Allen-Bradley

873P Ultrasonic Sensors with Dual Discrete/Single Analog Outputs

Catalog Numbers 873P-D18AIP2-900-D5, 873P-D30AIP2-2500-D5, 873P-D30AVP2-2500-D5, 873P-D30AIP2-3500-D5, 873P-D30AVP2-3500-D5, 873P-D30AIP2-6000-D5, 873P-D30AVP2-6000-D5

Specifications

Model	873P-D18x-900-D5 [1]	873P-D30x-2500-D5 [1]	873P-D30x-3500-D5 [1]	873P-D30x-6000-D5 [1]
Certifications	c-UL-us Listed and CE Marked for all applicable directives			
Rated Sensing Distance	100…900 mm [2] (3.95…35.43 in.)	200…2500 mm [2] (7.87…98.4 in.)	250…3500 mm [2] (9.84…137.8 in.)	350…6000 mm [3] (13.78…236.2 in.)
Teachable Sensing Range	100…900 mm [2] (3.95…35.43 in.)	200…2500 mm [2] (7.87…98.4 in.)	250…3500 mm [2] (9.84…137.8 in.)	350…6000 mm [3] (13.78…236.2 in.)
Blind Zone	0…100 mm (0…3.95 in.)	0…200 mm (0…7.87 in.)	0…250 mm (0…9.84 in.)	0…350 mm (0…13.78 in.)
Beam Angle	14°±2°	10°±2°	12°±2°	15°±2°
Sensitivity Adjustment	Push button			
Linearity	1%	<3%		
Resolution (SIO)	2 mm (0.08 in.)		4 mm (0.16 in.)	6 mm (0.24 in.)
Resolution (IO-Link)	1 mm (0.04 in.)			
Accuracy	0.5%	1%		
Hysteresis	<1%	<3%		
Ripple	5%			
Current Consumption	<50 mA	<30 mA		
Protection Type	Short circuit, reverse polarity, transient noise, overload			
Output Current	100 mA			
Leakage Current	≤10 µA			
Transducer Frequency	300 kHz	150 kHz	112 kHz	75 kHz
Output Voltage Drop	2.2V max			
Output Type	AIP2, AVP2, IO-Link			
Switching Frequency	3 Hz	1 Hz	1 Hz	1 Hz
Time Delay before Availability (Digital Output)	600 ms			
Response Time (analog output)	400 ms	450 ms		
Time Delay before Availability (analog output)	650 ms	600 ms		
Temperature Range	-20…+70 °C (-4…+158 °F)			
Temperature Compensation	Yes			
Temperature Drift	±2%	±5%		
Housing Material	Plastic—PBT			
Active Head Material	Epoxy—glass resin			
Ingress Protection Rating	IP67			

(1) Replace the x with **AIP2** (two PNP discrete output and one analog current [4…20 mA]) or **AVP2** (two PNP discrete outputs and one analog voltage [0…10V DC]).
(2) Metallic target 200 x 200 mm (7.87 x 7.87 in.)
(3) Metallic target 400 x 400 mm (15.75 x 15.75 in.)

Rockwell Automation

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 setpoints 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 setpoint mode with a maximum sensing range from the factory.

Window Function

In this sensing mode, you teach the sensor a near setpoint and a far setpoint 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 setpoints.
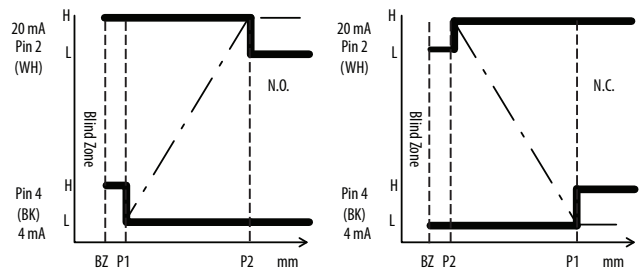
Setpoint 1 (P1)

1. Place the target at the desired near/far setpoint.
   a. The near setpoint first yields a normally open/rising ramp.
   b. The far setpoint first yields a normally closed/falling ramp.
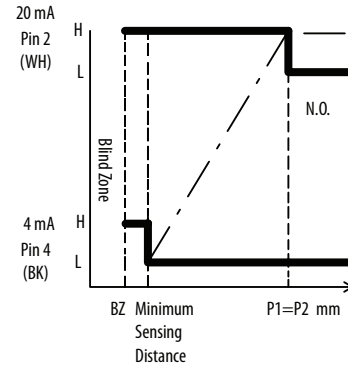2. With the target still in place, press and release the Teach button.

The yellow and green status indicators flash simultaneously, which indicates that the first setpoint P1 is now set. The sensor is waiting for the P2 setpoint.

Setpoint 2 (P2)

1. Place the target at the desired near/far setpoint.
2. Press and release the Teach button while the green and yellow status indicators stop flashing. The sensor is ready to operate.

One Setpoint Function

In this sensing mode, a setpoint is taught in the defined sensing range. The working range of the sensor becomes the minimum sensing distance to a user-taught setpoint. Depending on where the setpoint is taught, the output turns ON when the target passes between the minimum sensing distance of the sensor and the taught setpoint. The analog output is scaled between those two setpoints. When using the one setpoint 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.

Setpoint 1 (P1)

1. Place the target at the desired setpoint.
2. With the target still in place, press and release the Teach button.

The yellow and green status indicators flash simultaneously, which indicates that the first setpoint P1 is now set. The sensor is waiting for the P2 setpoint.

Setpoint 2 (P2)

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

1. The yellow and green status indicators flash simultaneously. Press and release the Teach button.

The yellow status indicator turns off and the green status indicator stops flashing, which indicates that the sensor is ready for use. The minimum sensing distance is indicated in .

IMPORTANT	When you configure the sensor for one setpoint mode, it is 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.
	The green and yellow status indicators flash asynchronously for about 2 seconds, which indicates that there is no target present within the sensing range of the sensor and, therefore, no setpoint to teach. When no setpoint to teach occurs, the 873P sensor ignores the teach attempt and restores its previous settings. By comparison, when an object is detected during teach, the yellow and green status indicators flash synchronously and continue flashing until the second push of the Teach button.

Status Indicators

Teach
Button

Yellow Status Indicator B
Teach Function

Green Status Indicator C
Echo LED/Teach Function

Yellow Status Indicator A
Output State
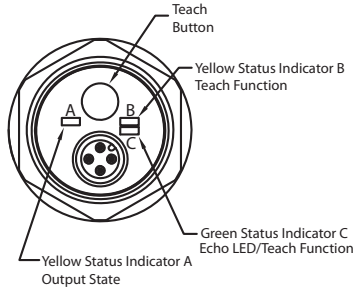
Double PNP Output Status Indicator Functions

Indicator	Color	Function
A	Yellow	P1 Point in double digital output
B	Yellow	P2 Point in double digital output/Teach function
C	Green	ECHO Indicator/Teach function

Dual PNP Discrete Output and One Analog Output Status Indicators [1]

Operating Model	Green Indicator (Alignment)	Yellow Indicator A (Output)	Yellow Indicator 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 setpoints for the dual discrete sensor. Therefore, it does not have a separate status indicator.
(2) Green status indicator 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, status indicator A triggers ON/OFF depending on target position relative to the taught set points and if N.O. or N.C. logic is used.
For dual discrete sensors, status indicators A and B trigger ON/OFF depending on the target position relative to the taught setpoints and on the logic used (N.O. or N.C.).

Lockout Feature for Teach Button

The lockout feature locks the push button to help prevent unwanted teaching of the sensor.
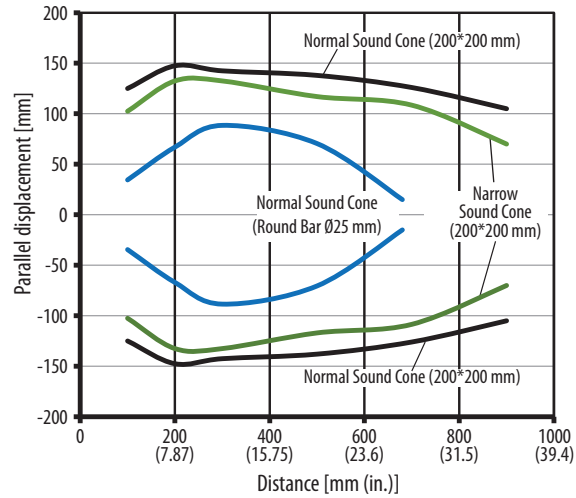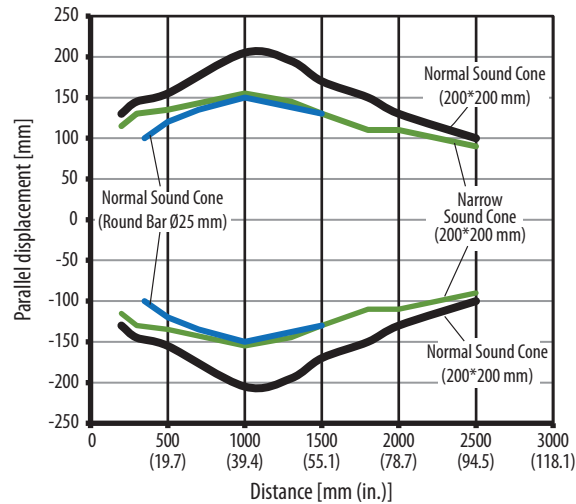
Lock Teach Button

1. Press the Teach button for 8 seconds, until the yellow status indicators A and B flash alternately with the green status indicator C.

2. Release the Teach button.

    The push button is now locked.

Unlock Teach Button

1. Press the Teach button for 8 seconds, until the yellow status indicators A and B flash alternately with the green status indicator C.

2. Release the Teach button.

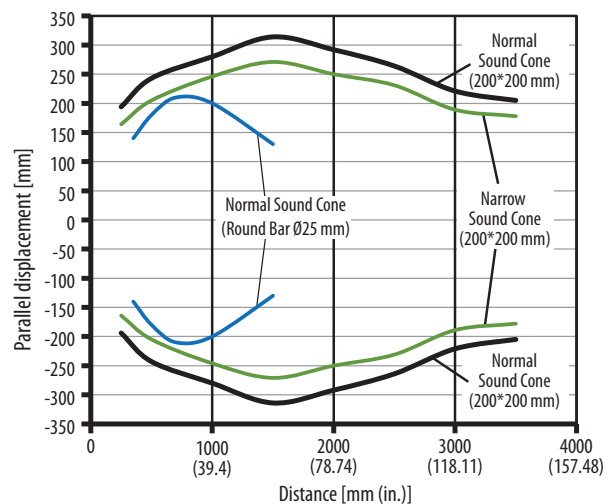   It is once again possible to teach the sensor.

Beam Diagrams
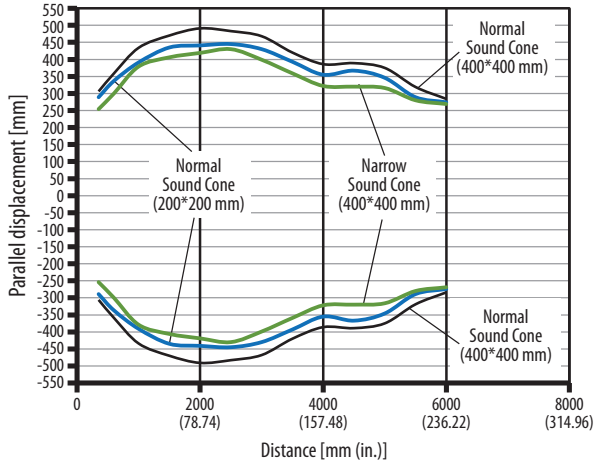
100…900 mm (3.94…35.43 in.) Sensing Range

Normal Sound Cone (200*200 mm)

Normal Sound Cone (Round Bar Ø25 mm)

Narrow Sound Cone (200*200 mm)

Normal Sound Cone (200*200 mm)

Parallel displacement [mm]

Distance [mm (in.)]

200…2500 mm (7.87…98.43 in.) Sensing Range

Normal Sound Cone (200*200 mm)

Normal Sound Cone (Round Bar Ø25 mm)

Narrow Sound Cone (200*200 mm)

Normal Sound Cone (200*200 mm)

Parallel displacement [mm]

Distance [mm (in.)]

250…3000 mm (9.84…118.11 in.) Sensing Range

Normal Sound Cone (200*200 mm)

Normal Sound Cone (Round Bar Ø25 mm)

Narrow Sound Cone (200*200 mm)

Normal Sound Cone (200*200 mm)

Parallel displacement [mm]

Distance [mm (in.)]

350…6000 mm (13.78…236.22 in.) Sensing Range

Graph — Parallel displacement [mm] (vertical axis, -550 to 550) vs Distance [mm (in.)] (horizontal axis, 0 to 8000 (314.96)).

Labels:
- Normal Sound Cone (400*400 mm)
- Normal Sound Cone (200*200 mm)
- Narrow Sound Cone (400*400 mm)
- Normal Sound Cone (400*400 mm)

Horizontal axis: 0, 2000 (78.74), 4000 (157.48), 6000 (236.22), 8000 (314.96)

Wiring Diagrams

Load / Load — Analog 4…20 mA
Pins: 2, 3, 5, 1, 4

Push-Pull/IO-Link
10…30V DC
Dual PNP Discrete and One
Analog Current Models

Load
Pins: 2, 3, 5, 1, 4
0…10V DC
Load
Load

Dual PNP Discrete and One
Analog Voltage Models

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 can be performed to verify 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 can be guarded.

Approximate Dimensions [mm (in.)]

M18
8.3 (0.33)
3 (0.12)
M18x1
M12x1
1 (0.04)
57.5 (0.12)
19.1 (0.75)
14 (0.55)
91.6 (3.6)

M30 x 1.5
10 (0.4)
3 (0.12)
M30x1.5
M12x1
1 (0.04)
69.6 (2.74)
18.2 (0.72)
10 (0.4)
98.8 (3.89)

M30 [1]
10 (0.4)
3 (0.12)
10.5 (0.41)
M30x1.5
38.8 (1.53)
M12x1
1.5 (0.06)
18 (0.71)
58.9 (2.32)
10 (0.4)
98.9 (3.9)
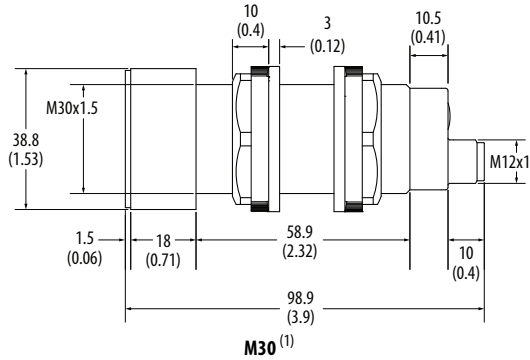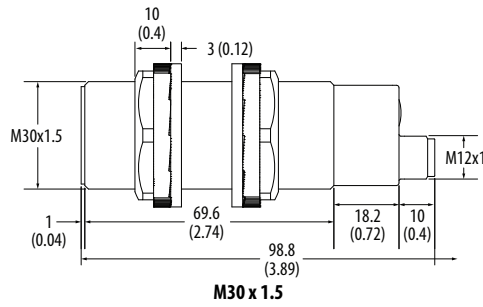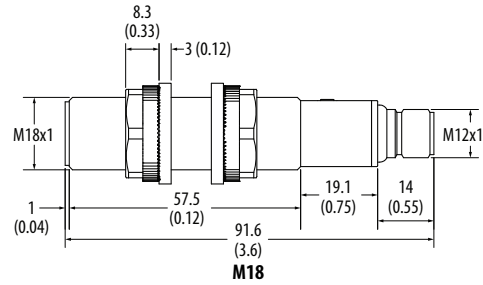
(1)   38.8 mm (1.53 in.) diameter, max

Waste Electrical and Electronic Equipment (WEEE)

At the end of its life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation Support

For technical support, visit rok.auto/support.