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Sensing and Control
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Sensing and Control

Honeywell Inc.

11 West Spring Street

Freeport, IL 61032

www.honeywell.com/sensing

Ultrasonic Sensors

Teachable 30 mm Diameter
Precision Digital Outputs

946 Series

- 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.) Stainless Steel	800 - 6000 (31.5-236)	Connector	PNP	946-A4V-2D-001-65E
	200 - 1000 (7.87-39.4)	Connector	PNP	946-A4V-2D-001-175E
	60 - 300 (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°		
POWER SUPPLY			
Supply Voltage	10 - 30 VDC		
Supply Current	<25 mA without load		
Circuit Protection	Reverse polarity		
OUTPUT CHARACTERISTICS			
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		
ENVIRONMENTAL			
Operating Temperature	−25 to 70°C (−13 to 150°F)		
Storage Temperature	−40 to 85°C (−40 to 185°F)		
Sealing	IP 65		
SPECIAL FEATURES			
LED Indicator	RED - Illuminates when object is not recognized, probe coded plug withdrawn or short circuited YELLOW - Illuminates when indicating output function or output status GREEN - Illuminates when target is recognized during “teach mode” or normal operation		

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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)



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

Teachable 30 mm Diameter
Precision Analog Outputs

946 Series

- 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.) Stainless Steel	800 - 6000 (31.5-236)	Cable	4 - 20 mA 0 - 10 VDC	946-A4V-2D-2C0-65E
	500 - 4000 (19.7-157.5)	Cable	4 - 20 mA 0 - 10 VDC	946-A4V-2D-2C0-85E
	200 - 2000 (7.87-78.74)	Cable	4 - 20 mA 0 - 10 VDC	946-A4V-2D-2C0-175E
	60 - 500 (2.36-19.7)	Cable	4 - 20 mA 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°			
POWER SUPPLY				
Supply Voltage	10 - 30 VDC			
Supply Current	<33 mA without load			
Circuit Protection	Reverse polarity			
OUTPUT CHARACTERISTICS				
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			
ENVIRONMENTAL				
Operating Temperature	−25 to 75°C (−13 to 167°F)			
Storage Temperature	−40 to 85°C (−40 to 185°F)			
Sealing	IP 65			
SPECIAL FEATURES				
LED Indicator	RED - Illuminates when object is not recognized, probe coded plug withdrawn or short circuited YELLOW - Illuminates when indicating output function or output status GREEN - Illuminates when target is recognized during “teach mode” or normal operation			

Ultrasonic Sensors

Teachable 30 mm Diameter
Precision Analog Outputs

946 Series

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