# 45LMA Analog Output Card

*For use with Analog Q45U Ultrasonic Proximity Mode Sensors*

## Features

- Analog Output Card plugs into any Q45U ultrasonic proximity mode sensor in place of the existing output card.
- Selectable 0 to 10V dc voltage-sourcing or 4 to 20 mA current-sourcing analog outputs
- Selectable output slope: positive or negative as target distance increases

## Installing the 45LMA Card

Use the following procedure to install the 45LMA Analog Output Card:

1) Remove power from the Q45U sensor.
2) Remove the output card from the Q45U sensor (Figure 1). Use a small screwdriver, or similar tool, to dislodge the output card from its connector. Then, slide the card out of the sensor.
3) Slide the 45LMA card into the sensor in place of the sensor output card (Figure 3); push it firmly into place.
4) Configure DIP switches as necessary. See programming instructions and table for information.
5) Apply power to the sensor.

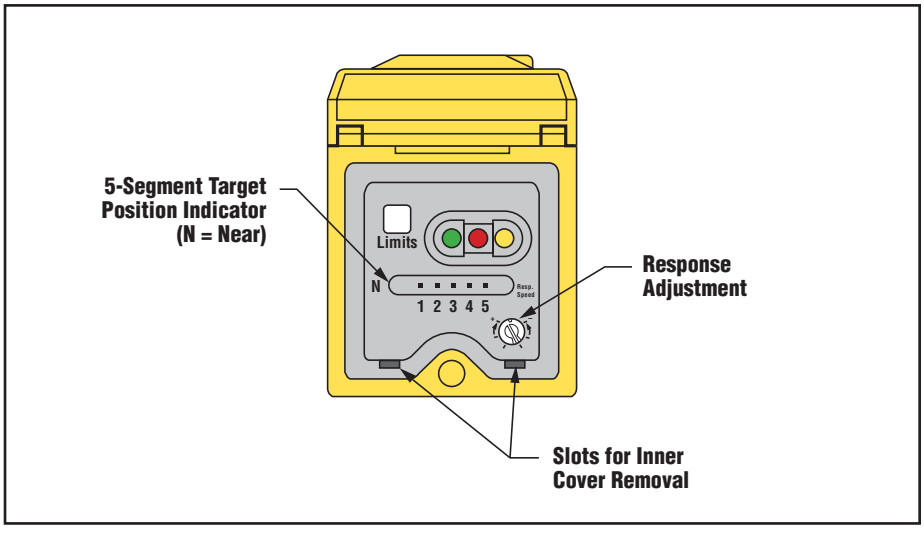



**Figure 1. Analog Q45U (45LMA card) features**

# Q45LMA Analog Output Card

## Programming the 45LMA Card

**Status Indicators:**

Status indicator LEDs are visible through the transparent, o-ring sealed Lexan® top cover. Indicator function in the **RUN** mode is, as follows:

- The green LED is on steadily whenever power is applied to the sensor, and flashes to indicate a current output fault.
- The red LED lights when an echo is received, and flashes at a rate that is proportional to echo strength.
- The yellow LED lights whenever the target is within the operating window limits.

The 5-segment moving dot LED indicator displays the relative position of the target within the programmed sensing window. The #1 LED flashes when the target is closer than the near limit. The #5 LED flashes when the target is beyond the far limit.

**Figure 2. Remove the output card using a small screwdriver to dislodge it from its connector.**

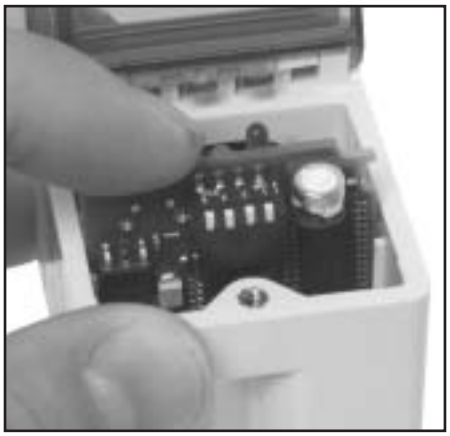
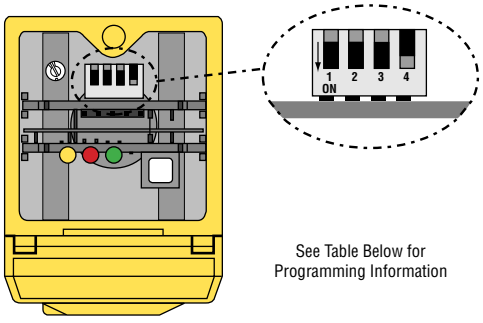


**Figure 3. Slide the 45LMA card into the sensor and push it firmly into place.**




| Switch | Function | Settings |
|---|---|---|
| 1 | Output Slope | On = Output value *increases* with distance<br>Off* = Output value *decreases* with distance |
| 2 | Output Mode | On = Current output enabled<br>Off* = Voltage output enabled |
| 3 | Loss of Echo | On = Min - Max Mode<br>Off* = Hold Mode |
| 4 | Min - Max | On* = Default to maximum output value<br>Off = Default to minimum output value |

*Indicates factory settings

**Figure 4. 45LMA programming switches and their functions**

**Output Response Settings:**

IMPORTANT: Remove power before making any internal adjustments.

Using the two slots shown in Figure 1, a small flat-blade screwdriver may be used to lift up and remove the black inner cover to expose the 4-position DIP switch (Figure 2).

Those switches are used to program the functions as indicated in Figure 4.



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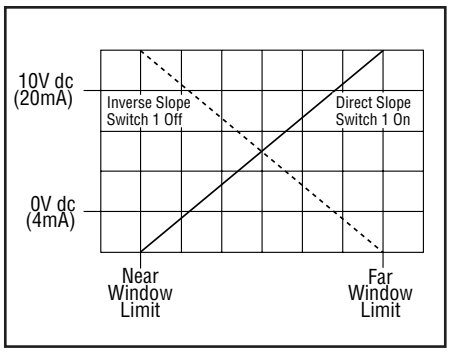



**Figure 5. Output Slope**

**Explanation of Programmable Output Functions:**

**Switch 1: Output Slope Select**

On = Direct = Output value (voltage or current) increases with increasing distance of the target from the sensor
Off* = Inverse = Output value decreases with increasing distance of the target from the sensor

**Switch 2: Output Mode Select**

On = The 4 to 20mA current output (white wire) is enabled
Off* = The 0 to 10V dc voltage output (black wire) is enabled

This switch configures the D/A driver to use either the current output or the voltage output driver. **This output function can only be set with the power to the sensor turned off.**

**Switch 3: Loss of Echo Mode Select**

On = Min - Max Mode
Off* = Hold Mode

This switch determines the output response to the loss of echo. The “Hold Mode” (Switch 3 Off*) maintains the output at the value which was present at the time of echo loss. The “Min - Max Mode” (Switch 3 On) drives the output to either the minimum value (0V or 4mA or the maximum value (10V or 20mA) when the echo is lost. Minimum or maximum value is selected by Switch 4.

**Switch 4: Min - Max Default**

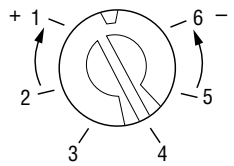
On* = Default to maximum output value at loss of echo
Off = Default to minimum output value at loss of echo

Switch 4 selects the output response to loss of echo when “Min - Max Mode” is selected by Switch 3 (see above).

**Response Speed Adjustment**

The speed of the output response is set using the single-turn potentiometer (see Figures 1 and 6). There are six values for response speed, which relate directly to the number of sensing cycles over which the output value is averaged. The response value is set by aligning the slot of the potentiometer with one of the marked positions. The positions and their corresponding settings are identified in Figure 6.

**Response Speed Settings**




NOTE: This example shows the potentiometer set at position number 4. There are no numbers on the actual product label.

| Position | Response Speed |
|---|---|
| 1 | 40 milliseconds (2 cycles) |
| 2 | 80 milliseconds (4 cycles) |
| 3 | 160 milliseconds (8 cycles) |
| 4 | 320 milliseconds (16 cycles) |
| 5 | 640 milliseconds (32 cycles) |
| 6 | 1280 milliseconds (64 cycles) |

**Figure 6. Response adjustment positions and their corresponding response speed values**

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