




# MINI-ARRAY® Measuring Light Screens

- The MINI-ARRAY® is a programmable measuring light screen for inspections and profiling with a long range up to 17 m.
- Offers programmable controller with a selection of measurement modes, scan modes and output configurations
  - Available with 9.5 or 19 mm beam spacing for detecting objects as small as 12.7 mm
  - Advanced software GUI
  - Highly visible indicators for status monitoring
  - Cordsets and brackets see page 378

## MINI-ARRAY®–19.1 mm Beam Spacing

Housing Length (L)	Array Length	Total Beams	Range	Connection	Minimum Object Size	Models*	
						Emitter	Receiver
201 mm	133 mm	8	0.9 - 17 m	5-pin Mini QD	38.1 mm Interlaced Mode: 25.4 mm	BMEL616A	BMRL616A
356 mm	286 mm	16	0.9 - 17 m			BMEL1216A	BMRL1216A
505 mm	438 mm	24	0.9 - 17 m			BMEL1816A	BMRL1816A
659 mm	591 mm	32	0.9 - 17 m			BMEL2416A	BMRL2416A
810 mm	743 mm	40	0.9 - 17 m			BMEL3016A	BMRL3016A
963 mm	895 mm	48	0.9 - 17 m			BMEL3616A	BMRL3616A
1115 mm	1048 mm	56	0.9 - 17 m			BMEL4216A	BMRL4216A
1267 mm	1200 mm	64	0.9 - 14 m			BMEL4816A	BMRL4816A
1572 mm	1505 mm	80	0.9 - 14 m			BMEL6016A	BMRL6016A
1877 mm	1810 mm	96	0.9 - 14 m			BMEL7216A	BMRL7216A

For more specifications see page 378.

 **QD models:** A model with a QD requires a mating cordset (see page 378).

\* "E" and "R" in models numbers denotes "Emitter" and "Receiver" respectively. Sold separately.


## MINI-ARRAY®-9.5 mm Beam Spacing

Housing Length (L)	Total Beams	Array Length	Range	Connection	Minimum Object Size	Models*	
						Emitter	Receiver
201 mm	16	143 mm	0.6 - 6.1 m	5-pin Mini QD	19.1 mm  Interlaced Mode: 12.7 mm	BMEL632A	BMRL632A
356 mm	32	295 mm	0.6 - 6.1 m			BMEL1232A	BMRL1232A
505 mm	48	448 mm	0.6 - 6.1 m			BMEL1832A	BMRL1832A
659 mm	64	600 mm	0.6 - 6.1 m			BMEL2432A	BMRL2432A
810 mm	80	752 mm	0.6 - 6.1 m			BMEL3032A	BMRL3032A
963 mm	96	905 mm	0.6 - 6.1 m			BMEL3632A	BMRL3632A
1115 mm	112	1057 mm	0.6 - 6.1 m			BMEL4232A	BMRL4232A
1267 mm	128	1210 mm	0.6 - 4.6 m			BMEL4832A	BMRL4832A
1572 mm	160	1514 mm	0.6 - 4.6 m			BMEL6032A	BMRL6032A
1877 mm	192	1819 mm	0.6 - 4.6 m			BMEL7232A	BMRL7232A

## MINI-ARRAY® Controllers†, 16-30 V DC

Inputs	Solid-State Discrete Outputs	Analog Outputs	Serial Output	Controller Models
1 Sensor pair & Trigger (Gate)	1 Reed & 1 NPN	—	RS-232 & RS-485	MAC-1
	2 NPN	—		MACN-1
	2 PNP	—		MACP-1
	1 NPN	(2) 0-10 V Sourcing	RS-232	MACV-1
	1 NPN	(2) 4-20 mA Sinking		MACI-1
1 Sensor pair & Trigger (Gate)	16 NPN	—	RS-232	MAC16N-1
	16 PNP	—		MAC16P-1

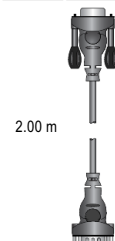

For more specifications see page 378.

 **QD models:** A model with a QD requires a mating cordset (see page 378).




\* "E" and "R" in models numbers denotes "Emitter" and "Receiver" respectively. Sold separately.

† One controller and an emitter/receiver pair (of matching length and resolution) required per system.




Cordsets

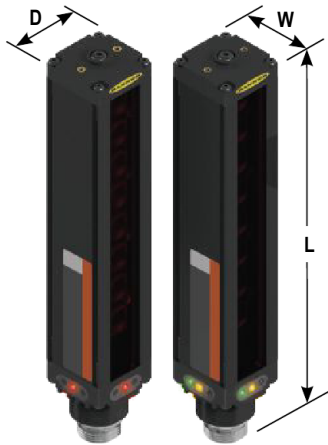
Mini QD (Shielded with Twisted Pair)		DB9 Communication	
See page 922		See page 924	
	Threaded 5-Pin		9-Pin
Length	Straight	Length	Straight
4.57 m	QDC-515C		2.00 m MASC
7.62 m	QDC-525C		
15.2 m	QDC-550C		
22.9 m	MAQDC-575C		
30.5 m	MAQDC-5100C		
38.1 m	MAQDC-5125C		
45.7 m	MAQDC-5150C		
 Additional cordset information available. See page 902.			

Other Accessories

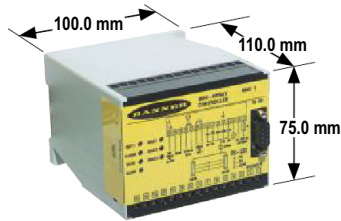
Stands	Enclosures	Lens Shields
See page 944	See page 952	See page 954
		

Brackets

MINI-ARRAY®	
See page 854	See page 878
DIN-35-..	MSMB-3
	
 Additional bracket information available. See page 852.	




MINI-ARRAY Sensors  
W = 38.1 mm    D = 38.1 mm  
L = Length (see model chart page 376)



MINI-ARRAY Controller

MINI-ARRAY® Emitter/Receiver Specifications

Emitter/Receiver Range Max range is specified at the point where 3x excess gain remains	9.5 mm beam spacing Array Length 143 to 1057 mm: 0.6 to 6.1 m Array Length 1210 to 1819 mm: 0.6 to 4.6 m	19.1 mm beam spacing Array Length 133 to 1057 mm: 0.9 to 17 m Array Length 1200 to 1810 mm: 0.9 to 14 m
	9.5 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 Interlaced Mode: 12.7 mm*	19.1 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 Interlaced Mode: 25.4 mm*
*Assumes sensing is in the middle 1/3 of sensing range		
Sensor Scan Time	55 microseconds per beam, plus 1 millisecond post process time per scan	
Power Requirements †Maximum current is for a 6' sensor	9.5 mm beam spacing 12 V dc ±2%, supplied by controller Emitter: 0.10 A @ 12 V dc Receiver: 0.75 A @ 12 V dc†	19.1 mm beam spacing 12 V dc ±2%, supplied by controller Emitter: 0.10 A @ 12 V dc Receiver: 0.50 A @ 12 V dc†
Connections	Sensors connect to controller using 5-conductor Mini-style quick-disconnect cordsets (one each for emitter and receiver), ordered separately. Use only Banner cordsets, which incorporate a "twisted pair" for noise immunity. Cordsets measure 8.1 mm dia. and are shielded and PVC-jacketed. Conductors are 20 gauge. Emitter and receiver cordsets may not exceed 75 m long, each. See page 378.	
Status Indicators	Emitter: Red LED lights to indicate proper emitter operation Receiver: Green indicates sensors aligned (> 3x excess gain) Yellow indicates marginal alignment of one or more beams (1x -3x excess gain) Red indicates sensors misaligned or one or more beam(s) blocked	
Construction	Aluminum, with black anodized finish; acrylic lens cover	
Environmental Rating	NEMA 4, 13; IP65	
Certification		

## MINI-ARRAY® Controller Specifications

<b>Power Requirements</b>	16 to 30 V dc @ 1.25 amps max. (see current requirements for sensors); controller alone, (without sensors connected) requires 0.1 amp.
<b>Inputs</b>	<b>Sensor input (5 connections):</b> Emitter and receiver wire in parallel to five terminals <b>Trigger (Gate) input:</b> Optically isolated, requires 10 to 30 V dc (7.5K input impedance) for gate signal
<b>Discrete Outputs</b>	<p><b>MAC-1:</b> Output 1 (OUT 1) - Reed relay contact rated 125 V ac/dc max., 10 VA max. resistive load (non-inductive). Output 2 (ALARM) - Open collector NPN transistor rated 30 V dc 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 <b>OFF-state leakage current:</b> less than 10 <math>\mu</math>A @ 30 V dc <b>ON-state saturation voltage:</b> less than 1 V @ 10 mA; less than 1.5 V @ 150 mA</p> <p><b>MACN-1:</b> (2) Open collector NPN transistor outputs <b>MACP-1:</b> (2) Open collector PNP transistor outputs; transistor rated 30 V dc 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 <b>OFF-state leakage current:</b> less than 10 <math>\mu</math>A @ 30 V dc <b>ON-state saturation voltage:</b> less than 1 V @ 10 mA; less than 1.5 V @ 150 mA</p> <p><b>MACV-1/MACI-1:</b> Alarm - Open collector NPN transistor rated 30 V dc 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 <b>OFF-state leakage current:</b> less than 10 <math>\mu</math>A @ 30 V dc <b>ON-state saturation voltage:</b> less than 1 V @ 10 mA; less than 1.5 V @ 150 mA</p> <p><b>MAC16P-1:</b> Sixteen open collector PNP transistor outputs <b>MAC16N-1:</b> Sixteen open collector NPN transistor outputs 30 V dc max, 150 mA max., short circuit protected <b>OFF-state leakage current:</b> less than 10 <math>\mu</math>A <b>ON-state saturation voltage:</b> less than 1 V @ 10 mA; less than 1.9 V @ 150 mA</p>
<b>Serial Data Outputs</b>	<p>RS-232, ASCII or binary data format <b>Baud Rate:</b> 9600, 19.2K, or 38.4K, 8 data bits, 1 start bit, 1 stop bit, even parity Clear data may be suppressed Header string may be suppressed in binary format <b>MAC-1:</b> Up to 15 controllers may be given unique address for RS-485 party line</p>
<b>Analog Outputs</b>	<p><b>MACV-1:</b> 0-10 Volts sourcing adjustable Null and Span (20 mA current limit) <b>MACI-1:</b> 4-20 mA current sinking adjustable Null and Span (16 to 30 V input) <b>Resolution:</b> Span/(Number of sensor channels) <b>Linearity:</b> 0.1% of Full Scale <b>Temperature variation:</b> 0.01% of Full Scale/° C</p>
<b>Controller Programming</b>	<b>All models:</b> Via RS-232 PC-compatible computer running Windows XP, 2000, Vista, Windows 7 or Windows 8 and using Banner supplied software
<b>Sensor Scan Time</b>	<p><b>All models:</b> 55 microseconds per beam plus processing time The processing time is dependent on the scan analysis and the number of active outputs This timing assumes a straight scan, continuous, and TBB mode <b>MAC-1, MACN-1 &amp; MACP-1:</b> 1 millisecond processing time <b>MACV-1 &amp; MACI-1:</b> 1.5 milliseconds processing time <b>MAC16N-1 &amp; MAC16P-1:</b> 2.3 to 7 milliseconds processing time</p>
<b>System Response Time</b>	<p>Outputs are not active for 5 seconds after system power up. Maximum response time for the system is two sensor scan cycles. A scan cycle includes a sensor scan plus any serial data transmission. Serial transmission (if activated) follows every sensor scan.</p>
<b>Status Indicators</b>	<p>The following status LEDs are located on the top surface of the module: <b>MACV-1 &amp; MACI-1:</b> V OUT (Red) - (also called I OUT) Indicates that the analog outputs are active <b>MAC-1, MACN-1 &amp; MACP-1:</b> OUT 1 (Red) - Indicates that output 1 is energized <b>MAC16N-1 &amp; MAC16P-1:</b> OUT (Red) - Indicates that at least one output is active ALARM (Red) - Indicates that Output 2 is active/MAC16N-1 &amp; MAC16P-1: Indicates output 16 is active GATE (Red) - Indicates voltage is applied to Trigger (Gate) input ALIGN (Green) - Indicates sensor aligned (excess gain &gt; 1x) DIAG1 (Green) - Indicates power is applied to the module DIAG2 (Red) - Indicates receiver failure DIAG3 (Red) - Indicates emitter failure</p>
<b>Construction</b>	Polycarbonate
<b>Environmental Rating</b>	NEMA 1; IP20
<b>Operating Conditions</b>	<b>Temperature:</b> -20° to +70° C <b>Relative humidity:</b> 95% (non-condensing)
<b>Certifications</b>	