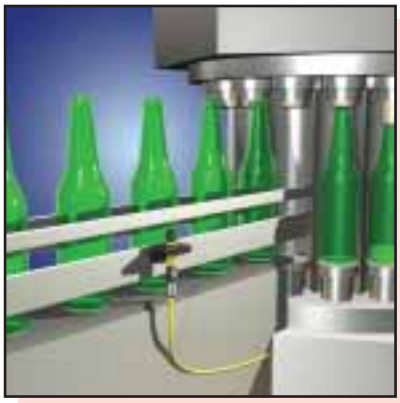
S18U Ultrasonic Sensor

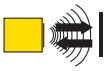


Features

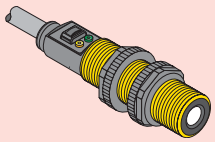
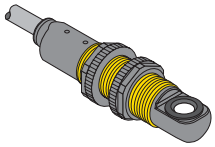
- Integrated diagnostic LEDs and push-button programming
- Minimal dead-zone
- Retro-sonic sensing mode
- Temperature compensation circuitry
- Programmable background suppression
- Analogue or digital versions
- Available in straight or right-angle emitter versions with a wide variety of mounting hardware for enhanced sensing versatility
- Ideal for packaged goods or material handling applications
- Use for bottling or small container liquid level detection and control
- 30 to 300 mm range

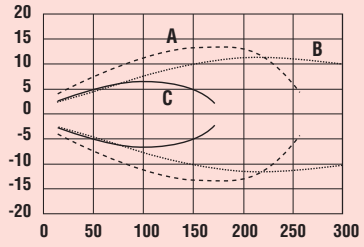
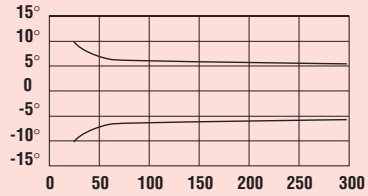
S18U Series Table of Contents

S18U Series Detection Modes

	Ultrasonic Diffuse Mode		

S18U Series, Ultrasonic Diffuse Mode

Model	View	Range	Connection	Output	P/N
S18UBA		30 - 300 mm	2 m cable, 5 wire	bipolar PNP/NPN	30 027 11
S18UBAQ		30 - 300 mm	M12x1, 5-pin	bipolar PNP/NPN	30 027 12
S18UUA		30 - 300 mm	2 m cable, 5 wire	1 x analogue 0-10 Vdc	30 026 99
S18UUAQ		30 - 300 mm	M12x1, 5-pin	1 x analogue 0-10 Vdc	30 027 00
S18UIA		30 - 300 mm	2 m cable, 5 wire	1 x analogue 4-20 mA	30 027 02
S18UIAQ		30 - 300 mm	M12x1, 5-pin	1 x analogue 4-20 mA	30 027 03
Straight					
S18UBAR		30 - 300 mm	2 m cable, 5 wire	bipolar PNP/NPN	30 027 14
S18UBARQ		30 - 300 mm	M12x1, 5-pin	bipolar PNP/NPN	30 027 15
S18UUAR		30 - 300 mm	2 m cable, 5 wire	1 x analogue 0-10 Vdc	30 027 05
S18UUARQ		30 - 300 mm	M12x1, 5-pin	1 x analogue 0-10 Vdc	30 027 06
S18UIAR		30 - 300 mm	2 m cable, 5 wire	1 x analogue 4-20 mA	30 027 08
S18UIARQ		30 - 300 mm	M12x1, 5-pin	1 x analogue 4-20 mA	30 027 09
Right-angle					

Effective Beam	Chart	Maximum Target Rotation Angle	Chart
Lateral distance in mm versus sensing distance in mm A) 8 mm rod B) 50 mm x 50 mm C) 2,25 mm rod		Target aluminium plate 50 x 50 mm Target rotation in degrees versus sensing distance in mm	

S18U Series Cables

Model	Length	Description	P/N
MQDEC2-506	2 m	M12x1, 5-pin connector, straight	30 608 10
MQDEC2-515	5 m	M12x1, 5-pin connector, straight	30 608 11
MQDEC2-530	9 m	M12x1, 5-pin connector, straight	30 608 12
MQDEC2-506RA	2 m	M12x1, 5-pin connector, angled	30 608 13
MQDEC2-515RA	5 m	M12x1, 5-pin connector, angled	30 608 14
MQDEC2-530RA	9 m	M12x1, 5-pin connector, angled	30 608 15

S18U Series Specifications

Supply Voltage	10 to 30 Vdc (10% maximum ripple); 65 mA max (exclusive of load)
Sensing Range	30 to 300 mm
Ultrasonic Frequency	300 kHz, rep. rate 2,5 ms
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Analogue:** 0 to 10 Vdc or 4 to 20 mA, depending on model **Digital:** Solid-state switch conducts when target is sensed within sensing window; 1 PNP and 1 NPN output in each model
Output Protection	Protected against short circuit conditions
Output Ratings	**Analogue Voltage Output:** 2,5 kΩ minimum load resistance, minimum supply for a full 10 V output is 12 Vdc (for supply voltages between 10 and 12, Vout max is at least V supply – 2) **Analogue Current Output:** 1 kΩ max at 24 V input, max load resistance = (Vcc-4)/0,02 Ω **Digital:** 100 mA maximum **OFF-state leakage current:** < 5 µA **NPN saturation:** < 200 mV at 10 mA and < 600 mV at 100 mA **PNP saturation:** < 1,2 V at 10 mA and < 1,6 V at 100 mA
Output Response Time	**Analogue: 2,5 ms:** Black wire at 0-2 Vdc (or open) **30 ms:** Black wire at 5-30 Vdc **Digital:** 5 ms
Delay at Power-up	300 ms
Temperature Effect	0,02% of distance/°C
Temperature Warmup Drift	Less than 1,7% of sensing distance upon power-up, stable after 25 minutes from power-up
Repeatability/Resolution	0,5 mm
Minimum Window Size	5 mm
Switching Hysteresis (Digital 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 via TEACH input
Remote TEACH Input	**Impedance:** 12 kΩ

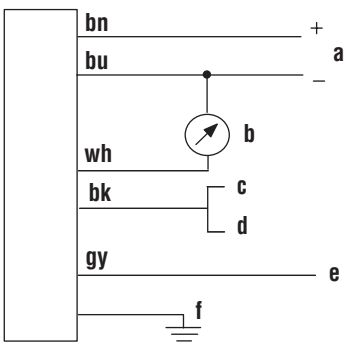
S18U Series Specifications *(cont'd)*

Indicators	**Range Indicator (Red/Green)** **Green:** Target within sensing range **Red:** Target outside sensing range **OFF:** Sensing power OFF	**Teach/Output Indicator (Yellow/Red)** **Yellow:** Target within taught limits **OFF:** Target outside taught window limits **Red:** Sensor in TEACH mode
Construction	**Threaded Barrel:** Thermoplastic polyester **Push-button:** Santoprene	**Push-button Housing:** ABS/PC **Lightpipes:** Acrylic
Environmental Rating	Rated IEC IP67	
Connections	2 m shielded 5-conductor (with drain) PVC jacketed attached cable or 5-pin M12x1 quick-disconnect	
Temperature Conditions	**Temperature:** -20 to +60 °C	**Maximum relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (vibration frequency 10 to 60 Hz max, double amplitude 1,5 mm, maximum acceleration 10 G). Also meets IEC 60947-5-2 requirements: 30 G, 11 ms pulse duration, half sine wave pulse shape.	
Application Notes	Objects passing inside the specified near limit may produce a false response	

M & I

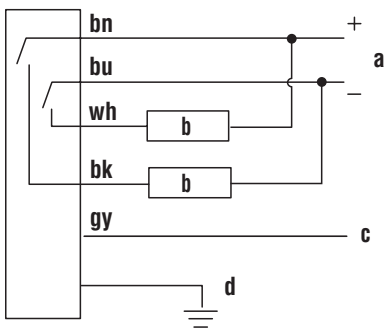
S18U Series Wiring Diagrams

Analogue Output



a) 10-30 Vdc, b) 4-20 mA or 0-10 Vdc, c) 5-30 Vdc (fast response), d) 0-2 Vdc (slow response), e) Remote TEACH (0-2 Vdc), f) Shield (it is recommended that the shield wire be connected to either earth ground or dc common)

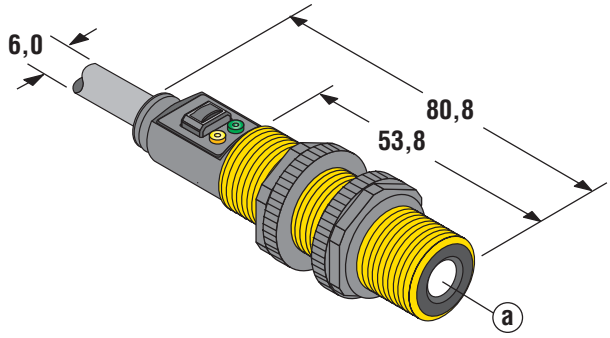
Digital Output



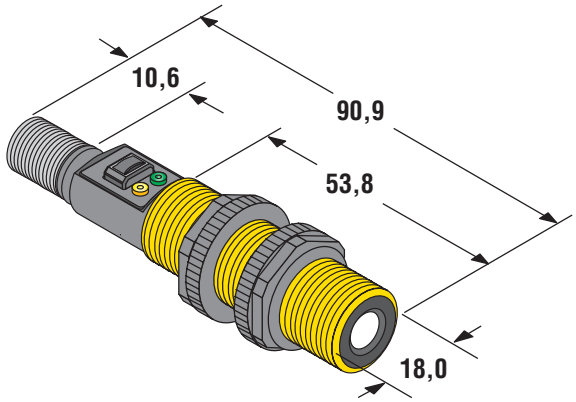
a) 10-30 Vdc, b) Load, c) Remote TEACH (0-2 Vdc), d) Shield (it is recommended that the shield wire be connected to either earth ground or dc common)

S18U Series Dimensions (mm)

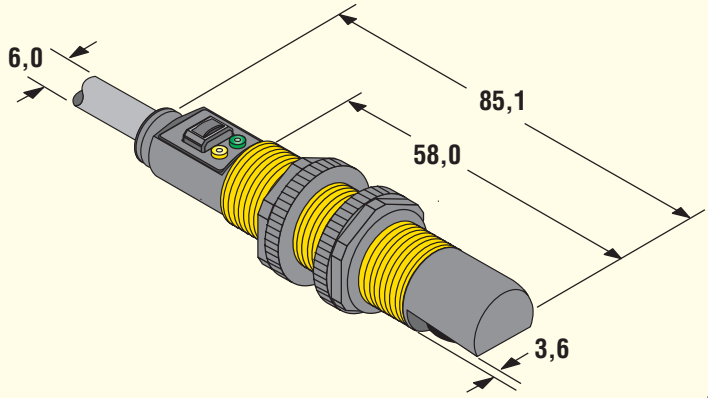
S18U straight housing with cable



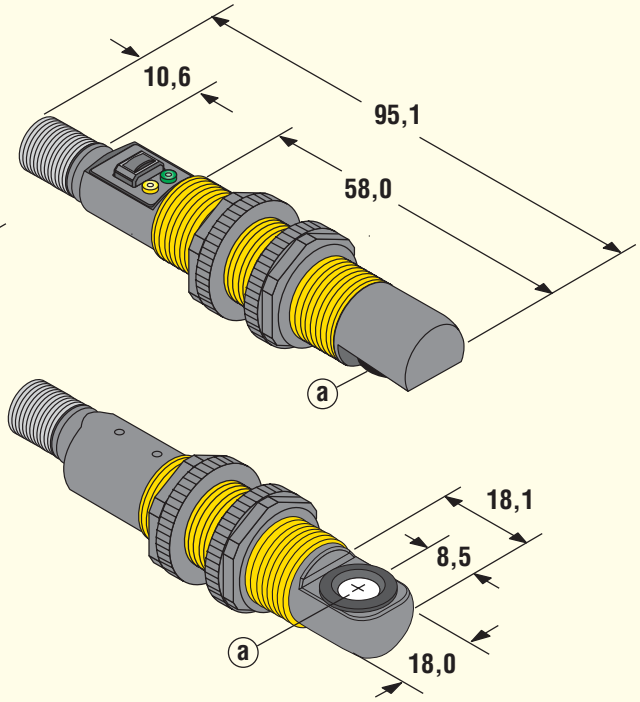
S18U straight housing with QD



S18U right-angle housing with cable



S18U right-angle housing with QD



Legend:
a) Transducer

S18U Series Indicators

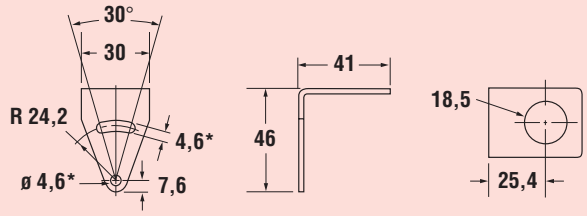
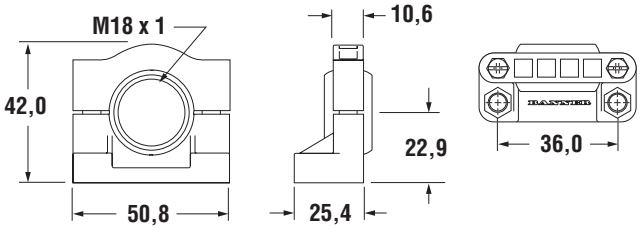
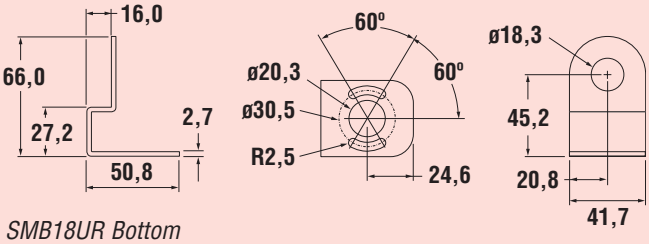
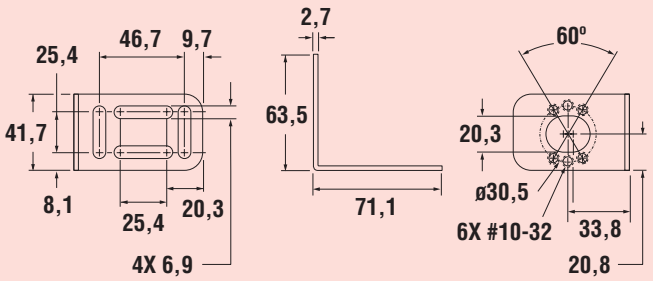
Legend:
a) Output/TEACH indicator
b) TEACH push-button
c) Power/Signal strength

S18U Series Housing Styles

Straight ***Right-angled***

M & I

S18U Series Brackets

Model	Description	Dimensions (mm)	P/N
SMB18A 	• 2 mm thick stainless steel right-angle bracket • Curved mounting slot for versatility and orientation	 ** Use M4 screws to mount bracket. Drill screw holes 24,2 mm apart.*	34 702 00
SMB18SF 	• 18 mm swivel bracket, black thermoplastic polyester • Includes stainless steel mounting hardware		30 525 19
SMB18UR 	• 2-piece universal swivel bracket for 18 mm sensors • 300 series stainless steel • Includes stainless steel swivel locking hardware	*SMB18UR Top*  *SMB18UR Bottom* 	30 525 17

M & I

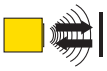
T30U Ultrasonic Sensor

Features

- Incredible versatility by including both digital and analogue outputs in the same unit
- Two models: PNP or NPN digital output, plus a 0-10 Vdc or 4-20 mA analogue output in the same sensor
- Dual-digital output models; two PNP or two NPN digital outputs
- Outputs are independently programmable
- Ultra-short T-shaped package
- Four LED indicators for information on programming and operating status
- Received signal strength indicator
- Includes digital filtering for immunity to random and electrical noise, in addition to transient voltage and reverse polarity protection
- Push-button TEACH-mode programming allows to set accurate, custom-sized sensing windows anywhere within a 150 mm to 1 m or 300 mm to 2 m range
- Users also can program the sensor from a remote location using an external switch, computer or controller for added security and convenience

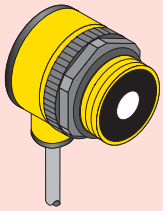
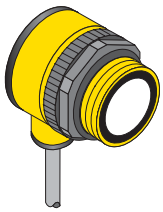
T30U Series Table of Contents

T30U Series Detection Modes

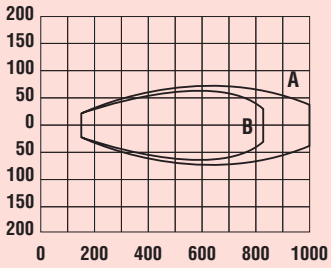
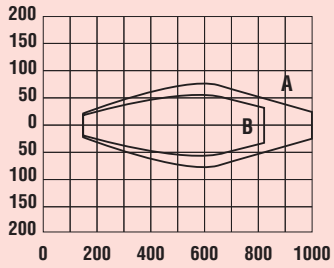
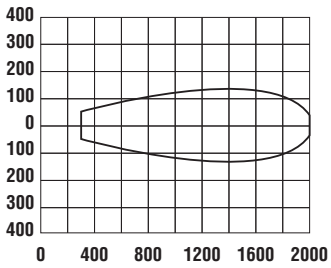
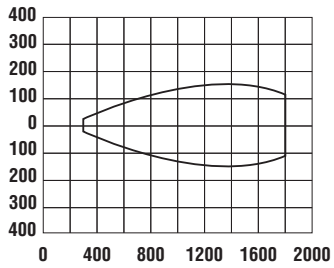
	Ultrasonic Diffuse Mode		

M & I

T30U Series, Ultrasonic Diffuse Mode

Model	View	Range	Connection	Output*	P/N
T30UDPA		150 mm - 1 m	2 m cable, 5 wire	2 x PNP	30 555 44
T30UDPAQ		150 mm - 1 m	M12x1, 5-pin	2 x PNP	30 555 45
T30UIPA		150 mm - 1 m	2 m cable, 5 wire	1 PNP + 1 analogue 4-20 mA	30 559 74
T30UIPAQ		150 mm - 1 m	M12x1, 5-pin	1 PNP + 1 analogue 4-20 mA	30 559 75
T30UUPA		150 mm - 1 m	2 m cable, 5 wire	1 PNP + 1 analogue 0-10 Vdc	30 559 86
T30UUPAQ		150 mm - 1 m	M12x1, 5-pin	1 PNP + 1 analogue 0-10 Vdc	30 559 87
T30UDPB		300 mm - 2 m	2 m cable, 5 wire	2 x PNP	30 555 50
T30UDPBQ		300 mm - 2 m	M12x1, 5-pin	2 x PNP	30 555 51
T30UIPB		300 mm - 2 m	2 m cable, 5 wire	1 PNP + 1 analogue 4-20 mA	30 559 80
T30UIPBQ		300 mm - 2 m	M12x1, 5-pin	1 PNP + 1 analogue 4-20 mA	30 559 81
T30UUPB		300 mm - 2 m	2 m cable, 5 wire	1 PNP + 1 analogue 0-10 Vdc	30 559 92
T30UUPBQ		300 mm - 2 m	M12x1, 5-pin	1 PNP + 1 analogue 0-10 Vdc	30 559 93

** NPN models also available*

Effective Beam Pattern	Chart	Effective Beam Pattern	Chart
1 m models Effective beam with plate target (typical) Width in mm versus distance in mm A) 100 x 100 mm B) 10 x 10 mm		**1 m models** Effective beam with rod target (typical) Width in mm versus distance in mm A) ø 25 mm rod B) ø 10 mm rod	
2 m models Effective beam with plate target (typical) Width in mm versus distance in mm 100 x 100 mm		**2 m models** Effective beam with rod target (typical) Width in mm versus distance in mm ø 25 mm rod	

M & I

T30U Series Specifications

Proximity Mode Range	**"A" suffix:** 150 mm min near limit; 1 m max far limit **"B" suffix:** 300 mm min near limit; 2 m max far limit
Ultrasonic Frequency	**Short Range ("A" suffix):** 228 kHz **Long Range ("B" suffix):** 128 kHz
Supply Voltage	**Current sourcing analogue output:** 12 to 24 Vdc (10% max ripple) at 90 mA, excl. of load **Voltage sourcing analogue output:** 15 to 24 Vdc (10% max ripple) at 90 mA, excl.of load **Dual-digital output:** 12 to 24 Vdc (10% max ripple) at 90 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Digital output:** Solid-state switch conducts when target is sensed within sensing window; choose PNP or NPN models **Analogue output:** Choose 0 to 10 Vdc or 4 to 20 mA output models; output slope selectable via TEACH sequence
Output Ratings	**Digital output:** 100 mA max per sensor **Off-state leakage current:** < 10 µA **On-state saturation voltage:** < 1 V at 10 mA and < 1,5 V at 100 mA **Analogue Output: Voltage sourcing:** 0 to 10 Vdc (at 1 KΩ minimum resistance) **Current sourcing:** 4 to 20 mA, 1 Ω to Rmax. Rmax. = (V supply/20 mA) - 7 V
Output Protection	Protected against continuous overload and short-circuit; transient over-voltage; false pulse on power-up
Output Response Time	**Digital output:** **"A" suffix:** 48 ms **"B" suffix:** 96 ms **Analogue output:** **"A" suffix:** 48 ms average, 16 ms update **"B" suffix:** 96 ms average, 32 ms update
Sensing Performance (on aluminum target, 100 x 100 mm at 25 ºC)	**Analogue sensing resolution or digital output repeatability:** ±0,25% of measured distance ["A" suffix (0,5 mm min); "B" suffix (1 mm min)] **Analogue linearity:** ±0,5% of full-scale span **Minimum window size:** 10 mm **Hysteresis of digital output:** 2,5 mm
Temperature Effect	0,2% of sensing distance / ºC
Adjustments	**Sensing window limits (analogue or digital):** TEACH-mode programming of near and far window limits may be set using membrane push-buttons on sensor or remotely via TEACH input. Window limits may be programmed separately or together. **Analogue output slope:** The first limit taught is assigned to the minimum output value (4 mA or 0 V)
Construction	Molded reinforced thermoplastic polyester housing, leakproof design is rated IP67

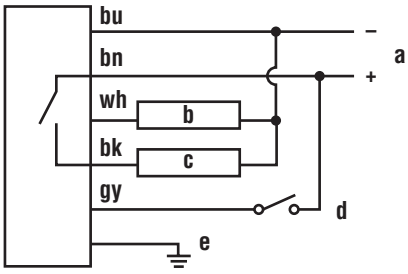
M & I

T30U Series Specifications (cont'd)

Indicators	**4 status LEDs: In RUN mode:** **Green ON:** Power ON **Green Flashing:** Digital output overloaded **Red Flashing:** Relative received signal strength **Yellow analogue ON:** Target inside window limits **Yellow digital ON:** Output conducting	**4 status LEDs: In Program mode:** **Green OFF:** PROGRAM mode **Red Flashing:** Relative received signal strength **Yellow ON:** Ready for first window limit **Yellow Flashing:** Ready for second limit **Yellow OFF:** Not teaching this output
Connections	2 m 5-conductor PVC-covered attached cable or 5-pin M12x1 quick-disconnect fitting	
Operating Conditions	**Temperature:** -20 to +70 °C	**Maximum relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (vibration frequency 10 to 60 Hz max, double amplitude 1,5 mm, maximum acceleration 10 G). Also meets IEC 60947-5-2 requirements: 30 G, 11 ms pulse duration, half sine wave pulse shape.	
Application Notes	Objects passing inside the specified near limit may produce a false response	

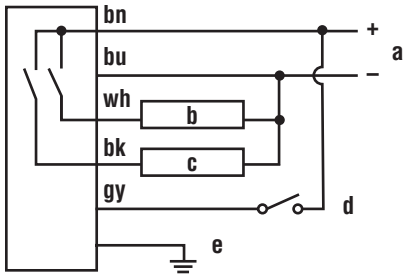
T30U Series Wiring Diagrams

Analogue-Digital PNP



a) 12-24 Vdc, b) Analogue (4-20 mA or 0-10 Vdc), c) Digital output, d) Remote teach, e) Shield (recommended to be connected to either earth ground or dc common)

Dual-Digital PNP



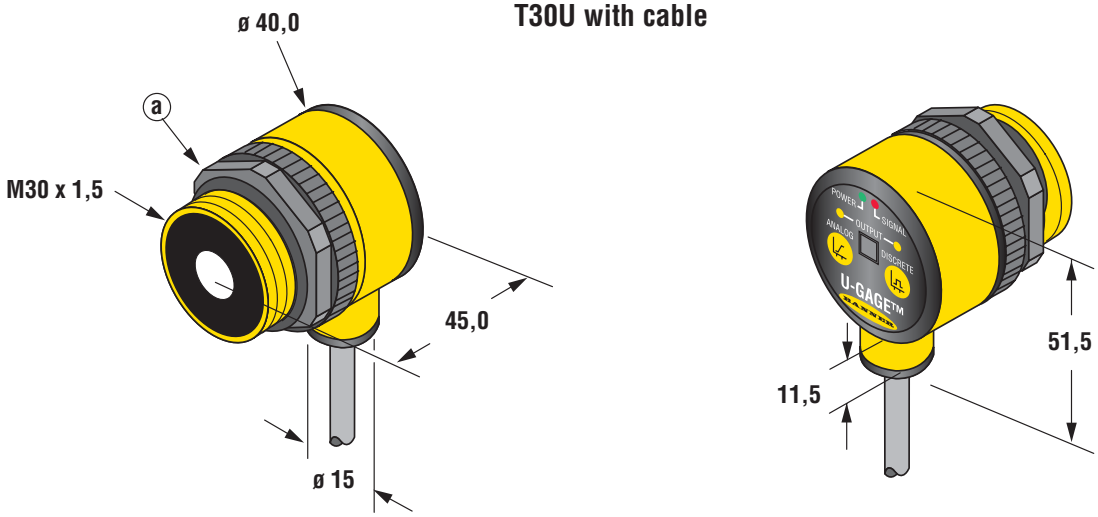
a) 12-24 Vdc, b) Output 1, c) Output 2, d) Remote teach, e) Shield (recommended to be connected to either earth ground or dc common)

T30U Series Cables

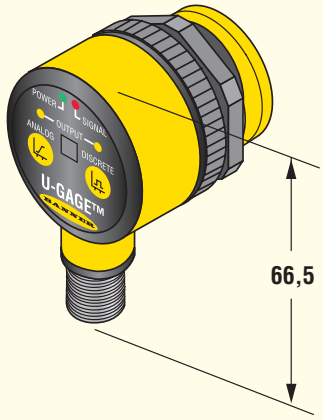
Model	Length	Description	P/N
MQDEC2-506	2 m	M12x1, 5-pin connector, straight	30 608 10
MQDEC2-515	5 m	M12x1, 5-pin connector, straight	30 608 11
MQDEC2-530	9 m	M12x1, 5-pin connector, straight	30 608 12
MQDEC2-506RA	2 m	M12x1, 5-pin connector, angled	30 608 13
MQDEC2-515RA	5 m	M12x1, 5-pin connector, angled	30 608 14
MQDEC2-530RA	9 m	M12x1, 5-pin connector, angled	30 608 15

T30U Series Dimensions (mm)

T30U with cable



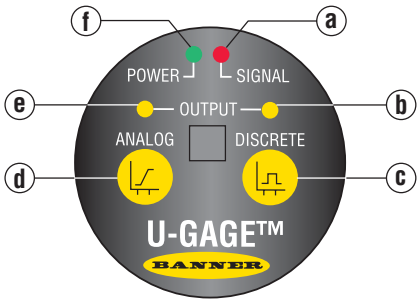
T30U with QD



Legend:
a) Jam nut supplied

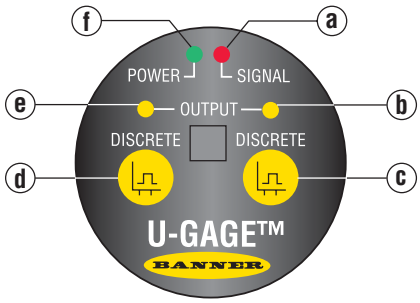
T30U Series Indicators

Analogue-Digital Output Models



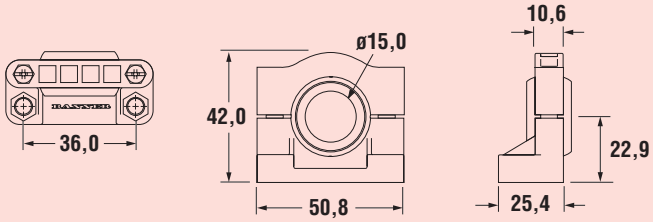
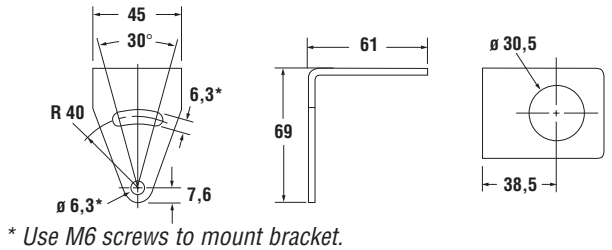
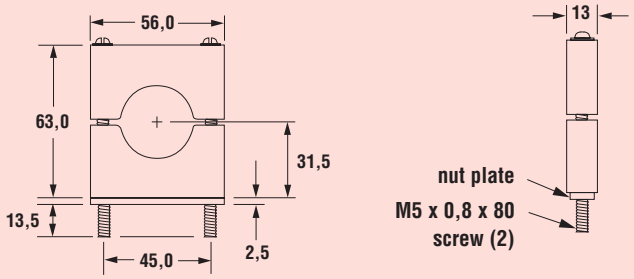
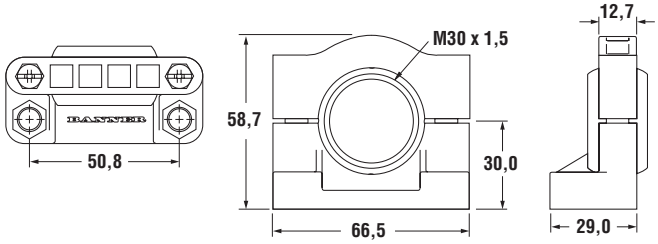
Legend:
a) Red signal strength LED
b) Yellow digital output LED
c) Digital output programming push-button
d) Analogue output programming push-button
e) Yellow analogue output LED
f) Green Power ON/OFF LED

Dual-Digital Output Models



Legend:
a) Red signal strength LED
b) Yellow digital output 2 LED
c) Digital output 2 programming push-button
d) Digital output 1 programming push-button
e) Yellow digital output 1 LED
f) Green Power ON/OFF LED

T30U Series Brackets

Model	Description	Dimensions (mm)	P/N
SMB1815SF 	• Swivel bracket with set screws for mounting by cable hub • Black reinforced thermoplastic polyester • Includes stainless steel swivel locking hardware and hex wrench		30 532 79
SMB30A 	• 2 mm thick stainless steel, right-angle mounting bracket • Curved mounting slot for orientation • Clearance for M6 hardware	 ** Use M6 screws to mount bracket. Drill screw holes 40 mm apart.*	34 703 00
SMB30C 	• 30 mm split clamp bracket • Black reinforced thermoplastic polyester • Includes stainless steel mounting hardware		34 701 00
SMB30SC 	• M30 swivel bracket • Black reinforced thermoplastic polyester • Includes stainless steel mounting and swivel locking hardware		30 525 21

M & I

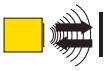
QT50U Long-range Ultrasonic Sensor

Features

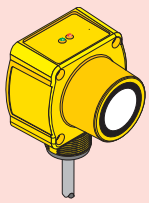
- Extended sensing range of 8 m
- Ultrasonic dead-zone is only 2,5% of the total sensing range
- Available in analogue or digital models
- Retro-sonic sensing mode eliminates dead zone
- Completely sealed, shock resistant housing, ideal for level monitoring of both liquids and solids
- Analogue unit provides continuous monitoring
- Dual-digital option offers independent near and far limits for both outputs – ideal for use in a an application requiring high-and-low limit sensing
- Advanced microprocessor and 8-pin DIP-switch offer a multitude of configurations
- Temperature compensation circuitry for increased sensing accuracy

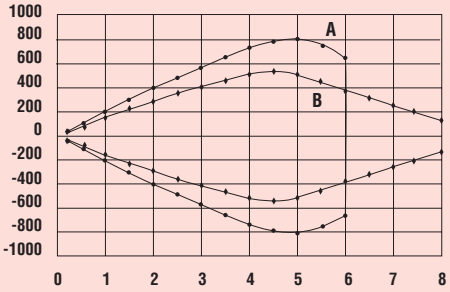
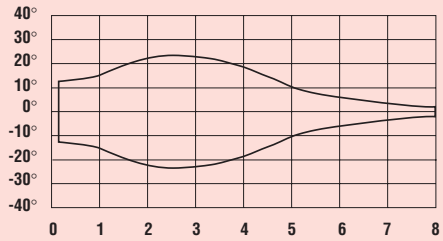
QT50U Series Table of Contents

QT50U Series Detection Modes

	Ultrasonic Diffuse Mode		

QT50U Series, Ultrasonic Diffuse Mode

Model	View	Range	Connection	Output	P/N
QT50UDB		200 mm - 8 m	2 m cable, 5 wire	2 PNP or NPN selectable	30 027 22
QT50UDBQ6		200 mm - 8 m	M12x1, 5-pin	2 PNP or NPN selectable	30 027 24
QT50ULB		200 mm - 8 m	2 m cable, 5 wire	selectable 0-10 Vdc or 4-20 mA	30 027 26
QT50ULBQ6		200 mm - 8 m	M12x1, 5-pin	selectable 0-10 Vdc or 4-20 mA	30 027 28

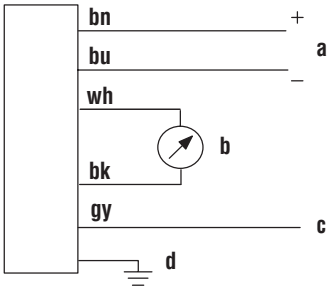
Effective Beam Pattern	Chart	Max Target Rotation Angle	Chart
Target offset in mm versus target distance in m A) 25 mm rod B) 500 mm plate		QT50U with 500 mm plate Target rotation in degrees versus target distance in m	

QT50U Series Cables

Model	Length	Description	P/N
MQDEC2-506	2 m	M12x1, 5-pin connector, straight	30 608 10
MQDEC2-515	5 m	M12x1, 5-pin connector, straight	30 608 11
MQDEC2-530	9 m	M12x1, 5-pin connector, straight	30 608 12
MQDEC2-506RA	2 m	M12x1, 5-pin connector, angled	30 608 13
MQDEC2-515RA	5 m	M12x1, 5-pin connector, angled	30 608 14
MQDEC2-530RA	9 m	M12x1, 5-pin connector, angled	30 608 15

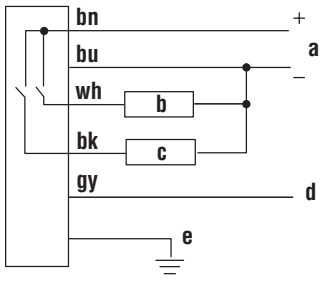
QT50U Series Wiring Diagrams

Analogue Output



a) 10-30 Vdc, b) 4-20 mA or 0-10 Vdc, c) Remote teach (0-2 Vdc), d) Shield (recommended to be connected to either earth ground or dc common)

Dual-Digital PNP



a) 10-30 Vdc, b) Load 1, c) Load 2, d) Remote teach (0-2 Vdc), e) Shield (recommended to be connected to either earth ground or dc common)

M & I

QT50U Series Specifications

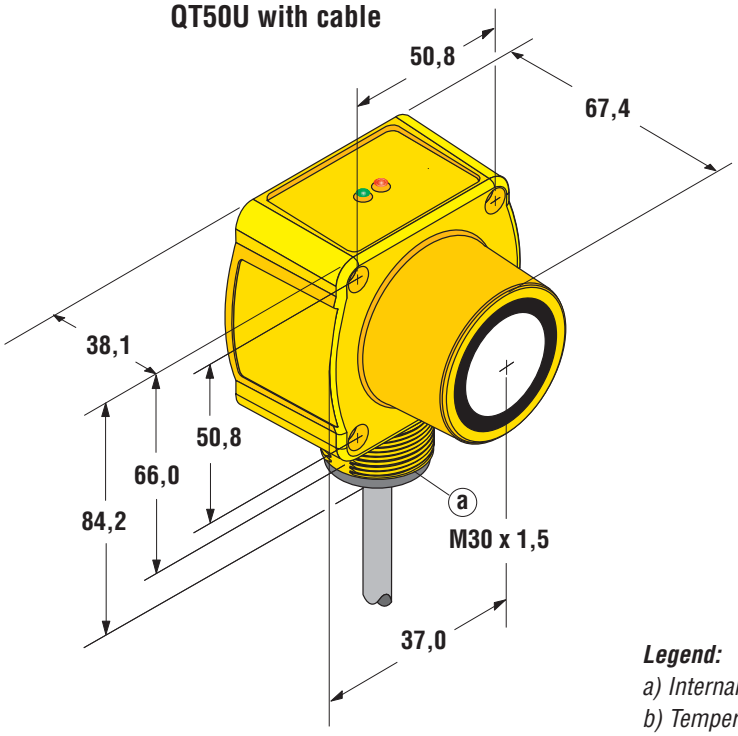
Sensing Range	200 mm to 8 m	
Ultrasonic Frequency	75 kHz, rep. rate 96 ms	
Supply Voltage	10 to 30 Vdc (10% maximum ripple); 60 mA max (exclusive of load)	
Supply Protection Circuitry	Protected against reverse polarity and transient overvoltages	
Output Protection	Protected against short circuit conditions	
Delay at Power-up	1,5 s	
Output Configuration	**Analogue models:** **Voltage Sourcing:** 0 to 10 Vdc **Current Sourcing:** 4 to 20 mA	**Dual-Digital models:** Dual PNP or NPN, selectable via DIP-switch and connection; 150 mA, each output
Temperature Effect	**Uncompensated:** 0,2% of span/°C	**Compensated:** 0,02% of span/°C
Linearity (Analogue Models)	± 0,2% of span from 200 to 8000 mm; ± 0,1% of span from 500 to 8000 mm	
Resolution/Repeatability	1,0 mm	
Hysteresis	5 mm	
Output Response Time	**Analogue models:** 100 ms to 2300 ms **Dual-Digital models:** 100 ms to 1600 ms	
Minimum Window Size	20 mm	
Adjustments	**Sensing window limits:** TEACH-Mode programming of near and far window limits may be set using the push-buttons or remotely via TEACH input	
Indicators	**Green Power On LED:** Power ON **Red Signal LED:** Target within sensing range and indicates condition of received signal **Teach/Output indicator (bi-colour Yellow/Red):** **Yellow:** Target within taught limits **OFF:** Target outside taught window limits **Red:** Sensor in TEACH mode	
Construction	**Transducer:** Ceramic/Epoxy composite **Housing:** ABS/Polycarbonate **Membrane Switch:** Polyester **Lightpipes:** Acrylic Rated IEC IP67	

QT50U Series Specifications *(cont'd)*

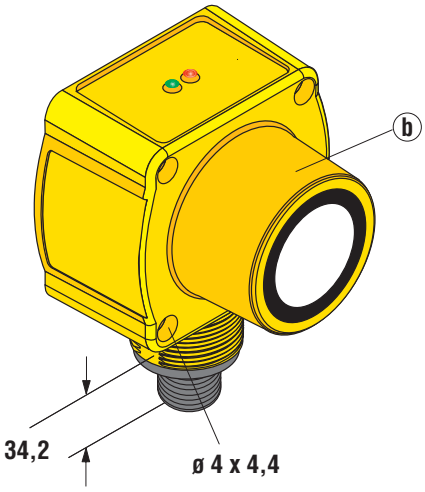
Connections	2 m shielded 5-conductor (with drain) PVC jacketed attached cable or 5-pin M12x1 quick-disconnect
Operating Conditions	**Temperature:** -20 to +70 °C **Maximum relative humidity:** 100%
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (vibration frequency 10 to 60 Hz max, double amplitude 1,5 mm, maximum acceleration 10 G). Also meets IEC 60947-5-2 requirements: 30 G, 11 ms pulse duration, half sine wave pulse shape.
Application Notes	Objects passing inside the specified near limit may produce a false response For best accuracy, allow 30 minutes warm-up before programming or operating

QT50U Series Dimensions *(mm)*

QT50U with cable



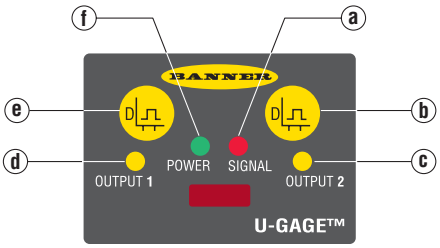
QT50U with QD



Legend:
a) Internal thread 1/2 NPSM, external thread M30 x 1,5
b) Temperature sensor location

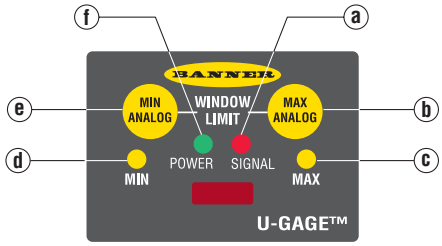
QT50U Series Indicators

Dual-Digital Output Models



Legend:
a) Target signal strength indicator, b) Output 2 push-button,
c) Output 2 indicator, d) Output 1 indicator, e) Output 1 push-button,
f) Sensor power indicator

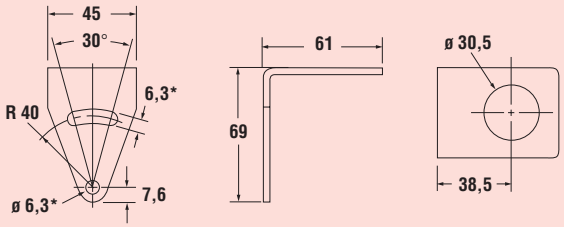
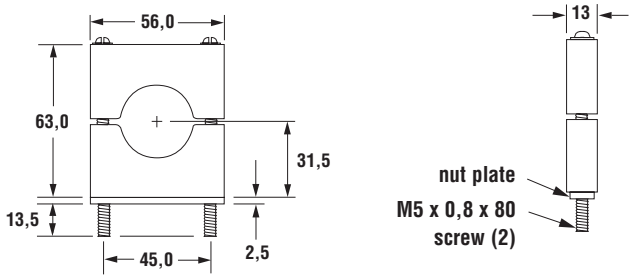
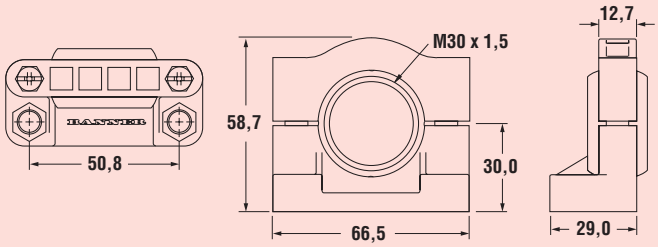
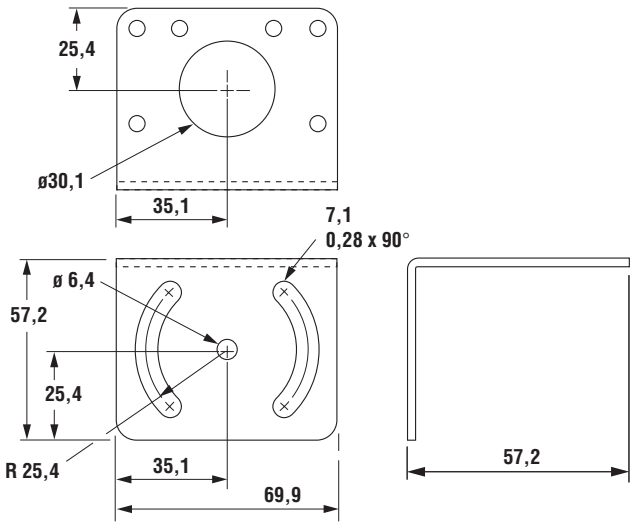
Analogue Output Models



Legend:
a) Target signal strength indicator, b) Analogue max output programming push-button, c) Maximum limit indicator, d) Minimum limit indicator, e) Analogue min output programming push-button
f) Output 1 indicator

M & I

QT50U Series Brackets

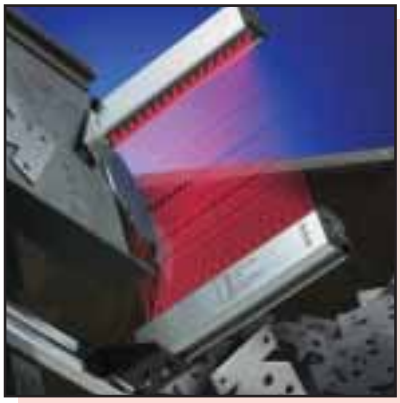
Model	Description	Dimensions (mm)	P/N
SMB30A 	• 2 mm thick stainless steel, right-angle mounting bracket • Curved mounting slot for orientation • Clearance for M6 hardware	 ** Use M6 screws to mount bracket. Drill screw holes 40 mm apart.*	34 703 00
SMB30C 	• 30 mm split clamp bracket • Black reinforced thermoplastic polyester • Includes stainless steel mounting hardware		34 701 00
SMB30SC 	• M30 swivel bracket • Black reinforced thermoplastic polyester • Includes stainless steel mounting and swivel locking hardware		30 525 21
SMB30MM 	• ø 30 mm bracket with curved mounting slots for versatility and orientatio • Clearance for M6 hardware • 2,30 mm thick stainless steel		37 849 00

M & I

BANNER

Notes

LX Series Light Screens

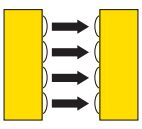


High-speed detection of small objects

- Unique beam pattern for highest sensing accuracy
- Synchronised multiple-beam infrared LED emitters and receivers
- Precise optical cross-hatched pattern
- Minimum object detection size: ø 9,5 mm for standard models, ø 5,6 mm for short-range models
- Detects extremely low-profile objects
- Ideal for die-protection, small part or pill counting, parcel handling and variable height detection applications
- 0,8 to 3,2 ms response speed
- Enable automated systems to operate at peak efficiency
- 76,2 mm, 152,4 mm or 304,8 mm lengths
- Short range or standard range models
- Sensing distances from 75 mm to 2 m
- Rugged silver anodised housing
- Integrated mounting channel offers mounting flexibility

LX Series Table of Contents

LX Series Detection Modes

	Opposed Mode Light Screens		

LX Series, Opposed Light Screen, IR 880 nm

Emitter Model*	P/N	Receiver Model*	P/N	Sensing Area	Range (Min-Max)**
LX3E	30 026 58	LX3R	30 026 64	67 mm	150-2000 mm
LX3ESR	30 026 59	LX3RSR	30 026 65	67 mm	75-200 mm
					
LX6E	30 026 70	LX6R	30 026 76	143 mm	150-2000 mm
LX6ESR	30 026 71	LX6RSR	30 026 77	143 mm	75-200 mm
					
LX12E	30 026 82	LX12R	30 026 88	295 mm	150-2000 mm
LX12ESR	30 026 83	LX12RSR	30 026 89	295 mm	75-200 mm
					

** Add suffix "Q" to model number for 150 mm pigtail with 5-pin M12x1. ** See specifications page 146 for details.*

LX Series Lens Shields

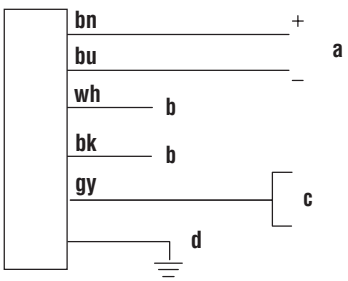
Model	Description	P/N
LXS3	Self-adhesive clear polycarbonate lens shields protect sensor lens window from impact or weld flash. When shields are installed on both emitter and receiver, max operating range is reduced by 20%.	30 713 51
LXS6		30 713 52
LXS12		30 713 53

LX Series Cables

Model	Length	Description	P/N
MQDEC2-506	2 m	M12x1, 5-pin connector, straight	30 608 10
MQDEC2-515	5 m	M12x1, 5-pin connector, straight	30 608 11
MQDEC2-530	9 m	M12x1, 5-pin connector, straight	30 608 12
MQDEC2-506RA	2 m	M12x1, 5-pin connector, angled	30 608 13
MQDEC2-515RA	5 m	M12x1, 5-pin connector, angled	30 608 14
MQDEC2-530RA	9 m	M12x1, 5-pin connector, angled	30 608 15

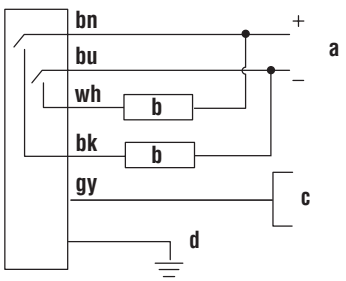
LX Series Wiring Diagrams

Emitter



a) 10-30 Vdc
b) No connection
c) Select:
Normal 5-30 Vdc or
Reduced 0-2 Vdc
d) Shield

Receiver



a) 10-30 Vdc
b) Load
c) Select:
Normal 5-30 Vdc or
Reduced 0-2 Vdc
d) Shield

M & I

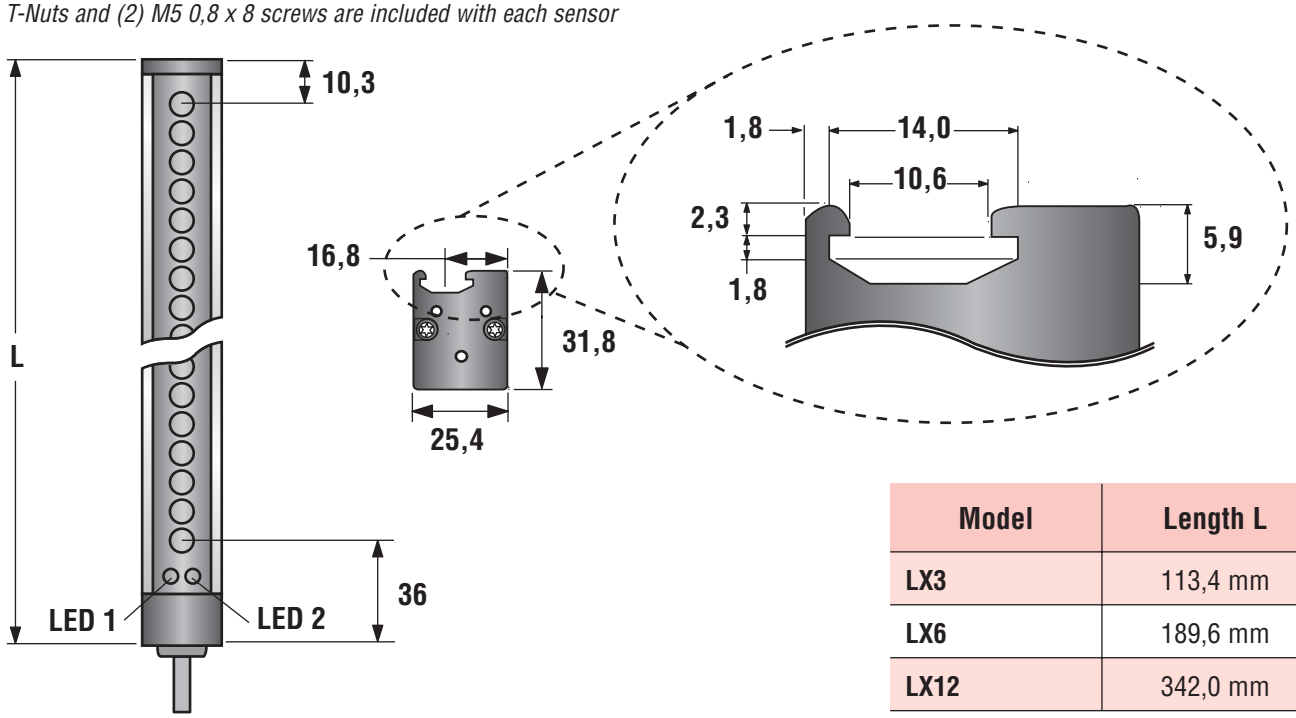
LX Series Specifications

Sensing Range	**Normal:** **Short-range:** 100 to 200 mm **Standard-range:** 300 mm to 2 m **Reduced:** **Short-range:** 75 to 150 mm **Standard-range:** 150 mm to 600 mm
Supply Voltage and Power	10 to 30 Vdc (10% max ripple) at < 1 W each for emitter and receiver (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** 1 PNP and 1 NPN open-collector transistor
Output Rating	150 mA maximum each output **Off-state leakage current:** < 5 µA **Output saturation voltage (PNP):** < 1 V at 10 mA and < 1,5 V at 100 mA **Output saturation voltage (NPN):** < 0,5 V at 10 mA and < 0,6 V at 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**LX3:** 0,8 ms ON-time; 6 ms OFF-time (5 ms OFF-delay) **LX6:** 1,6 ms ON-time; 7 ms OFF-time (5 ms OFF-delay) **LX12:** 3,2 ms ON-time; 8,5 ms OFF-time (5 ms OFF-delay)
Minimum Object Detection Size	Smallest diameter rod that can be detected in sensing range: ø 5,6 mm (short range) or ø 9,5 mm (standard range)
Indicators	**Emitter: LED1 (green)** **ON:** Power ON, good sensor **OFF:** Emitter hardware failure **Emitter: LED2 (red)** **ON:** Reduced range **OFF:** Normal range **Flashing:** Emitter hardware failure **Receiver: LED1 (yellow)** **ON:** Output conducting **OFF:** Output not conducting **Receiver: LED2 (bi-colour green/red)** **Green:** Normal range **Red:** Reduced range **Flashing Red:** Receiver hardware failure
Construction	Aluminum housing, plastic endcaps, acrylic lens window, rated IEC IP65
Connections	2 m 5-conductor (with drain) pvc-jacketed attached cable or 5-pin M12x1, 150 mm pigtail QD, depending on model
Operating Conditions	**Temperature:** -20 to +70 °C **Max relative humidity:** 90% at 50 °C (non-condensing)
Application Notes	The best sensing resolution occurs within the centre 80% of the sensing area, between the emitter and receiver Low-profile packages can be reliably detected Outputs are energised whenever the light screen is interrupted

LX Series Dimensions (mm)

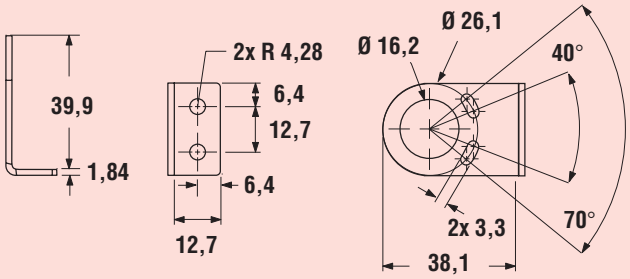
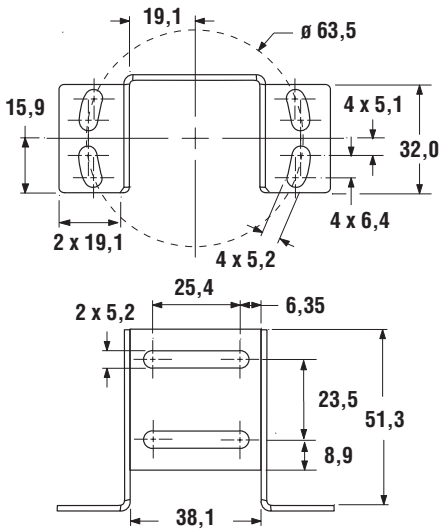
Legend:

(2) T-Nuts and (2) M5 0,8 x 8 screws are included with each sensor



Model	Length L
LX3	113,4 mm
LX6	189,6 mm
LX12	342,0 mm

LX Series Brackets

Model	Description	Dimensions (mm)	P/N
SMBLX 	• End-cap brackets • Zinc-plated cold rolled steel • Set of 2		30 029 15
SMBLXR 	• Back-mount bracket for secure one-end mounting • Zinc-plated cold rolled steel		30 029 14

M & I

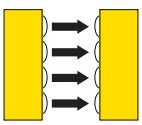
Standard Mini-Array & High-Resolution Mini-Array

Inspection and profiling light screens

- Standard Mini-Arrays are ideal for inspection and profiling applications
- High-resolution systems excel in high-speed, precise monitoring and inspection applications, including on-the-fly sizing, profiling, precision edge and centre guiding and hole detection
- Each system consists of a controller module, emitter/receiver pair and cables
- Programmable controller modules offer a selection of measurement modes, scanning modes and output configurations
- Controller output in digital, analogue or serial data (ASCII or binary) or DeviceNet™
- Programmable blanking, hysteresis and serial communication modes through dedicated software
- Compact 38 mm square sensors
- Status indicators are visible from three sides
- Standard Mini-Array: 10 array lengths, from 130 mm to 1,8 m with choice of 9,7 mm or 19 mm beam spacing
- High-resolution models from 163 mm to 1951 mm and 2,5 mm beam spacing
- Accessories such as heated enclosures, power supplies for heated enclosures and stands are available

Mini-Array Series Table of Contents

Mini-Array Series Detection Modes

	Opposed Mode Light Screens		

Standard Mini-Array & High-Resolution Mini-Array, Opposed Light Screen

Emitter Model	P/N	Receiver Model	P/N	Beam Spacing	Range	Sensing Area
BMEL616A	30 399 19	BMRL616A	30 399 20	19 mm	0,9 - 17 m	143 mm
BMEL1216A	30 385 41	BMRL1216A	30 385 42	19 mm	0,9 - 17 m	295 mm
BMEL1816A	30 395 74	BMRL1816A	30 395 82	19 mm	0,9 - 17 m	448 mm
BMEL2416A	30 385 43	BMRL2416A	30 385 44	19 mm	0,9 - 17 m	600 mm
BMEL3016A	30 395 76	BMRL3016A	30 395 84	19 mm	0,9 - 17 m	752 mm
BMEL3616A	30 385 45	BMRL3616A	30 385 46	19 mm	0,9 - 17 m	905 mm
BMEL4216A	30 395 78	BMRL4216A	30 395 86	19 mm	0,9 - 17 m	1057 mm
BMEL4816A	30 385 47	BMRL4816A	30 385 48	19 mm	0,9 - 14 m	1210 mm
BMEL6016A	30 385 49	BMRL6016A	30 385 50	19 mm	0,9 - 14 m	1514 mm
BMEL7216A	30 385 51	BMRL7216A	30 385 52	19 mm	0,9 - 14 m	1819 mm
BMEL632A	30 399 21	BMRL632A	30 399 22	9,7 mm	0,6 - 6,1 m	133 mm
BMEL1232A	30 385 29	BMRL1232A	30 385 30	9,7 mm	0,6 - 6,1 m	286 mm
BMEL1832A	30 395 75	BMRL1832A	30 395 83	9,7 mm	0,6 - 6,1 m	438 mm
BMEL2432A	30 385 31	BMRL2432A	30 385 32	9,7 mm	0,6 - 6,1 m	591 mm
BMEL3032A	30 395 77	BMRL3032A	30 395 85	9,7 mm	0,6 - 6,1 m	743 mm
BMEL3632A	30 385 33	BMRL3632A	30 385 34	9,7 mm	0,6 - 6,1 m	895 mm
BMEL4232A	30 395 79	BMRL4232A	30 395 87	9,7 mm	0,6 - 6,1 m	1048 mm
BMEL4832A	30 385 35	BMRL4832A	30 385 36	9,7 mm	0,6 - 4, 6 m	1200 mm
BMEL6032A	30 385 37	BMRL6032A	30 385 38	9,7 mm	0,6 - 4, 6 m	1505 mm
BMEL7232A	30 385 39	BMRL7232A	30 385 40	9,7 mm	0,6 - 4, 6 m	1810 mm
High-Res Emitter Model	**P/N**	**High-Res Receiver Model**	**P/N**	**Beam Spacing**	**Range**	**Sensing Area**
MAHE6A	30 626 50	MAHR6A	30 626 62	2,5 mm	0,4 - 1,8 m	163 mm
MAHE13A	30 626 51	MAHR13A	30 626 63	2,5 mm	0,4 - 1,8 m	325 mm
MAHE19A	30 626 52	MAHR19A	30 626 64	2,5 mm	0,4 - 1,8 m	488 mm
MAHE26A	30 626 53	MAHR26A	30 626 65	2,5 mm	0,4 - 1,8 m	650 mm
MAHE32A	30 626 54	MAHR32A	30 626 66	2,5 mm	0,4 - 1,8 m	813 mm
MAHE38A	30 626 55	MAHR38A	30 626 67	2,5 mm	0,4 - 1,8 m	975 mm
MAHE45A	30 626 56	MAHR45A	30 626 68	2,5 mm	0,4 - 1,8 m	1138 mm
MAHE51A	30 626 57	MAHR51A	30 626 69	2,5 mm	0,4 - 1,8 m	1300 mm
MAHE58A	30 626 58	MAHR58A	30 626 70	2,5 mm	0,4 - 1,8 m	1463 mm
MAHE64A	30 626 59	MAHR64A	30 626 71	2,5 mm	0,4 - 1,8 m	1626 mm
MAHE70A	30 626 60	MAHR70A	30 626 72	2,5 mm	0,4 - 1,8 m	1788 mm
MAHE77A	30 626 61	MAHR77A	30 626 73	2,5 mm	0,4 - 1,8 m	1951 mm

Standard Mini-Array Series Controller Specifications

Power Requirements	16 to 30 Vdc at 1,25 A max (see current requirements for sensors); controller alone (without sensors connected) requires 0,1 A
Inputs	Sensor input (5 connections); emitter and receiver wire in parallel to 5 terminals Gate input, optically-isolated, requires 10 to 30 Vdc (7,5 K input impedance) for gate signal
Digital Outputs	**MACP-1:** (2) Open collector PNP transistor outputs; transistor rated 30 Vdc max, 150 mA max, short circuit protected; may be configured as a second data analysis output, a system alarm output or a scan trigger output for a parallel array **Off-state leakage current:** <10 µA at 30 Vdc **On-state saturation voltage:** <1 V at 10 mA, <1,5 V at 150 mA **MACV-1/MACI-1:** Open collector NPN transistor rated 30 Vdc max, 150 mA max, short circuit protected; may be configured as a data analysis output, a system alarm output or a scan trigger output for a parallel array **Off-state leakage current:** <10 µA at 30 Vdc **On-state saturation voltage:** <1 V at 10 mA, <1,5 V at 150 mA **MAC16P-1:** 16 open collector PNP transistor outputs 30 Vdc max, 150 mA max, short circuit protected **Off-state leakage current:** 10 µA **On-state saturation voltage:** <1 V at 10 mA, <1,9 V at 150 mA
Serial Data Outputs	RS-232, ASCII or binary data format **Baud Rate:** 9600, 19,2 K or 38,4 K, 8 data bits, 1 start bit, 1 stop bit, even parity Clear data may be suppressed, header string may be suppressed in binary format **MAC-1:** Up to 15 controllers may be given unique address for RS485 party line
Analogue Outputs	**MACV-1:** 0-10 V adjustable Null and Span (20 mA current limit) **MACI-1:** 4-20 mA adjustable Null and Span (16 to 30 V input) **Resolution:** Span/Number of sensor channels, **Linearity:** 0,1% of full scale **Temperature Variation:** 0,01% of full scale / °C
Controller Programming	Via RS232 PC-compatible computer running Windows® 95, 98, NT or 2000 operating system and using Banner supplied software
Sensor Scan Time	**Sensor Scan Time:** 55 µs per beam, plus controller processing time **Controller Scan Time: MACV-1 & MACI-1:** 1,5 ms processing time per scan This timing assumes a straight scan, continuous and TBB mode **MACP-1:** 1 ms processing time **MAC16P-1:** 2,3 to 7 ms processing time
System Response Time	Outputs are not active for 5 s after system power up. Maximum response time for the system is 2 sensor scan cycles. A scan cycle includes a sensor scan plus any serial data transmission. Serial transmission (if activated) follows every sensor scan.
Construction	Polycarbonate, DIN-rail mountable Rated IP20
Operating Conditions	**Temperature:** -20 to +70 °C **Maximum relative humidity:** 95% (non-condensing)

Standard Mini-Array Series Controller Specifications (cont'd)

Status Indicators	The following status LEDs are located on the top surface of the module: **MACV-1 & MACI-1:** VOUT (red) (also called IOUT): Indicates that analogue outputs are active **MACP-1:** OUT 1 (red): Indicates that output 1 is energised **MAC16P-1:** OUT (red): Indicates that at least 1 output is active ALARM (red): Indicates that output 2 is active MAC16P-1: Indicates output 16 is active GATE (red): Indicates voltage is applied to GATE input ALIGN (green): Indicates sensor aligned (excess gain > 1x) DIAG1 (green): Indicates power applied to module DIAG2 (red): Indicates receiver failure DIAG3 (red): Indicates emitter failure

Standard Mini-Array Series Emitter & Receiver Specifications

Emitter/Receiver Range	Max range is specified at the point where 3x excess gain remains	
	9,7 mm beam spacing **Sensors < 1210 mm:** 0,6 to 6,1 m **Sensors ≥ 1210 mm:** 0,6 to 4,6 m	**19 mm beam spacing** **Sensors < 1210 mm:** 0,9 to 17 m **Sensors ≥ 1210 mm:** 0,9 to 14 m
Minimum Object Sensitivity	**9,7 mm beam spacing** **Straight, Edge Modes:** 19,1 mm **Interlaced Mode:** 12,7 mm* **Skip Mode:** Multiply the above by the number of skipped beams, plus 1 * Assumes sensing is in the middle 1/3 of sensing range	**19 mm Beam Spacing** **Straight, Edge Modes:** 38,1 mm **Interlaced Mode:** 25,4 mm* **Skip Mode:** Multiply the above by the number of skipped beams, plus 1 * Assumes sensing is in the middle 1/3 of sensing range
Power Requirements	12 Vdc ±2%, supplied by controller **Emitter:** 0,10 A at 12 Vdc **Receiver spacing 9,7 mm beam spacing:** 0,75 A at 12 Vdc* **Receiver spacing 19 mm beam spacing:** 0,50 A at 12 Vdc* * Maximum current is for a 1819 mm sensor	
Connections	Sensors connect to controller using 5-conductor quick-disconnect cables (one each for emitter and receiver), ordered separately. Use only Banner cables, which incorporate a "twisted pair" for noise immunity. Cables measure ø 8,1 mm and are shielded and PVC-jacketed. Conductors are 0,9 mm. Emitter and receiver cables may not exceed 75 m long, each.	
Construction	Aluminum with black anodised finish; acrylic lens cover Rated IP65	
Status Indicators	**Emitter:** Red LED lights to indicate proper emitter operation **Receiver:** Green indicates sensors aligned (> 3x excess gain) Yellow indicates marginal alignment of 1 or more beams (1x < excess gain < 3x) Red indicates sensors misaligned or 1 or more beam(s) blocked	
Operating Conditions	**Temperature:** -20 to +70 °C **Max relative humidity:** 95% at 50 °C (non-condensing)	

High-Resolution Mini-Array Series Controller Specifications

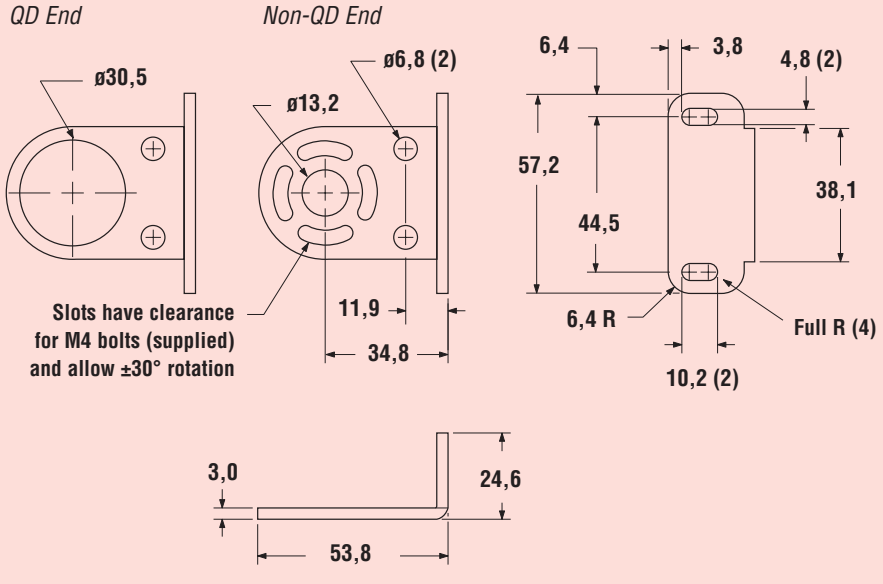
Power Requirements	16 to 30 Vdc at 1,0 A (typical: 0,5 A at 16 Vdc)
Inputs	**Sensor input:** Emitter and receiver wire in parallel to 5 terminals **Gate input:** Optically isolated, requires 10 to 30 Vdc (7,5 kΩ impedance) for gate signal **Remote alignment input:** Optically isolated, requires 10 to 30 Vdc (7,5 kΩ impedance) for alignment sequence signal
Digital Outputs	**NPN outputs:** Open collector NPN transistor rated at 30 Vdc max, 150 mA max **PNP outputs:** Open collector PNP transistor rated at 30 Vdc max, 150 mA max **All digital outputs: OFF-state leakage current:** < 10 µA at 30 Vdc **ON-state saturation voltage:** < 1 V at 10 mA and < 1,5 V at 150 mA
Analogue Outputs	**Voltage-sourcing outputs:** 0 to 10 Vdc (25 mA current limit) **Current-sinking outputs:** 4 to 20 mA (16 to 30 Vdc input) **Resolution:** Span/Number of sensing channels **Linearity:** 0,1% of full scale **Temperature variation:** 0,01% of full scale / °C
Serial Data Outputs	RS-232 or RS-485 interface (up to 15 control modules may be given unique addresses on one RS-485 party line), ASCII or binary data format, 9600, 19,2 K or 39,4 K baud rate, 8 data bits, stop bit and even, odd or no parity
Output Configuration	**MAHCVP-1:** Two PNP digital (switched), two 0-10 V **MAHCIP-1:** Two PNP digital (switched), two 4-20 mA
System Programming	Via RS-232 interface to PC-compatible computer running Windows® 95, 98, NT or 2000 and using software supplied with each control module
Status Indicators	**Output 1 (red):** Lights to indicate Digital Output 1 is active **Alarm (red):** Lights to indicate Digital Output 2 is active **Gate (red):** Lights to indicate GATE is active **Align (green):** Lights to indicate emitter and receiver are aligned **Diagnostics indicator:** (Key on controller side label) Identifies system errors and status
Construction	Polycarbonate housing, DIN-rail mountable Rated IP20
Operating Conditions	**Temperature:** 0˚ to +50˚C **Max relative humidity:** 95% at 50˚C (non-condensing)

High-Resolution Mini-Array Series Emitter & Receiver Specifications

Emitter/Receiver Range	380 mm to 1,8 m
Minimum Object Sensitivity	2,5 mm
Sensor Scan Time	1,8 ms to 58,4 ms, depending on scanning method and sensor length plus 1 ms post processing time for controller
Power Requirements	12 Vdc ±2%, supplied by controller
Connections	Sensors connect to controller using two 5-conductor quick-disconnect cables (one each for emitter and receiver), ordered separately. Use only Banner cables, which incorporate a "twisted pair" for noise immunity. Cables measure ø 8,1 mm and are shielded and PVC-jacketed. Conductors are 0,9 mm. Emitter and receiver cables may not exceed 75 m long, each.
Status Indicators	**Emitter:** Red LED lights to indicate proper emitter operation **Receiver:** Green indicates sensors aligned Yellow indicates marginal alignment of 1 or more beams Red indicates sensors misaligned or 1 or more beam(s) blocked
Construction	Aluminum, with black anodised finish; acrylic lens cover, rated IP65
Operating Conditions	**Temperature:** 0 to +50 °C **Maximum relative humidity:** 95% at 50 °C (non-condensing)

M & I

Standard Mini-Array & High-Resolution Mini-Array Series Bracket

Model/ Description	Dimensions (mm)	P/N
MSMB-3 • 1 pair of brackets is supplied with each emitter and receiver • 2,30 mm thick • Black zinc-plated chromate dip finish		30 461 66

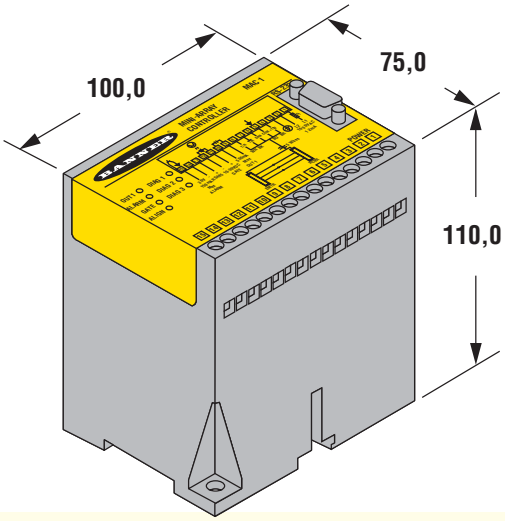
*Standard Mini-Array & High-Resolution Mini-Array Series Controllers**

Controller Model	Use with	Digital Output	Analogue Output	P/N
MACP-1	BM..A	2 PNP	–	30 478 20
MACV-1	BM..A	1 NPN	2 x 0-10 Vdc	30 463 27
MACI-1	BM..A	1 NPN	2 x 4-20 mA	30 463 26
MAC16P-1	BM..A	16 PNP	–	30 573 68
High-Res Controller Model	**Use with**	**Digital Output**	**Analogue Output**	**P/N**
MAHCVP-1	MAH..	2 PNP	2 x 0-10 Vdc	30 613 31
MAHCIP-1	MAH..	2 PNP	2 x 4-20 mA	30 613 33

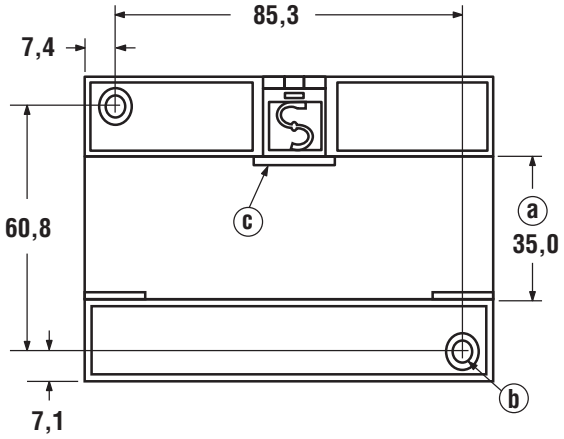
** DeviceNet™ controller models available*

Standard Mini-Array & High-Resolution Mini-Array Series Controllers Dimensions (mm)

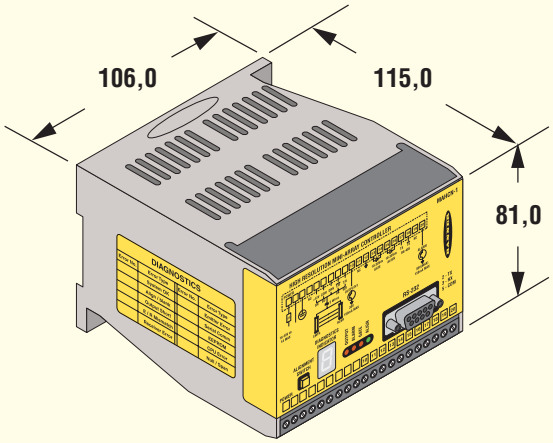
Standard Mini-Array Controller Module



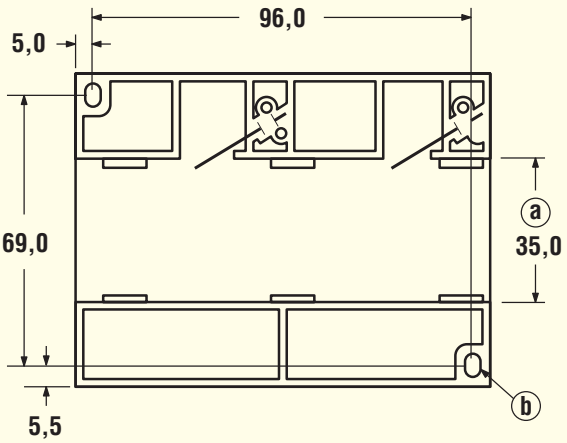
Standard Mini-Array Controller Module Bottom View



High-Resolution Mini-Array Controller Module



High-Res Mini-Array Controller Module Bottom View

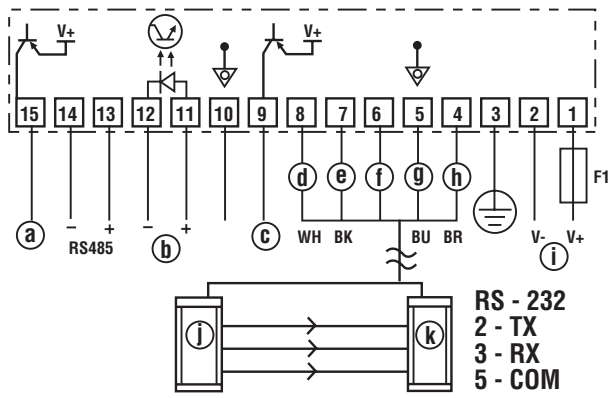


Legend:

a) DIN mounting slot, b) Slot for M3,5 screws (2), c) DIN mounting tab (supplied)
Supplied mounting hardware: Combo Head Screws M3,5 x 0,6 x 14 mm (2); M3,5 Washers (2); M3,5 x 0,6 mm nuts.
Recommended torque is 1,8-2,26 Nm on mounting screws.

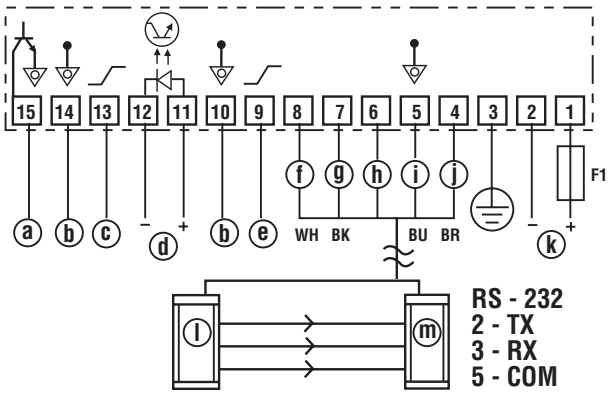
Standard Mini-Array & High-Resolution Mini-Array Series Controllers Wiring Diagrams

MACP-1



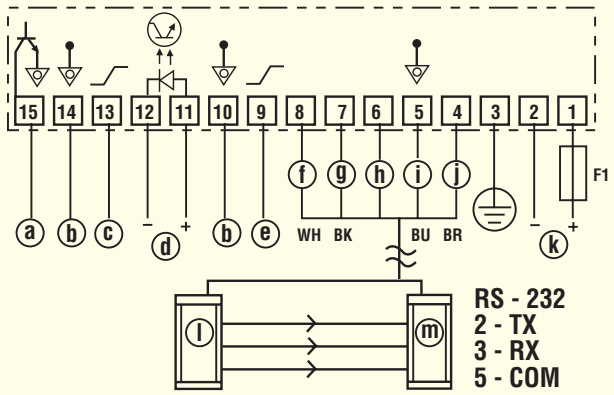
a) 30 V 150 mA max Alarm, b) 10-30 Vdc Gate, c) 500 mA max OUT 1, d) T/R, e) $\overline{T/R}$, f) Drain, g) Com, h) +12 V, i) 16-30 Vdc 1,2 A max, j) Emitter, k) Receiver

MACV-1



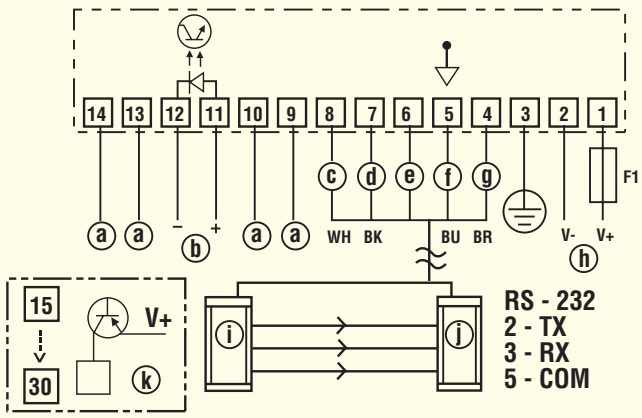
a) 30 V 150 mA max Alarm, b) Com, c) 0-10 V 10 mA Vout 2, d) 10-30 Vdc Gate, e) 0-10 V 10 mA Vout 1, f) T/R, g) $\overline{T/R}$, h) Drain, i) Com, j) +12 V, k) 16-30 Vdc 1,2 A max, l) Emitter, m) Receiver

MACI-1



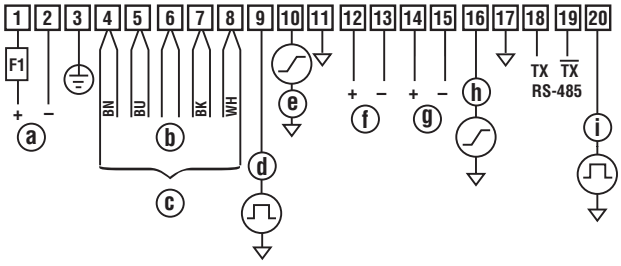
a) 30 V 150 mA max Alarm, b) Com, c) 0-10 V 4-20 mA Iout 2, d) 10-30 Vdc Gate, e) 4-20 mA max Iout 1, f) T/R, g) $\overline{T/R}$, h) Drain, i) Com, j) +12 V, k) 16-30 Vdc 1,2 A max, l) Emitter, m) Receiver

MAC16P-1



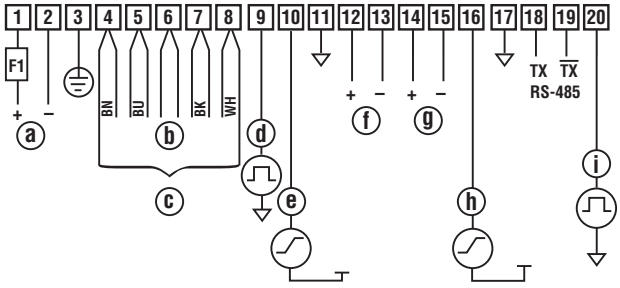
a) NC, b) 10-30 Vdc Gate, c) T/R, d) $\overline{T/R}$, e) Drain, f) Com, g) +12 V, h) 16-30 Vdc 1,2 A max, i) Emitter, j) Receiver, k) 16 solid-state outputs (15 through 30), 150 mA max each

MAHCVP-1 (High-Resolution)



a) Power, 16-30 Vdc, 1 A max, b) Drain (bare), c) Emitter and receiver cables, d) Digital output 1, 150 mA max, e) 0-10 V analogue output 1, 25 mA max, f) 10-30 Vdc Gate Signal, g) 10-30 Vdc Align, h) 0-10 V analogue output 2, 25 mA max, i) Digital output 2 (alarm), 150 mA max

MAHCIP-1 (High-Resolution)

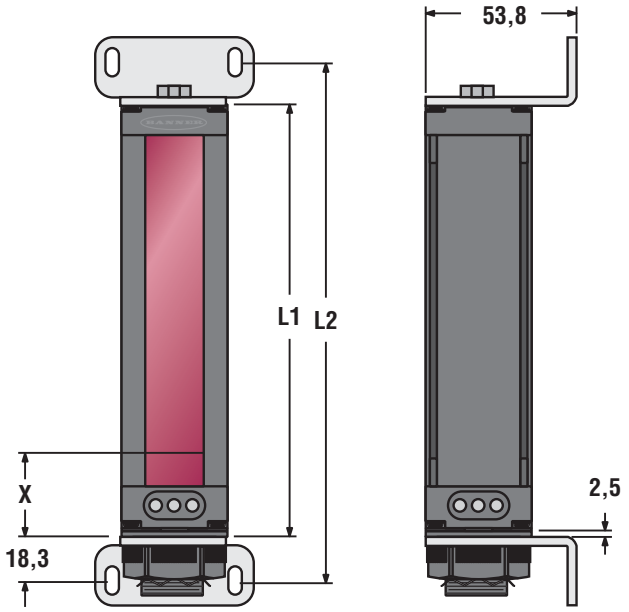


a) Power, 16-30 Vdc, 1 A max, b) Drain (bare), c) Emitter and receiver cables, d) Digital output 1, 150 mA max, e) 4-20 mA analogue output 1, load 16-30 Vdc, f) 10-30 Vdc Gate Signal, g) 10-30 Vdc Align, h) 4-20 mA analogue output 2, load 16-30 Vdc, i) Digital output 2 (alarm), 150 mA max

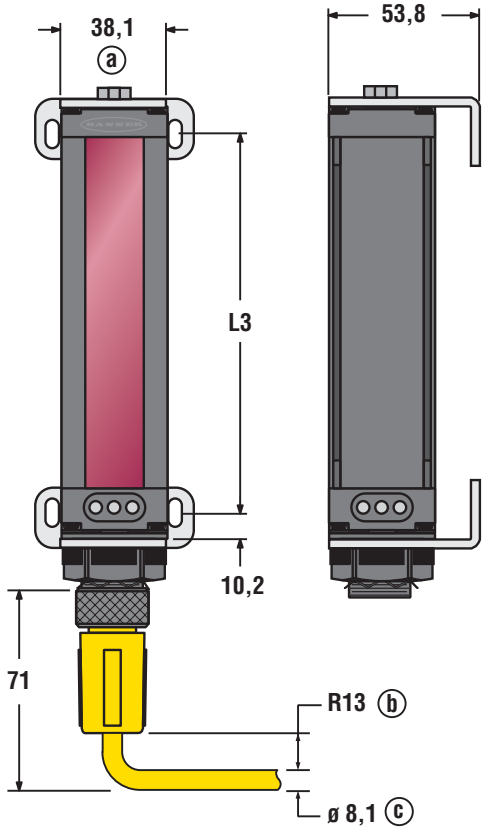
M & I

Standard Mini-Array & High-Resolution Mini-Array Emitter & Receiver Dimensions (mm)

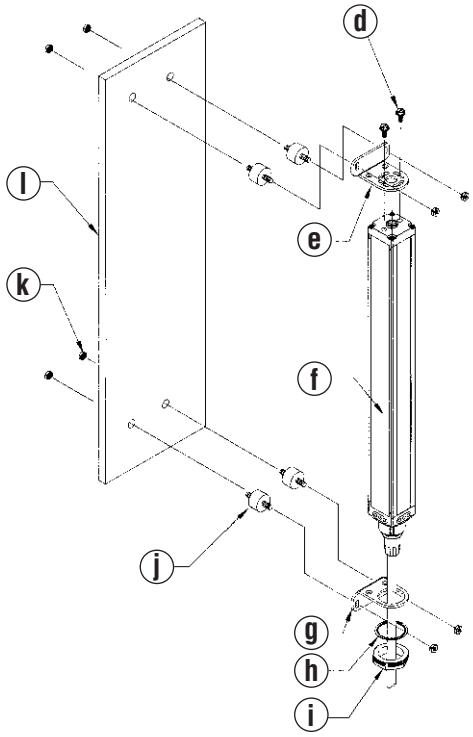
With mounting bracket flanges OUT



With mounting bracket flanges IN



Model	X (Distance to first optical channel)
19 mm beam spacing	38,1 mm
9,7 mm beam spacing	42,9 mm
High-Res Mini Array	47,2 mm



Legend:

a) 38,1 mm square
b) R13 mm minimum bend
c) ø 8,1 mm maximum
d) M4 x 10 slotted hex head with compression washer (2)
e) Mounting bracket
f) Emitter or receiver
g) Mounting bracket
h) Washer
i) Nut
j) Anti-vibration mounts (4), studs: M4 x 0,7; 9,5 mm long
k) M4 keps nut (8)
l) Mounting surface

M & I

Standard Mini-Array Emitter & Receiver Housing Length & Distance between Holes

Emitter/Receiver Model	Housing Length L1	Distance between Bracket Holes L2	Distance between Bracket Holes L3
BMEL6..A & BMRL6..A	201 mm	233,9 mm	177,0 mm
BMEL12..A & BMRL12..A	356 mm	389,7 mm	332,8 mm
BMEL18..A & BMRL18..A	505 mm	538,7 mm	481,8 mm
BMEL24..A & BMRL24..A	659 mm	693,2 mm	636,3 mm
BMEL30..A & BMRL30..A	810 mm	843,5 mm	786,6 mm
BMEL36..A & BMRL36..A	963 mm	997,4 mm	940,5 mm
BMEL42..A & BMRL42..A	1115 mm	1148 mm	1091 mm
BMEL48..A & BMRL48..A	1267 mm	1301 mm	1244 mm
BMEL60..A & BMRL60..A	1572 mm	1606 mm	1549 mm
BMEL72..A & BMRL72..A	1877 mm	1910 mm	1853 mm

High-Resolution Mini-Array Emitter & Receiver Housing Length & Distance between Holes

Emitter/Receiver Model	Housing Length L1	Distance between Bracket Holes L2	Distance between Bracket Holes L3
MAHE6A & MAHR6A	236 mm	268 mm	211 mm
MAHE13A & MAHR13A	399 mm	430 mm	373 mm
MAHE19A & MAHR19A	561 mm	593 mm	536 mm
MAHE26A & MAHR26A	724 mm	756 mm	699 mm
MAHE32A & MAHR32A	887 mm	918 mm	861 mm
MAHE38A & MAHR38A	1049 mm	1081 mm	1024 mm
MAHE45A & MAHR45A	1215 mm	1246 mm	1189 mm
MAHE51A & MAHR51A	1377 mm	1409 mm	1352 mm
MAHE58A & MAHR58A	1540 mm	1572 mm	1515 mm
MAHE64A & MAHR64A	1703 mm	1734 mm	1677 mm
MAHE70A & MAHR70A	1865 mm	1897 mm	1840 mm
MAHE77A & MAHR77A	2028 mm	2060 mm	2003 mm

Standard Mini-Array & High-Resolution Mini-Array Series Cables

Model	Length	Description	P/N
QDC-515C	5 m	Between sensors and controller	30 374 42
QDC-525C	8 m	Between sensors and controller	30 374 43
QDC-550C	15 m	Between sensors and controller	30 374 98
MASC	2 m	Serial communication to PC	30 552 40