Ultrasonic

Ultrasonic sensors use sound waves rather than light, making them ideal for stable detection of uneven surfaces, liquids, clear objects, and objects in dirty environments. These sensors work well for applications that require precise measurements between stationary and moving objects.

Series	Description	Max Sensing Range	Dimensions H x W x D (mm)	Protection Rating	Housing Material	Power Supply
	**QT50U** The QT50U features a completely sealed, shock-resistant housing that is ideal for monitoring levels of liquids and solids. page 218	8 m	84.2 x 74.1 x 67.4	IP67; NEMA 6P	ABS/ Polycarbonate	10 to 30 V dc, 85 to 264 V ac
	**S18U** The S18U is ideal for material handling and packaged goods applications, such as bottling or liquid level detection and as a control for small containers. page 222	300 mm	80.8 x ø 18	IP67; NEMA 6P	Thermoplastic polyester	10 to 30 V dc
	**T30U/T30UX** The T30UX features T-style, right-angle sensor package with a 30 mm threaded barrel and a wide variety of mounting options. page 226	3 m	51.5 x 40 x 45	IP67; NEMA 6	PTB polyester	10 to 30 V dc, 12 to 24 V dc, 15 to 24 V dc
	**M25U** The M25U Ultrasonic Sensor features a smooth 316 series stainless steel construction to withstand the toughest sanitary challenges. page 226	500 mm	103 x ø 25	IP67; NEMA 6, IP69K	316 Stainless Steel	10 to 30 V dc
	**T18U** The T18U offers versatile mounting, and a response time of 1 millisecond. page 230	600 mm	51.5 x 40 x 30	IP67; NEMA 6P	PTB polyester	12 to 30 V dc
	**Q45U** The Q45U accepts programming storage cards for fast and easy sensing parameter changes. page 232	3 m	87.6 x 44.5 x 60.5	IP67; NEMA 6P	PTB polyester	12 to 24 V dc, 15 to 24 V dc
	**Q45UR** The Q45UR has sensing head choices of 18 mm diameter threaded barrel housing in plastic or stainless steel, or ultra-compact plastic Flat-Pak. page 234	250 mm	87.6 x 44.5 x 60.5 (Remote sensors vary by model)	IP67; NEMA 6P	Thermoplastic polyester	12 to 24 V dc, 15 to 24 V dc
	**QS18U** The QS18U senses clear and transparent materials, as well as color variations, including clear web material, clear or shiny bottles, highly reflective surfaces and liquid or dry bulk materials inside cramped locations. page 236	500 mm	41.5 x 15 x 33.5	IP67 or IP68; NEMA 6P	ABS	12 to 30 V dc
	**K50U** Designed for plug-and-play use with the Q45U wireless node, creating a cost-effective and easy-to-use solution for monitoring mobile or remote tanks and totes page 238	3 m	59.5 x ø 50	IP67 NEMA 6P	PTB polyester	3.6 to 5.5 V dc or 10 to 30 V dc

QT50U Series

Long-Range Ultrasonic Sensors

- Features a small ultrasonic dead zone of 200 mm
- Available in a chemically resistant model with a Teflon® flange
- Detects targets at long ranges within confined areas, such as a storage tank, without interference from the tank walls
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

QT50U, 10-30 V DC

Range	Connection	Output	Models*
200 mm to 8 m	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	QT50ULB QT50ULBQ QT50ULBQ6
200 mm to 8 m	2 m 5-pin Mini QD 5-pin Euro QD	Selectable Dual NPN or PNP	QT50UDB QT50UDBQ QT50UDBQ6

QT50U Universal Voltage, 85-264 V AC/48-250 V DC

Range	Connection	Output Operation Mode	Output	Models*
200 mm to 8 m	2 m 5-pin Micro QD 5-pin Mini QD	Window-limit (complementary outputs)	SPDT e/m relay	QT50UVR3W QT50UVR3WQ1 QT50UVR3WQ
200 mm to 8 m	2 m 5-pin Micro QD 5-pin Mini QD	Pump/level control (pump-in and pump-out logic)	SPDT e/m relay	QT50UVR3F QT50UVR3FQ1 QT50UVR3FQ

For more specifications see page 220-221.

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **QT50ULB W/30**).

* For sensors with Teflon®-protected face and transducer, add suffix **-CRFV** to the model number (example, **QT50ULB-CRFV**).

Teflon® is a registered trademark of Dupont™.

5-Pin

Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

MQDEC2-506
2 m (6.5')
MQDEC2-55
5 m (15')
MQDEC2-530
9 m (30')

5-Pin

Micro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQVR3S-506RA**)

MQVR3S-506
2 m (6.5')
MQVR3S-515
5 m (15')
MQVR3S-50
9 m (30')

5-Pin

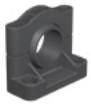
Mini-Style
Straight connector models only

MBCC2-506
2 m (6.5')
MBCC2-512
4 m (15')
MBCC2-530
9 m (30')

Additional cordset information is available
See page 758

SMB30A

SMB30MM



SMB30SC

Additional bracket information is available
See page 725

DC and Universal Voltage Models

Teflon®-protected Models
(Suffix -CRFV)

QT50U DC Specifications

Supply Voltage and Current	**Analog models:** 10 to 30 V dc (10% max. ripple); 100 mA max @ 10 V, 40 mA max. @ 30 V (exclusive of load) **Dual-discrete models:** 10 to 30 V dc (10% max. ripple); 100 mA max. @ 10 V, 40 mA @ 30 V (exclusive of load)
Ultrasonic Frequency	75 kHz burst, rep. rate 96 milliseconds
Supply Protection Circuitry	Protected against reverse polarity and transient overvoltages
Output Protection	Protected against short circuit conditions
Delay at Power-up	1.5 seconds
Output Configuration	**Analog models: Voltage sourcing:** 0 to 10 V dc **Current sourcing:** 4 to 20 mA **Dual-discrete models:** Dual PNP or NPN, selectable using DIP switch
Output Ratings	**Analog Voltage Output:** 0 to 10 V dc Minimum load resistance = 500 Ω Minimum required supply voltage for full 0-10 V output span = $\left(\frac{1000}{RLOAD} + 13\right)$V dc **Analog Current Output:** 4 to 20 mA Maximum load resistance = 1 kΩ or $\left(\frac{V\ supply - 5}{0.02}\right)$ Ω, whichever is lower Minimum required supply voltage for full 4-20 mA output span = 10 V dc or [(RLoad x 0.02)+5] V dc, whichever is greater. 4-20 mA output calibrated at 25° C with 250 Ω load. **Discrete Output:** 150 mA max. **OFF-State leakage current:** less than 5 µA **Output saturation: NPN:** less than 200 mV @ 10 mA; less than 650 mV @ 150 mA **PNP:** less than 1.2 V @ 10 mA; less than 1.65 V @ 150 mA
Temperature Effect	**Uncompensated:** 0.2% of distance/° C **Compensated:** 0.02% of distance/° C
Linearity (Analog Models)	+/- 0.2% of span from 200 to 8000 mm; +/- 0.1% of span from 500 to 8000 mm (1 mm minimum)
Resolution/Repeatability	1.0 mm
Hysteresis	5 mm
Output Response Time	**Analog models:** 100 to 2300 milliseconds **Dual-discrete models:** 100 to 1600 milliseconds
Minimum Window Size	20 mm
Adjustments	**Sensing window limits:** TEACH-Mode programming of near and far window limits may be set using the buttons or remotely using TEACH input
Indicators	**Green Power ON LED:** Indicates power is ON **Red Signal LED:** Indicates target is within sensing range, and the condition of the received signal **Teach/Output indicator (bicolor Yellow/Red):** **Yellow**: Target is within taught limits **Yellow OFF (Discrete)**: Target is outside taught window limits **Red**: Sensor is in TEACH mode **Yellow Flashing (Analog):**Target is outside taught window limits
Remote TEACH	See data sheet
Construction	**Transducer:** Ceramic/Epoxy composite **Housing:** ABS/Polycarbonate **Membrane Switch:** Polyester **Lightpipes:** Acrylic
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Operating Conditions	**Temperature:** -20 to +70 °C **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", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave.
Temperature Warmup Drift	Less than 0.8% of sensing distance upon power-up with Temperature Compensation enabled
Application Notes	1. Objects passing inside the specified near limit (200 mm) may produce a false response 2. For best accuracy, allow 30 minute warm-up before programming or operating
Certifications	CE

QT50U Universal Voltage Specifications

Supply Voltage	85 to 264 V ac, 50/60 Hz/48 to 250 V dc (1.5 watts max., exclusive of load)
Ultrasonic Frequency	75 kHz burst, rep. rate 96 milliseconds
Supply Protection Circuitry	Protected against transient over voltages. DC hookup is without regard to polarity.
Output Protection	Protected against short circuit conditions
Delay at Power-up	1.5 seconds
Output Configuration	SPDT (Single-Pole, Double-Throw) electromechanical relay output One normally open (NO) and one normally closed (NC)
Output Ratings	**Max. switching power (resistive load):** 2000 VA, 240 W (1000 VA, 120 W for sensors with Micro QD **Max. switching voltage (resistive load):** 250 V ac, 125 V dc **Max. switching current (resistive load):** 8A @ 250 V ac, 8A @ 30 V dc derated to 200 mA @ 125 V dc (4A max. for sensors with Micro QD) **Min. voltage and current:** 5 V dc, 10 mA **Mechanical life of relay:** 50,000,000 operations **Electrical life of relay at full resistive load:** 100,000 operations NOTE: Transient suppression is recommended when switching inductive loads
Temperature Effect	**Uncompensated:** 0.2% of distance/ °C **Compensated:** 0.02% of distance/ °C
Repeatability	1.0 mm
Hysteresis	**Window-limit sensor models:** 5 mm **Fill-level control sensor models:** 0 mm
Output Response Time	Selectable 1600, 400 or 100 milliseconds
Minimum Window Size	20 mm
Adjustments	**Sensing limits:** TEACH-Mode programming of near and far limits may be set using the TEACH push button **Sensor configuration:** Output response time and temperature compensation mode may be set using the Speed push button **Factory default settings:** 400 milliseconds output response time; temperature compensation enabled
Indicators	**Green Power ON LED:** Indicates power is ON **Red Signal LED:** Indicates target is within sensing range, and the condition of the received signal **Output indicator (bicolor Yellow/Red):** Indicates output status or TEACH mode **Response indicator (bicolor Yellow/Red):** Indicates output response time selection
Construction	**Transducer:** Ceramic/Epoxy composite **Housing:** ABS **Membrane Switch:** Polyester
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Operating Conditions	**Temperature:** -20 to +70 °C **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", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave.
Temperature Warmup Drift	Less than 1.0% of sensing distance upon power-up with Temperature Compensation enabled
Application Notes	Objects passing inside the specified minimum sensing distance (200 mm) may produce a false response
Certifications	CE

S18U Series

Barrel Ultrasonic Sensors

- Features minimal dead zone and can eliminate dead zone if used in retrosonic mode
- Compensates for temperature to provide greatest sensing accuracy
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

Straight Models

S18U

Range	Connections	Output	Housing Configuration	Models
30 to 300 mm	2 m 5-pin Euro QD	0 to 10 V dc	Straight	S18UUA S18UUAQ
30 to 300 mm	2 m 5-pin Euro QD	4 to 20 mA	Straight	S18UIA S18UIAQ
30 to 300 mm	2 m 5-pin Euro QD	Bipolar NPN/PNP	Straight	S18UBA S18UBAQ

Right-Angle Models

S18U Right-Angle

Range	Connections	Output	Housing Configuration	Models
30 to 300 mm	2 m 5-pin Euro QD	0 to 10 V dc	Right-Angle	S18UUAR S18UUARQ
30 to 300 mm	2 m 5-pin Euro QD	4 to 20 mA	Right-Angle	S18UIAR S18UIARQ
30 to 300 mm	2 m 5-pin Euro QD	Bipolar NPN/PNP	Right-Angle	S18UBAR S18UBARQ

Connection options: A model with a QD requires a mating cable.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **S18UUA W/30**).

5-Pin

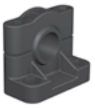
Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')

Additional cordset information is available
See page 758

SMB18A

SMB18FM



SMB18SF

Additional bracket information is available
See page 723

Ultrasonic Wave Guides

Inside Diameter	Model
5.0 mm	**UWG18-5.0**
6.4 mm	**UWG18-6.4**

Additional wave guide information is available
See page 959

S18U Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); 65 mA max. (exclusive of load), 40 mA typical @ 25 V input
Ultrasonic Frequency	300 kHz, rep. rate 2.5 milliseconds
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection	Protected against short circuit conditions
Output Ratings	**Analog Voltage Output:** 2.5 kΩ min. load resistance Minimum supply for a full 10 V output is 12 V dc (for supply voltages between 10 and 12, V out max is at least V supply -2) **Analog Current Output:** 1 kΩ max @ 24 V input Max load resistance = (Vcc-4)/0.02 Ω **Discrete:** 100 mA max. **OFF-state leakage current:** less than 5 µA **NPN saturation:** less than 200 mV @ 10 mA and less than 600 mV @ 100 mA **PNP saturation:** less than 1.2 V @ 10 mA and less than 1.6 V @ 100 mA
Output Configuration	**Analog:** 0 to 10 V dc or 4 to 20 mA, depending on model **Discrete: Bipolar:** One NPN (current sinking) and one PNP (current sourcing) output in each model. Solid-state switch conducts when target is sensed within sensing window.
Output Response Time	**Analog: 30 milliseconds:** Black wire at 0 to 2 V dc (or open) **2.5 milliseconds:** Black wire at 5 to 30 V dc **Discrete:** 5 milliseconds
Delay at Power-up	300 milliseconds
Linearity	**Analog output models: 2.5 milliseconds response:** ± 1 mm **30 milliseconds response:** ± 0.5 mm
Resolution	**Analog output models: 2.5 milliseconds response:** 1 mm **30 milliseconds response:** 0.5 mm
Repeatability	**Discrete models:** 0.5 mm
Temperature Effect	0.02% of distance/ °C
Temperature Warmup Drift	Less than 1.7% of sensing distance upon power-up
Minimum Window Size	5 mm
Switching Hysteresis	**Discrete output models:** 0.7 mm
Adjustments	**Sensing window limits:** TEACH-Mode programming of near and far window limits may be set using the push button or remotely using TEACH input
Indicators	**Power/Signal Strength (Red/Green):** **Green:** Target is within sensing range **Red:** Target is outside sensing range **OFF:** Sensing power is OFF **Teach/Output Indicator (Yellow/Red):** **Yellow:** Target is within taught limits **OFF:** Target is outside taught window limits **Red:** Sensor is in TEACH mode
Remote TEACH Input	**Impedance:** 12 kΩ
Construction	**Threaded Barrel:** Thermoplastic polyester **Push Button Housing:** ABS/PC **Push Button:** Santoprene **Lightpipes:** Acrylic
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Operating Conditions	**Temperature:** -20 to +60 °C **Relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave
Application Notes	Objects passing inside the specified near limit may produce a false response
Certifications	CE cULus

T30UX Series

Right-Angle, Long-Range Ultrasonic Sensors

- Built-in temperature compensation for high-accuracy across a wide range of ambient temperatures
- Resists harsh environments with rugged IP67 (NEMA 6) housing and fully encapsulated electronics
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

T30UX

Range	Frequency	Connection	Response Time	Output	Models*
100 mm to 1 m	224 kHz	2 m 4-Pin Euro QD	45 ms	**Discrete:** NPN, PNP, NO, NC, Selectable	**T30UXDA** **T30UXDAQ8**
200 mm to 2 m	174 kHz	2 m 4-Pin Euro QD	92 ms	**Discrete:** NPN, PNP, NO, NC, Selectable	**T30UXDB** **T30UXDBQ8**
300 mm to 3 m	114 kHz	2 m 4-Pin Euro QD	135 ms	**Discrete:** NPN, PNP, NO, NC, Selectable	**T30UXDC** **T30UXDCQ8**
100 mm to 1 m	224 kHz	2 m 4-Pin Euro QD	Selectable 45 or 105 ms	**Analog:** 0 to 10 V dc	**T30UXUA** **T30UXUAQ8**
100 mm to 1 m	224 kHz	2 m 4-Pin Euro QD	Selectable 45 or 105 ms	**Analog:** 4 to 20 mA	**T30UXIA** **T30UXIAQ8**
200 mm to 2 m	174 kHz	2 m 4-Pin Euro QD	Selectable 92 or 222 ms	**Analog:** 0 to 10 V dc	**T30UXUB** **T30UXUBQ8**
200 mm to 2 m	174 kHz	2 m 4-Pin Euro QD	Selectable 92 or 222 ms	**Analog:** 4 to 20 mA	**T30UXIB** **T30UXIBQ8**
300 mm to 3 m	114 kHz	2 m 4-Pin Euro QD	Selectable 135 or 318 ms	**Analog:** 0 to 10 V dc	**T30UXUC** **T30UXUCQ8**
300 mm to 3 m	114 kHz	2 m 4-Pin Euro QD	Selectable 135 or 318 ms	**Analog:** 4 to 20 mA	**T30UXIC** **T30UXICQ8**

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **T30UXDA W/30**).
QD models: For a 4-pin 150 mm Euro-style PUR pigtail QD, add suffix **QPMA** the 2 m model number (example, **T30UXDAQPMA**).
* Contact factory to request chemically resistant flange or fill-level control models.

4-Pin

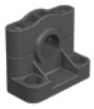
Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-406RA**)

MQDEC2-406
2 m (6.5')
MQDEC2-415
5 m (15')
MQDEC2-430
9 m (30')

Additional cordset information is available
See page 758

SMB30A

SMB30FA..



SMB1815SF

Additional bracket information is available
See page 723

T30UX (Long-range) Models

T30UX Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at 40 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Discrete (switched) output models:** SPST solid-state switch. Configurable as NPN (sinking) or PNP (sourcing) via Mode push button. Normally Open (NO) or Normally Closed (NC) operation is also selectable via Mode push button. The default setting is PNP/NO. **Analog output models:** 0 to 10 V dc or 4 to 20 mA, depending on model
Output Ratings	**Discrete output models:** 100 mA max. **OFF-state leakage current: NPN:** < 200 µA @ 30 V dc (see NOTE 1) **PNP:** < 10 µA @ 30 V dc **ON-state saturation voltage: NPN:** < 1.6 V @ 100 mA **PNP:** < 3 V @ 100 mA **Analog output models:** **Analog Voltage Output:** 2.5 kΩ min. load resistance Minimum supply for a full 10 V output is 12 V dc (for supply voltages between 10 and 12, V out max. is at least V supply -2) **Analog Current Output:** 1 kΩ max. @ 24 V input; max. load resistance = (Vcc-4)/0.02Ω For current output (4-20 mA) models, ideal results are achieved when the total load resistance R = [(Vin – 4)/0.020]Ω. Example, at Vin = 24 V dc, R ≈ 1 kΩ (1 watt)
Output Protection Circuitry	Protected against short circuit conditions
Output Response Time	**"A" suffix models:** 45 milliseconds **"B" suffix models:** 92 milliseconds **"C" suffix models:** 135 milliseconds
Delay at Power-up	500 milliseconds
Temperature Effect	0.02% of distance/ ºC
Linearity (analog models)	0.25% of distance
Repeatability/Resolution	**"A" suffix models:** 0.1% of distance (0.5 mm min.) **"B" suffix models:** 0.1% of distance (1.0 mm min.) **"C" suffix models:** 0.1% of distance (1.5 mm min.)
Sensing Hysteresis (discrete models)	**"A" suffix models:** 2 mm **"B" suffix models:** 3 mm **"C" suffix models:** 4 mm
Minimum Window Size	10 mm
Adjustments	**Sensing window limits:** TEACH-Mode configuration of near and far window limits may be set using the push button or remotely viaTEACH input **Discrete output models:** **Output Configuration:** NPN, PNP, Normally Open (NO), Normally Closed (NC) select **Advanced configuration options:** Push button enabled/disabled, temperature compensation enabled/disabled **Analog output models:** **Response speed selection:** Fast or Slow **Advanced configuration options:** Analog output slope, push button enabled/disabled, temperature compensation enabled/disabled
Indicators	**Green Power LED ON:** Power ON, RUN mode **Red Signal LED:** Target signal strength **Amber Output LED:** Output enabled; sensor receiving a signal within the window limits **Amber Mode LED:** Currently selected mode
Loss of Signal Indication (analog models)	**0 to 10 V dc models:** Analog output goes to 0 V **4 to 20 mA models:** Analog output goes to 3.6 mA
Construction	**Housing:** PBT polyester **Push buttons:** Polyester **Transducer:** Epoxy /ceramic composite
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6)
Operating Conditions	**Temperature:** -40 to +70 °C **Relative humidity:** 95% at 50 °C non-condensing
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Application Notes	The temperature warmup drift upon power-up is less than 1% of the sensing distance
Certifications	CE c UL us LISTED

NOTE: NPN < 200 µA for load impedance > 3 kΩ; for load current of 100 mA, leakage < 1% of load current

T30U Series

Right-Angle, Long-Range Ultrasonic Sensors

- Dual-discrete models for ON/OFF switching or pump-level control
- Resists harsh environments with rugged IP67 (NEMA 6) housing and fully encapsulated electronics
- Chemically resistant models with a Telfon® coating
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

T30U, 12-24 V DC

Range	Frequency	Connection	Response Time	Discrete Output(s)	Analog Output	Models*
150 mm to 1 m	228 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms	NPN PNP	4 to 20 mA	**T30UINA** **T30UINAQ** **T30UIPA** **T30UIPAQ**
300 mm to 2 m†	128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	96 ms	NPN PNP	4 to 20 mA	**T30UINB** **T30UINBQ** **T30UIPB** **T30UIPBQ**
150 mm to 1 m	228 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms	Dual NPN Dual PNP	None	**T30UDNA** **T30UDNAQ** **T30UDPA** **T30UDPAQ**
300 mm to 2 m†	128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	96 ms	Dual NPN Dual PNP	None	**T30UDNB** **T30UDNBQ** **T30UDPB** **T30UDPBQ**
150 mm to 1 m 300 mm to 2 m†	228 kHz 128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms 96 ms	Pump/Level Control Dual NPN	None	**T30UHNA** **T30UHNAQ** **T30UHNB** **T30UHNBQ**
150 mm to 1 m 300 mm to 2 m†	228 kHz 128 kHz	2 m 5-pin Euro QD 2 m 5-pin Euro QD	48 ms 96 ms	Pump/Level Control Dual PNP	None	**T30UHPA** **T30UHPAQ** **T30UHPB** **T30UHPBQ**

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **T30UXDA W/30**).
QD models: For a 4-pin 150 mm Euro-style PUR pigtail QD, add suffix **QPMA** the 2 m model number (example, **T30UXDAQPMA**).
* Contact factory to request chemically resistant flange or fill-level control models.
† **Teflon®-encapsulated models have a range of 300 mm - 1.5 m**

T30U, 15-24 V DC

Range	Frequency	Connection	Response Time	Analog Output	Models NPN*	Models PNP*
150 mm to 1 m	228 kHz	2 m 5-pin Euro QD	48 ms	0 to 10 V dc	T30UUNA T30UUNAQ	T30UUPA T30UUPAQ
300 mm to 2 m†	128 kHz	2 m 5-pin Euro QD	96 ms	0 to 10 V dc	T30UUNB T30UUNBQ	T30UUPB T30UUPBQ

Connection options: A model with a QD requires a mating cordset

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **T30UUNA W/30**).

* **For sensors with Teflon®-protected face and transducer (long-range models only), add suffix -CRFV to the model number (example, T30UUNB-CRFV).**

† **Teflon®-encapsulated models have a range of 300 mm - 1.5 m.**

Teflon® is a registered trademark of Dupont™.

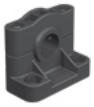
Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

5-Pin
MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')

Additional cordset information is available
See page 758

SMB30A

SMB30FA..



SMB1815SF

Additional bracket information is available
See page 723

T30U Models

T30U Specifications

Supply Voltage and Current	**Current sourcing analog output models:** 12 to 24 V dc (10% max. ripple); 90 mA (exclusive of load) **Voltage sourcing analog output models:** 15 to 24 V dc (10% max. ripple); 90 mA (exclusive of load) **Dual-discrete output models:** 12 to 24 V dc (10% max. ripple); 90 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Ultrasonic Frequency	**Short Range ("A" suffix modesl):** 228 kHz **Long Range ("B" suffix models):** 128 kHz
Output Protection	Protected against continuous overload and short-circuit; transient over-voltage; no false pulse on power-up
Output Configuration	**Discrete (switched) output:** Solid-state switch conducts when target is sensed within sensing window; choose NPN (current sinking) or PNP (current sourcing) models **Analog output:** Choose 0 to 10 V dc sourcing or 4 to 20 mA sourcing output models; output slope may be selected using TEACH sequence
Output Ratings	**Discrete (switched) output:** 100 mA max., total–both outputs **OFF-state leakage current:** less than 10 µA **ON-state saturation voltage:** less than 1 V at 10 mA and less than 1.5 V at 100 mA **Analog Output:** **Voltage sourcing:** 0 to 10 V dc (at 1 kΩ min. resistance) **Current sourcing:** 4 to 20 mA, 1 Ω to Rmax $Rmax = \frac{Vsupply - 7V}{20\ mA}$
Output Response Time	**Discrete output: "A" suffix models:** 48 milliseconds **"B" suffix models:** 96 milliseconds **Analog output: "A" suffix models:** 48 milliseconds average, 16-millisecond update **"B" suffix models:** 96 milliseconds average, 32-millisecond update
Sensing Performance (Specified using a 100 x 100 mm aluminum target at 25˚ C under fixed sensing conditions.)	**Analog sensing resolution or discrete output repeatability:** ±0.25% of measured distance **"A" suffix models:** .5 mm min **"B" suffix models:** 1 mm min **Analog linearity:** ±0.5% of full-scale span **Min. window size:** 10 mm **Hysteresis of discrete output:** 2.5 mm **Temperature effect:** 0.2% of sensing distance per °C
Indicators	**Four status LEDs: In RUN mode:** **Green ON Steady:** Power ON, RUN mode **Green Flashing:** Discrete output is overloaded **Red Flashing:** Relative received signal strength **Yellow analog ON Steady:** Target is inside window limits **Yellow discrete ON Steady:** Output conducting **In Program mode:** **Green OFF:** PROGRAM mode **Red Flashing:** Relative received signal strength **Yellow ON Steady:** Ready for first window limit **Yellow Flashing:** Ready for second limit **Yellow OFF:** Not teaching this output
Construction	Molded reinforced thermoplastic polyester housing
Environmental Rating	Leakproof design is rated IEC IP67; NEMA 6P
Operating Conditions	**Temperature:** -20 to +70 °C **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", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Certifications	CE

M25U Series

Stainless Steel Opposed Ultrasonic Sensors

- 316 stainless steel with no thread, gaps or seams to trap debris
- Constructed with FDA approved materials and rated to IP69K, IEC IP67 (NEMA 6) with fully encapsulated electronics
- Withstands high-temperatures sprays of up to 80° C and 1500 psi occurring every few hours
- Features high-immunity to ambient electrical and sonic noise

M25U

Range*	Frequency	Connection	Output	Response Time	Models
Normal Speed: 500 mm **High Speed:** 250 mm	140 kHz	4-pin Euro QD	—	—	**M25UEQ8** Emitter
		5-pin Euro QD	Bipolar NPN/PNP	**Normal Speed:** 4.0 ms **High Speed:** 3.0 ms	**M25URBQ8** Receiver

Connection options: A model with a QD requires a mating cordset.

* M25U receivers may be wired for either of two speed modes: Normal or High, depending on hookup. The Normal-Speed mode offers a sensing range of 500 mm. The Normal-Speed mode maximizes sensing energy, as is required in demanding environments. The High-Speed mode offers a sensing range of 250 mm. The High-Speed mode maximizes sensing response, as is needed in high-speed counting applications.

5-Pin

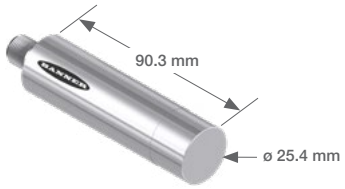
Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')

5-Pin

Euro-Style Washdown
Straight connector models only

MQDCWD-506
2 m (6.5')
MQDCWD-530
9 m (30')



Additional cordset information is available
See page 758

SMBM25A

SMBM25B

Additional bracket information is available
See page 725

M25U Specifications

Sensing Range	**Normal Speed:** 500 mm **High Speed:** 250 mm
Ultrasonic Frequency	140KHz
Supply Voltage and Current	**Emitter:** 10 to 30 V dc (10% max. ripple) at less than 85 mA **Receiver:** 10 to 30 V dc (10% max. ripple) at less than 38 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Receiver Output Configuration	Bipolar (1 NPN & 1 PNP) solid-state output; Normally Open (output is activated when an object blocks the sensing beam)
Output Rating	100 mA (each output) with short circuit protection; see Note 1 **OFF-state leakage current:** **NPN:** < 200 µA sinking **PNP:** < 10 µA sourcing **ON-state saturation voltage:** **NPN:** < 1.6 V @ 100 mA **PNP:** < 3.0 V @ 100 mA
Output Protection Circuitry	Protected against short circuit conditions
Output Response Time	**Normal Speed:** 4.0 milliseconds **High Speed:** 3.0 milliseconds
Repeatability	1 millisecond
Delay at Power-up	< 250 milliseconds
Delay for Switching Between Normal and High Speed	20 milliseconds
Indicators	**Green Power LED:** indicates Power ON **Amber Output LED:** indicates output activated
Construction	**Housing:** 316 Stainless Steel **LED window:** Polysulphone
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6), IP69K
Operating Conditions	**Temperature:** -20 to +70 °C **Max. Relative Humidity:** 95% at 50° C non-condensing
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max. amplitude 0.06", max. acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration.
Notes	1. NPN < 200 µA for load impedance > 3 KΩ; for load current of 100 mA, leakage < 1% of load current 2. When mounting the M25U, care should be taken to acoustically isolate the emitter and receiver to eliminate sound energy coupling between the sensor pair. This is best accomplished with elastomeric materials between the sensor and rigid mounting brackets.
Certifications	CE

T18U Series

Opposed Dual-Range Ultrasonic Sensors

- T-style right-angle sensor package with an 18 mm threaded mounting hub, for versatile mounting
- Response time of 1 millisecond and ranges up to 600 mm suitable for high-speed applications such as counting
- Offers high immunity to electrical and acoustic noise
- Includes signal strength indicator to make alignment easy
- Ideal for small object and clear object detection

T18U

Range†	Connection	Response Time	Models NPN*	Models PNP*
NORMAL resolution: 600 mm **HIGH resolution:** 300 mm	2 m 4-pin Euro QD	**NORMAL resolution:** 2 ms **HIGH resolution:** 1 ms	**T186UE Emitter** **T186UEQ Emitter**	
NORMAL resolution: 600 mm **HIGH resolution:** 300 mm	2 m 4-pin Euro QD	**NORMAL resolution:** 2 ms **HIGH resolution:** 1 ms	**T18VN6UR** **T18VN6URQ**	**T18VP6UR** **T18VP6URQ**

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **T18VN6UR W/30**).
† Receivers may be wired for either resolutions: Normal or High.
* Sensor pair requires one emitter and one receiver.

4-Pin

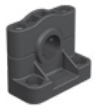
Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Additional cordset information is available
See page 758

SMB18A

SMB18FA..



SMB1815SF

Additional bracket information is available
See page 723

Ultrasonic Wave Guides

Inside Diameter	Model
5.0 mm	**UWG18-5.0**
6.4 mm	**UWG18-6.4**

Additional wave guide information is available
See page 959

T18U Specifications

Sensing Range (no minimum range)	**NORMAL resolution mode:** to 600 mm **HIGH resolution mode:** to 300 mm
Supply Voltage and Current	12 to 30 V dc, 10% max. ac ripple 50 mA (emitters); 35 mA (receivers), exclusive of output load
Ultrasonic Frequency	230 kHz
Minimum spacing (adjacent pairs)	50 mm for emitter-to-receiver separations of up to 150 mm Add 10 mm of adjacent-pair spacing for every 100 mm of emitter-to-receiver spacing beyond 150 mm
Receiver Output Configuration	**T18VN models:** NPN sinking, NO and NC (complementary) **T18VP models:** PNP sourcing, NO and NC (complementary)
Receiver Output Rating	150 mA max. each output at 25 °C, derated to 100 mA at 70 °C (derate ≈ 1 mA per °C) Both outputs may be used simultaneously. **ON-state saturation voltage:** less than 1.5 V at 10 mA; less than 2.0 V at 150 mA **OFF-state leakage current:** less than 1 µA at 30 V dc **Output protection:** Overload and short-circuit protected. **No false pulse upon receiver power-up:** false pulse protection causes a 100 millisecond delay upon power-up.
Output Response Time	**NORMAL resolution mode:** 2 milliseconds ON/OFF **HIGH resolution mode:** 1 millisecond ON/OFF
Rep Rate	**NORMAL resolution mode:** 125 Hz max. **HIGH resolution mode:** 200 Hz max.
Mechanical Sensing Repeatability at 300 mm range	**NORMAL resolution mode:** less than 2 mm **HIGH resolution mode:** less than 1 mm
Beam Angle (-3dB full angle)	15 ± 2°
Indicators	Emitters have a green LED for dc power ON. Receivers have two LEDs, one yellow and one green **Solid Green:** power ON **Flashing Green:** output overloaded **Yellow:** sonic signal received (flash rate is proportional to received signal strength; flash is from full to half intensity) See data sheet for detailed information
Construction	T-style yellow PBT polyester housing with black PBT polyester back cover. Transducer housing is threaded M18 x 1. Mating jam nut is supplied for mounting. Acoustic face is epoxy reinforced. Circuitry is epoxy-encapsulated.
Environmental Rating	IEC IP67; NEMA 6P
Operating Temperature	-40 to +70 °C
Vibration and Mechanical Shock	All models meet Mil.Std 202F requirements method 201A (Vibration: frequency 10 to 60 Hz, max., and double amplitude 0.06", maximum acceleration 10G) and method 213B conditions H&I (Shock: 75G with unit operation; 100G for non-operation). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half sine wave.
Certifications	CE

Q45U Series

Versatile Ultrasonic Sensors

- The Q45U accepts programming storage cards for fast, easy sensing parameter changes with ranges up to 3 m
- Bipolar discrete models have switches for ON/OFF presence detection and HIGH/LOW level control
- In ON/OFF mode, bipolar discrete models detect when the target is within the set range or when it is outside the range
- In HIGH/LOW mode, bipolar discrete models detect when the target is outside the configured range, for fill level control, web tensioning control and similar applications
- Response time is programmed with switches in discrete models and with a potentiometer in analog models
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

Q45U Discrete Output, 12-24 V DC

Range	Temperature Compensation	Connection	Output Type	Response Time	Models
100 mm to 1.4 m	No	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Programmable for 20, 40, 160 or 640 ms	**Q45UBB63DA** **Q45UBB63DAQ** **Q45UBB63DAQ6**
100 mm to 1.4 m	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Programmable for 20, 40, 160 or 640 ms	**Q45UBB63DAC** **Q45UBB63DACQ** **Q45UBB63DACQ6**
250 mm to 3 m†	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Programmable for 40, 80, 320 or 1280 ms	**Q45UBB63BC** **Q45UBB63BCQ** **Q45UBB63BCQ6**

Q45U Analog Output, 15-24 V DC

Range	Temperature Compensation	Connection	Output Type	Response Time	Models
100 mm to 1.4 m	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	Adjustable from 40 to 1280 ms	**Q45ULIU64ACR** **Q45ULIU64ACRQ** **Q45ULIU64ACRQ6**
250 mm to 3 m†	Yes	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	Adjustable from 80 to 2560 ms	**Q45ULIU64BCR** **Q45ULIU64BCRQ** **Q45ULIU64BCRQ6**

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q45UBB63DA W/30**).

† The far limit may be extended as far as 3.9 m for good acoustical targets–hard surfaces with area greater than 100 cm^2.

5-Pin

Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')

5-Pin

Mini-Style with Shield
Straight connector models only

MBCC2-506
2 m (6.5')
MBCC2-515
5 m (15')
MBCC2-530
9 m (30')

SMB30A

SMB30MM

SMB30SC

Additional cordset information is available
See page 758

Additional bracket information is available
See page 722

Q45U Specifications

Sensing Range	**"A" suffix: Near limit:** 100 mm min. (239 kHz) **"B" suffix:** Near limit: 250 mm min. (128 kHz) **"A" suffix: Far limit:** 1.4 m max. (239 kHz) **"B" suffix:** Far limit: 3.0 m max. (128 kHz) NOTE: The far limit may be extended on long range units, as far as 3.9 m for good acoustical targets (hard surfaces with area greater than 100 cm2)
Supply Voltage and Current	**Discrete:** 12 to 24 V dc (10% max. ripple); 100 mA (exclusive of load) **Analog:** 15 to 24 V dc (10% max. ripple); 100 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Configuration	**Discrete: Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open collector transistor **Analog:** One voltage sourcing and one current sourcing; one or the other output is enabled by internal programming switch #2
Output Ratings	**Discrete:** 150 mA max. (each) **OFF-state leakage current:** less than 25 µA at 24 V dc **ON-state saturation voltage:** less than 1.5 V at 10 mA; less than 2.0 V at 150 mA **Analog:** **Voltage sourcing:** 0 to 10 V dc, 10 mA max. **Current sourcing:** 4 to 20 mA, 1 to 500 Ω impedance
Performance Specifications	

	"A" suffix	"B" suffix
Analog resolution or discrete repeatability:	± 0.1% of sensing distance (± 0.25 mm min.)	± 0.1% of sensing distance (± 0.5 mm min.)
Analog Linearity:	1% of full scale	1% of full scale
Temperature effect:	0.05% of sensing distance/ °C with temp. comp. 0.2% of sensing distance/ °C without temp. comp.	0.05% of sensing distance/ °C
Min. window size:	10 mm	25 mm
Hysteresis (discrete output):	5 mm	10 mm

Adjustments	The following may be selected by a 4-position DIP switch. **Discrete:** **Switch 1:** Output normally open/normally closed (pump in/pump out) **Switch 2:** High/Low level control mode or on/off presence sensing mode **Switch 3 & 4:** Response speed selection (digital filter) **Analog:** **Switch 1:** Output slope positive or output slope negative **Switch 2:** Current output mode or voltage output mode **Switch 3:** Loss of echo min/max mode or loss of echo Hold Mode **Switch 4:** Loss of echo min/max default output value
Indicators	**Discrete: Three status LEDs:** **Solid Green:** power ON **Flashing Green:** output overloaded **Yellow:** outputs are conducting (Yellow LED also indicates programming status during setup mode) **Red:** indicates relative strength of received echo **Analog: Three status LEDs:** **Green:** power ON **Flashing Green: current** output fault (4-20 mA current path to ground is open) **Yellow:** 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. See data sheet for detailed information.
Construction	Molded PBT polyester 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
Operating Conditions	**Temperature:** -25 to +70 °C **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", 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 milliseconds duration, half sine wave.
Application Notes	**"A" suffix: Min. target size:** 10 x 10 mm aluminum plate at 500 mm 35 x 35 mm aluminum plate at 1.4 m **"B" suffix: Min. target size:** 50 x 50 mm aluminum plate at 3 m **Discrete:** Enable/Disable; Connect yellow wire to +5 to 24 V dc to enable sensor and 0 to +2 V dc to disable sensor. When the sensor is disabled, the last output state is held until the sensor is re-enabled. The wire must be held to the appropriate voltage for at least 40 milliseconds for the sensor to enable or disable.
Certifications	CE

Q45UR Series

Remote Transducer Ultrasonic Sensors

- Q45 housing with an available plastic or a stainless steel 18 mm threaded barrel sensing head or an ultra-compact plastic Flat-Pak sensing head
- The Q45UR has sensing ranges up to 250 mm
- Resolution/repeatability +/- 0.2% of sensing distance
- Analog models feature a selectable positive or negative output slope
- Environmental rating is IEC IP65 and NEMA 4
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

Q45UR Discrete Output, 12-24 V DC

Sensor Range	Controller Connection	Controller Output	Kit Models	Kit Includes: Controller & Sensor		
50 to 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Q45UR3BA63CK Q45UR3BA63CQK Q45UR3BA63CQ6K	Q45UR3BA63C Q45UR3BA63CQ Q45UR3BA63CQ6		**M18C2.0** Stainless Steel Barrel
50 to 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Q45UR3BA63CKQ Q45UR3BA63CQKQ Q45UR3BA63CQ6KQ	Q45UR3BA63C Q45UR3BA63CQ Q45UR3BA63CQ6		**Q13C2.0** Flat-Pak
50 to 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Bipolar NPN/PNP	Q45UR3BA63CKS Q45UR3BA63CQKS Q45UR3BA63CQ6KS	Q45UR3BA63C Q45UR3BA63CQ Q45UR3BA63CQ6		**S18C2.0** Molded Barrel

Q45UR Analog Output, 15-24 V DC

Sensor Range	Controller Cable	Controller Output	Kit Models	Kit Includes: Controller & Sensor		
50 to 250 mm	2 m 5-pin Mini QD 5-pin Euro QD	Selectable 0 to 10 V dc or 4 to 20 mA	Q45UR3LIU64CK Q45UR3LIU64CQK Q45UR3LIU64CQ6K	Q45UR3LIU64C Q45UR3LIU64CQ Q45UR3LIU64CQ6		**M18C2.0** Stainless Steel Barrel
50 to 250 mm	2 m 5-pin Mini QD 5-pin Euro QD		Q45UR3LIU64CKQ Q45UR3LIU64CQKQ Q45UR3LIU64CQ6KQ	Q45UR3LIU64C Q45UR3LIU64CQ Q45UR3LIU64CQ6		**Q13C2.0** Flat-Pak
50 to 250 mm	2 m 5-pin Mini QD 5-pin Euro QD		Q45UR3LIU64CKS Q45UR3LIU64CQKS Q45UR3LIU64CQ6KS	Q45UR3LIU64C Q45UR3LIU64CQ Q45UR3LIU64CQ6		**S18C2.0** Molded Barrel

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q45UR3BA63CK W/30**).

Euro-Style with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

5-Pin	
MQDEC2-506	2 m (6.5')
MQDEC2-515	5 m (15')
MQDEC2-530	9 m (30')

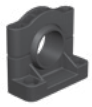
Additional cordset information is available See page 758

Mini-Style with Shield
Straight connector models only

5-Pin	
MBCC2-506	2 m (6.5')
MBCC2-512	4 m (12')
MBCC2-530	9 m (30')

SMB30A

SMB30MM



SMB30SC

Additional bracket information is available See page 722

Q45UR High-Gain Controllers

Version	Model	
Discrete	63060	**Q45UR3BA63CQ6-63060**
Analog	63667	**Q45UR3LIU64CQ6-63667**

NOTE: Special High-Gain controllers are available for small object detection. Contact factory for more information.

Q45UR Remote Sensors Specifications

Supply Voltage and Current	**Discrete:** 12 to 24 V dc (10% max. ripple); 100 mA (exclusive of load) **Analog:** 15 to 24 V dc (10% max. ripple); 100 mA (exclusive of load)
Ultrasonic Frequency	400 kHz
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection Circuitry	Both outputs are protected against continuous overload and short circuit
Output Rating	**Discrete:** 150 mA max. (each output) **OFF-state leakage current:** less than 25 µA at 24 V dc **ON-state saturation voltage:** less than 1.5 V at 10 mA; **Analog:** **Voltage sourcing:** 0 to 10 V dc, 10 mA max. **Current sourcing:** 4 to 20 mA, 1 to 500 Ω impedance
Output Configuration	**Discrete: Bipolar:** One current sourcing (PNP) and one current sinking (NPN) open collector transistor **Analog:** One voltage sourcing and one current sourcing; one or the other output is enabled by internal programming switch #2
Performance Specifications	**Discrete: Response Speed:** 40 or 160 ms (switch selectable) **Repeatability*:** ±0.2% of measured distance **Temperature stability:** ±0.03% of the window limit positions per °C from 0 to 50 °C, (±0.05% per °C over remainder of operating temperature range) **Sensing window width:** 5 to 200 mm, when independent near and far limits are taught; 1, 2, 3, or 4 mm (switch selectable), when a sensing distance set point is taught **Hysteresis:** 0.5 mm **Ultrasonic beam angle:** ±3.5˚ **Analog: Response Speed:** 10 to 320 ms (2 to 64 cycles) selectable **Resolution*:** 0.2% of sensing distance at 320 ms response, 0.4% of sensing distance a 10 ms response **Linearity*:** 1% of full scale **Temperature stability:** ±0.03% of sensing distance per °C from 0 to 50 °C, (±0.05% per °C over remainder of operating temperature) **Ultrasonic beam angle:** ±3.5° * Repeatability and analog resolution and linearity are specified using a 50 x 50 mm aluminum plate at 22° C under fixed sensing conditions (Analog: using the 4 to 20 mA output @ 15 V dc)
Adjustments	**Discrete:** The following may be selected by a 4-position DIP switch **Switch 1:** Output normally open (output is energized when target is within sensing window limits), or normally closed (output is energized when target is outside sensing window limits) **Switches 2 & 3:** Sensing window size (1, 2, 3 or 4 mm) **Switch 4:** Response speed selection (40 or 160 milliseconds) **Analog:** Push-button TEACH-mode programming of window limits. The following may be selected by a 4-position DIP switch located on top of the controller, beneath a transparent o-ring sealed acrylic cover and beneath the black inner cover. **Switch 1:** Output slope: output value increases or decreases with distance **Switch 2:** Output mode: current output or voltage output **Switches 3 & 4:** Response to loss of echo **Response Speed Adjustment:** Single-turn potentiometer selects six response values from 10 to 320 milliseconds
Indicators	**Discrete: Three status LEDs:** **Green:** Power ON **Yellow:** Output are conducting (Yellow also indicates programming status during setup) **Red:** Relative strength of received echo 5-segment moving dot LED indicates the position of the target within the sensing window **Analog: Three status LEDs:** **Solid Green:** Power ON **Flashing Green:** current output fault (4-20 mA current path to ground is open) **Yellow:** Target is sensed within the window limits (Yellow LED also indicates programming status during setup mode) **Red:** Relative strength of received echo 5-segment moving dot LED indicates the position of the target within the sensing window (See data sheet for detailed information)
Construction	**Controller:** Molded thermoplastic polyester housing, o-ring sealed transparent acrylic top cover, and stainless steel hardware **Sensors: M18C2.0:** Stainless steel M18 threaded barrel housing and jam nuts, polyetherimide front cover, ceramic transducer, polyurethane rear cover **S18C2.0:** Thermoplastic polyester S18 threaded barrel housing and jam nuts, polyetherimide front cover, ceramic transducer, polyurethane rear cover **Q13C2.0:** Molded 30% glass reinforced thermoplastic polyester housing, ceramic transducer, fully epoxy-encapsulated
Environmental Rating	**Controller:** IEC IP67; NEMA 6P **Sensor:** IEC IP65; NEMA 4
Operating Conditions	**Controller and sensor:** -25 to +70 °C **Relative humidity:** 85% (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A Vibration: 10 to 60Hz max., double amplitude 0.06" (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 milliseconds duration, half sine wave.
Certifications	CE

QS18U Series

Right-Angle Ultrasonic Sensors

- Senses clear and transparent materials, as well as color variations, including clear web material, clear or shiny bottles, highly reflective surfaces and liquid or dry bulk materials inside cramped locations
- Sensing range up to 500 mm.
- Features a universal housing with an 18 mm threaded lens or side mount
- Available in encapsulated IP68 models rated for a range of harsh conditions
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

QS18U

Range	Connection	TEACH Options	Models NPN	Models PNP
50 to 500 mm	2 m 4-pin Euro QD	Integral push button and remote TEACH (IP67; NEMA 6P)	QS18UNA QS18UNAQ8	QS18UPA QS18UPAQ8
50 to 500 mm	2 m 4-pin Euro QD	Remote TEACH (epoxy-encapsulated, IP68; NEMA 6P)	QS18UNAE* QS18UNAEQ8*	QS18UPAE* QS18UPAEQ8*

* Models are epoxy-encapsulated, IP68; NEMA 6P with remote TEACH programming

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **QS18UNA W/30**).
QD models:
- For 4-pin integral Euro-style QD, add suffix **Q8** (example, **QS18UNAQ8**).
- For 4-pin integral Pico-style QD, add suffix **Q7** (example, **QS18UNAQ7**).
- For 4-pin 150 mm Euro-style pigtail, add suffix **Q5** (example, **QS18UNAQ5**).
- For 4-pin 150 mm Pico-style pigtail, add suffix **Q** (example, **QS18UNAFQ**).

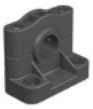
	4-Pin
Euro-Style with Shield Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-406RA**)	**MQDEC2-406** 2 m (6.5') **MQDEC2-415** 5 m (15') **MQDEC2-430** 9 m (30')

	Straight 4-Pin	Right-Angle 4-Pin
Pico-Style with Shield	**PKG4S-2** 2 m (6.5')	**PKW4ZS-2** 2 m (6.5')

Additional cordset information is available
See page 758

SMB18A

SMB18FA..



SMB1815SF

Additional bracket information is available
See page 722

Ultrasonic Wave Guides

Inside Diameter	Model
5.0 mm	**UWG18-5.0**
6.4 mm	**UWG18-6.4**

Additional wave guide information is available
See page 959

QS18U Specifications

Sensing Range	50 to 500 mm
Supply Voltage and Current	12 to 30 V dc (10% max. ripple); 25 mA max. (exclusive of load)
Ultrasonic Frequency	300 kHz, rep. rate 7.5 milliseconds
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Protection	Protected against short circuit conditions
Delay at Power-Up	300 milliseconds
Output Configurations	Solid-state switch conducts when target is sensed within sensing window; one NPN (current sinking) or one PNP (current sourcing), depending on model
Temperature Effect	**Non-encapsulated models:** ± 0.05% per °C from -20 to +50 °C, ± 0.1% per °C from +50 to +60 °C **Encapsulated models:** ± 0.05% per ° C from 0° to +60° C, ± 0.1% per ° C from -20° to 0° C
Repeatability	0.7 mm
Hysteresis	1.4 mm
Output Ratings	100 mA max. (see Application Note 1) **OFF-state leakage current:** less than 10 µA (sourcing); less than 200 µA (sinking); See Application Note 2 **NPN ON-state saturation voltage:** less than 1.6 V @ 100 mA **PNP ON-state saturation voltage:** less than 3.0 V @ 100 mA
Output Response Time	15 milliseconds
Minimum Window Size	5 mm
Adjustments	**Sensing window limits:** TEACH-Mode programming of near and far window limits may be set using the push button or remotely using TEACH input
Indicators	**Range Indicator (Red/Green)** **Green:** Target is within sensing range **Red:** Target is outside sensing range **OFF:** Sensing power is OFF **Teach/Output Indicator (Yellow/Red)** **Yellow:** Target is within taught limits **OFF:** Target is outside taught window limits **Red:** Sensor is in TEACH mode
Construction	**Housing:** ABS **Push Button Housing:** ABS **Push Button:** TPE **Lightpipes:** Polycarbonate
Environmental Rating	Leakproof design, rated IEC IP67 or IP68; NEMA 6P, depending on model; UL type 1
Operating Conditions	**Temperature:** -20 to +60 °C **Relative humidity:** 100% (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 milliseconds duration, half sine wave.
Temperature Warmup Drift	See data sheet
Application Notes	1. If supply voltage is > 24 V dc, derate maximum output current 5 mA/ °C above 50 °C. 2. NPN OFF-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load current of 100 mA, leakage is < 1% of load current. 3. Objects passing inside the specified near limit may produce a false response.
Certifications	CE

K50U Series

Ultrasonic Sensor for Wireless Level and Tank Monitoring

- Three meter sensing range with a 300 mm dead zone
- Provides a distance measurement from the target to the sensor
- Built-in temperature compensation
- Rugged design for demanding sensing environments; rated IEC IP67, NEMA 6P
- Functions as a Modbus slave device using RS-485

K50U

Range and Frequency	Supply Voltage	I/O	Models
Range: 300 mm to 3 m **Frequency:** 114 kHz	3.6 to 5.5 V dc	Distance to target using a 1-wire serial interface	**K50UX1RA**
Range: 300 mm to 3 m **Frequency:** 114 kHz	3.6 to 5.5 V dc or 10 to 30 V dc	Distance to target using Modbus RS-485	**K50UX2RA**

5-Pin

Euro-Style
Double-ended, straight male to female

DEE2R-51D
0.31 m (1')
DEE2R-53D
0.91 m (3')
DEE2R-58D
2.44 m (8')

Additional cordset information is available
See page 758

BWA-BK-006
Mounts both the K50U Ultrasonic sensor and a Wireless Q45 Node

K50U Specifications

Supply Voltage and Current	3.6 to 5.5 V dc or 10 to 30 V dc
Current	Active comms: 11.3 mA at 30 V dc
Indicators	Two LEDs
Performance	**Sensing range:** 300 mm to 3 m (11.8 in to 118 in) **Ultrasonic frequency:** 114 kHz **Temperature effect:** 0.02% of distance/°C **Resolution:** 0.1% of distance (1.5 mm minimum)
Discrete Inputs	300 milliseconds
Output Configurations	One Sinking **Rating:** 3 mA max current at 30 V dc **ON Condition:** Less than 0.7 V **OFF Condition:** Greater than 2 V or open
Communication Protocol	Modbus RTU
Communication Hardware	RS-485 Serial **Baud Rates:** 9.6k, 19.2k (default), or 38.4k **Data Format:** 8 data bits, No parity (default), even parity, or odd parity 1 stop bit Do not use a termination resistor
Communications Line	**Level Receive ON:** Greater than 2 V **Level Receive OFF:** Less than 0.7 V **Level Transmit ON:** 2.7 to 3 V **Level Transmit OFF:** 0 V (pulldown resistor of 10 kOhm)
Construction	**Housing:** PBT polyester **Transducer:** Epoxy/ceramic composite
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6)
Operating Conditions	**Temperature:** –40 to +70 °C **Relative humidity:** 95% at +50 °C maximum relative humidity (non-condensing)
Vibration and Mechanical Shock	All models meet Mil Std. 202F requirements. Method 201A (vibration: 10 Hz to 60 Hz max., double amplitude 0.06 inch, maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G 11 ms duration, half sine wave
Certifications	CE