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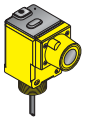
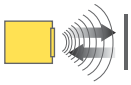
U-GAGE™ Analog Q45U Long-Range Ultrasonic Sensors

Piezoelectric Proximity Mode Sensors with Push-button Programming of Sensing Window Limits

Features

- Ultrasonic proximity detection from 0.25 to 3.0 m (9.8" to 118")
- Push button TEACH-mode programming of sensing window limits
- Digital filtering for exceptional immunity to electrical and acoustic “noise”
- Selectable 0 to 10V dc voltage sourcing or 4 to 20mA current sourcing analog outputs
- Selectable output slope: positive or negative with increasing target distance
- Wide operating temperature range of -25° to +70°C; all models include temperature compensation
- Rugged design for use in demanding sensing environments; rated IEC IP67, NEMA 6P
- Choose models with integral 2 m (6.5') or 9 meter (30') cable, or with Mini-style or Euro-style quick-disconnect fitting
- Input for remote TEACH-mode programming of window limits





Ultrasonic

Analog Q45U Series Proximity Mode

Models	Temperature Compensation	Range	Cable*	Supply Voltage	Output Type	Response Time
Q45ULIU64BCR	Yes	250 mm - 3.0 m (9.8" - 118")	2 m (6.5')	15-24V dc	Selectable 0-10V dc or 4 - 20 mA sourcing	Adjustable from 80 milliseconds to 2.56 seconds
Q45ULIU64BCRQ			5-Pin Mini-style QD			
Q45ULIU64BCRQ6			5-Pin Euro-style QD			

* NOTES:

- 9 m (30') cables are available by adding suffix **“W/30”** to the model number of the cabled sensor (e.g., **Q45ULIU64BCR W/30**).
- A model with a QD connector requires an optional mating cable, see page 8.

Temperature Compensation:

All models listed above feature temperature compensation. An increase in air temperature shifts both sensing window limits closer to the sensor. Conversely, a decrease in air temperature shifts both limits further away from the sensor. The shift is approximately 3.5% of the limit distance for a 20°C change in temperature.

Temperature compensated models maintain the position of both sensing window limits to within 1% of each limit distance over the 0° to +50°C range, and to within 2.5% over the full operating range of from -25° to +70°C.

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Analog Q45U Series Specifications

Proximity Mode Range	Near limit: 250 mm (9.8") min Far limit: 3.0 m (118") NOTE: The far limit may be extended as far as 3.9 m for good acoustical targets (hard surfaces with area > 100 cm^2)
Supply Voltage and Current	15 to 24V dc (10% maximum ripple) at 100mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	One voltage sourcing and one current sourcing; one or the other output is enabled by internal programming switch #2. Output function may be programmed by a 4-position DIP switch located on top of the sensor, beneath the transparent o-ring sealed acrylic cover (see page 3 for complete information)
Output Rating	**Voltage sourcing:** 0 to 10V dc, 10mA maximum **Current sourcing:** 4 to 20mA, 1 to 500 ohm impedance
Output Protection Circuitry	Both outputs are protected against continuous overload and short circuit
Performance Specifications	**Sensing Repeatability:** ±0.1% of the measured distance (±0.50 mm minimum) **Sensing Resolution:** 0.50 mm (0.02 in) **Analog Output Resolutions:** 2mV, 3µA
Indicators	Three status LEDs: **Green ON steady** = power to sensor is ON **Green flashing** = current output fault detected (indicates that the 4-20mA current path to ground has been opened) **Yellow ON steady** = target is sensed within the window limits (Yellow LED also indicates programming status during setup mode) **Red flashing** = indicates relative strength of received echo 5-segment moving dot LED indicates the position of the target within the sensing window
Construction	Molded PBT thermoplastic polyester housing, o-ring sealed transparent acrylic top cover, and stainless steel hardware. Q45U sensors are designed to withstand 1200 psi washdown. The base of cabled models has a ½"-14NPS internal conduit thread
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Connections	2 m (6.5') or 9 m (30') attached cable, or 5-pin Mini-style or 5-pin Euro-style quick-disconnect fitting
Operating Temperature	**Temperature:** -25° to +70°C (-13° to +158°F) **Maximum relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60Hz max., double amplitude 0.06-inch, maximum acceleration 10G). Method 213B conditions H & I (Shock: 75G with unit operating; 100G for non-operation) Also meets IEC 947-5-2 requirements: 30G, 11 ms duration, half sine wave
Application Notes	**Minimum target size:** 50 mm x 50 mm aluminum plate at 3.0 m (118")

U-GAGE™ Analog Q45U Long-Range Ultrasonic Sensors

Remote Window Limit Programming

The yellow wire of the Analog Q45U may be connected to a switch or process controller for remote programming of the sensing window limits. The programming procedure is the same as for the push button (see page 4).

A remote programming input is generated when +5 to 24V dc is applied to the yellow wire. The timing diagrams, below, define the required input pulses.

Notes regarding remote window limit programming:

1) The push button is disabled during remote limit programming. (The remote programming input is disabled during push button programming.)
2) Also see the notes regarding window limit programming on page 4.

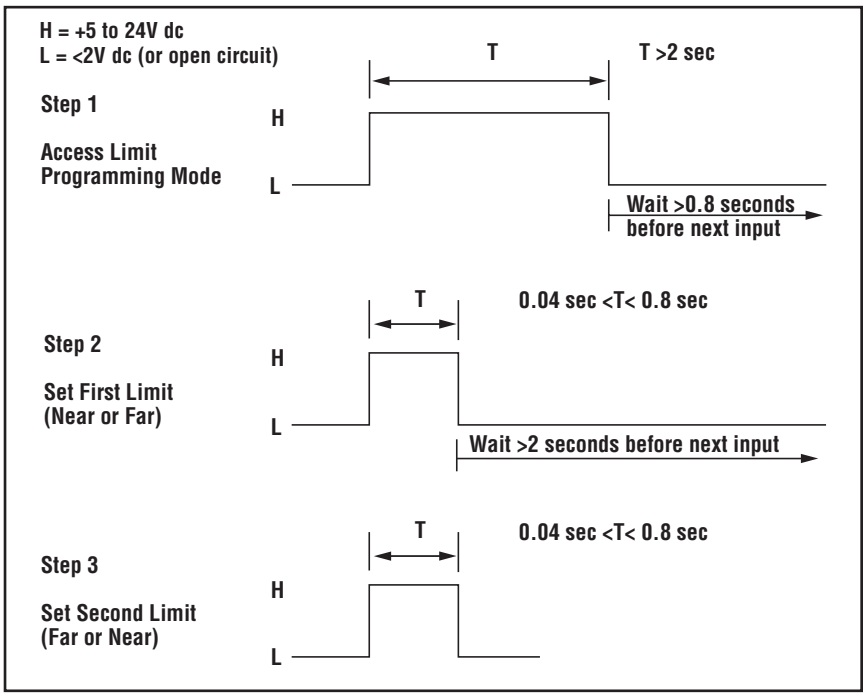
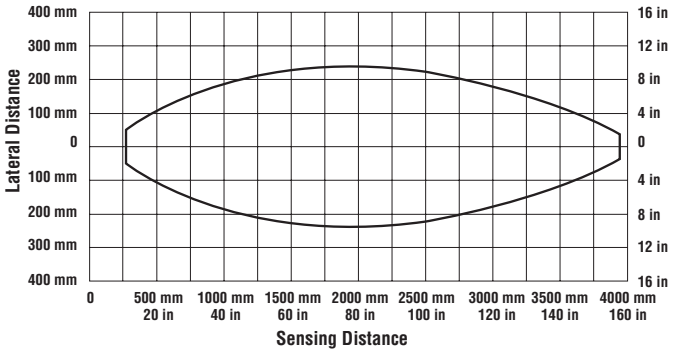


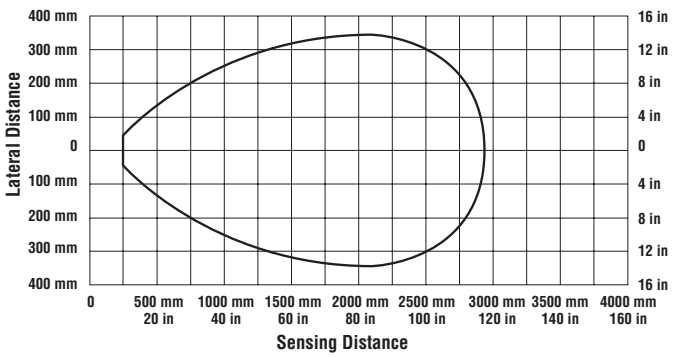
Figure 5. Remote window limit programming

Analog Q45U Response Curves

Analog Q45U Effective Beam with 100 mm x 100 mm Plate Target (Typical)



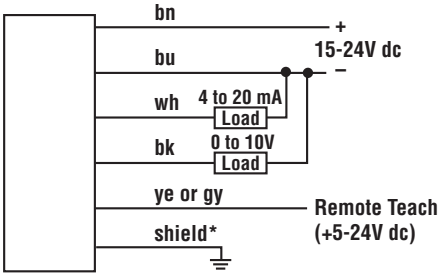
Analog Q45U Effective Beam with 2.5 cm Dia. Rod Target (Typical)



U-GAGE™ Analog Q45U Long-Range Ultrasonic Sensors

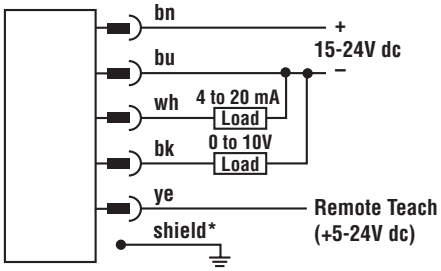
Analog Q45U Series Hookups

Q45U Sensor with Attached Cable

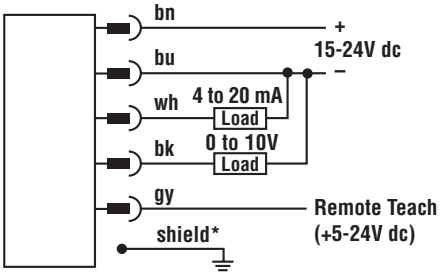


*It is recommended that the shield wire be connected to earth ground or dc common.

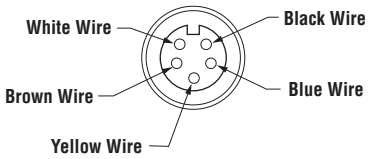
Q45U Sensor with 5-Pin Mini-Style QD ("Q" model suffix)



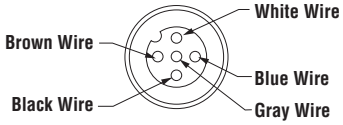
Q45U Sensor with 5-Pin Euro-Style QD ("Q6" model suffix)



5-Pin Mini-Style Pin-out (Cable Connector Shown)

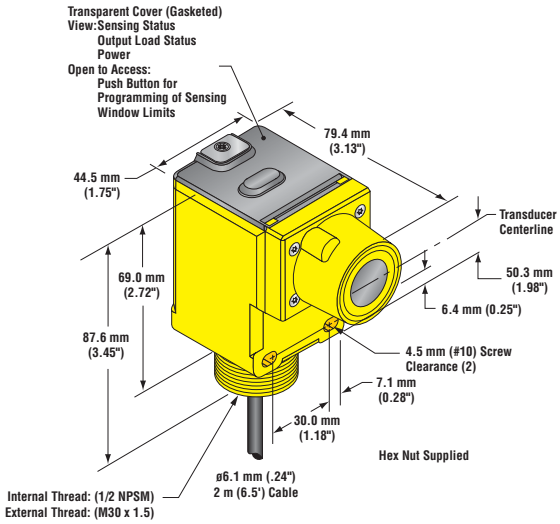


5-Pin Euro-Style Pin-out (Cable Connector Shown)

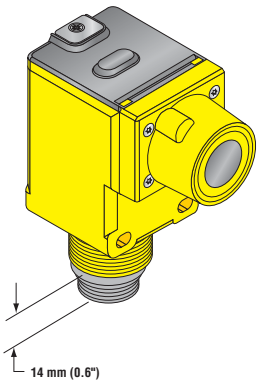
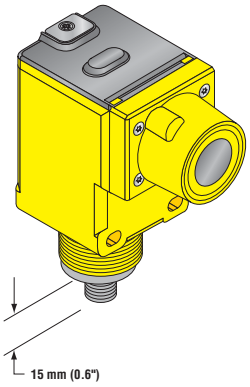


Analog Q45U Series Dimensions

Q45U Sensor with Attached Cable



Q45U Sensor with 5-Pin Mini-Style QD ("Q" model suffix)



Q45U Sensor with 5-Pin Euro-Style QD ("Q6" model suffix)