



Knowledge Article

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Product Family: MD Ultrasonic Sensor

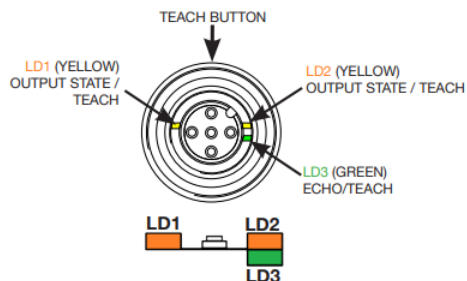
Number: KB-SEN-003

Subject: Configure UK1 with Analog and Digital Outputs

Date Issued: February 12, 2021

Part Numbers

UK1A-G6-0A	UK1A-G6-0E	UK1A-G6-1E	UK1A-G7-0A	UK1A-G7-0E	UK1A-G7-1E
UK1C-G6-0A	UK1C-G6-0E	UK1C-G6-1E	UK1C-G7-0A	UK1C-G7-0E	UK1C-G7-1E
UK1D-G6-0A	UK1D-G6-0E	UK1D-G6-1E	UK1D-G7-0A	UK1D-G7-0E	UK1D-G7-1E
UK1F-G6-0A	UK1F-G6-0E	UK1F-G6-1E	UK1F-G7-0A	UK1F-G7-0E	UK1F-G7-1E



Button and LED locations

The teach button is always "active" meaning you can set P1 and/or P2 any time you momentarily press the button (minus the block feature). There is not a "teach" mode, it is always in teach mode, hence the reason for the Teach Block feature. Once you have your setpoints configured, it is best to enable the Teach Block to prevent someone from accidentally pressing the teach button and making new setpoints.

To enable Teach Block

Press the teach button for 12 seconds. After the first 8 seconds, the LD1 and LD2 LEDs will start blinking, keep holding the teach button until the blinking rate increases. Once the faster blinking rate happens, then you can release the button. The teach button will not allow new setpoints to be set.

To disable the Teach Block

Same as the enable. Press the teach button for 12 seconds. After the first 8 seconds, the LD1 and LD2 LEDs will start blinking, keep holding the teach button until the blinking rate increases. Once the faster blinking rate happens, then you can release the button. The teach button will allow new setpoints to be set.

There is no way to tell if you are turning the Block mode On or Off. If Block mode is enabled, then momentarily pressing the teach button will cause LD1 and LD2 to blink once, to tell you that the button press is locked out. If LD1 and LD2 start flashing, that means that a new P1 setpoint has been entered.



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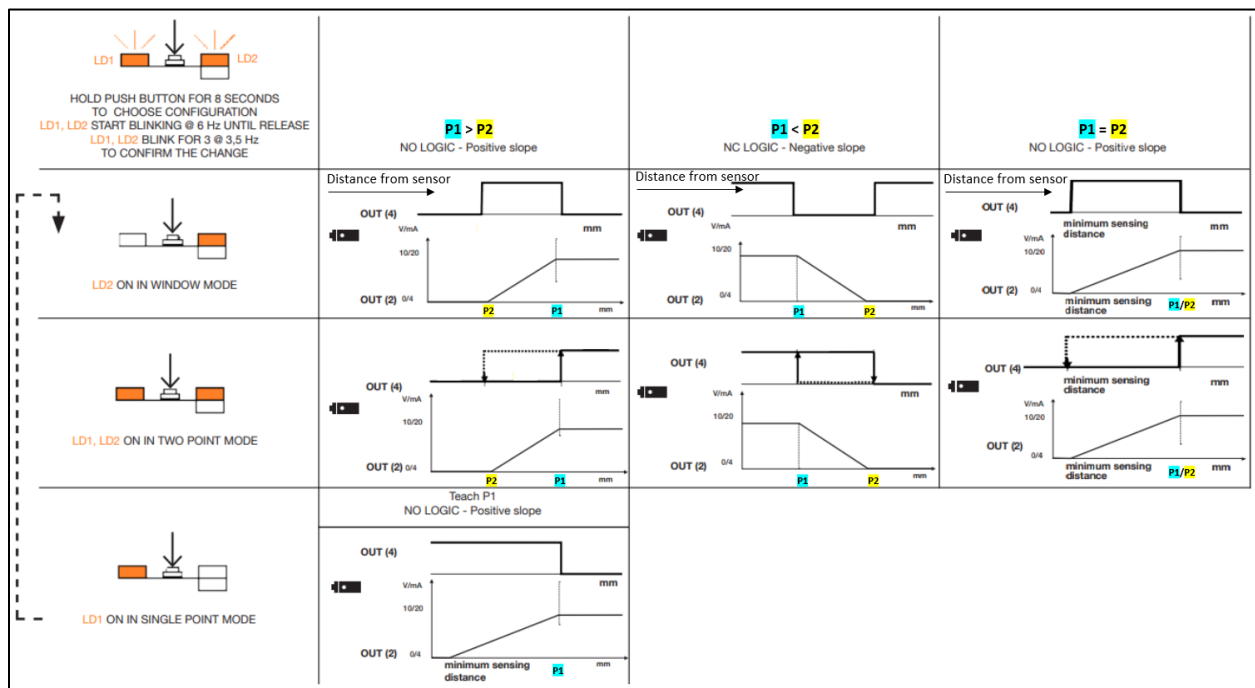
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Changing Modes

Push and hold the teach button for 8 seconds. LD1 and LD2 will start blinking to tell you that you have entered the configuration mode. When entering mode selection, the sensor will always start in Window Mode. To change the sensor mode, you can press the teach button to cycle through the 3 modes:

- Window Mode (LD1 off, LD2 on)
- Two Point Mode (LD1 on, LD2 on)
- Single Point Mode (LD1 on, LD2 off)

After the teach button has not been pressed for 3 seconds, the new mode is enabled and you would need to set P1 and P2.





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Selecting Setpoints (Not Single Point Mode)

Place the object for the first setpoint location (P1), press the teach button. LD1 and LD2 will start blinking, waiting for P2 to be set. Move the object to the second setpoint location (P2) and press the teach button again. That will set P1 and P2. LD1 and LD2 will blink 5 times to acknowledge that the setpoints have been set. If P2 was closer to the sensor than P1, then $P1 > P2$. If P1 was closer to the sensor than P2, then $P1 < P2$. This is important because that will change the output from Normally Open to Normally Closed.

Selecting Setpoints (Single Point Mode)

Place the object for the setpoint location (P1), press the teach button. LD1 and LD2 will blink 5 times to acknowledge that the setpoint have been set.

Sensor Outputs

Out(4) is pin 4 on the M12 connector. That is the digital output, which is typically the Black wire.
Out(2) in pin 2 on the M12 connector. That is the analog output, which is typically the White wire.

Window Mode

- $P1 > P2$
 - Out(4) will be ON if the sensed object is in between P1 and P2 window.
 - At the sensor minimum sensing distance, Out(2) will be at its minimum value. Out(2) will remain at its minimum value until the sensed object reaches P2. At that point, Out(2) will start increasing towards its minimum value as the sensed object moves towards P1.
- $P1 < P2$
 - Out(4) will be OFF if the sensed object is in between P1 and P2 window.
 - At the sensor minimum sensing distance, Out(2) will be at its maximum value. Out(2) will remain at its maximum value until the sensed object reaches P1. At that point, Out(2) will start decreasing towards its minimum value as the sensed object moves towards P2.
- $P1 = P2$
 - At the minimum sensing distance, Out(4) is ON and will remain ON until the sensed object is $> P1/P2$.
 - At the minimum sensing distance, Out(2) is at its minimum value. Out(2) will start increasing until it reaches maximum value at $P1/P2$



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Two Point Mode

- P1 > P2
 - Out(4) will be OFF until the sensed object is > P1. It will remain ON until the sensed object is < P2.
 - At the sensor minimum sensing distance, Out(2) will be at its minimum value. Out(2) will remain at its minimum value until the sensed object reaches P2. At that point, Out(2) will start increasing towards its maximum value, as the sensed object moves towards P1.

- P1 < P2
 - Out(4) will be ON until the sensed object is > P2. It will remain OFF until the sensed object is < P1.
 - At the sensor minimum sensing distance, Out(2) will be at its maximum value. Out(2) will remain at its maximum value until the sensed object reaches P1. At that point, Out(2) will start decreasing towards its minimum value, as the sensed object moves towards P2.

- P1 = P2
 - Out(4) is OFF and will remain OFF until the sensed object is > P1/P2. Out(4) will not turn OFF until the sensed object moves back to the minimum sensing distance of the sensor.
 - At the minimum sensing distance, Out(2) is at its minimum value. Out(2) will start increasing until it reaches maximum value at P1/P2

Single Point Mode

- Out(4) will be ON until the sensed object is > P1
- At the minimum sensing distance, Out(2) will be at its minimum value. Out(2) will start increasing as it moves towards P1. Out(4) will be at its maximum value at P1.

Clear Sensor back to Default

With the sensed object within the P1 setpoint, press the teach button once, LD1 and LD2 will blink constantly. Then move the sensed object outside the sensing range of the sensor. Press the teach button again. LD3 (green) will blink 5 times, to signal that the sensor has been returned to default settings. The default mode is Window Mode.