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Sensing and Control  
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### Sensing and Control

Honeywell Inc.

11 West Spring Street

Freeport, IL 61032

# Ultrasonic Sensors

946 Series

## Teachable 30 mm Diameter Precision Digital Outputs

### FEATURES

- Two independent setpoints
- Teach-in programming
- N.O., N.C. window characteristic possible



### ORDER GUIDE

| Sensor Package Style                | Sensing Range* mm (in.)   | Termination** | Digital Output | Catalog Listing     |
|-------------------------------------|---------------------------|---------------|----------------|---------------------|
| 30 mm (1.18 in.)<br>Stainless Steel | 800 - 6000<br>(31.5-236)  | Connector     | PNP            | 946-A4V-2D-001-65E  |
|                                     | 200 - 1000<br>(7.87-39.4) | Connector     | PNP            | 946-A4V-2D-001-175E |
|                                     | 60 - 300<br>(2.36-11.8)   | Connector     | PNP            | 946-A4V-2D-001-400E |

\* Standard target is 120 mm thick square of mild steel perpendicular to ultrasonic beam.

\*\*Includes 2 meter cable with straight connector.

### SPECIFICATIONS

#### SENSING CHARACTERISTICS

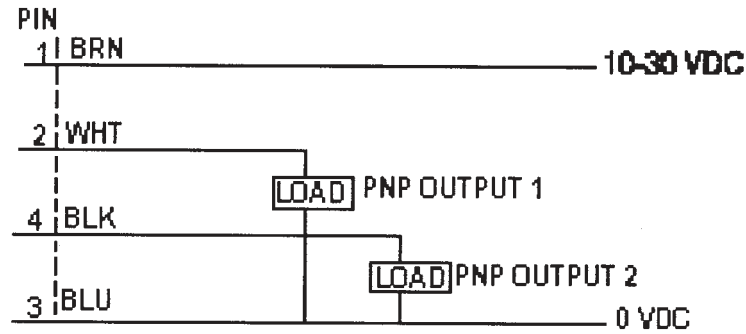
| Catalog Listings              | 946A4V-3D-001-65E  | 946-A4V-2D-001-175E | 946-A4V-2D-001-400E |
|-------------------------------|--|---------------------|---------------------|
| Max. Sensing Distance         | 6000 mm (236 in.)  | 1000 mm (39.4 in.)  | 300 mm (11.8 in.)   |
| Min. Sensing Distance         | 800 mm (31.5 in.)  | 200 mm (7.87 in.)   | 60 mm (2.36 in.)    |
| Beam Angle                    | 5°   |                     |                     |
| <b>POWER SUPPLY</b>           |  |                     |                     |
| Supply Voltage                | 10 - 30 VDC  |                     |                     |
| Supply Current                | <25 mA without load  |                     |                     |
| Circuit Protection            | Reverse polarity   |                     |                     |
| <b>OUTPUT CHARACTERISTICS</b> |  |                     |                     |
| Load Current                  | 0 - 200 mA   |                     |                     |
| Hysteresis                    | ≤3.2%  |                     |                     |
| Switching Frequency           | 1 Hz   | 5Hz                 | 15 Hz               |
| Repeatability                 | ≤ 0.1% of reading  |                     |                     |
| Setpoint Adjustment           | Programmable with probe coded plug   |                     |                     |
| Circuit Protection            | Short Circuit  |                     |                     |
| <b>ENVIRONMENTAL</b>          |  |                     |                     |
| Operating Temperature         | -25 to 70°C (-13 to 150°F)   |                     |                     |
| Storage Temperature           | -40 to 85°C (-40 to 185°F)   |                     |                     |
| Sealing                       | IP 65  |                     |                     |
| <b>SPECIAL FEATURES</b>       |  |                     |                     |
| LED Indicator                 | RED - Illuminates when object is not recognized, probe coded plug withdrawn or short circuited<br>YELLOW - Illuminates when indicating output function or output status<br>GREEN - Illuminates when target is recognized during "teach mode" or normal operation |                     |                     |

# Ultrasonic Sensors

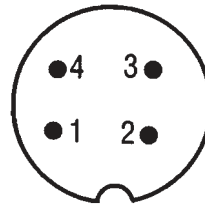
946 Series

Teachable 30 mm Diameter  
Precision Digital Outputs

## WIRING DIAGRAMS



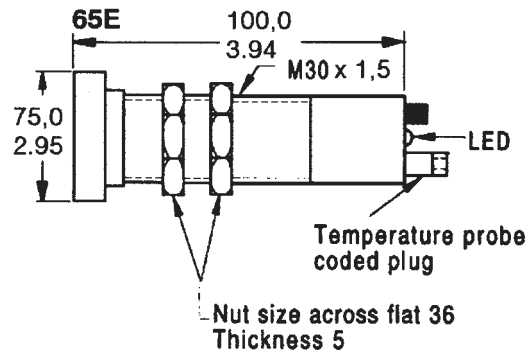
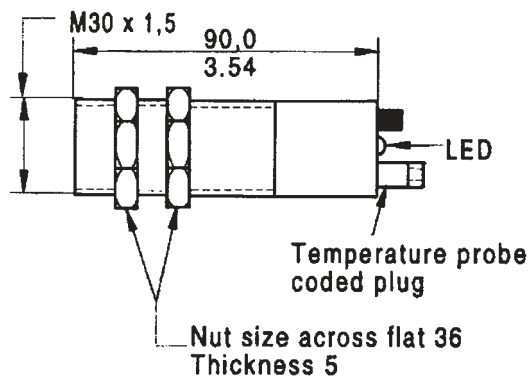
4-pin DC  
MICRO CONNECTOR  
(M12 x 1)



| PIN | COLOR |
|-----|-------|
| 1   | BROWN |
| 2   | WHITE |
| 3   | BLUE  |
| 4   | BLACK |

## MOUNTING DIMENSIONS (For reference only)

### 175E/400E



Proximity

## ACCESSORIES

|  | Catalog Listing | Features                          |
|--|-----------------|-----------------------------------|
| 2 Meter cable with straight connector*           | 804000A09M020   | Used for wiring to connector      |
| 2 Meter cable with right angle connector         | 804001A09M020   | Used for wiring to connector      |
| 24 VDC Power supply, relay output, 110 VAC input | FF-MADB24RB     | See page B24 for more information |

\*Supplied with sensor.

# Ultrasonic Sensors

946 Series

## Teachable 30 mm Diameter Precision Analog Outputs

### FEATURES

- Voltage and current output
- Teach-in programming
- Measuring range up to 6000 mm (236 inches)



### ORDER GUIDE

| Sensor Package Style                | Sensing Range* mm (in.)    | Termination | Analog Output           | Catalog Listing     |
|-------------------------------------|----------------------------|-------------|-------------------------|---------------------|
| 30 mm (1.18 in.)<br>Stainless Steel | 800 - 6000<br>(31.5-236)   | Cable       | 4 - 20 mA<br>0 - 10 VDC | 946-A4V-2D-2C0-65E  |
|                                     | 500 - 4000<br>(19.7-157.5) | Cable       | 4 - 20 mA<br>0 - 10 VDC | 946-A4V-2D-2C0-85E  |
|                                     | 200 - 2000<br>(7.87-78.74) | Cable       | 4 - 20 mA<br>0 - 10 VDC | 946-A4V-2D-2C0-175E |
|                                     | 60 - 500<br>(2.36-19.7)    | Cable       | 4 - 20 mA<br>0 - 10 VDC | 946-A4V-2D-2C0-380E |

\* Standard target is 120 mm thick square of mild steel perpendicular to ultrasonic beam.

### SPECIFICATIONS

#### SENSING CHARACTERISTICS

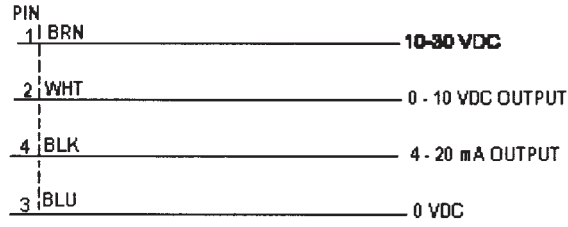
| Catalog Listings              | 946-A4V-3D-2C0-65E   | 946-A4V-2D-2C0-85E  | 946-A4V-2D-2C0-175E | 946-A4V-2D-2C0-380E |
|-------------------------------|--|---------------------|---------------------|---------------------|
| Max. Sensing Distance         | 6000 mm (236 in.)  | 4000 mm (157.5 in.) | 2000 mm (78.74 in.) | 500 mm (19.7 in.)   |
| Min. Sensing Distance         | 800 mm (31.5 in.)  | 500 mm (19.7 in.)   | 200 mm (7.87 in.)   | 60 mm (2.36 in.)    |
| Beam Angle                    | 5°   |                     |                     |                     |
| <b>POWER SUPPLY</b>           |  |                     |                     |                     |
| Supply Voltage                | 10 - 30 VDC  |                     |                     |                     |
| Supply Current                | <33 mA without load  |                     |                     |                     |
| Circuit Protection            | Reverse polarity   |                     |                     |                     |
| <b>OUTPUT CHARACTERISTICS</b> |  |                     |                     |                     |
| Switching Frequency           | 2 Hz   | 3.3 Hz              | 10 Hz               | 28.6 Hz             |
| Repeatability                 | ≤ 0.1% of reading  |                     |                     |                     |
| Linearity                     | ≤ 0.1%   |                     |                     |                     |
| Setpoint Adjustment           | Programmable with probe coded plug   |                     |                     |                     |
| Min. Load Resistance (VDC)    | 1000 Ohms (0 - 10 VDC Output)  |                     |                     |                     |
| Max. Load Resistance (mA)     | 500 Ohms (4 - 20 mA Output)  |                     |                     |                     |
| Slope of Output               | Positive or Negative; Programmable with Probe Coded Plug   |                     |                     |                     |
| Circuit Protection            | Short Circuit  |                     |                     |                     |
| <b>ENVIRONMENTAL</b>          |  |                     |                     |                     |
| Operating Temperature         | -25 to 75°C (-13 to 167°F)   |                     |                     |                     |
| Storage Temperature           | -40 to 85°C (-40 to 185°F)   |                     |                     |                     |
| Sealing                       | IP 65  |                     |                     |                     |
| <b>SPECIAL FEATURES</b>       |  |                     |                     |                     |
| LED Indicator                 | RED - Illuminates when object is not recognized, probe coded plug withdrawn or short circuited<br>YELLOW - Illuminates when indicating output function or output status<br>GREEN - Illuminates when target is recognized during "teach mode" or normal operation |                     |                     |                     |

# Ultrasonic Sensors

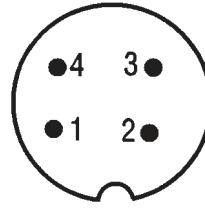
946 Series

## Teachable 30 mm Diameter Precision Analog Outputs

### WIRING DIAGRAM



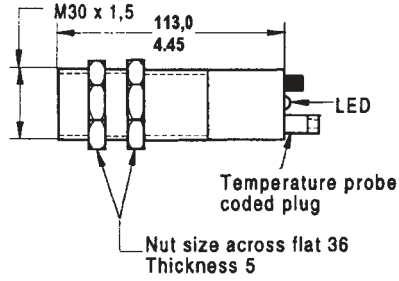
4-pin  
MICRO CONNECTOR  
(M12 x 1)



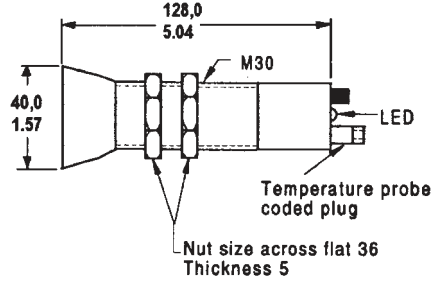
| PIN | COLOR |
|-----|-------|
| 1   | BROWN |
| 2   | WHITE |
| 3   | BLUE  |
| 4   | BLACK |

### MOUNTING DIMENSIONS (For reference only)

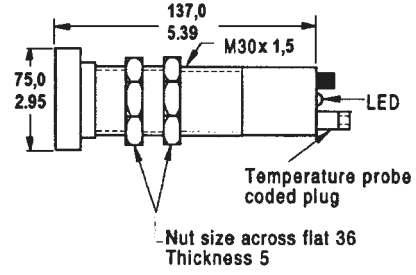
175E/380E



85E



65E



### ACCESSORIES

|  | Catalog Listing | Features                     |
|--|-----------------|------------------------------|
| 2 Meter cable with straight connector*   | 804000A09M020   | Used for wiring to connector |
| 2 Meter cable with right angle connector | 804001A09M020   | Used for wiring to connector |

\*Supplied with sensor

Proximity