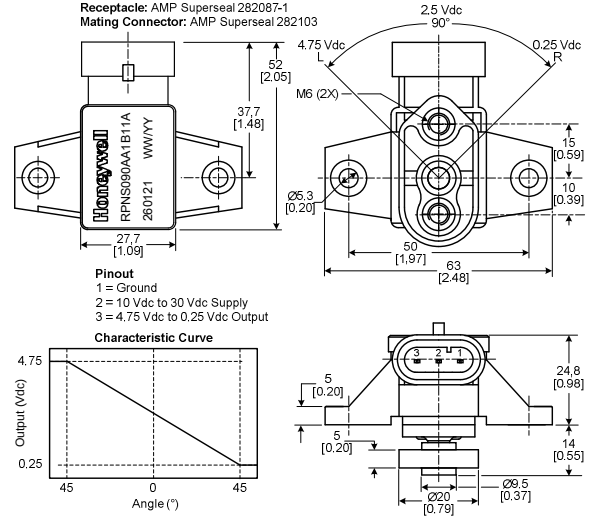
RPNS090AA1A11X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



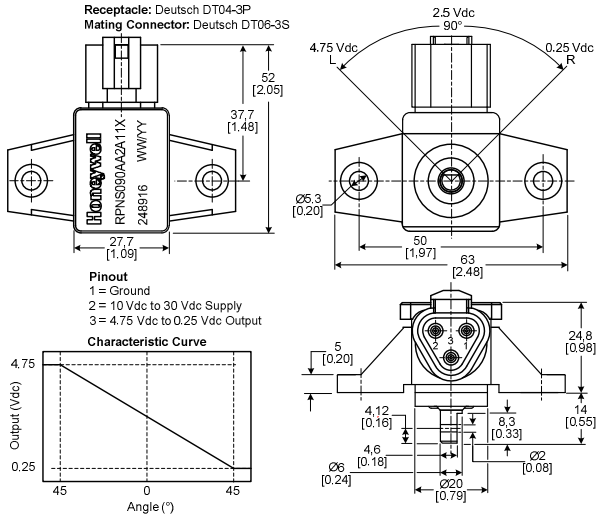
RPNS090AA1B11A

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



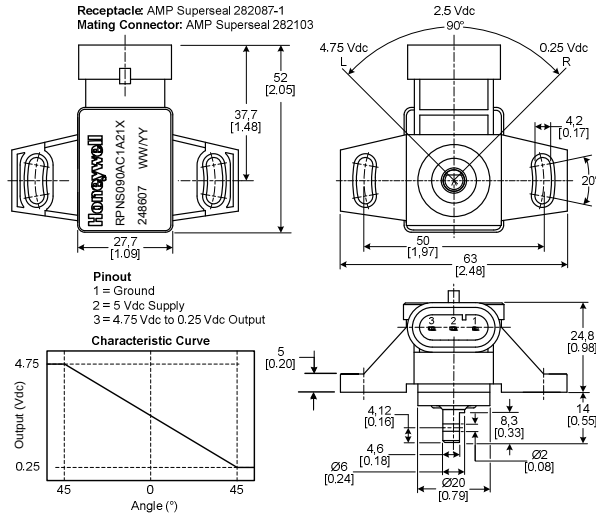
RPNS090AA2A11X

Receptacle: Deutsch DT04-3P
Mating Connector: Deutsch DT06-3S



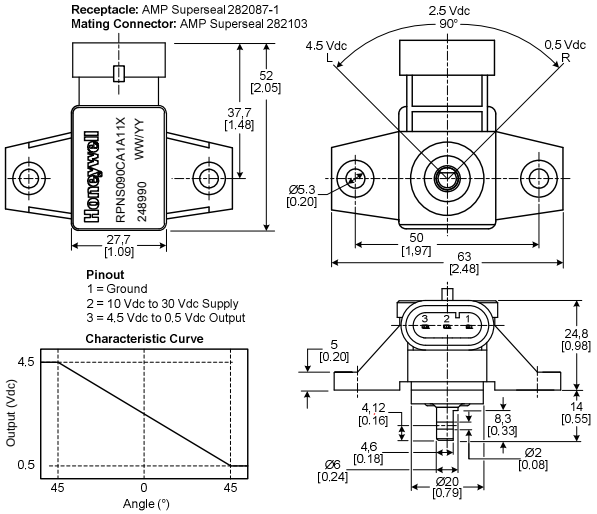
RPNS090AC1A21X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



RPNS090CA1A11X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



RPNS090DD2A21X

Receptacle: Deutsch DT04-3P
Mating Connector: Deutsch DT06-3S

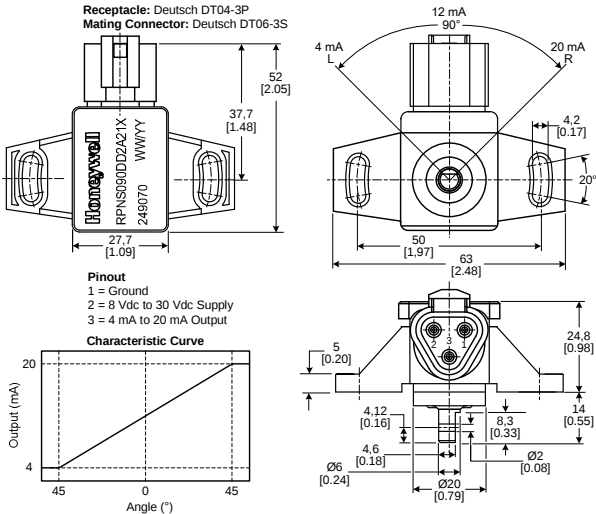
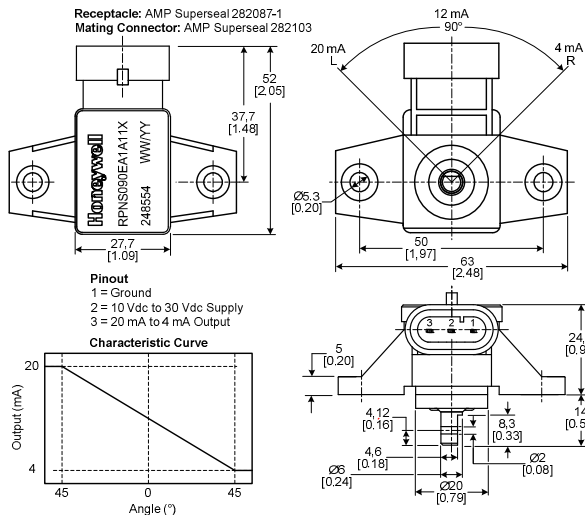


Figure 2. RPNS Single Output Versions (Continued)

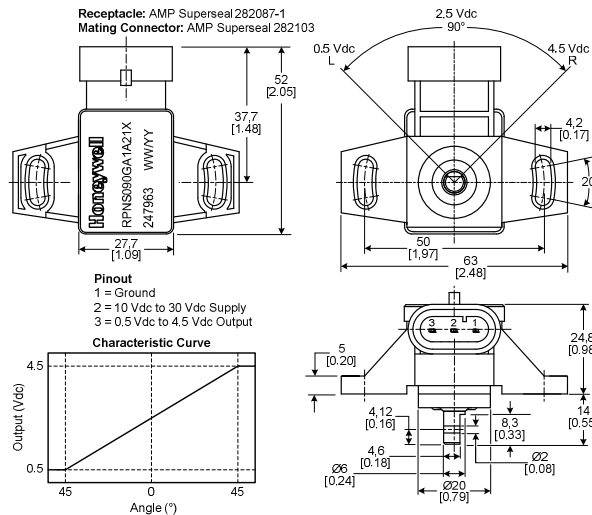
RPNS090EA1A11X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



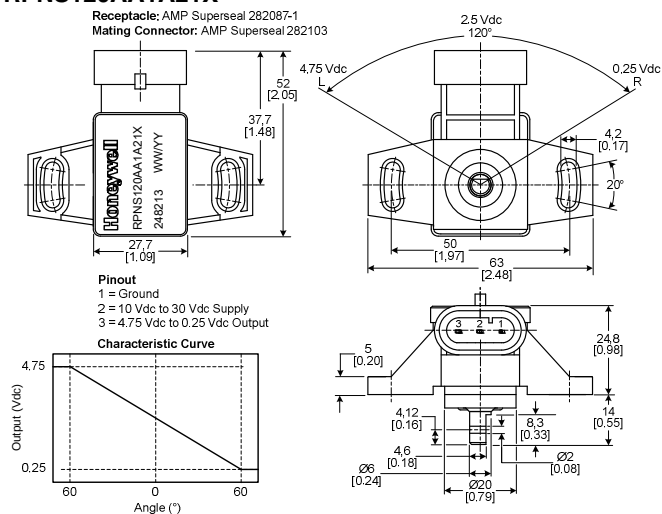
RPNS090GA1A21X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



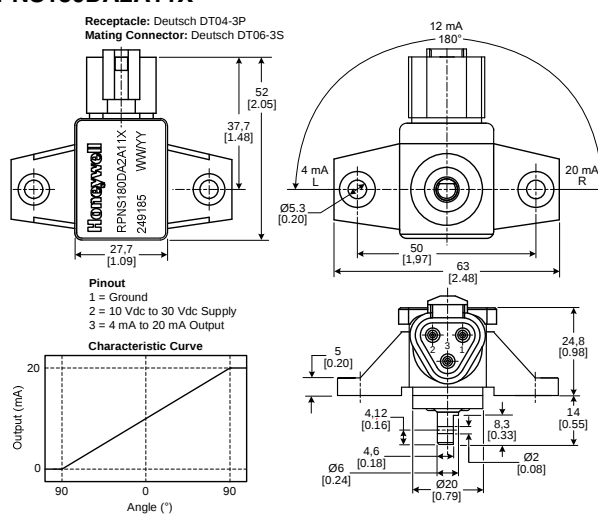
RPNS120AA1A21X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



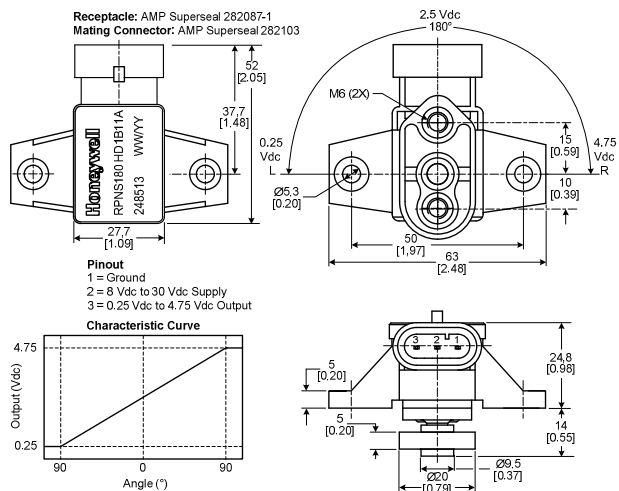
RPNS180DA2A11X

Receptacle: Deutsch DT04-3P
Mating Connector: Deutsch DT06-3S



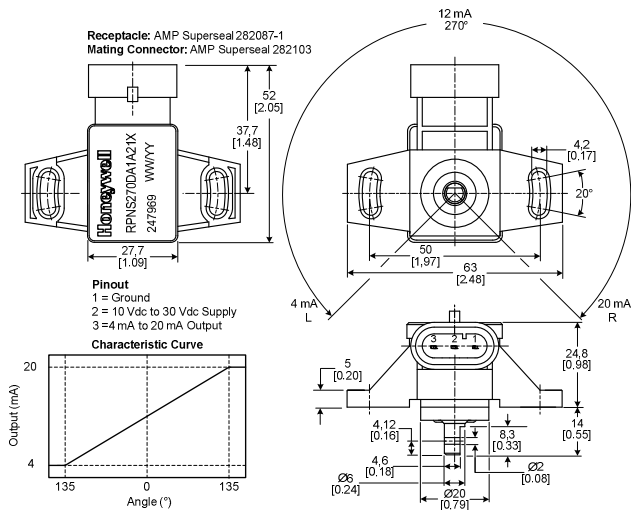
RPNS180HD1B11A

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



RPNS270DA1A21X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103



RPNS360GC1A11X

Receptacle: AMP Superseal 282087-1
Mating Connector: AMP Superseal 282103

Technical drawing of the RPNS360GC1A11X connector. The front view shows a rectangular body with a central receptacle and two side flanges. Dimensions include a total width of 27.7 [1.09], a height of 52 [2.05], and a distance of 37.7 [1.48] from the top to the center of the side flanges. The top view shows a circular footprint with a diameter of 63 [2.48] and a central hole diameter of 50 [1.97]. The side view shows a height of 24.8 [0.98] and a distance of 14 [0.55] from the base to the top of the side flanges. The characteristic curve shows a linear relationship between Output (Vdc) and Angle (°), ranging from 0.5 Vdc at 180° to 4.5 Vdc at 180°.

2.5 Vdc
360°

Ø5.3 [0.20]

50 [1.97]

63 [2.48]

0.5 Vdc L

4.5 Vdc R

Pinout
1 = Ground
2 = 5 Vdc Supply
3 = 0.5 Vdc to 4.5 Vdc Output

Characteristic Curve

Output (Vdc)

Angle (°)

4.5

0.5

180

0

180

5 [0.20]

24.8 [0.98]

14 [0.55]

4.12 [0.16]

8.3 [0.33]

4.6 [0.18]

Ø6 [0.24]

Ø20 [0.79]

Ø2 [0.08]

Order Guide

Catalog Listing	Output Style	Operating Range	Supply Voltage	Output Type	Termination	Shaft Shape	Mounting Hole	Lever
RPNR050DMEC3A21X	redundant (dual)	50° (±25°)	Channel 1: 8.5 Vdc Channel 2: 5 Vdc	Channel 1: 4 mA (left), 20 mA (right) Channel 2: 0.25 Vdc (left), 4.75 Vdc (right)	AMP 1-1419168-1	flat	oval	none
RPNR090KAAA3A11X	redundant (dual)	90° (±45°)	10 Vdc to 30 Vdc	Channel 1: 0.25 Vdc (left), 4.75 Vdc (right) Channel 2: 4.75 Vdc (left), 0.25 Vdc (right)	AMP 1-1419168-1	flat	round	none
RPNS050BB1A21X	single	50° (±25°)	18 Vdc to 30 Vdc	1 Vdc (left), 9 Vdc (right)	AMP Superseal 282087-1	flat	oval	none
RPNS050FA1A21X	single	50° (±25°)	10 Vdc to 30 Vdc	3 Vdc (left), 5 Vdc (right)	AMP Superseal 282087-1	flat	oval	none
RPNS060AC1A21X	single	60° (±30°)	5 Vdc	4.75 Vdc (left), 0.25 Vdc (right)	AMP Superseal 282087-1	flat	oval	none
RPNS070DD1A21X	single	70° (±35°)	8 Vdc to 30 Vdc	4 mA (left), 20 mA (right)	AMP Superseal 282087-1	flat	oval	none
RPNS090AA1A11X	single	90° (±45°)	10 Vdc to 30 Vdc	4.75 Vdc (left), 0.25 Vdc (right)	AMP Superseal 282087-1	flat	round	none
RPNS090AA1B11A	single	90° (±45°)	10 Vdc to 30 Vdc	4.75 Vdc (left), 0.25 Vdc (right)	AMP Superseal 282087-1	round	round	43 mm [1.69 in]
RPNS090AA2A11X	single	90° (±45°)	10 Vdc to 30 Vdc	4.75 Vdc (left), 0.25 Vdc (right)	Deutsch DT04-3P	flat	round	none
RPNS090AC1A21X	single	90° (±45°)	5 Vdc	4.75 Vdc (left), 0.25 Vdc (right)	AMP Superseal 282087-1	flat	oval	none
RPNS090 CA1A11X	single	90° (±45°)	10 Vdc to 30 Vdc	4.5 Vdc (left), 0.5 Vdc (right)	AMP Superseal 282087-1	flat	round	none
RPNS090DD2A21X	single	90° (±45°)	8 Vdc to 30 Vdc	4 mA (left), 20 mA (right)	Deutsch DT04-3P	flat	oval	none
RPNS090EA1A11X	single	90° (±45°)	10 Vdc to 30 Vdc	20 mA (left), 4 mA (right)	AMP Superseal 282087-1	flat	round	none
RPNS090GA1A21X	single	90° (±45°)	10 Vdc to 30 Vdc	0.5 Vdc (left), 4.5 Vdc (right)	AMP Superseal 282087-1	flat	oval	none
RPNS120AA1A21X	single	120° (±60°)	10 Vdc to 30 Vdc	4.75 Vdc (left), 0.25 Vdc (right)	AMP Superseal 282087-1	flat	oval	none
RPNS180DA2A11X	single	180° (±90°)	10 Vdc to 30 Vdc	4 mA (left), 20 mA (right)	Deutsch DT04-3P	flat	round	none
RPNS180HD1B11A	single	180° (±90°)	8 Vdc to 30 Vdc	0.25 Vdc (left), 4.75 Vdc (right)	AMP Superseal 282087-1	round	round	43 mm [1.69 in]
RPNS270DA1A21X	single	270° (±135°)	10 Vdc to 30 Vdc	4 mA (left), 20 mA (right)	AMP Superseal 282087-1	flat	oval	none
RPNS360GC1A11X	single	360° (±180°)	5 Vdc	0.5 Vdc (left), 4.5 Vdc (right)	AMP Superseal 282087-1	flat	round	none

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.

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 web site, 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.

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.

SALES AND SERVICE

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 or:

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