

## RPN Series

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### 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

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- 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

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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)<br>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<br>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 <sup>6</sup> 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)<br>0.5 Vdc (left), 4.5 Vdc (right)      20 mA (left), 4 mA (right)<br>1 Vdc (left), 9 Vdc (right)<br>3 Vdc (left), 5 Vdc (right)<br>4.5 Vdc (left), 0.5 Vdc (right)<br>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 <sup>6</sup> 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].)

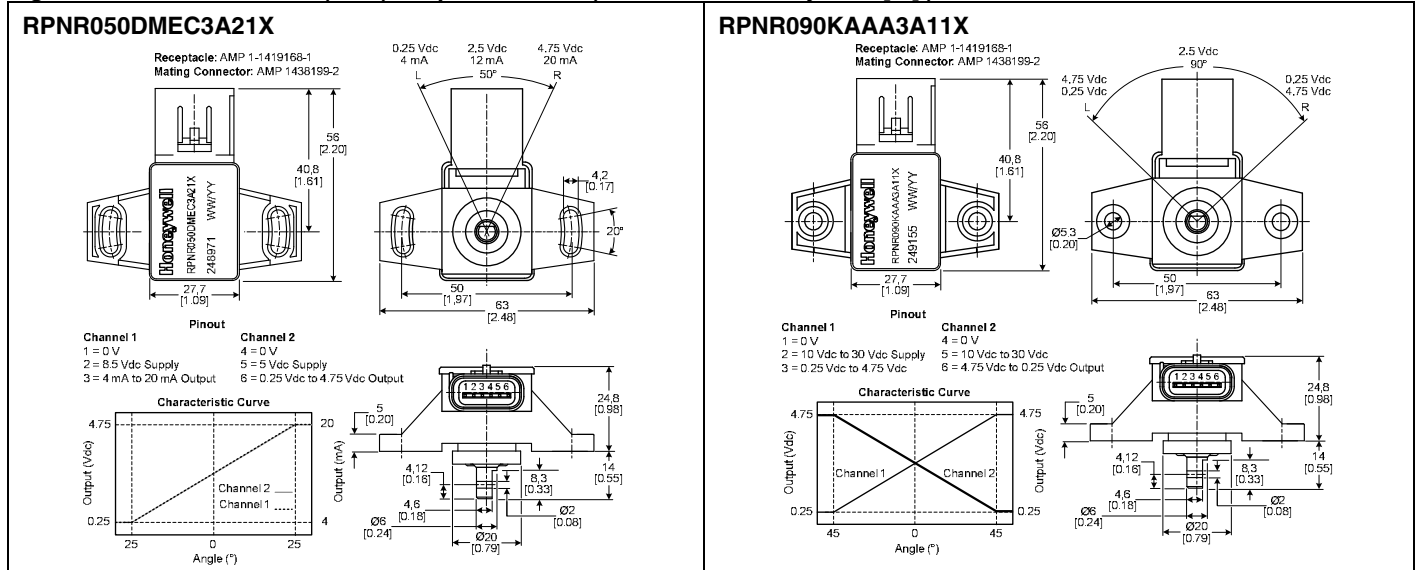


Figure 2. RPNS Single Output Versions (For Reference Only: mm/[in].)

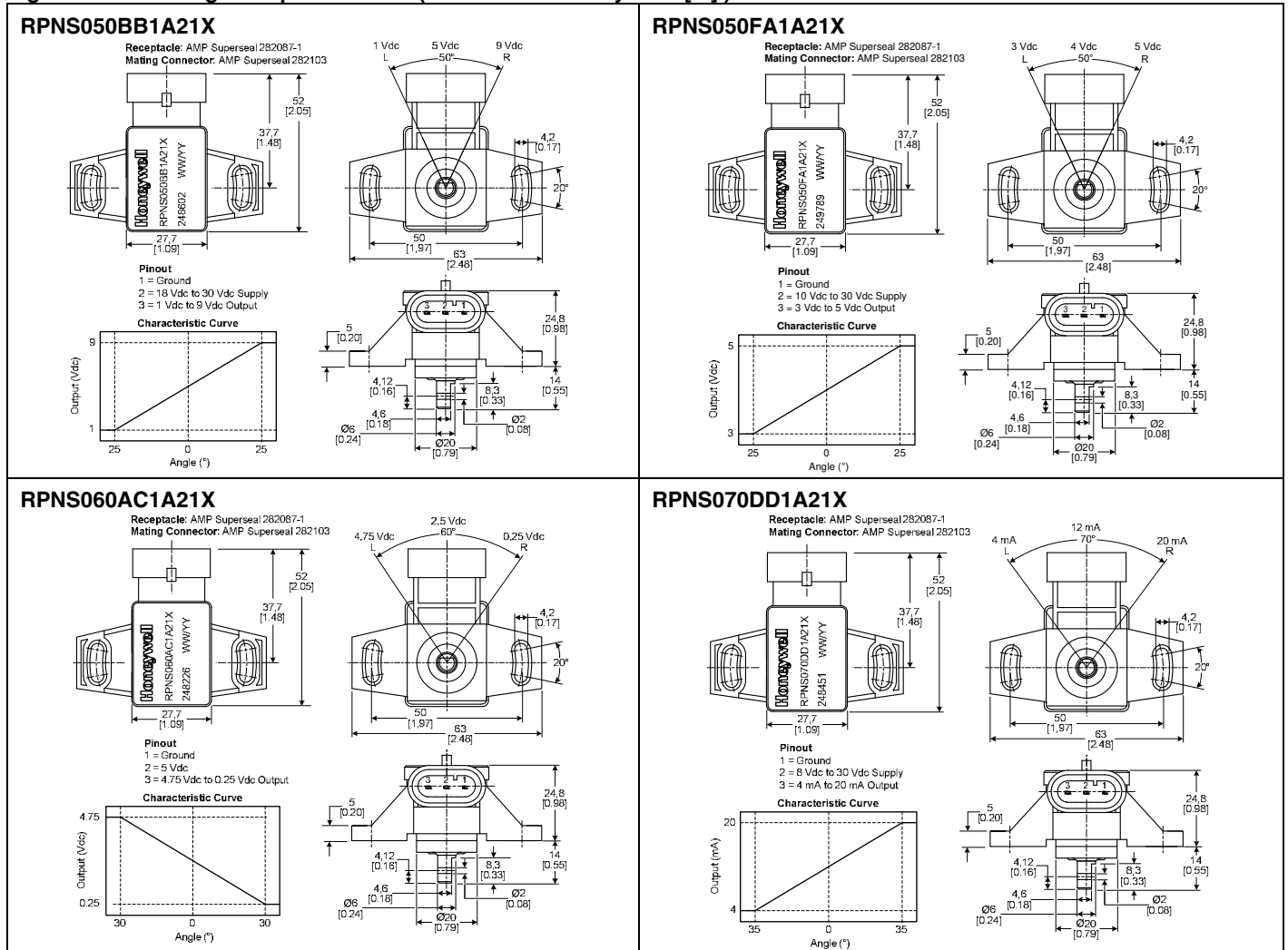


Figure 2. RPNS Single Output Versions (Continued)

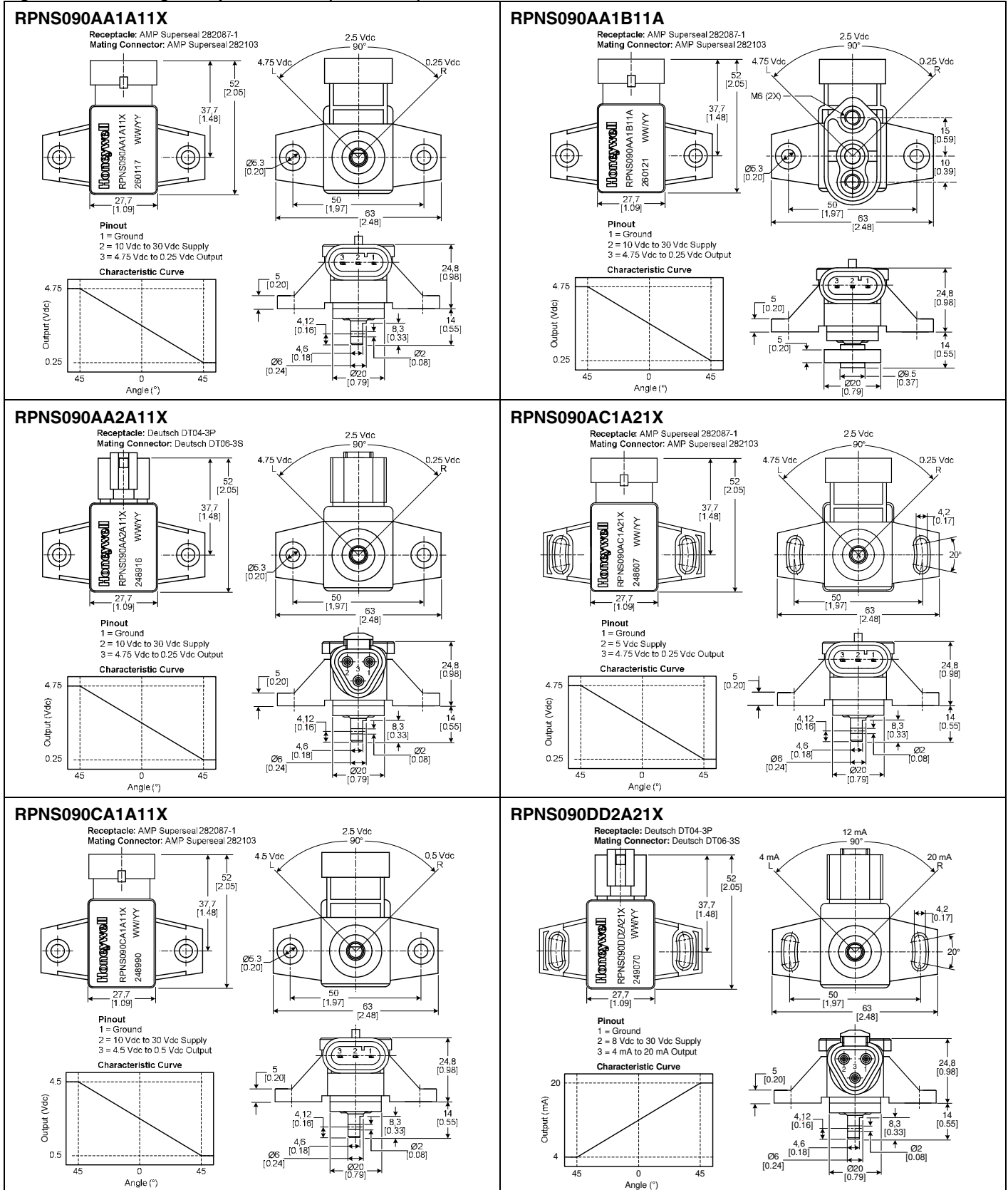


Figure 2. RPNS Single Output Versions (Continued)

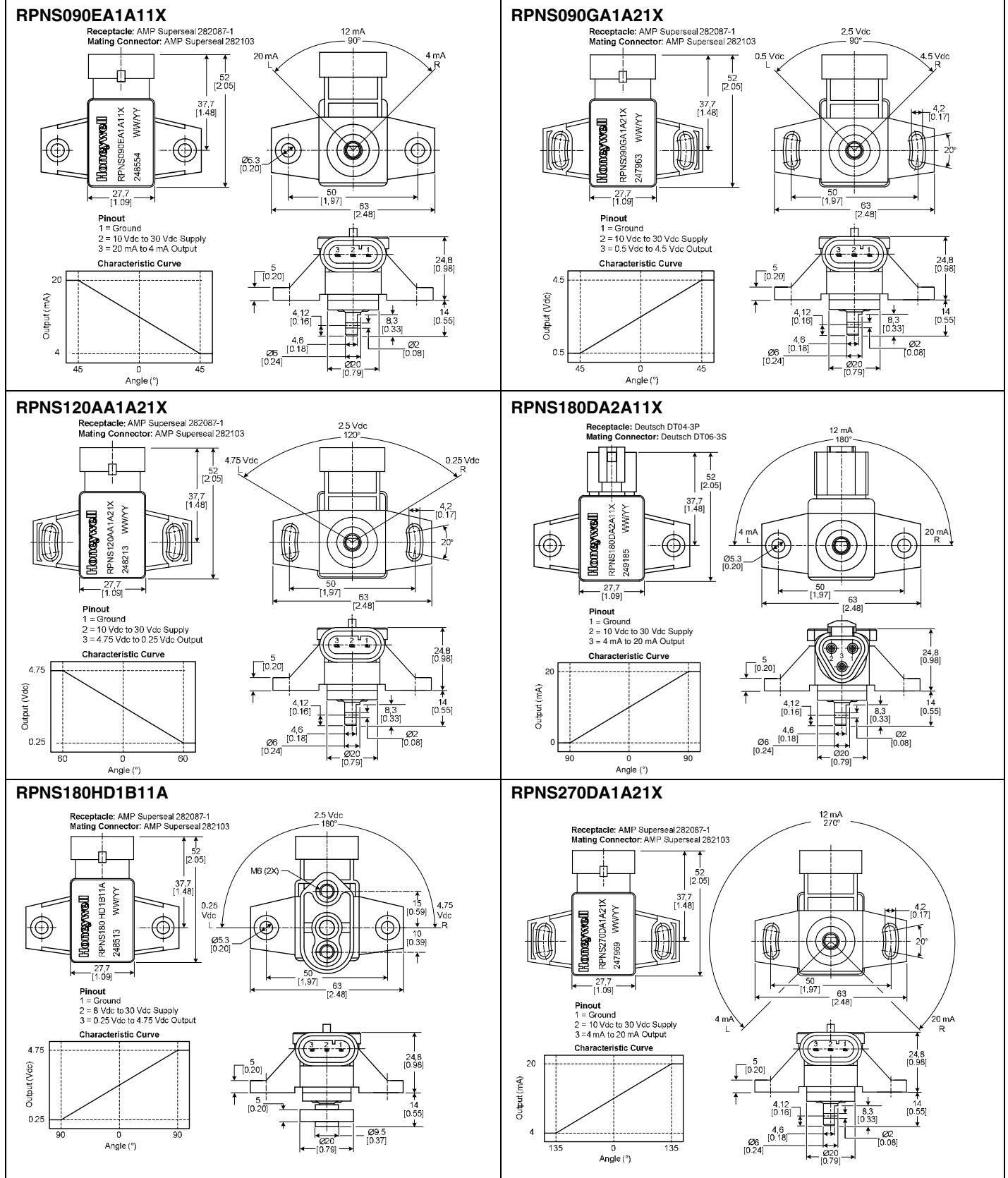
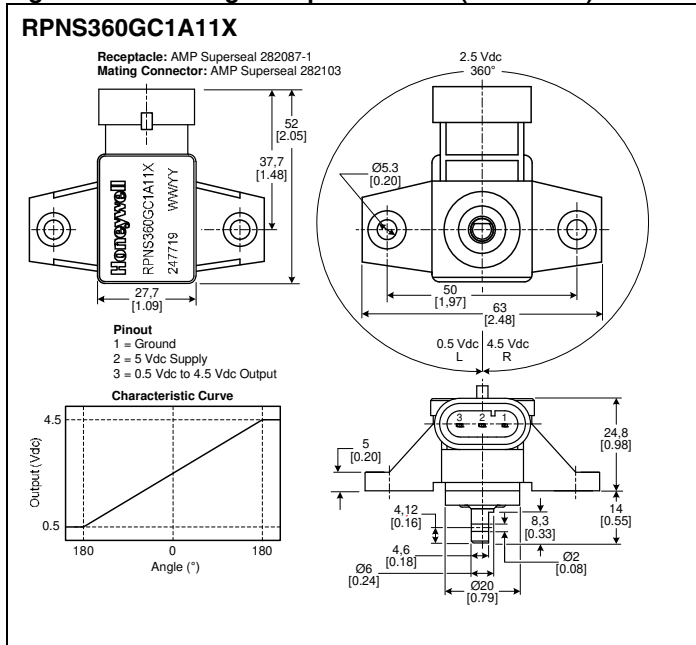


Figure 2. RPNS Single Output Versions (Continued)



**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<br>Channel 2: 5 Vdc | Channel 1: 4 mA (left), 20 mA (right)<br>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)<br>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**

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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:

**E-mail:** [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

**Internet:** [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

#### **Phone and Fax:**

Asia Pacific +65 6355-2828  
+65 6445-3033 Fax  
Europe +44 (0) 1698 481481  
+44 (0) 1698 481676 Fax  
Latin America +1-305-805-8188  
+1-305-883-8257 Fax  
USA/Canada +1-800-537-6945  
+1-815-235-6847  
+1-815-235-6545 Fax

Sensing and Control  
Honeywell  
1985 Douglas Drive North  
Minneapolis, MN 55422  
[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

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