

Installation Instructions

873P Ultrasonic Sensors with Dual Discrete/Single Analog Outputs

IMPORTANT: SAVE THESE INSTRUCTIONS FOR FUTURE USE.

Specifications

Model	873P-D300-2500-D5	873P-D300-3500-D5	873P-D300-6000-D5
Certifications	cULus Listed and CE Marked for all applicable directives		
Rated Sensing Distance	200...2500 mm (7.87...98.4 in.)	250...3500 mm (9.84...137.8 in.)	350...6000 mm (13.78...236.2 in.)
Teachable Sensing Range	200...2500 mm	250...3500 mm	350...6000 mm
Blind Zone	0...200 mm (0...7.87 in.)	0...250 mm (0...9.84 in.)	0...350 mm (0...13.78 in.)
Beam Angle	14° ±1°	15° ±2°	
Sensitivity Adjustment	Push button		
Repeatability	0.2% of full-scale value		
Linearity	1% of full scale value		
Resolution	2 mm (0.08 in.)	4 mm (0.16 in.)	6 mm (0.24 in.)
Accuracy	<0.1% of sensing range		
Hysteresis	<1%		
Ripple	5%		
Current Consumption	≤50 mA		
Protection Type	Short-circuit, reverse polarity, transient noise, overload		
Output Current	100 mA (digital output)		
Leakage Current	≤10 μA @ 30V (digital output)		
Transducer Frequency	150 kHz	112 kHz	75 kHz
Output Voltage Drop	2.2V max (digital output)		
Output Type	AIP2 or AVP2		
Switching Frequency	2 Hz (digital output)	1 Hz (digital output)	
Response Time	250 ms (digital output)	500 ms (digital output)	
Time Delay before Availability	≤900 ms (digital output)		
Response Time (analog output)	600 ms (analog output)		
Time Delay before Availability	≤1400 ms (analog output)		
Temperature Range	-20...+70°C (-4...+158°F)		
Temperature Compensation	Yes		
Temperature Drift	±5%		
Housing Material	Plastic—PBT		
Active Head Material	Epoxy—glass resin		
Ingress Protection Rating	IP67 (EN 60529)		

- **AIP2**—(2) PNP discrete output and (1) analog current (4...20 mA) or **AVP2**—(2) PNP discrete outputs and (1) analog voltage (0...10V DC)
- Metallic target 200 x 200 mm (7.87 x 7.87 in.)
- Metallic target 400 x 400 mm (15.75 x 15.75 in.)

Operating Voltage

Operating Voltage	Models
12...30V DC	Analog current models
15...30V DC	Analog voltage models

Double Discrete Outputs

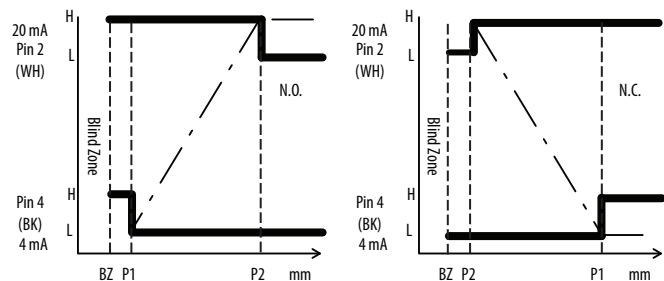
These sensors feature two programmable independent set points with sourcing (PNP) outputs that can be configured for normally open (N.O.) or normally closed (N.C.) operation.

IMPORTANT The 873P sensor is a one set point mode with a maximum sensing range from the factory.

Window Function

In this sensing mode, you teach the sensor a near set point and a far set point within the defined sensing range of the sensor. P1 and P2 define the analog output slope. P1 determines the 4 mA position and P2 determines the 20 mA position.

With normally open logic, if an object passes through the defined window, the discrete output turns ON or the opposite if the logic is normally closed. The analog output is scaled between the two taught set points.



Set Point 1 (P1):

1. Place the target at the desired near/far set point.
 - a. The near set point first yields a normally open/rising ramp.
 - b. The far set point first yields a normally closed/falling ramp.
2. With the target still in place, press the teach button, then release.

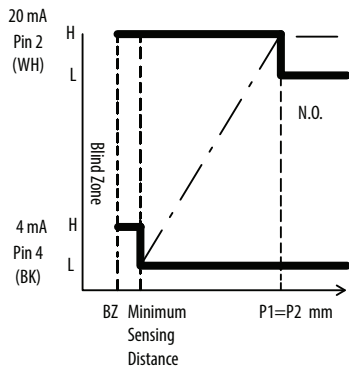
The yellow and green LEDs flash simultaneously, indicating that the first set point P1 is now set. The sensor is waiting for the last set point.

Set Point 2 (P2):

1. Place the target at the desired near/far set point.
2. Press the teach button and release while the green and yellow LEDs blink five times. The sensor is ready to operate.

One Set Point Function

In this sensing mode, a set point is taught in the defined sensing range. The working range of the sensor becomes the minimum sensing distance to a user-taught set point. Depending on where the set point is taught, the output will turn ON when the target passes between the minimum sensing distance of the sensor and the taught set point. The analog output is scaled between those two set points. **When using the one set point mode it is only possible to configure the sensor for normally open logic and rising ramp analog output. It is not possible to configure the sensor for N.C. or falling ramp.**



Set Point 1 (P1):

1. Place the target at the desired set point.
2. With the target still in place, press the teach button then release.

The yellow and green LEDs flash simultaneously, indicating that the first set point P1 is now set. The sensor is waiting for the P2 set point.

Set Point 2 (P2):

Keep the target in the same position you used to set P1.

1. The yellow and green LEDs flash simultaneously. Press the teach button, then release.

The yellow LED blinks twice, indicating that the sensor is ready for use. The minimum sensing distance is indicated on page 1 in the Specifications table.

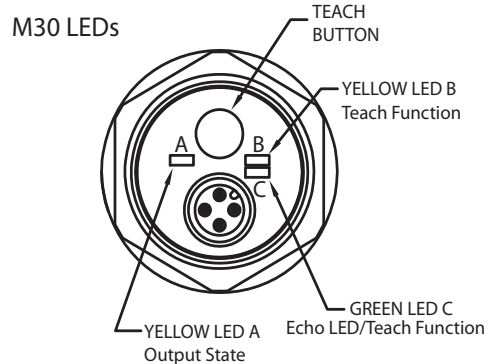
IMPORTANT

When configuring the sensor for one set point mode it is very important that the target is at the **exact** same distance for both the first and second push of the teach button. If the target (or sensor) has moved even slightly, the detected ranges will be different for the two pushes of the teach button, and the sensor will be configured for Window Mode.

IMPORTANT

The green and yellow LEDs flash asynchronously for about two seconds indicating there is no target present within the sensing range of the sensor and, therefore, no set point to teach. When this happens, the 873P ignores this teach attempt and restores its previous settings. By comparison, when an object is detected during the teach, the yellow and green LEDs flash synchronously and continue flashing until the second push of the teach button.

Double PNP Output LED Functions		
LED	Color	Function
A	Yellow	P1 Point in double digital output
B	Yellow	P2 Point in double digital output/Teach function
C	Green	ECHO LED/Teach function



LED Indicators: Dual PNP Discrete Output and One Analog Output ¹

Operating Mode	Green LED (Alignment)	Yellow LED A (Output)	Yellow LED B (Teach)
Standard Operation			
Target Present	ON ²	ON/OFF ³	ON/OFF ³
Target Absent	ON/OFF ²	ON/OFF ³	ON/OFF ³

- ¹ The analog output depends on the user-taught set points for the dual discrete sensor. Therefore, it does not have a separate status LED.
- ² Green LED indicates that an echo is reflected back to the sensor by an object, not necessarily the target. Primary use is alignment.
- ³ For single discrete sensors, LED A triggers ON/OFF depending on target position relative to the taught set point(s) and if N.O. or N.C. logic is used. In the case of a dual discrete sensor, LEDs A and B trigger ON/OFF depending on the target position relative to the taught set points and on the logic used (N.O. or N.C.).

Other Functions

Lockout Feature for Teach Button

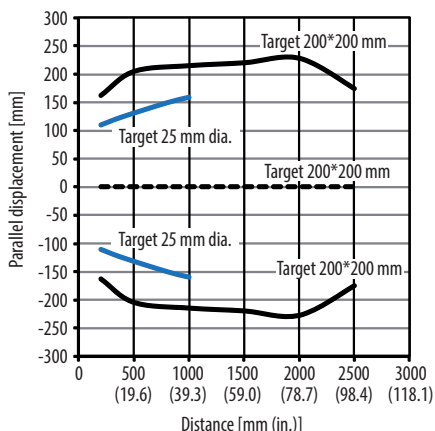
The lockout feature locks the push button to prevent unwanted teaching of the sensor.

Lock Teach Button: Press the teach button for eight seconds, until the yellow LEDs A and B flash alternately with the green LED C. Release the teach button. The push button is now locked.

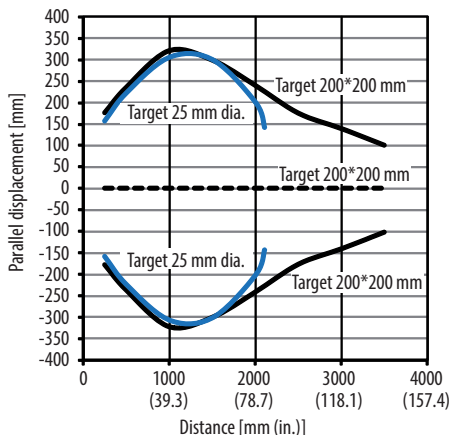
Unlock Teach Button: Press the teach button for eight seconds, until the yellow LEDs A and B flash alternately with the green LED C. Release the teach button. It is once again possible to teach the sensor.

Beam Diagrams

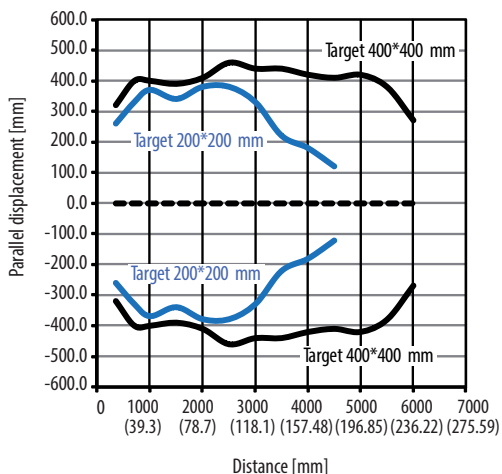
200...2500 mm Sensing Range



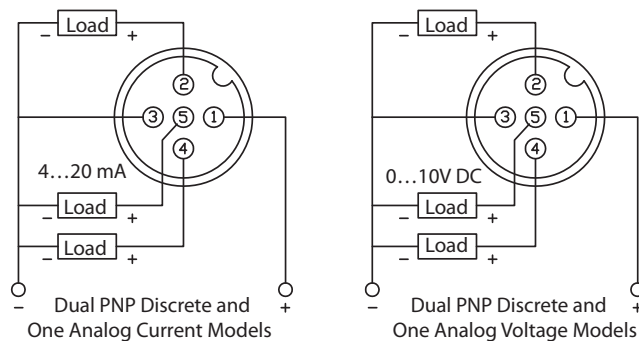
250...3500 mm Sensing Range



350...6000 mm Sensing Range



Wiring Diagrams



IMPORTANT

Solid-state devices can be susceptible to radio frequency (RF) interference depending on the power and the frequency of the transmitting source. If RF transmitting equipment is to be used in the vicinity of the solid-state devices, thorough testing should be performed to assure that transmitter operation is restricted to a safe operating distance from the sensor equipment and its wiring.

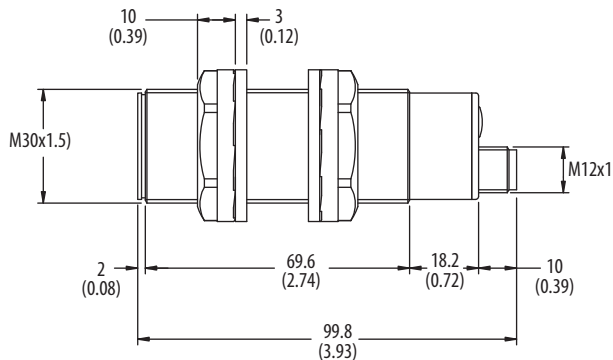
ATTENTION



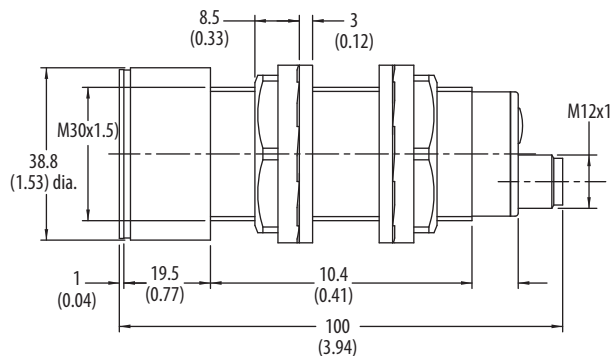
If a hazardous condition can result from unintended operation of this device, access to the sensing area should be guarded.

Dimensions [mm (in.)]

M30



M30 (maximum diameter 38.8 mm (1.53 in.))



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<http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>

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