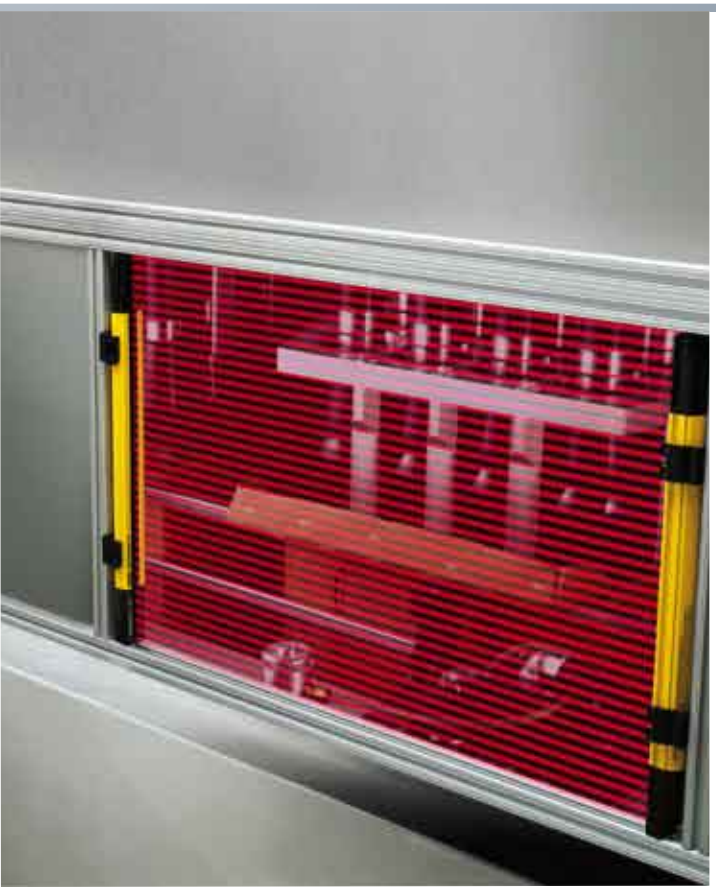


EZ-SCREEN®

Type 4 Light Screens

page 23

- Provides point-of-operation, area, access and perimeter safeguarding
- Protects personnel from injury and equipment from damage
- Offered in a standard housing with 14 and 30 mm resolution, low-profile housing with 14 and 25 mm, single-beam points or multi-beam grids
- Reduced resolution and fixed blanking
- External Device Monitoring (EDM) ensures that a controller or "third box" is not required
- Easily understood advanced diagnostics allow for quick troubleshooting
- Safety PLC input compatible (per OSSD specifications)
- Rated Type 4 per IEC 61496
- Available with optional ESD-safe housing, pigtail connectors and cascading on some models

EZ-SCREEN® Type 2 page 39

- Designed for lower-risk applications
- Provides economical, compact optical safeguarding
- Rated Type 2 per IEC 61496
- Offered with 30 mm resolution and 15 m range

PICO-GUARD™ page 61

- Provides access and perimeter guarding
- Offers low-cost alternative to cumbersome machine guarding methods
- Combines fiber optic and photoelectric technologies for safeguarding in explosive or harsh environments
- Installs easily using inexpensive plastic fiber optics
- Rated Type 4 per IEC 61496

Model			Page	Safety Rating	Resolution	Supply Voltage	Maximum Range	
EZ-SCREEN® Type 4	Standard Systems		23	Type 4 Category 4 PLe SIL 3 Control Reliable	14 & 30 mm	24V dc	6 m/18 m	
	Cascade Systems				14 & 30 mm		6 m/18 m	
	Low-Profile Systems				14 & 25 mm		6 m	
	Low-Profile Cascade Systems				14 & 25 mm		6 m	
	Grid & Point Systems			Type 4 Category 4 Control Reliable	300 to 584 mm (beam spacing)		70 m	
EZ-SCREEN® Type 2	Type 2 Systems		39	Type 2 Category 2	30 mm	24V dc	15 m	
PICO-GUARD™	Grid Systems		61	Type 4 Category 4 (call for PL and SIL ratings) Control Reliable	300 to 584 mm (beam spacing)	24V dc	31 m	
	Point Systems				—			

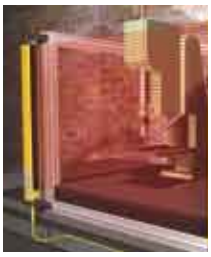
	Safety Output	Auxiliary Output	Blanking	Output Response Time	Housing Material	Environmental Rating
	2 PNP OSSD (Trip /Latch Selectable)	Yes PNP OSSD follow (when configured for 1-CH EDM)	2-beam Reduced Resolution & Fixed	9 to 56 ms	Aluminum housing with yellow polyester powder finish (other colors available) nickel-plated ESD, clear anodized aluminum or nickel-plated silver	IEC IP65
				11 to 56 ms		
				8 to 43.5 ms	Aluminum housing with yellow polyester powder finish, nickel-plated ESD, or clear anodized aluminum	
				9.5 to 43.5 ms		
		—	—	24 ms	Aluminum housing with yellow polyester powder finish	
	2 PNP OSSD (Trip or Latch)	—	—	11 to 25 ms	Aluminum housing with yellow polyester powder finish	IEC IP65
	2 PNP OSSD (Trip /Latch Selectable) See page 60 for controller	Yes (Dependent on controller model)	—	13 ms See page 60 for controller	Black aluminum housing, tempered glass window (MEK resistant)	IEC IP65
					12 mm threaded barrel: Black polycarbonate plastic housing **30 mm threaded barrel:** Stainless steel housing, glass window.	IEC IP67

EZ-SCREEN®
Safety Light Screens

- Simple, two-piece integrated system has no control box.
- EZ-SCREEN point-of-operation systems provide finger, hand and ankle detection in a standard or low-profile housing to fit any machine.
- Point and Grid systems allow one-, two-, three- or four-beam perimeter and access guarding.
- Type 4 models are designed with redundant microprocessor-controlled, self-checking circuitry to exceed control reliability requirements and are certified for CE (Type 4/Category 4) and cULus (NIPF, Type 4) applications.
- Type 2 systems are suited to lower-risk applications where the result of an accident is only a slight injury and meet all requirements for CE (Type 2/Category 2) and cULus (NIPF, Type 2) applications.
- Superior optical design makes system extremely easy to align.
- Status indicators and diagnostics show when alignment is complete and if there are problems with the installation.
- Cascading models allow up to four systems of any length and resolution to be wired together to form a single safety device.
- Systems have ranges up to 70 m, with power and range for all types of applications including long-range perimeter guarding.

Interface multiple devices with the SC22-3 Safety Controller. See page 76

A complete family of machine guarding products.

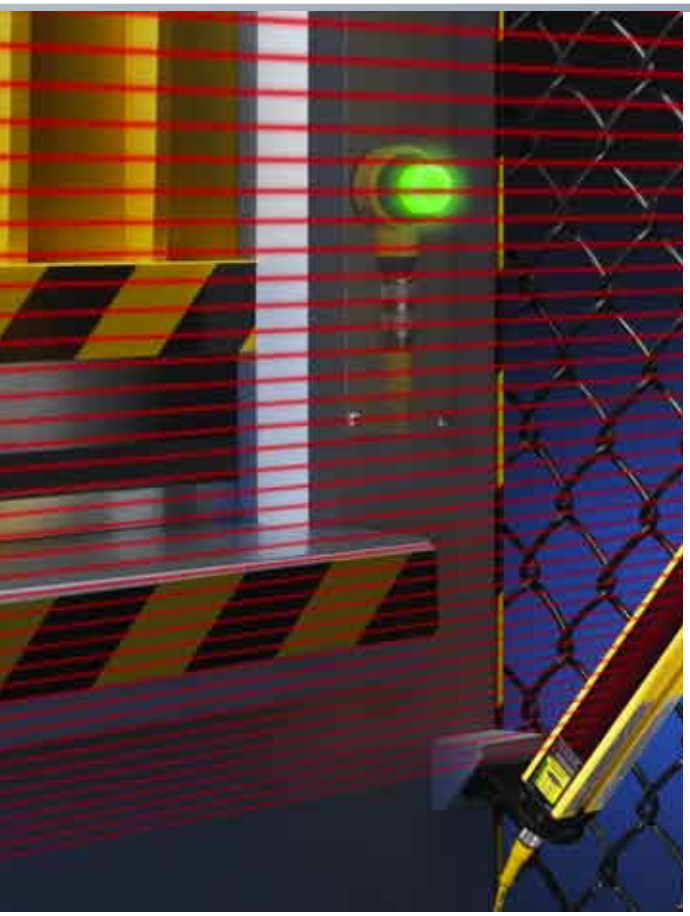


Point-of-Operation and Area
- Provides choice of models for finger, hand and ankle detection
- Includes standard or low-profile models to fit any machine
- Available in models to meet Type 4 requirements
- Includes cascading and ESD-safe solutions

Perimeter and Access Guarding
- Uses one-, two-, three- or four- beams for perimeter and long-range single-sided protection
- Guards multiple sides of a dangerous area up to 70 m long
- Meets Type 4 requirements

Single-Point Access
- Uses angled mirrors to simulate a two-beam system
- Allows for the use of multiple units to create custom beam patterns
- Meets Type 4 requirements

Type 2
- Designed for lower-risk operation applications
- Meets Type 2 requirements
- Offered with 30 mm resolution and 15 m range



EZ-SCREEN®

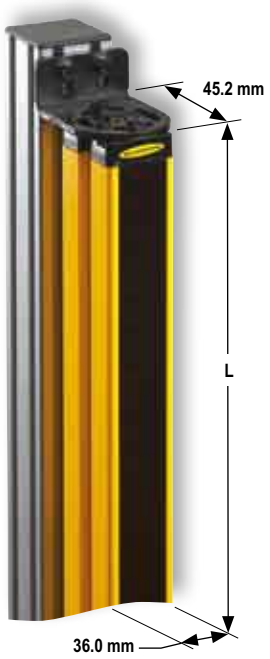
Type 4 Point-of-Operation

- Available in 14 mm resolution for finger, hand and ankle protection or 30 mm resolution for hand and ankle protection
- Operates in ranges from 0.1 to 6 m (14 mm models) and 0.1 to 18 m (30 mm models)
- Offers optional reduced resolution (floating blanking) to ignore tooling or constant inflow of materials
- Displays operating status, configuration and error codes, and blocked beams
- Features user-configurable trip or latch outputs, and Scan Code 1 or 2
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cULus NIPF, and CE certified to Type 4, Cat 4 PLe, and SIL 3
- Resists impact, twisting and abusive environments with a durable aluminum housing and metal endcaps
- Available with standard yellow, clear anodized aluminum housing or nickel-plated ESD-safe housing for protection against electrostatic discharges (other color options available)
- Offers optional cascading to create up to a four sensor system that responds to a single stop command
- Offers optional lens shields and enclosures for added durability

EZ-SCREEN® Type 4
EZ-SCREEN® Type 2
PICO-GUARD™
CORDSETS PAGE 28
INDICATORS PAGE 192
BRACKETS PAGE 28
MIRRORS PAGE 194
STANDS PAGE 198
LENS SHIELDS PAGE 200
ENCLOSURES PAGE 201
INTERFACE PAGE 51

EZ-SCREEN® Systems

- 24V dc supply voltage
- Two solid-state OSSD safety outputs
- 7-segment diagnostic display
- Clear/Blocked beam zone indicators
- System status and system reset status
- Metal endcaps for added durability
- User configurable trip or latch outputs and Scan Code 1 or 2
- Fixed or 2-beam reduced resolution (floating) blanking
- EDM input and optional TEST function
- Integral or pigtail M12/Euro-style QD connection
- QD cordsets ordered separately or in kits (see page 28)



EZ-SCREEN Systems

ONLINE
AUTOCAD, STEP, IGES & PDF

Some of the Available Finishes

Yellow Painted Aluminum | Clear Anodized Aluminum | Nickel-Plated ESD

EZ-SCREEN® Systems, 14 mm Resolution–0.1 to 6 m Range

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
150 mm	SLSE14-150Q8	SLSR14-150Q8	SLSP14-150Q88	8-pin QD	262 mm	11 ms	20	112852
	SLSE14-150P8	SLSR14-150P8	SLSP14-150P88	8-pin Pigtail QD				
300 mm	SLSE14-300Q8	SLSR14-300Q8	SLSP14-300Q88	8-pin QD	372 mm	15 ms	40	
	SLSE14-300P8	SLSR14-300P8	SLSP14-300P88	8-pin Pigtail QD				
450 mm	SLSE14-450Q8	SLSR14-450Q8	SLSP14-450Q88	8-pin QD	522 mm	19 ms	60	
	SLSE14-450P8	SLSR14-450P8	SLSP14-450P88	8-pin Pigtail QD				
600 mm	SLSE14-600Q8	SLSR14-600Q8	SLSP14-600Q88	8-pin QD	671 mm	23 ms	80	
	SLSE14-600P8	SLSR14-600P8	SLSP14-600P88	8-pin Pigtail QD				
750 mm	SLSE14-750Q8	SLSR14-750Q8	SLSP14-750Q88	8-pin QD	821 mm	27 ms	100	
	SLSE14-750P8	SLSR14-750P8	SLSP14-750P88	8-pin Pigtail QD				
900 mm	SLSE14-900Q8	SLSR14-900Q8	SLSP14-900Q88	8-pin QD	971 mm	32 ms	120	
	SLSE14-900P8	SLSR14-900P8	SLSP14-900P88	8-pin Pigtail QD				
1050 mm	SLSE14-1050Q8	SLSR14-1050Q8	SLSP14-1050Q88	8-pin QD	1120 mm	36 ms	140	
	SLSE14-1050P8	SLSR14-1050P8	SLSP14-1050P88	8-pin Pigtail QD				
1200 mm	SLSE14-1200Q8	SLSR14-1200Q8	SLSP14-1200Q88	8-pin QD	1270 mm	40 ms	160	
	SLSE14-1200P8	SLSR14-1200P8	SLSP14-1200P88	8-pin Pigtail QD				
1350 mm	SLSE14-1350Q8	SLSR14-1350Q8	SLSP14-1350Q88	8-pin QD	1420 mm	43 ms	180	
	SLSE14-1350P8	SLSR14-1350P8	SLSP14-1350P88	8-pin Pigtail QD				
1500 mm	SLSE14-1500Q8	SLSR14-1500Q8	SLSP14-1500Q88	8-pin QD	1569 mm	48 ms	200	
	SLSE14-1500P8	SLSR14-1500P8	SLSP14-1500P88	8-pin Pigtail QD				
1650 mm	SLSE14-1650Q8	SLSR14-1650Q8	SLSP14-1650Q88	8-pin QD	1719 mm	52 ms	220	
	SLSE14-1650P8	SLSR14-1650P8	SLSP14-1650P88	8-pin Pigtail QD				
1800 mm	SLSE14-1800Q8	SLSR14-1800Q8	SLSP14-1800Q88	8-pin QD	1869 mm	56 ms	240	
	SLSE14-1800P8	SLSR14-1800P8	SLSP14-1800P88	8-pin Pigtail QD				

EZ-SCREEN® Systems, 30 mm Resolution–0.1 to 18 m Range

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
150 mm	SLSE30-150Q8	SLSR30-150Q8	SLSP30-150Q88	8-pin QD	262 mm	9 ms	10	112852
	SLSE30-150P8	SLSR30-150P8	SLSP30-150P88	8-pin Pigtail QD				
300 mm	SLSE30-300Q8	SLSR30-300Q8	SLSP30-300Q88	8-pin QD	372 mm	11 ms	20	
	SLSE30-300P8	SLSR30-300P8	SLSP30-300P88	8-pin Pigtail QD				
450 mm	SLSE30-450Q8	SLSR30-450Q8	SLSP30-450Q88	8-pin QD	522 mm	13 ms	30	
	SLSE30-450P8	SLSR30-450P8	SLSP30-450P88	8-pin Pigtail QD				
600 mm	SLSE30-600Q8	SLSR30-600Q8	SLSP30-600Q88	8-pin QD	671 mm	15 ms	40	
	SLSE30-600P8	SLSR30-600P8	SLSP30-600P88	8-pin Pigtail QD				
750 mm	SLSE30-750Q8	SLSR30-750Q8	SLSP30-750Q88	8-pin QD	821 mm	17 ms	50	
	SLSE30-750P8	SLSR30-750P8	SLSP30-750P88	8-pin Pigtail QD				
900 mm	SLSE30-1050Q8	SLSR30-900Q8	SLSP30-900Q88	8-pin QD	971 mm	19 ms	60	
	SLSE30-1050P8	SLSR30-900P8	SLSP30-900P88	8-pin Pigtail QD				

More on next page

* **ESD-safe models**: Add **N** to the model number, prior to the QD option designation (example, **SLSE14-150NQ8**). ESD-safe models are not available with the pigtail QD option.

Optional housing finishes:
Prior to the QD designation in the model number, add **A** for a clear (brushed) anodized aluminum finish, black endcaps (example, **SLSE14-150AQ8**); **S** for a nickel-plated (silver) finish, black endcaps (example, **SLSE14-150SQ8**), **B** for a black painted finish, black endcaps (example, **SLSE14-150BQ8**), **W** for a white painted finish, black endcaps (example, **SLSE14-150WQ8**) or **SO** for a safety orange painted finish, black endcaps (example, **SLSE14-150SOQ8**).

** For an emitter with TEST function, replace **Q8** with **Q5** on emitter model numbers (example, **SLSE14-150Q5**) and **Q88** with **Q85** on pair model numbers (example, **SLSP14-150Q85**). For a 300 mm Euro pigtail QD, replace **Q** with **P** in model numbers (example, **SLSP14-150P88**). For a 5-pin 300 mm Euro pigtail QD with No EDM or No TEST functions, replace **Q8** with **P5NT** on emitter or receiver (example, **SLSE14-150P5NT**) and **Q88** with **P55NT** on pair model numbers (example, **SLSP14-150P55NT**.) A model with a QD requires a mating cordset (see page 28).

† A pair includes an emitter and receiver (example, **SLSP14-150Q88**). Emitters (example, **SLSE14-150Q8**) and receivers (example, **SLSR14-150Q8**) are also sold separately.

EZ-SCREEN® Systems, 30 mm Resolution–0.1 to 18 m Range (cont'd)

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
1050 mm	SLSE30-1050Q8	SLSR30-1050Q8	SLSP30-1050Q88	8-pin QD	1120 mm	21 ms	70	112852
	SLSE30-1050P8	SLSR30-1050P8	SLSP30-1050P88	8-pin Pigtail QD				
1200 mm	SLSE30-1200Q8	SLSR30-1200Q8	SLSP30-1200Q88	8-pin QD	1270 mm	23 ms	80	
	SLSE30-1200P8	SLSR30-1200P8	SLSP30-1200P88	8-pin Pigtail QD				
1350 mm	SLSE30-1350Q8	SLSR30-1350Q8	SLSP30-1350Q88	8-pin QD	1420 mm	25 ms	90	
	SLSE30-1350P8	SLSR30-1350P8	SLSP30-1350P88	8-pin Pigtail QD				
1500 mm	SLSE30-1500Q8	SLSR30-1500Q8	SLSP30-1500Q88	8-pin QD	1569 mm	27 ms	100	
	SLSE30-1500P8	SLSR30-1500P8	SLSP30-1500P88	8-pin Pigtail QD				
1650 mm	SLSE30-1650Q8	SLSR30-1650Q8	SLSP30-1650Q88	8-pin QD	1719 mm	30 ms	110	
	SLSE30-1650P8	SLSR30-1650P8	SLSP30-1650P88	8-pin Pigtail QD				
1800 mm	SLSE30-1800Q8	SLSR30-1800Q8	SLSP30-1800Q88	8-pin QD	1869 mm	32 ms	120	
	SLSE30-1800P8	SLSR30-1800P8	SLSP30-1800P88	8-pin Pigtail QD				
1950 mm	SLSE30-1950Q8	SLSR30-1950Q8	SLSP30-1950Q88	8-pin QD	2018 mm	34 ms	130	
	SLSE30-1950P8	SLSR30-1950P8	SLSP30-1950P88	8-pin Pigtail QD				
2100 mm	SLSE30-2100Q8	SLSR30-2100Q8	SLSP30-2100Q88	8-pin QD	2168 mm	36 ms	140	
	SLSE30-2100P8	SLSR30-2100P8	SLSP30-2100P88	8-pin Pigtail QD				
2250 mm	SLSE30-2250Q8	SLSR30-2250Q8	SLSP30-2250Q88	8-pin QD	2318 mm	38 ms	150	
	SLSE30-2250P8	SLSR30-2250P8	SLSP30-2250P88	8-pin Pigtail QD				
2400 mm	SLSE30-2400Q8	SLSR30-2400Q8	SLSP30-2400Q88	8-pin QD	2468 mm	40 ms	160	
	SLSE30-2400P8	SLSR30-2400P8	SLSP30-2400P88	8-pin Pigtail QD				

EZ-SCREEN® Cascade Systems, 14 mm Resolution–0.1 to 6 m Range

Defined Area	Models*			Connection**	Housing Length (L)	Response Time***	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
300 mm	SLSCE14-300Q8	SLSCR14-300Q8	SLSCP14-300Q88	8-pin QD	372 mm	15 ms	40	112852
	SLSCE14-300P8	SLSCR14-300P8	SLSCP14-300P88	8-pin Pigtail QD				
450 mm	SLSCE14-450Q8	SLSCR14-450Q8	SLSCP14-450Q88	8-pin QD	522 mm	19 ms	60	
	SLSCE14-450P8	SLSCR14-450P8	SLSCP14-450P88	8-pin Pigtail QD				
600 mm	SLSCE14-600Q8	SLSCR14-600Q8	SLSCP14-600Q88	8-pin QD	671 mm	23 ms	80	
	SLSCE14-600P8	SLSCR14-600P8	SLSCP14-600P88	8-pin Pigtail QD				
750 mm	SLSCE14-750Q8	SLSCR14-750Q8	SLSCP14-750Q88	8-pin QD	821 mm	27 ms	100	
	SLSCE14-750P8	SLSCR14-750P8	SLSCP14-750P88	8-pin Pigtail QD				
900 mm	SLSCE14-900Q8	SLSCR14-900Q8	SLSCP14-900Q88	8-pin QD	971 mm	32 ms	120	
	SLSCE14-900P8	SLSCR14-900P8	SLSCP14-900P88	8-pin Pigtail QD				
1050 mm	SLSCE14-1050Q8	SLSCR14-1050Q8	SLSCP14-1050Q88	8-pin QD	1120 mm	36 ms	140	
	SLSCE14-1050P8	SLSCR14-1050P8	SLSCP14-1050P88	8-pin Pigtail QD				
1200 mm	SLSCE14-1200Q8	SLSCR14-1200Q8	SLSCP14-1200Q88	8-pin QD	1270 mm	40 ms	160	
	SLSCE14-1200P8	SLSCR14-1200P8	SLSCP14-1200P88	8-pin Pigtail QD				
1350 mm	SLSCE14-1350Q8	SLSCR14-1350Q8	SLSCP14-1350Q88	8-pin QD	1420 mm	43 ms	180	
	SLSCE14-1350P8	SLSCR14-1350P8	SLSCP14-1350P88	8-pin Pigtail QD				

More on next page

* **ESD-safe models**: Add **N** to the model number, prior to the QD option designation (example, **SLSE30-1050NQ8**). ESD-safe models are not available with the pigtail QD option.
Optional housing finishes: Prior to the QD designation in the model number, add **A** for a clear (brushed) anodized aluminum finish, black endcaps (example, **SLSE30-1050AQ8**); **S** for a nickel-plated (silver) finish, black endcaps (example, **SLSE30-1050SQ8**), **B** for a black painted finish, black endcaps (example, **SLSE30-1050BQ8**), **W** for a white painted finish, black endcaps (example, **SLSE30-1050WQ8**) or **SO** for a safety orange painted finish, black endcaps (example, **SLSE30-1050SOQ8**).

** For an emitter with TEST function, replace **Q8** with **Q5** on emitter model numbers (example, **SLSE30-1050Q5**) and **Q88** with **Q85** on pair model numbers (example, **SLSP30-1050Q85**). For a 300 mm Euro pigtail QD, replace **Q** with **P** in model numbers (example, **SLSP30-1050P88**).
For a 5-pin 300 mm Euro pigtail QD with No EDM or No TEST, replace **Q8** with **P5NT** on emitter or receiver (example, **SLSE30-1050P5NT**) and **Q88** with **P55NT** on pair models (example, **SLSP30-1050P55NT**). A model with a QD requires a mating cordset (see page 28).

*** **Cascading system response time:** To the response time of the slowest pair, add 2 ms for each additional pair.
Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

† A pair includes an emitter and receiver (example, **SLSP30-1050Q88**). Emitters (example, **SLSE30-1050Q8**) and receivers (example, **SLSR30-1050Q8**) are also sold separately.

EZ-SCREEN® Cascade Systems, 14 mm Resolution–0.1 to 6 m Range (cont'd)

Defined Area	Models*			Connection**	Housing Length (L)	Response Time***	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
1500 mm	SLSCE14-1500Q8	SLSCR14-1500Q8	SLSCP14-1500Q88	8-pin QD	1569 mm	48 ms	200	112852
	SLSCE14-1500P8	SLSCR14-1500P8	SLSCP14-1500P88	8-pin Pigtail QD				
1650 mm	SLSCE14-1650Q8	SLSCR14-1650Q8	SLSCP14-1650Q88	8-pin QD	1719 mm	52 ms	220	
	SLSCE14-1650P8	SLSCR14-1650Q8	SLSCP14-1650P88	8-pin Pigtail QD				
1800 mm	SLSCE14-1800Q8	SLSCR14-1800Q8	SLSCP14-1800Q88	8-pin QD	1869 mm	56 ms	240	
	SLSCE14-1800P8	SLSCR14-1800Q8	SLSCP14-1800P88	8-pin Pigtail QD				

EZ-SCREEN® Cascade Systems, 30 mm Resolution–0.1 to 18 m Range

Defined Area	Models*			Connection**	Housing Length (L)	Response Time***	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
300 mm	SLSCE30-300Q8	SLSCR30-300Q8	SLSCP30-300Q88	8-pin QD	372 mm	11 ms	20	112852
	SLSCE30-300P8	SLSCR30-300P8	SLSCP30-300P88	8-pin Pigtail QD				
450 mm	SLSCE30-450Q8	SLSCR30-450Q8	SLSCP30-450Q88	8-pin QD	522 mm	13 ms	30	
	SLSCE30-450P8	SLSCR30-450P8	SLSCP30-450P88	8-pin Pigtail QD				
600 mm	SLSCE30-600Q8	SLSCR30-600Q8	SLSCP30-600Q88	8-pin QD	671 mm	15 ms	40	
	SLSCE30-600P8	SLSCR30-600P8	SLSCP30-600P88	8-pin Pigtail QD				
750 mm	SLSCE30-750Q8	SLSCR30-750Q8	SLSCP30-750Q88	8-pin QD	821 mm	17 ms	50	
	SLSCE30-750P8	SLSCR30-750P8	SLSCP30-750P88	8-pin Pigtail QD				
900 mm	SLSCE30-900Q8	SLSCR30-900Q8	SLSCP30-900Q88	8-pin QD	971 mm	19 ms	60	
	SLSCE30-900P8	SLSCR30-900P8	SLSCP30-900P88	8-pin Pigtail QD				
1050 mm	SLSCE30-1050Q8	SLSCR30-1050Q8	SLSCP30-1050Q88	8-pin QD	1120 mm	21 ms	70	
	SLSCE30-1050P8	SLSCR30-1050P8	SLSCP30-1050P88	8-pin Pigtail QD				
1200 mm	SLSCE30-1200Q8	SLSCR30-1200Q8	SLSCP30-1200Q88	8-pin QD	1270 mm	23 ms	80	
	SLSCE30-1200P8	SLSCR30-1200P8	SLSCP30-1200P88	8-pin Pigtail QD				
1350 mm	SLSCE30-1350Q8	SLSCR30-1350Q8	SLSCP30-1350Q88	8-pin QD	1420 mm	25 ms	90	
	SLSCE30-1350P8	SLSCR30-1350P8	SLSCP30-1350P88	8-pin Pigtail QD				
1500 mm	SLSCE30-1500Q8	SLSCR30-1500Q8	SLSCP30-1500Q88	8-pin QD	1569 mm	27 ms	100	
	SLSCE30-1500P8	SLSCR30-1500P8	SLSCP30-1500P88	8-pin Pigtail QD				
1650 mm	SLSCE30-1650Q8	SLSCR30-1650Q8	SLSCP30-1650Q88	8-pin QD	1719 mm	30 ms	110	
	SLSCE30-1650P8	SLSCR30-1650P8	SLSCP30-1650P88	8-pin Pigtail QD				
1800 mm	SLSCE30-1800Q8	SLSCR30-1800Q8	SLSCP30-1800Q88	8-pin QD	1869 mm	32 ms	120	
	SLSCE30-1800P8	SLSCR30-1800P8	SLSCP30-1800P88	8-pin Pigtail QD				
1950 mm	SLSCE30-1950Q8	SLSCR30-1950Q8	SLSCP30-1950Q88	8-pin QD	2018 mm	34 ms	130	
	SLSCE30-1950P8	SLSCR30-1950P8	SLSCP30-1950P88	8-pin Pigtail QD				
2100 mm	SLSCE30-2100Q8	SLSCR30-2100Q8	SLSCP30-2100Q88	8-pin QD	2168 mm	36 ms	140	
	SLSCE30-2100P8	SLSCR30-2100P8	SLSCP30-2100P88	8-pin Pigtail QD				
2250 mm	SLSCE30-2250Q8	SLSCR30-2250Q8	SLSCP30-2250Q88	8-pin QD	2318 mm	38 ms	150	
	SLSCE30-2250P8	SLSCR30-2250P8	SLSCP30-2250P88	8-pin Pigtail QD				
2400 mm	SLSCE30-2400Q8	SLSCR30-2400Q8	SLSCP30-2400Q88	8-pin QD	2468 mm	40 ms	160	
	SLSCE30-2400P8	SLSCR30-2400P8	SLSCP30-2400P88	8-pin Pigtail QD				

* **ESD-safe models**: Add **N** to the model number, prior to the QD option designation (example, **SLSCE14-1500NQ8**). ESD-safe models are not available with the pigtail QD option.
Optional housing finishes: Prior to the QD designation in the model number, add **A** for a clear (brushed) anodized aluminum finish, black endcaps (example, **SLSCE14-1500AQ8**); **S** for a nickel-plated (silver) finish, black endcaps (example, **SLSCE14-1500SQ8**), **B** for a black painted finish, black endcaps (example, **SLSCE14-1500BQ8**), **W** for a white painted finish, black endcaps (example, **SLSCE14-1500WQ8**) or **SO** for a safety orange painted finish, black endcaps (example, **SLSCE14-1500SOQ8**).

** For an emitter with TEST function, replace **Q8** with **Q5** on emitter model numbers (example, **SLSE14-1500Q5**) and **Q88** with **Q85** on pair model numbers (example, **SLSP14-1500Q85**). For a 300 mm Euro pigtail QD, replace **Q** with **P** in model numbers (example, **SLSCP30-300P88**).
For a 5-pin 300 mm Euro pigtail QD with No EDM or No TEST, replace **Q8** with **P5NT** on emitter or receiver model numbers (example, **SLSCE14-1050P5NT**), and **Q88** with **P55NT** on pair model number (example, **SLSP14-1050P55NT**). A model with a QD requires a mating cordset (see page 28).

*** **Cascading system response time:** To the response time of the slowest pair, add 2 ms for each additional pair. Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

† A pair includes an emitter and receiver (example, **SLSCP30-300Q88**). Emitters (example, **SLSE14-1500Q8**) and receivers (example, **SLSR14-1500Q8**) are also sold separately.

EZ-SCREEN® 14 & 30 mm Resolution Kits

You can purchase a kit that contains an emitter and receiver of equal length and resolution; brackets; and optional interfacing solution and quick-disconnect cordsets. Detailed information about individual kit components is as follows.

To Order:

1. Choose model, resolution and defined area.
2. Yellow housing is standard. To choose an optional housing, add designation listed below prior to the connection.
3. Choose the connection: Integral M12/Euro-Style QD with or without TEST, or 300 mm M12/Euro-Style pigtail with or without TEST.
4. Choose an optional interfacing solution, such as an **IM-T-9A** or **-11** interfacing model.
5. Choose one cordset for each sensor or two cordsets for a pair.

   M12/Euro QD models (example, **SLSK30-150Q88**) require mating M12/Euro QD cordsets, such as:
   - QDE cordset with flying leads
   - DEE2R double-ended cordset
   - CSB series splitter cordset

See EZ-SCREEN manual (p/n 112852) or www.bannerengineering.com for complete information and a current listing of accessories and options for kitting components. Call factory with questions regarding accessories.

Kit Model Key

Model Style	Kit	Resolution		Defined Area	Finish	Connection		Interfacing Options	QD Cordset Length Options
S L S	K	1 4	—	6 0 0		Q 8 8	—	1	R E 2 5

Model Style

SLS = Safety Light Screen
SLSC = Cascading Safety Light Screen

Kit

K = Kit

SLS Resolution

14 = 14 mm
30 = 30 mm

Sensor Finish

Blank = Yellow powder coat
N = Nickel plated ESD
A = Clear Anodized Aluminum
S = Nickel-plated (silver)
B = Black powder coat
W = White powder coat

Defined Area

150 mm*
300 mm
450 mm
600 mm
750 mm
900 mm
1050 mm
1200 mm
1350 mm
1500 mm
1650 mm
1800 mm

* 150 mm not available in cascade models

Receiver & Emitter QD Options

Q85 =	Receiver with integral 8-pin Euro-style QD Emitter with integral 5-pin Euro-style QD with Test
Q88 =	Receiver with integral 8-pin Euro-style QD Emitter with integral 8-pin Euro-style QD
P88 =	Receiver with 8-pin Euro-style pigtail QD Emitter with 8-pin Euro-style pigtail QD
P55NT =	Receiver with 5-pin Euro-style pigtail QD (No EDM) Emitter with 5-pin Euro-style pigtail QD (No Test)

QD Cordset Length Examples

RE15 = 4.5 m, 2 each
RE25 = 7.6 m, 2 each
R15E25 = 4.5 m (Receiver) & 7.6 m (Emitter)
R25E15 = 7.6 m (Receiver) & 4.5 m (Emitter)
DD1 = 0.3 DEE2R-81D, 2 each
C1D15 = CSB-M1281M1281 (Receiver) DEE2R-815D (8-pin Emitter)
C8D25 = CSB-M1288M1281 (SLS Receiver) DEE2R-825D (8-pin Emitter)
CU25D25 = CSB-UNT825M1281 (SLS Receiver) DEE2R-825D (8-pin Emitter)

Interfacing Options

1 = IM-T-9A Interface Module, 1 each (3 NO)
2 = IM-T-11A Interface Module, 1 each (2 NO/ 1 NC)
3 = 11-BG00-31-D-024 Contactors (10A), 2 each
4 = BF1801L-024 Contactors (18A), 2 each
5 = EZAC-R9-QE8 = AC Interface Box (3 NO), 1 each
6 = EZAC-R11-QE8 = AC Interface Box (2 NO/1 NC), 1 each

NOTE: See notes under model number tables. Not all combinations are listed.
Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Accessories EZ-SCREEN® (Type 4–14 & 30 mm Resolution)

Cordsets

Euro QD to Flying Leads

pg. 179

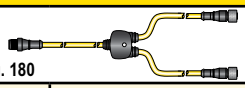
Length	8-Pin	5-Pin
4.5 m	QDE-815D	QDE-515D
7.6 m	QDE-825D	QDE-525D
15.2 m	QDE-850D	QDE-550D
22.8 m	QDE-875D	QDE-575D
30.4 m	QDE-8100D	QDE-5100D

Euro QD–Double-Ended

pg. 179

Length	8-Pin	5-Pin
0.3 m	DEE2R-81D	DEE2R-51D
0.9 m	DEE2R-83D	DEE2R-53D
2.5 m	DEE2R-88D	DEE2R-58D
4.6 m	DEE2R-815D	DEE2R-515D
7.6 m	DEE2R-825D	DEE2R-525D
15.2 m	DEE2R-850D	DEE2R-550D
22.9 m	DEE2R-875D	DEE2R-575D
30.5 m	DEE2R-8100D	DEE2R-5100D

Euro QD Splitter



pg. 180

Length	8-Pin
0 m	CSB-M1280M1280
0.3 m	CSB-M1281M1281
2.5 m	CSB-M1288M1281
4.6 m	CSB-M12815M1281
7.6 m	CSB-M12825M1281
7.6 m	CSB-UNT825M1281

NOTE: See page 51 for interface solutions. Additional accessories are listed on page 163.

Brackets

14 & 30 mm		14 & 30 mm	14 & 30 mm Cascade
 pg. 167	 pg. 166	 pg. 167	 pg. 167
EZA-MBK-12*	EZA-MBK-11*	EZA-MBK-20	EZA-MBK-21

*** Standard brackets included with emitter/receiver.**
Additional brackets are available, see page 164.

Replacement Parts

Model	Description
EZA-ADE-1	Copolyester access cover with label for 14 or 30 mm resolution emitters
EZA-ADE-2	Copolyester access cover with inverted label for 14 or 30 mm resolution emitters
EZA-ADR-1	Copolyester access cover with label for 14 or 30 mm resolution receiver
EZA-ADR-2	Copolyester access cover with inverted label for 14 or 30 mm resolution receiver
EZA-MBK-1	Center bracket kit (includes 1 bracket and hardware to mount to MSA Series stands) for 14 or 30 mm resolution EZ-SCREEN
EZA-MBK-11	Standard bracket kit with hardware (includes 2 end brackets and hardware to mount to MSA Series stands) for 14 or 30 mm resolution EZ-SCREEN
EZA-TP-1	Access cover security plate (includes 2 screws, wrench) for 14 or 30 mm resolution EZ-SCREEN
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Keyed reset switch (same as that included in kits)
SMA-MBK-1	SSM Series Mirror Bracket Kit
STP-3	Specified test piece, 45 mm dia.
STP-13	14 mm test piece (for 14 mm resolution systems)
STP-14	30 mm test piece (for 14 mm resolution systems with 2-beam Reduced Resolution and for 30 mm resolution systems)
STP-15	60 mm test piece (for 30 mm resolution systems with 2-beam Reduced Resolution)

EZ-SCREEN® 14 & 30 mm Resolution Specifications

Supply Voltage at the Device	24V dc ±15% (use a SELV-rated supply according to EN IEC60950) (The external voltage supply must be capable of buffering brief mains interruptions of 20 ms, as specified in EN/IEC 60204-1.)
Residual Ripple	± 10% maximum
Supply Current	**Emitter:** 100 mA max. **Receiver:** 275 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Response Time	9 to 56 milliseconds (see model number tables) **Cascade Safety Stop Interface (CSSI):** 40 milliseconds max.
Remote Test Input (Optional – available only on model SLSE..-..Q5 emitters)	Test Mode is activated either by applying a low signal (less than 3V dc) to emitter TEST #1 terminal for a minimum of 50 milliseconds, or by opening a switch connected between TEST #1 and TEST #2 for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal at TEST #1 deactivates Test Mode. (See p/n 112852 for more information.) **High signal:** 10 to 30V dc **Low signal:** 0 to 3V dc **Input current:** 35 mA inrush, 10 mA max.
Wavelength of Emitter Elements	Infrared LEDs, 950 nm at peak emission
Recovery Time–Blocked to clear (OSSDs turn ON; varies with total number of sensing beams and whether Sync beam is blocked)	<table><tr><th></th><th>Beam 1 (Sync Beam)</th><th>All Other Beams</th></tr><tr><td>14 mm Models</td><td>109 to 800 ms</td><td>33 to 220 ms</td></tr><tr><td>30 mm Models</td><td>81 to 495 ms</td><td>25 to 152 ms</td></tr></table>
EDM Input	+24V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver. (See p/n 112852 for more information). **High signal:** 10 to 30V dc at 30 mA typical **Low signal:** 0 to 3V dc
Reset Input	The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver. **High signal:** 10 to 30V dc at 30 mA typical **Low signal:** 0 to 3V dc **Closed switch time:** 0.25 to 2 sec
Safety Outputs (OSSDs)	Two redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake". **ON-State voltage:** ≥ Vin-1.5V dc **OFF-State voltage:** 1.2V dc max. (0-1.2V dc) **Max. load capacitance:** 1.0 µF **Max. load inductance:** 10 H **Leakage current:** 0.50 mA maximum **Cable resistance:** 10 Ω maximum **OSSD test pulse width:** 100 to 300 microseconds **OSSD test pulse period:** 10 to 27 milliseconds (varies with number of beams) **Switching current:** 0-0.5 A
Auxiliary (Aux.) Output Switching Capacity	Current-sourcing (PNP) solid-state output, 24V dc at 75mA max that follow the safety outputs (lockout function optional)
Controls and Adjustments	**Emitter:** **Scan Code selection:** 2-position switch (code 1 or 2). Factory default position is code 1. **Receiver:** **Scan Code selection:** 2-position switch (code 1 or 2). Factory default position is code 1. **Trip/Latch Output selection:** Redundant switches. Factory default position is T (Trip). **EDM/MPCE monitor selection:** 2-position switch selects between 1- or 2-channel monitoring. Factory default position is 2. **Reduced Resolution (2-beam Floating Blanking):** Redundant switches. Factory default is OFF.
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common.
Electrical Safety Class (IEC 61140)	III
Operating Range	**14 mm models:** 0.1 m to 6 m **30 mm models:** 0.1 m to 18 m Range decreases with use of mirrors and/or lens shields: **Lens shields** – approximately 10% less range per shield. **Glass-surface mirrors** – approximately 8% less range per mirror. See Accessory section for more information on a specific mirror, page 194.
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2, ± 2.5° @ 3 m

More on next page

EZ-SCREEN® 14 & 30 mm Resolution Specifications (cont'd)

Enclosure	**Materials:** Extruded aluminum housing with yellow polyester powder (optional black or white or nickel-plated silver finish) and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover. Endcaps on silver models are also nickel-plated. **Rating:** IP65
Operating Conditions	**Temperature:** 0° to +55° C **Relative humidity:** 95% (non-condensing)
Status Indicators	**Emitter:** **One Bi-color (Red/Green) Status Indicator –** indicates operating mode, Lockout or power OFF condition **7-segment Diagnostic Indicator (1 digit) –** indicates proper operation, scan code or error code **Receiver:** **Yellow Reset Indicator –** indicates whether system is ready for operation or requires a reset **Bi-Color (Red/Green) Status Indicator –** indicates general system and output status **Bi-Color (Red/Green) Zone Status Indicators –** indicates condition (clear or blocked beam) of a defined group of beams **7-Segment Diagnostic Indicator (3-digit) –** indicates proper operation, scan code or error code, total number of blocked beams
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets. Models longer than 900 mm also include a swivel center-mount bracket. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.
Shock and Vibration	EZ-SCREEN components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 4 per IEC 61496; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL 3 per IEC 62061; Type 4 per UL 61496-1/-2
Certifications	CE c UL us LISTED
Wiring Diagrams	WD001, WD003, WD004, WD005, WD006, WD007, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (pp. 220-230)

EZ-SCREEN®

Type 4 Low-Profile

- Available in 14 mm resolution for finger, hand and ankle protection or 25 mm resolution for hand and ankle protection
- Features space saving design to fit perfectly into machinery
- Operates in ranges up to 6 m
- Offers optional reduced resolution (floating blanking) to ignore tooling or constant inflow of materials
- Features a 7-segment display for diagnostic information and number of blocked beams
- Identifies clear and blocked beam using zone indicators
- Features user-configurable trip or latch outputs, and Scan Code 1 or 2
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cULus NIPF, and CE certified to Type 4, Cat 4 PLe, and SIL 3
- Resists impact, twisting and abusive environments with a durable aluminum housing and metal endcaps
- Available with nickel-plated ESD-safe housing for protection against electrostatic discharges, clear anodized aluminum or with a “safety” yellow power-coat housing
- Offers optional cascading to create a system that responds to a single stop command

Coming Soon! ***Low-profile models with integral muting***

EZ-SCREEN® Type 4
EZ-SCREEN® Type 2
PICO-GUARD™
CORDSETS PAGE 36
INDICATORS PAGE 192
BRACKETS PAGE 36
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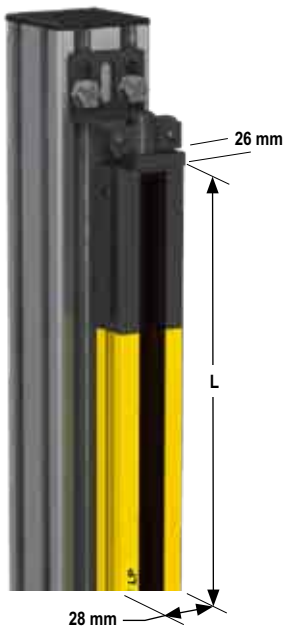
STANDS PAGE 198
INTERFACE PAGE 51

EZ-SCREEN® Low-Profile Light Screen Systems

- Compact 28 x 26 mm housings
- 24V dc supply voltage
- Two solid-state OSSD safety outputs
- Blocked beam zone indicators
- Integral Removable Disconnect (RD) or pigtail Euro-style QD connection
- Multi-directional cable for easy integration into machinery
- QD cordsets ordered separately or in kits (see page 36)
- Metal endcaps for added durability
- User configurable trip or latch outputs and Scan Code 1 or 2
- EDM input and optional TEST function



EZ-SCREEN LP Systems

ONLINE
AUTOCAD, STEP, IGES & PDF

Available Finishes

Yellow Painted Aluminum | Clear Anodized Aluminum | Nickel-Plated ESD

EZ-SCREEN® Low-Profile Systems, 14 mm Resolution

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
270 mm	SLPE14-270P8	SLPR14-270P8	SLPP14-270P88	Pigtail QD, 8-pin M12/Euro	270 mm	10.5 ms	27	140044
	SLPE14-270	SLPR14-270	SLPP14-270	Integral RD				
410 mm	SLPE14-410P8	SLPR14-410P8	SLPP14-410P88	Pigtail QD, 8-pin M12/Euro	410 mm	13.5 ms	41	
	SLPE14-410	SLPR14-410	SLPP14-410	Integral RD				
550 mm	SLPE14-550P8	SLPR14-550P8	SLPP14-550P88	Pigtail QD, 8-pin M12/Euro	549 mm	16.5 ms	55	
	SLPE14-550	SLPR14-550	SLPP14-550	Integral RD				
690 mm	SLPE14-690P8	SLPR14-690P8	SLPP14-690P88	Pigtail QD, 8-pin M12/Euro	689 mm	19.5 ms	69	
	SLPE14-690	SLPR14-690	SLPP14-690	Integral RD				
830 mm	SLPE14-830P8	SLPR14-830P8	SLPP14-830P88	Pigtail QD, 8-pin M12/Euro	829 mm	22.5 ms	83	
	SLPE14-830	SLPR14-830	SLPP14-830	Integral RD				
970 mm	SLPE14-970P8	SLPR14-970P8	SLPP14-970P88	Pigtail QD, 8-pin M12/Euro	969 mm	25.5 ms	97	
	SLPE14-970	SLPR14-970	SLPP14-970	Integral RD				
1110 mm	SLPE14-1110P8	SLPR14-1110P8	SLPP14-1110P88	Pigtail QD, 8-pin M12/Euro	1108 mm	28.5 ms	111	
	SLPE14-1110	SLPR14-1110	SLPP14-1110	Integral RD				
1250 mm	SLPE14-1250P8	SLPR14-1250P8	SLPP14-1250P88	Pigtail QD, 8-pin M12/Euro	1248 mm	31.5 ms	125	
	SLPE14-1250	SLPR14-1250	SLPP14-1250	Integral RD				
1390 mm	SLPE14-1390P8	SLPR14-1390P8	SLPP14-1390P88	Pigtail QD, 8-pin M12/Euro	1388 mm	34.5 ms	139	
	SLPE14-1390	SLPR14-1390	SLPP14-1390	Integral RD				
1530 mm	SLPE14-1530P8	SLPR14-1530P8	SLPP14-1530P88	Pigtail QD, 8-pin M12/Euro	1528 mm	37.5 ms	153	
	SLPE14-1530	SLPR14-1530	SLPP14-1530	Integral RD				
1670 mm	SLPE14-1670P8	SLPR14-1670P8	SLPP14-1670P88	Pigtail QD, 8-pin M12/Euro	1667 mm	40.5 ms	167	
	SLPE14-1670	SLPR14-1670	SLPP14-1670	Integral RD				
1810 mm	SLPE14-1810P8	SLPR14-1810P8	SLPP14-1810P88	Pigtail QD, 8-pin M12/Euro	1807 mm	43.5 ms	181	
	SLPE14-1810	SLPR14-1810	SLPP14-1810	Integral RD				

EZ-SCREEN® Low-Profile Systems, 25 mm Resolution

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
270 mm	SLPE25-270P8	SLPR25-270P8	SLPP25-270P88	Pigtail QD, 8-pin M12/Euro	270 mm	8 ms	14	140044
	SLPE25-270	SLPR25-270	SLPP25-270	Integral RD				
410 mm	SLPE25-410P8	SLPR25-410P8	SLPP25-410P88	Pigtail QD, 8-pin M12/Euro	410 mm	9.5 ms	21	
	SLPE25-410	SLPR25-410	SLPP25-410	Integral RD				
550 mm	SLPE25-550P8	SLPR25-550P8	SLPP25-550P88	Pigtail QD, 8-pin M12/Euro	549 mm	11 ms	28	
	SLPE25-550	SLPR25-550	SLPP25-550	Integral RD				
690 mm	SLPE25-690P8	SLPR25-690P8	SLPP25-690P88	Pigtail QD, 8-pin M12/Euro	689 mm	12.5 ms	35	
	SLPE25-690	SLPR25-690	SLPP25-690	Integral RD				

More on next page

* Only standard yellow housing models are listed. 300 mm Pigtail QD models (example, **SLPE14-270P8**) have yellow PVC cable and black PVC QD overmold.
For other models:
Anodized aluminum housing: Prior to the connection designation (if any) in the model number, add **A** for a clear (brushed) anodized aluminum finish and black endcaps (example, **SLPE14-270AP8**). Pigtail QD models (example, **SLPE14-270AP8**) have black PVC cable and QD overmold.
ESD-safe models: Prior to the connection designation (if any) in the model number, add **N** for a nickel-plated housing and endcaps (example, **SLPE14-270NP8**). Pigtail QD models (example, **SLPE14-270NP8**) have black PVC cable and QD overmold.

** Pigtail QD models require mating cordsets with an 8-pin M12/Euro-style connector (such as **QDE-8..D**, **DEE2R-8..D** or **CSB-M128..M1281**; see page 36). Integral RD models require mating cordsets with a removable disconnect connector (such as **RDLP-8..D** or **DELPE-8..D**; see page 36).

† A pair includes an emitter and receiver.

EZ-SCREEN® Low-Profile Systems, 25 mm Resolution (cont'd)

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
830 mm	SLPE25-830P8	SLPR25-830P8	SLPP25-830P88	Pigtail QD, 8-pin M12/Euro	829 mm	14 ms	42	140044
	SLPE25-830	SLPR25-830	SLPP25-830	Integral RD				
970 mm	SLPE25-970P8	SLPR25-970P8	SLPP25-970P88	Pigtail QD, 8-pin M12/Euro	969 mm	15.5 ms	49	
	SLPE25-970	SLPR25-970	SLPP25-970	Integral RD				
1110 mm	SLPE25-1110P8	SLPR25-1110P8	SLPP25-1110P88	Pigtail QD, 8-pin M12/Euro	1108 mm	17 ms	56	
	SLPE25-1110	SLPR25-1110	SLPP25-1110	Integral RD				
1250 mm	SLPE25-1250P8	SLPR25-1250P8	SLPP25-1250P88	Pigtail QD, 8-pin M12/Euro	1248 mm	18.5 ms	63	
	SLPE25-1250	SLPR25-1250	SLPP25-1250	Integral RD				
1390 mm	SLPE25-1390P8	SLPR25-1390P8	SLPP25-1390P88	Pigtail QD, 8-pin M12/Euro	1388 mm	20 ms	70	
	SLPE25-1390	SLPR25-1390	SLPP25-1390	Integral RD				
1530 mm	SLPE25-1530P8	SLPR25-1530P8	SLPP25-1530P88	Pigtail QD, 8-pin M12/Euro	1528 mm	21 ms	77	
	SLPE25-1530	SLPR25-1530	SLPP25-1530	Integral RD				
1670 mm	SLPE25-1670P8	SLPR25-1670P8	SLPP25-1670P88	Pigtail QD, 8-pin M12/Euro	1668 mm	22.5 ms	84	
	SLPE25-1670	SLPR25-1670	SLPP25-1670	Integral RD				
1810 mm	SLPE25-1810P8	SLPR25-1810P8	SLPP25-1810P88	Pigtail QD, 8-pin M12/Euro	1807 mm	24 ms	91	
	SLPE25-1810	SLPR25-1810	SLPP25-1810	Integral RD				

EZ-SCREEN® Low-Profile Cascade Systems, 14 mm Resolution

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
410 mm	SLPCE14-410P8	SLPCR14-410P8	SLPCP14-410P88	Pigtail QD, 8-pin M12/Euro	410 mm	13.5 ms	41	140044
	SLPCE14-410	SLPCR14-410	SLPCP14-410	Integral RD				
550 mm	SLPCE14-550P8	SLPCR14-550P8	SLPCP14-550P88	Pigtail QD, 8-pin M12/Euro	549 mm	16.5 ms	55	
	SLPCE14-550	SLPCR14-550	SLPCP14-550	Integral RD				
690 mm	SLPCE14-690P8	SLPCR14-690P8	SLPCP14-690P88	Pigtail QD, 8-pin M12/Euro	689 mm	19.5 ms	69	
	SLPCE14-690	SLPCR14-690	SLPCP14-690	Integral RD				
830 mm	SLPCE14-830P8	SLPCR14-830P8	SLPCP14-830P88	Pigtail QD, 8-pin M12/Euro	829 mm	22.5 ms	83	
	SLPCE14-830	SLPCR14-830	SLPCP14-830	Integral RD				
970 mm	SLPCE14-970P8	SLPCR14-970P8	SLPCP14-970P88	Pigtail QD, 8-pin M12/Euro	969 mm	25.5 ms	97	
	SLPCE14-970	SLPCR14-970	SLPCP14-970	Integral RD				
1110 mm	SLPCE14-1110P8	SLPCR14-1110P8	SLPCP14-1110P88	Pigtail QD, 8-pin M12/Euro	1108 mm	28.5 ms	111	
	SLPCE14-1110	SLPCR14-1110	SLPCP14-1110	Integral RD				

* Only standard yellow housing models are listed. Pigtail QD models (example, **SLPE25-830P8**) have yellow PVC cable and black PVC QD overmold.
For other models:
Anodized aluminum housing: Prior to the connection designation (if any) in the model number, add **A** for a clear (brushed) anodized aluminum finish and black endcaps (example, **SLPE25-830AP8**). Pigtail QD models (example, **SLPE25-830AP8**) have black PVC cable and QD overmold.
ESD-safe models: Prior to the connection designation (if any) in the model number, add **N** for a nickel-plated housing and endcaps (example, **SLPE25-830NP8**). Pigtail QD models (example, **SLPE25-830NP8**) have black PVC cable and QD overmold.
** Pigtail QD models require mating cordsets with an 8-pin M12/Euro-style connector (such as **QDE-8..D**, **DEE2R-8..D** or **CSB-M128..M1281**; see page 36). Integral RD models require mating cordsets with a removable disconnect connector (such as **RDLP-8..D** or **DELPE-8..D**; see page 36).
† A pair includes an emitter and receiver.

More on next page

EZ-SCREEN® Low-Profile Cascade Systems, 14 mm Resolution (cont'd)

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
1250 mm	SLPCE14-1250P8	SLPCR14-1250P8	SLPCP14-1250P88	Pigtail QD, 8-pin M12/Euro	1248 mm	31.5 ms	125	140044
	SLPCE14-1250	SLPCR14-1250	SLPCP14-1250	Integral RD				
1390 mm	SLPCE14-1390P8	SLPCR14-1390P8	SLPCP14-1390P88	Pigtail QD, 8-pin M12/Euro	1388 mm	34.5 ms	139	
	SLPCE14-1390	SLPCR14-1390	SLPCP14-1390	Integral RD				
1530 mm	SLPCE14-1530P8	SLPCR14-1530P8	SLPCP14-1530P88	Pigtail QD, 8-pin M12/Euro	1528 mm	37.5 ms	153	
	SLPCE14-1530	SLPCR14-1530	SLPCP14-1530	Integral RD				
1670 mm	SLPCE14-1670P8	SLPCR14-1670P8	SLPCP14-1670P88	Pigtail QD, 8-pin M12/Euro	1667 mm	40.5 ms	167	
	SLPCE14-1670	SLPCR14-1670	SLPCP14-1670	Integral RD				
1810 mm	SLPCE14-1810P8	SLPCR14-1810P8	SLPCP14-1810P88	Pigtail QD, 8-pin M12/Euro	1807 mm	43.5 ms	181	
	SLPCE14-1810	SLPCR14-1810	SLPCP14-1810	Integral RD				

EZ-SCREEN® Low-Profile Cascade Systems, 25 mm Resolution

Defined Area	Models*			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
	Emitter	Receiver	Pair†					
410 mm	SLPCE25-410P8	SLPCR25-410P8	SLPCP25-410P88	Pigtail QD, 8-pin M12/Euro	410 mm	9.5 ms	21	140044
	SLPCE25-410	SLPCR25-410	SLPCP25-410	Integral RD				
550 mm	SLPCE25-550P8	SLPCR25-550P8	SLPCP25-550P88	Pigtail QD, 8-pin M12/Euro	549 mm	11 ms	28	
	SLPCE25-550	SLPCR25-550	SLPCP25-550	Integral RD				
690 mm	SLPCE25-690P8	SLPCR25-690P8	SLPCP25-690P88	Pigtail QD, 8-pin M12/Euro	689 mm	12.5 ms	35	
	SLPCE25-690	SLPCR25-690	SLPCP25-690	Integral RD				
830 mm	SLPCE25-830P8	SLPCR25-830P8	SLPCP25-830P88	Pigtail QD, 8-pin M12/Euro	829 mm	14 ms	42	
	SLPCE25-830	SLPCR25-830	SLPCP25-830	Integral RD				
970 mm	SLPCE25-970P8	SLPCR25-970P8	SLPCP25-970P88	Pigtail QD, 8-pin M12/Euro	969 mm	15.5 ms	49	
	SLPCE25-970	SLPCR25-970	SLPCP25-970	Integral RD				
1110 mm	SLPCE25-1110P8	SLPCR25-1110P8	SLPCP25-1110P88	Pigtail QD, 8-pin M12/Euro	1108 mm	17 ms	56	
	SLPCE25-1110	SLPCR25-1110	SLPCP25-1110	Integral RD				
1250 mm	SLPCE25-1250P8	SLPCR25-1250P8	SLPCP25-1250P88	Pigtail QD, 8-pin M12/Euro	1248 mm	18.5 ms	63	
	SLPCE25-1250	SLPCR25-1250	SLPCP25-1250	Integral RD				
1390 mm	SLPCE25-1390P8	SLPCR25-1390P8	SLPCP25-1390P88	Pigtail QD, 8-pin M12/Euro	1388 mm	20 ms	70	
	SLPCE25-1390	SLPCR25-1390	SLPCP25-1390	Integral RD				
1530 mm	SLPCE25-1530P8	SLPCR25-1530P8	SLPCP25-1530P88	Pigtail QD, 8-pin M12/Euro	1528 mm	21 ms	77	
	SLPCE25-1530	SLPCR25-1530	SLPCP25-1530	Integral RD				
1670 mm	SLPCE25-1670P8	SLPCR25-1670P8	SLPCP25-1670P88	Pigtail QD, 8-pin M12/Euro	1668 mm	22.5 ms	84	
	SLPCE25-1670	SLPCR25-1670	SLPCP25-1670	Integral RD				
1810 mm	SLPCE25-1810P8	SLPCR25-1810P8	SLPCP25-1810P88	Pigtail QD, 8-pin M12/Euro	1807 mm	24 ms	91	
	SLPCE25-1810	SLPCR25-1810	SLPCP25-1810	Integral RD				

* Only standard yellow housing models are listed. Pigtail QD models (example, **SLPCE25-1670P8**) have yellow PVC cable and black PVC QD overmold.
For other models:
Anodized aluminum housing: Prior to the connection designation (if any) in the model number, add **A** for a clear (brushed) anodized aluminum finish and black endcaps (example, **SLPCE25-1670AP8**). Pigtail QD models (example, **SLPCE25-1670AP8**) have black PVC cable and QD overmold.
ESD-safe models: Prior to the connection designation (if any) in the model number, add **N** for a nickel-plated housing and endcaps (example, **SLPCE25-1670NP8**). Pigtail QD models (example, **SLPCE25-1670NP8**) have black PVC cable and QD overmold.
** Pigtail QD models require mating cordsets with an 8-pin M12/Euro-style connector (such as **QDE-8..D**, **DEE2R-8..D** or **CSB-M128..M1281**; see page 36).
Integral RD models require mating cordsets with a removable disconnect connector (such as **RDLP-8..D** or **DELPE-8..D**; see page 36).
† A pair includes an emitter and receiver.

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Kits

You can purchase a kit that contains an emitter and receiver of equal length and resolution; brackets; and optional interfacing solution and quick-disconnect cordsets. Detailed information about individual kit components is as follows.

To Order:

1. Choose model, resolution and defined area.
2. Yellow housing is standard. To choose an optional housing, add an **A** or **N** prior to the connection designation:

   A for anodized aluminum (clear) finish with black endcaps (example, **SLPK25-270A**). †

   N for ESD-safe models with a nickel-plated housing and endcaps (example, **SLPK25-270N**). †
3. Choose the connection: 300 mm M12/Euro-Style Pigtail QD or integral Removable Disconnect (RD).
4. Choose an optional interfacing solution, such as an **IM-T-9A** or **-11** interfacing model.

See EZ-SCREEN LP manual (p/n 140044) or www.bannerengineering.com for complete information and a current listing of accessories and options for kitting components. Call factory with questions regarding accessories.

† Optional housings with Pigtail QD models have a black 300 mm PVC cable and QD overmold.

5. Choose one cordset for each sensor or two cordsets for a pair.

   M12/Euro Pigtail QD models (example, **SLPK25-270P88**) require mating 8-pin M12/Euro QD cordsets, such as:
   - QDE cordset with flying leads
   - DEE2R double-ended cordset
   - CSB series splitter cordset

   Integral RD models (example, **SLPK25-270**) require mating cordsets, such as:
   - RDLP cordset with flying leads
   - DELPE double-ended cordset with M12/Euro QD (requires additional mating 8-pin M12/Euro QD cordsets)
   - DELP cordset in cascade application for connection of 2nd, 3rd and 4th sensors

Kit Model Key

Model Style	Kit	Resolution		Defined Area	Finish	Connection		Interfacing Options	QD Cordset Length Options
S L P	K	1 4	—	2 7 0		P 8 8	—	1	R 1 5 E 2 5

Model Style

SLP = Standard
SLPC = Cascade

Kit

K = Kit

SLS Resolution

14 = 14 mm
25 = 25 mm

Sensor Finish

Blank = Yellow powder coat
A = Clear anodized Aluminum
N = Nickel plated (ESD)

QD Cordset Length Examples

RE15 = 4.6 m, 2 each
RE25 = 8 m, 2 each
R15E25 = 4.6 m (Receiver) & 8 m (Emitter)
R25E15 = 8 m (Receiver) & 4.6 m (Emitter)
DD1 = 0.3 m, 2 each, DEE2R-8xxD, DELPE-8xxD or DELP-11xxxE, depending on QD option
C1D15 = CSB-M1281M1281 (Receiver) DEE2R-815D (Emitter)
C8D25 = CSB-M1288M1281 (Receiver) DEE2R-850D (Emitter)
CU25D25 = CSB-UNT825M1281 (Receiver DEE2R-825D (Emitter)

Defined Area

270 mm *
410 mm
550 mm
690 mm
830 mm
970 mm
1110 mm
1250 mm
1390 mm
1530 mm
1670 mm
1810 mm

* 270 mm not available in cascade models

Connection Options

P88 = Two 300 mm pigtail with 8-pin Euro-style QD connector. Used with QDE-8xxD, DEE2R-8xxD or CSB-M1281M128xx. Cordsets ordered separately.
R88 = Two RDLP-8xxD Removable Disconnect cordsets with flying lead wires
D88 = Two DELPE-8xxD with 8-pin Euro-style QD connector. Used with QDE-8xxD, DEE2R-8xxD or CSB-M1281M128xx. Cordsets ordered separately.
D1111 = Two DELP-11xxxE cordsets for 2nd, 3rd or 4th SLPC cascade sensors.

Interfacing Options

1 = IM-T-9A Interface Module, 1 each
2 = IM-T-11A Interface Module, 1 each
3 = 11-BG00-31-D-024 Contactors (10A), 2 each
4 = BF1801L-024 Contactors (18A), 2 each
5 = EZAC-R9-QE8 = AC Interface Box (3 NO), 1 each
6 = EZAC-R11-QE8 = AC Interface Box (2 NO/1 NC), 1 each

NOTE: See notes under model number tables. Not all combinations are listed. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

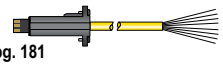
Accessories

EZ-SCREEN® (Type 4–Low-Profile)

Cordsets

For use with models with integral RD connections. All standard cordsets are yellow PVC with black overmold. For black PVC cable and overmold, add suffix B to model number (example, RDLP-815DB).

RD to Flying Leads



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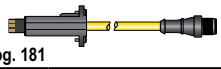
Length	8-Wire
4.6 m	RDLP-815D
8 m	RDLP-825D
15.3 m	RDLP-850D
23 m	RDLP-875D
30.5 m	RDLP-8100D

RD* to Euro QD



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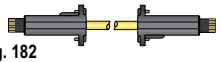
Length	8-Pin
0.3 m	DELPE-81D
1 m	DELPE-83D
2.5 m	DELPE-88D
4.6 m	DELPE-815D
8 m	DELPE-825D
15.3 m	DELPE-850D
23 m	DELPE-875D
30.5 m	DELPE-8100D

* Requires mating 8-pin M12/Euro cordset, such as those listed below.

RD to RD



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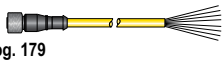
Length	Cascade
0.05 m	DELP-110E
0.3 m	DELP-111E
1 m	DELP-113E
2.5 m	DELP-118E
4.6 m	DELP-1115E
8 m	DELP-1125E
15.3 m	DELP-1150E
23 m	DELP-1175E
30.5 m	DELP-11100E

For use with models with Pigtail QD and DELPE-8xxD connections.

Euro QD to Flying Leads



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Length	8-Pin
4.5 m	QDE-815D
7.6 m	QDE-825D
15.2 m	QDE-850D
22.8 m	QDE-875D
30.4 m	QDE-8100D

Euro QD–Double-Ended

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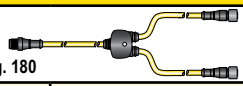
Length	8-Pin
0.3 m	DEE2R-81D
0.9 m	DEE2R-83D
2.5 m	DEE2R-88D
4.6 m	DEE2R-815D
7.6 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D

Euro QD Splitter



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Length	8-Pin
0 m	CSB-M1280M1280
0.3 m	CSB-M1281M1281
2.5 m	CSB-M1288M1281
4.6 m	CSB-M12815M1281
7.6 m	CSB-M12825M1281
7.6 m	CSB-UNT825M1281

Brackets

Low-Profile 14 & 25 mm

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LPA-MBK-11*

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LPA-MBK-12*

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LPA-MBK-20

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LPA-MBK-22

Low-Profile 14 & 25 mm–Cascade

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LPA-MBK-21

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LPA-MBK-90

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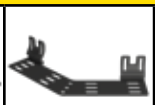
LPA-MBK-120



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LPA-MBK-135

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LPA-MBK-180

* Standard brackets included with emitter/receiver
Additional brackets are available, see page 164.

Replacement Parts

Model	Description
STP-13	14 mm test piece (for 14 mm resolution systems)
STP-17	34 mm test piece (for 14 mm resolution systems with 2-beam reduced resolution enabled)
STP-16	25 mm test piece (for 25 mm resolution systems)
STP-18	65 mm test piece (for 25 mm resolution systems with 2-beam reduced resolution enabled)
LPA-TP-1	Terminator plug, for emitter or receiver

Model	Description
DELPE-81D	Replacement for M12-terminated pigtail QD, as shipped with standard pigtail QD models; 8-conductor cable, 24 AWG; 0.3 m long
LPA-MBK-11	End-cap bracket kit (includes 2 end brackets and hardware to mount one sensor to MSA series stands; 360° sensor rotation; 14 ga (1.9 mm) steel, black zinc plated; die-cast zinc end-cap plate
LPA-MBK-12	Side-mount bracket kit (includes 1 bracket and hardware to mount to MSA Series stands; +10°/ −30° sensor rotation; 14 ga (1.9 mm) steel, black zinc plated; die-cast zinc clamp

NOTE: See page 51 for interfacing solutions.
Additional accessories are listed on page 163.

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Specifications

Supply Voltage at the Device	24V dc ±15% (use a SELV-rated supply according to EN IEC60950) (The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds, as specified in EN/IEC 60204-1.)
Residual Ripple	± 10% maximum
Supply Current	**Emitter:** 100 mA max. **Receiver:** 275 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each) and Aux Output load (up to an additional 0.25A)
Response Time	8 to 43.5 milliseconds **Cascade safety stop interface (CSSI):** 40 miliseconds max.
Remote Test Input	Test mode is activated either by applying a low signal (less than 3V dc) to emitter Test/Reset terminal for a minimum of 50 milliseconds, or by opening a switch connected between Test/Reset and 24V dc for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal at Test/Reset deactivates Test Mode. (See p/n 140044 for more information.) **High Signal:** 10 to 30V dc **Low Signal:** 0 to 3V dc **Input Current:** 35 mA inrush, 10 mA max.
Wavelength of Emitter Elements	Infrared LEDs, 850 nm at peak emission
Recovery Time–Blocked to clear (OSSDs turn ON; varies with total number of sensing beams and whether Sync beam is blocked)	<table><tr><th></th><th>Beam 1 (Sync Beam)</th><th>All Other Beams</th></tr><tr><td>14 mm Models</td><td>109 to 800 ms</td><td>33 to 220 ms</td></tr><tr><td>25 mm Models</td><td>81 to 495 ms</td><td>25 to 152 ms</td></tr></table>
EDM Input	+24V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver (see p/n 140044 for more information). **High Signal:** 10 to 30V dc at 30 mA typical **Low Signal:** 0 to 3V dc **Dropout Time:** 200 ms max.
Reset Input	The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver. **High Signal:** 10 to 30V dc at 30 mA typical **Low Signal:** 0 to 3V dc **Closed Switch Time:** 0.25 to 2 seconds
Safety Outputs (OSSDs)	Two redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner “Safety Handshake”. **ON-State voltage:** ≥ Vin-1.5V dc **OFF-State voltage:** 1.2V dc max. (0-1.2V dc) **Max. load capacitance:** 1.0 µF **Max. load inductance:** 10 H **Leakage Current:** 0.50 mA maximum **Cable Resistance:** 10 Ω maximum **OSSD test pulse width:** 100 to 300 microseconds **OSSD test pulse period:** 10 to 22 milliseconds (varies with number of beams) **Switching Current:** 0-0.5 A
Auxiliary (Aux.) /Fault Output Switching Capacity	Current-sourcing (PNP) Solid-state output, 24V dc at 250 mA max. that follow safety outputs or lock out status (configurable)

More on next page

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Specifications (cont'd)

Controls and Adjustments	**Emitter:** **Scan Code selection:** 2-position switch (code 1 or 2). Factory default position is code 1. **Test/Reset:** 2-position switch. Factory default position is Reset. **Invert Display:** 2-position switch default is OFF **Receiver:** **Scan Code selection:** 2-position switch (code 1 or 2). Factory default position is code 1. **Trip/Latch Output selection:** Redundant switches. Factory default position is T (trip). **EDM/MPCE monitor selection:** 2-position switch selects between 1- or 2-channel monitoring. Factory default position is 2. **Reduced Resolution:** Redundant switches. Factory default position is OFF. **Aux/Fault:** 2-position switch. Factory default position is Aux. **Invert Display:** 2-position switch. Factory default is OFF.
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common.
Electrical Safety Class (IEC 61140)	III
Operating Range	6 m Range decreases with use of mirrors and/or lens shields: **Lens shields** – approximately 10% less range per shield. **Glass-surface mirrors** – approximately 8% less range per mirror. See the Accessory section for more information on a specific mirror page 194, for further information.
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2, ± 2.5° @ 3 m
Enclosure	**Materials:** Extruded aluminum housing with yellow polyester powder finish standard (optional clear anodized aluminum or nickel-plated silver finish) and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover. End caps on silver models are also nickel-plated. ESD-safe models have static-dissipative acrylic lens cover. **Rating:** IP65
Operating Conditions	**Temperature:** 0° to +55° C **Max. Relative Humidity:** 95% maximum relative humidity (non-condensing)
Status Indicators	**Emitter:** **One Bi-color (Red/Green) status indicator–** indicates operating mode, lockout or power OFF condition **7-segment Diagnostic Indicator (1 digit) –** indicates proper operation, scan code or error code **Receiver:** **Yellow Reset indicator** – indicates whether system is ready for operation or requires a reset **Bi-color (Red/Green) Status indicator** – indicates general system and output status **Bi-color (Red/Green) Zone Status indicators** – indicate condition (clear or blocked beam) of a defined group of beams **7-Segment Diagnostic indicator (1 digit)** – indicates proper operation, scan code, or error code, total number of blocked beams
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets and two swivel side-mounting brackets. Models longer than 690 mm also include one or more additional side-mount brackets for center support. See P/N 140044 for more information.
Shock and Vibration	EZ-SCREEN LP components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 4 per IEC 61496; Type 4 per UL 61496-1/-2; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL3 per IEC 62061
Certifications	CE c UL us LISTED
Wiring Diagrams	WD002, WD003, WD004, WD005, WD006, WD007, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (pp. 220-230)

EZ-SCREEN®

Type 2 Point-of-Operation

- A low-cost solution is suited to lower-risk applications where the result of an accident is only a slight injury such as a bump, bruise, knockdown or trapping (but not crushing), minor cuts and abrasions.
- Simple two-piece system requires no control box.
- 30 mm resolution detects narrow objects, such as a hand or ankle across long spans up to 15 m.
- System meets all requirements for Type 2 devices per IEC 61496.
- System performs continual internal self-tests and provides Test function for external safety checks.
- Dedicated models eliminate selectable functions, DIP switches and programming.
- Trip output model automatically resets when the beam is cleared; Latch output model requires a manual reset.
- Fast response times of 11 to 25 milliseconds shutdown machinery quickly.

EZ-SCREEN® Type 4
EZ-SCREEN® Type 2
PICO-GUARD™
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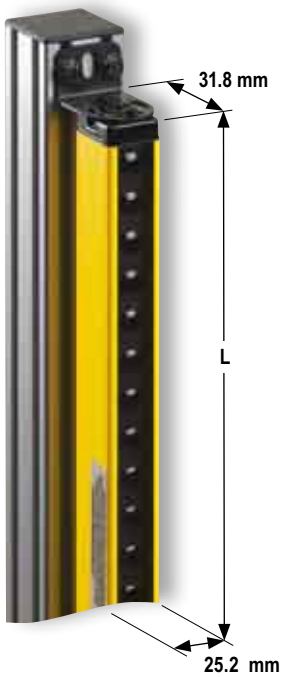
INTERFACE PAGE 51

EZ-SCREEN® Type 2 Systems

- Economical, compact optical safeguarding
- Type 2 per IEC 61496
- 30 mm resolution and 15 m range
- 24V dc supply voltage
- Two solid-state OSSD safety outputs
- Latch or trip output, depending on model
- 8-pin Euro QD connection
- QD cordsets ordered separately or in kits (see page 42)
- IEC IP65 housing



EZ-SCREEN Type 2 Systems

ONLINE
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Full View

Yellow Painted Aluminum

EZ-SCREEN® Type 2 Systems, 30 mm Resolution–15 m Range

Defined Area	Output	Models			Connection**	Housing Length (L)	Response Time	# of Beams	Data Sheet
		Emitter	Receiver	Pair†					
150 mm	Trip	LS2E30-150Q8	LS2TR30-150Q8	LS2TP30-150Q88	8-pin Euro QD	215 mm	11 ms	8	122452
	Latch		LS2LR30-150Q8	LS2LP30-150Q88					
300 mm	Trip	LS2E30-300Q8	LS2TR30-300Q8	LS2TP30-300Q88		365 mm	13 ms	16	
	Latch		LS2LR30-300Q8	LS2LP30-300Q88					
450 mm	Trip	LS2E30-450Q8	LS2TR30-450Q8	LS2TP30-450Q88		515 mm	14 ms	24	
	Latch		LS2LR30-450Q8	LS2LP30-450Q88					
600 mm	Trip	LS2E30-600Q8	LS2TR30-600Q8	LS2TP30-600Q88		665 mm	16 ms	32	
	Latch		LS2LR30-600Q8	LS2LP30-600Q88					
750 mm	Trip	LS2E30-750Q8	LS2TR30-750Q8	LS2TP30-750Q88		815 mm	17 ms	40	
	Latch		LS2LR30-750Q8	LS2LP30-750Q88					
900 mm	Trip	LS2E30-900Q8	LS2TR30-900Q8	LS2TP30-900Q88		964 mm	19 ms	48	
	Latch		LS2LR30-900Q8	LS2LP30-900Q88					
1050 mm	Trip	LS2E30-1050Q8	LS2TR30-1050Q8	LS2TP30-1050Q88		1114 mm	21 ms	56	
	Latch		LS2LR30-1050Q8	LS2LP30-1050Q88					
1200 mm	Trip	LS2E30-1200Q8	LS2TR30-1200Q8	LS2TP30-1200Q88		1264 mm	22 ms	64	
	Latch		LS2LR30-1200Q8	LS2LP30-1200Q88					
1350 mm	Trip	LS2E30-1350Q8	LS2TR30-1350Q8	LS2TP30-1350Q88		1414 mm	24 ms	72	
	Latch		LS2LR30-1350Q8	LS2LP30-1350Q88					
1500 mm	Trip	LS2E30-1500Q8	LS2TR30-1500Q8	LS2TP30-1500Q88		1563 mm	25 ms	80	
	Latch		LS2LR30-1500Q8	LS2LP30-1500Q88					

† A pair includes an emitter and receiver.
** A model with a QD requires a mating cordset (see page 42).

EZ-SCREEN® Type 2 Kits

You can purchase a kit that contains an emitter and receiver of equal length; brackets; and optional interfacing solution and quick-disconnect cordsets. Detailed information about individual kit components is as follows.

To Order:

1. Choose model, output and defined area.
2. Choose an optional interfacing solution, such as an **IM-T-9A** or **-11** interfacing model.
3. Choose one cordset for each sensor or two cordsets for a pair. Require mating 8-pin M12/Euro QD cordsets, such as:
   - QDE cordset with flying leads
   - DEE2R double-ended cordset
   - CSB series splitter cordset

See EZ-SCREEN Type 2 manual (p/n 122452) or www.bannerengineering.com for complete information and a current listing of accessories and options for kitting components. Call factory with questions regarding accessories.

Kit Model Key

Model Style	Kit	Resolution	Defined Area	Connection	Interfacing Options	QD Cordset Length Options
L S 2 T	K	3 0	6 0 0	Q 8 8	1	R E 2 5

Model Style

LS2T = Type 2 Light Screen (Trip)
LS2L = Type 2 Light Screen (Latch)

Kit

K = Kit

Resolution

30 = 30 mm

Defined Area

150 mm
300 mm
450 mm
600 mm
750 mm
900 mm
1050 mm
1200 mm
1350 mm
1500 mm

Receiver & Emitter QD Options

Q88 = Receiver with integral 8-pin Euro-style QD Emitter with integral 8-pin Euro-style QD

QD Cordset Length Examples

RE15 = 4.5 m, 2 each
RE25 = 7.6 m, 2 each
R15E25 = 4.5 m (Receiver) & 7.6 m (Emitter)
R25E15 = 8 m (Receiver) & 5 m (Emitter)
RE50 = 15.2 m, 2 each
R15E50 = 4.6 m (Receiver) & 15.2 m (Emitter)
R50E15 = 15.2 m (Receiver) & 4.6 m (Emitter)
R25E50 = 7.6 m (Receiver) & 15.2 m (Emitter)
R50E25 = 15.2 m (Receiver) & 7.6 m (Emitter)
RE75 = 22.8 m, 2 each
RE100 = 30.4 m, 2 each

Interfacing Examples

1 = IM-T-9A Interface Module, 1 each
2 = IM-T-11A Interface Module, 1 each
3 = 11-BG00-31-D-024 Contactors (10A), 2 each
4 = BF1801L-024 Contactors (18A), 2 each
10 = UM-FA-9A
11 = UM-FA-11A

NOTE: See notes under model number tables. Not all combinations are listed below.
Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

Accessories

EZ-SCREEN® (Type 2–30 mm Resolution)

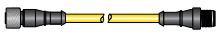
Cordsets

Euro QD to Flying Leads

pg. 179

Length	8-Pin
4.5 m	QDE-815D
7.6 m	QDE-825D
15.2 m	QDE-850D
22.8 m	QDE-875D
30.4 m	QDE-8100D

Euro QD–Double-Ended



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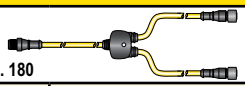
Length	8-Pin
0.3 m	DEE2R-81D
0.9 m	DEE2R-83D
2.5 m	DEE2R-88D
4.6 m	DEE2R-815D
7.6 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D

Euro QD Splitter



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Length	8-Pin
0 m	CSB-M1280M1280
0.3 m	CSB-M1281M1281
2.5 m	CSB-M1288M1281
4.6 m	CSB-M12815M1281
7.6 m	CSB-M12825M1281
7.6 m	CSB-UNT825M1281

Brackets

30 mm–Type 2

 pg. 176	 pg. 176	 pg. 176	 pg. 167	 pg. 176
USCMB-..	USMB-1	USMB-6	EZA-MBK-2	USMB-8

NOTE: See page 51 for interfacing solutions. Additional accessories are listed on page 163.

Replacement Parts

Model	Description
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Keyed reset switch (same as that included in kits)
STP-14	30 mm test piece
USCMB-1	Center bracket kit and hardware to mount to MSA series stands (1 bracket, for 700 to 900 mm long sensors)
USCMB-2	Center bracket kit and hardware to mount to MSA series stands (2 brackets, for 1050 to 1500 mm long sensors)

EZ-SCREEN® Type 2 Specifications

Supply Voltage at the Device	24V dc ±20% (PELV) (The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds as specified in EN/IEC 60204-1.)
Supply Current	**Emitter:** 50 mA max. **Receiver:** 90 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Wavelength of Emitter Elements	Infrared LEDs, 950 nm at peak emission
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common*
Electrical Safety Class	III (per IEC 61140)
Operating Range	0.2 m to 15 m Range decreases with use of mirrors and/or lens shields: **Lens shields** – approximately 10% less range per shield. **Glass-surface mirrors** – approximately 8% less range per mirror. See Accessory section for more information on a specific mirror, page 194.
Effective Aperture Angle (EAA)	Meets Type 2 requirements per IEC 61496-2; ± 5° @ 3 m
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Immune as per IEC 61496-2
Response Time	Dependent on number of beams; see Models table on page 40.
EDM Input	"Power Monitoring" accomplished via Reset/Remote Test input
Reset Input / Remote Test Input	Connect to +24V dc via a normally closed (NC) reset switch **Auto Rest (Trip Output) Models:** Test/Reset **Manual Rest (Latch Output) Models:** Test/Restart/Reset
Safety Outputs	Two redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Not compatible with the Banner "Safety Handshake." **ON-State voltage:** > Vin-1.5V dc **OFF-State voltage:** 0.2V dc max. **Max. load capacitance:** 0.1 µF **Min. load resistance:** 48 Ω **Open ground leakage current:** 0.65 mA max. **OSSD test pulse width:** 0.2 - 0.25 milliseconds **OSSD test pulse period:** 260 milliseconds
Enclosure	**Materials:** Extruded aluminum housing with yellow polyester powder finish and well-sealed, rugged die-cast zinc end caps, acrylic lens cover **Rating:** IP65
Operating Conditions	**Temperature:** 0° to +55° C **Relative humidity:** 95% maximum (non-condensing)
Shock and Vibration	EZ-SCREEN Type 2 components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 2 per IEC 61496-1, -2; Type 2 per UL 61496-1/-2; Category 2 per EN 954-1
Certifications	CE c UL us LISTED
Wiring Diagrams	**Emitter:** WD008 (p. 223) **Receiver with 2 Solid-State OSSDs, 2 FSDs and Power Monitoring:** WD009 (p. 224) **Power Monitoring of IM-T-9A Interface Module:** WD010 (p. 224)

CORDSETS PAGE 48
INDICATORS PAGE 192
BRACKETS PAGE 48
MIRRORS PAGE 194
STANDS PAGE 198
LENS SHIELDS PAGE 199
ENCLOSURES PAGE 202
INTERFACE PAGE 51

EZ-SCREEN®
Grids and Points

- Suited to a variety of access and long-range perimeter guarding applications
- Uses 1-, 2-, 3- or 4 beams to protect personnel and machinery
- Operates in ranges from 0.8 to 20 m or 15 to 70 m, depending on model
- Displays operating status, configuration and error codes
- Includes blocked beam zone indicators
- Features user-configurable trip or latch outputs, and Scan Code 1 or 2
- Can be combined with other devices, such as mirrors and Points, for a custom configuration
- Resists impact, twisting and abusive environments with a durable aluminum housing and metal endcaps
- Exceeds control reliability requirements and is certified per CE (Type 4/Category 4) and cULus (NIPF, Type 4) applications
- Offers optional lens shields and enclosures for added durability

EZ-SCREEN® Grid & Point Systems

- One to four beam models for access or perimeter guarding applications
- Two solid-state OSSD safety outputs
- 24V dc supply voltage
- Range from 0.8 to 20 m or 15 to 70 m, depending on model
- 7-segment diagnostic display
- Bi-color status indicator
- Type 4 per IEC 61496
- User configurable trip or latch outputs and Scan Code 1 or 2
- Configuration access port
- Models with integral Mini and Euro QD, or wiring terminal chamber
- QD cordsets ordered separately or kits (see page 48)

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EZ-SCREEN Grid Systems

EZ-SCREEN Point Systems

EZ-SCREEN Grid

Full View

EZ-SCREEN Point

EZ-SCREEN® Grid & Point Systems

Protected Height	Beam Spacing	Range	Models* Emitter	Models* Receiver	Models* Pair†	Connection**	Housing Length (L)	Data Sheet
1066 mm	 533 mm	0.8 - 20 m	SGE3-533Q8E	SGR3-533Q8E	SGP3-533Q88E	8-pin Euro QD	1251 mm	
		15 - 70 m	SGXLE3-533Q8E		SGXLP3-533Q88E			
900 mm	 300 mm	0.8 - 20 m	SGE4-300Q8E	SGR4-300Q8E	SGP4-300Q88E		1084 mm	
		15 - 70 m	SGXLE4-300Q8E		SGXLP4-300Q88E			
800 mm	 400 mm	0.8 - 20 m	SGE3-400Q8E	SGR3-400Q8E	SGP3-400Q88E		984 mm	68410
		15 - 70 m	SGXLE3-400Q8E		SGXLP3-400Q88E			
584 mm	 584 mm	0.8 - 20 m	SGE2-584Q8E	SGR2-584Q8E	SGP2-584Q88E		768 mm	
		15 - 70 m	SGXLE2-584Q8E		SGXLP2-584Q88E			
500 mm	 500 mm	0.8 - 20 m	SGE2-500Q8E	SGR2-500Q8E	SGP2-500Q88E		684 mm	
		15 - 70 m	SGXLE2-500Q8E		SGXLP2-500Q88E			
N/A	 1-BEAM	0.8 - 20 m	SPE1Q8E	SPR1Q8E	SPP1Q88E		149 mm	68413
		15 - 70 m	SPXLE1Q8E		SPXLP1Q88E			

* For emitters and receivers with a wiring terminal chamber, remove the **Q8E** or **Q88E** from the model number (example, **SGE4-300**). For an emitter with a 5-pin Mini QD and TEST function, replace **Q8E** with **Q5** on emitter model numbers (example, **SGE4-300Q5**) and **Q88E** with **Q85** on pair model numbers (example, **SGP4-300Q85**). For emitters with a 3-pin Mini QD, replace **Q8E** with **Q3** (example, **SGE4-300Q3**); and for receivers with an 8-pin Mini QD, replace **Q8E** with **Q8** on model numbers (example, **SGE4-300Q8**); or for a pair replace **Q88E** with **Q83** (example, **SGP4-300Q83**). A model with a QD requires a mating cordset (see page 48).

† A pair includes an emitter and receiver (example, **SGP4-300Q88E**). Emitters (example, **SGE4-300Q8E**) and receivers (example, **SGR4-300Q8E**) are also sold separately.

EZ-SCREEN® Grid Kits

You can purchase a kit that contains an emitter and receiver of equal length and beam spacing; brackets; and optional interfacing solution and quick-disconnect cordsets. Detailed information about individual kit components is as follows.

To Order:

1. Choose model range, number of beams and beam spacing.
2. Choose the connection: Integral M12/Euro-Style QD or intergal Mini-Style QD
3. Choose an optional interfacing solution, such as an **IM-T-9A** or **-11** interfacing model.

See EZ-SCREEN Grids manual (p/n 68410) or www.bannerengineering.com for complete information and a current listing of accessories and options for kitting components. Call factory with questions regarding accessories.

4. Choose one cordset for each sensor or two cordsets for a pair.

M12/Euro QD models (example, **SGK4-300Q88E**) require mating 8-pin M12/Euro QD cordsets, such as:
- QDE cordset with flying leads
- DEE2R double-ended cordset
- CSB series splitter cordset

Mini QD models (example, **SGK4-300Q83**) require mating cordsets, such as:
- QDS cordset with flying leads

Kit Model Key

Model Style	Kit	No. of Beams		Beam Spacing	Connection			Interfacing Options		QD Cordset Length Options			
S	G	K	4	—	3	0	0	Q	8	8	E	—	1	R	E	2	5

Model Style

SG = Safety Grid
SGXL = Safety Grid Long Range

Kit

K = Kit

No. of Beams

2 = two beams
3 = three beams
4 = four beams

Beam Spacing

300 mm
400 mm
500 mm
533 mm
584 mm

Receiver & Emitter QD Options

Blank =	Receiver and emitter with wiring terminal chamber
Q85 =	Receiver with integral 8-pin Mini-style QD Emitter with integral 5-pin Mini-style QD with Test
Q83 =	Receiver with integral 8-pin Mini-style QD Emitter with integral 3-pin Mini-style QD
Q88E =	Receiver and emitter with integral 8-pin Euro-style QD

Interfacing Examples

1 = IM-T-9A Interface Module, 1 each
2 = IM-T-11A Interface Module, 1 each
3 = 11-BG00-31-D-024 Contactors (10A), 2 each
4 = BF1801L-024 Contactors (18A), 2 each
5 = EZAC-R9-QE8 = AC Interface Box (3 NO), 1 each
6 = EZAC-R11-QE8 = AC Interface Box (2 NO/1 NC), 1 each

QD Cordset Length Examples

RE15 = 4.6 m, 2 each
RE25 = 7.6 m, 2 each
R15E25 = 4.6 m (Receiver) & 7.6 m (Emitter)
R25E15 = 7.6 m (Receiver) & 4.6 m (Emitter)
DD1 = 0.3 DEE2R-81D, 2 each
C1D15 = CSB-M1281M1281 (Receiver) DEE2R-815D (8-pin Emitter)
C8D25 = CSB-M1288M1281 (SLS Receiver) DEE2R-825D (8-pin Emitter)
CU25D25 = CSB-UNT825M1281 (SLS Receiver) DEE2R-825D (8-pin Emitter)

NOTE: See notes under model number table. Not all combinations are listed below. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

EZ-SCREEN® Point Kits

You can purchase a kit that contains an emitter and receiver of equal length; brackets; and optional interfacing solution and quick-disconnect cordsets. Detailed information about individual kit components is as follows.

To Order:

1. Choose model and range.
2. Choose the connection: Integral M12/Euro-Style QD or intergal Mini-Style QD
3. Choose an optional interfacing solution, such as an **IM-T-9A** or **-11** interfacing model.

See EZ-SCREEN Point manual (p/n 68413) or www.bannerengineering.com for complete information and a current listing of accessories and options for kitting components. Call factory with questions regarding accessories.

4. Choose one cordset for each sensor or two cordsets for a pair.

M12/Euro QD models (example, **SGK1-Q88E**) require mating 8-pin M12/Euro QD cordsets, such as:
- QDE cordset with flying leads
- DEE2R double-ended cordset
- CSB series splitter cordset

Mini QD models (example, **SGK1-Q83**) require mating cordsets, such as:
- QDS cordset with flying leads

Kit Model Key

Model Style	Kit	No. of Beams		Connector		Interfacing Options	QD Cordset Length Options
SP	K	1	—	Q 8 8 E	—	1	R E 2 5

Model Style

SP = Safety Point
SPXL = Safety Point Long Range

Kit

K = Kit

No. of Beams

1 = one beam

Receiver & Emitter QD Options

Blank =	Receiver and emitter with wiring terminal chamber
Q85 =	Receiver with integral 8-pin Mini-style QD Emitter with integral 5-pin Mini-style QD with Test
Q83 =	Receiver with integral 8-pin Mini-style QD Emitter with integral 3-pin Mini-style QD
Q88E =	Receiver and emitter with integral 8-pin Euro-style QD

NOTE: See notes under model table. Not all combinations are listed below. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

QD Cordset Length Examples

RE15 = 4.6 m, 2 each
RE25 = 7.6 m, 2 each
R15E25 = 4.6 m (Receiver) & 7.6 m (Emitter)
R25E15 = 7.6 m (Receiver) & 4.6 m (Emitter)
DD1 = 0.3 DEE2R-81D, 2 each
C1D15 = CSB-M1281M1281 (Receiver) DEE2R-815D (8-pin Emitter)
C8D25 = CSB-M1288M1281 (SLS Receiver) DEE2R-825D (8-pin Emitter)
CU25D25 = CSB-UNT825M1281 (SLS Receiver) DEE2R-825D (8-pin Emitter)

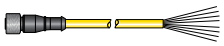
Interfacing Examples

1 = IM-T-9A Interface Module, 1 each
2 = IM-T-11A Interface Module, 1 each
3 = 11-BG00-31-D-024 Contactors (10A), 2 each
4 = BF1801L-024 Contactors (18A), 2 each
5 = EZAC-R9-QE8 = AC Interface Box (3 NO), 1 each
6 = EZAC-R11-QE8 = AC Interface Box (2 NO/1 NC), 1 each

Accessories EZ-SCREEN® (Grids & Points)

Cordsets

Euro QD to Flying Leads



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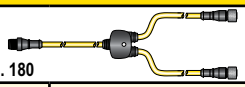
Length	8-Pin
4.5 m	QDE-815D
7.6 m	QDE-825D
15.2 m	QDE-850D
22.8 m	QDE-875D
30.4 m	QDE-8100D

Euro QD–Double-Ended

pg. 180

Length	8-Pin
0.3 m	DEE2R-81D
0.9 m	DEE2R-83D
2.5 m	DEE2R-88D
4.6 m	DEE2R-815D
7.6 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D

Euro QD Splitter



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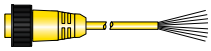
Length	8-Pin
0 m	CSB-M1280M1280
0.3 m	CSB-M1281M1281
2.5 m	CSB-M1288M1281
4.6 m	CSB-M12815M1281
7.6 m	CSB-M12825M1281
7.6 m	CSB-UNT825M1281

Mini QD with Flying Leads



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Length	3-Pin	5-Pin	8-Pin
4.5 m	QDS-315C	QDS-515C	QDS-815C
7.6 m	QDS-325C	QDS-525C	QDS-825C
15.2 m	QDS-350C	QDS-550C	QDS-850C
22.8 m	QDS-375C	–	QDS-875C
30.4 m	QDS-3100C	–	–

Brackets

Grid & Points–Type 4			Points–Type 4	
 pg. 166	 pg. 168	 pg. 168	 pg. 168	 pg. 168
EZA-MBK-1*	EZA-MBK-3	EZA-MBK-9	EZA-MBK-4	EZA-MBK-5

* Standard brackets included with emitter/receiver. Additional brackets are available, see page 164.
NOTE: See page 51 for interfacing solutions. Additional accessories are listed on page 163.

Replacement Parts

Model	Description
EZA-AP-1	Access port plug with o-ring
EZA-CP-13	Pg13.5 plug with o-ring
EZA-ECE-1	Emitter wiring chamber end cap (with gasket, captive screws, 3 plugs with o-rings, terminal block)
EZA-ECR-1	Receiver wiring chamber end cap (with gasket, captive screws, 3 plugs with o-rings, terminal block)
EZA-SW-1	Spanner wrench for Grid and Point
EZA-TBE-1	Emitter terminal block
EZA-TBR-1	Receiver terminal block
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Keyed reset switch (same as that included in kits)
SMA-MBK-1	SSM Series Mirror Bracket Kit
STP-3	Specified test piece, 45 mm dia.

EZ-SCREEN® Grid & Point Specifications

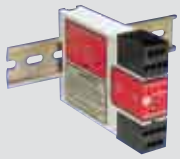
Supply Voltage (V in)	24V dc ±15%, 10% max. ripple
Supply Current	**Emitter:** 150 mA max. **Receiver:** 500 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common (except Emitter AUX power connections)
Response Time	24 milliseconds or less from interruption of light grid beam to safety outputs going to OFF-state
EDM Input	+24V dc signals from external device contacts can be monitored (single-channel, dual-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver. Monitored devices must respond within 200 milliseconds of an output change.
Reset Input	The Reset input must be high (10 to 30V dc at 30 mA) for 0.25 to 2 seconds and then low (less than 3V dc) to reset the receiver.
Remote Test Input (optional- available only on certain models)	Test mode is activated either by applying a low signal (less than 3V dc) to emitter TEST1 terminal for a minimum of 50 milliseconds, or by opening a switch connected between TEST1 and TEST2 terminals for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal (10 to 30V dc, 35 mA inrush, 10 mA max.) at TEST1 terminal deactivates Test mode and allows the emitter to operate normally. TEST1 and TEST2 are factory jumpered on models with wiring chamber.
Safety Outputs	Two diverse-redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake." **ON-State voltage:** ≥Vin-1.5V dc **OFF-State voltage:** 1.2V dc max. **Max. load resistance:** 1000 Ω **Max. load capacitance:** 0.1 µF **OSSD test pulse width:** 100 to 300 microseconds **OSSD test pulse period:** 10 to 27 milliseconds (varies with number of beams
Controls and Adjustments	**Emitter: Scan code selection:** 2-position switch (code 1 or 2). Factory default position is 1. **Receiver: Scan code selection:** 2-position switch (code 1 or 2). Factory default position is 1. **Trip/latch output selection:** redundant switches. Factory default position is L (latch) **EDM/MPCE monitor selection:** redundant switches select between 1- or 2-channel monitoring. Factory default position is 2.
Emitter/Receiver Operating Range	**Short-range models:** 0.8 m to 20 m **Long-range models:** 15 m to 70 m Range decreases with use of mirrors and/or lens shields.
Beam Spacing	**Model SG...4-300:** 300 mm **Model SG...3-400:** 400 mm **Model SG...2-500:** 500 mm **Model SG...3-533:** 533.4 mm **Model SG...2-584:** 584.2 mm
Beam Diameter	25 mm
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Emitter Elements	Infrared LEDs, 880 nm at peak emission
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2 **Short-range models:** ± 2.5° @ 3 m **Long-range models:** ± 2.5° @ 15 m
Enclosure	**Materials:** Extruded aluminum housings with yellow polyester powder finish and well-sealed, rugged molded PBT end caps, acrylic lens cover **Rating:** NEMA 4, 13; IP65
Operating Conditions	**Temperature:** 0° to +50° C **Relative humidity:** 95% (non-condensing)
Shock and Vibration	EZ-SCREEN systems have passed vibration and shock tests according to IEC 61496-1/-2. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).

More on next page

EZ-SCREEN® Grid & Point Specifications (cont'd)

Status Indicators	**7-Segment Diagnostic Indicators, Both Emitter and Receiver** **Dash (–)** = System is OK **Error Codes** = See product manuals (p/n 68410 or 68413) for code definitions and recommended action **Scan code setting** (C1 or C2) = Appears during power-up or after scan code is changed. (Temporary indication; normal display resumes within a few seconds.) **Emitter:** One bi-color (red/green) Status indicator **Green steady** = RUN mode **Green single flashing** = TEST mode **Red single flashing** = Lockout **OFF** = No power to sensor **Receiver:** Two System Status indicators, plus one bi-color (red/green) Beam Status indicator for each beam **Yellow Reset Indicator** **ON steady** = RUN mode **Double flashing** = Waiting for manual reset after power-up **Single flashing** = Waiting for manual latch reset **OFF** = No power to sensor or system is not ready for operation **Bi-Color (Red/Green) Status Indicator** **Green steady** = Outputs ON **Red steady** = RUN mode, outputs OFF **Red single flashing** = Lockout **OFF** = No power to sensor or system is not ready for operation **Bi-Color (Red/Green) Beam Status Indicators** **Green steady** = Clear beam, strong signal **Green flickering** = Clear beam, weak signal **Red steady** = Beam blocked **OFF** = No power to sensor or no scanning
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end mounting brackets. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.
Cables and Connections	Cables are user-supplied. Wiring terminals accommodate one 22 to 16 ga. wire or two wires up to 18 ga.; Pg 13.5 wiring chamber access port capacity varies, depending on cable gland or strain relief fitting used. Supplied cable gland is for a cable diameter of 6 to 12 mm.
Design Standards	Designed to comply with Type 4 per IEC 61496-1, -2; Type 4 per UL 61496-1/-2; Category 4 per ISO 13849-1 (EN 954-1)
Certifications	CE c UL us LISTED
Wiring Diagrams	WD011, WD012, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (pp. 225-230)

EZ-SCREEN® Interfacing Products

Models			Description	Product Information	Data Sheet
Interface Modules and Controllers		**IM-T-9A** (3 NO)	• Interface modules provide two or three normally open force-guided relay outputs rated at 6 A. • EZ-SCREEN monitors these interface modules when they are connected to the EZ-SCREEN External Device Monitoring (EDM) inputs. • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included.	Page 107	62822
		IM-T-11A (2 NO/1 NC)			
		**SC22-3-S...**	• One controller provides configurable monitoring of multiple safety devices. • 22 input terminals can monitor both contact-based and PNP solid-state input devices. • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring. • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • SC22-3 modules use 24V dc. • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models).	Page 76	133487
		SC22-3-C...			
		SC22-3E-S...			
		SC22-3E-C...			
Muting Modules		**MM-TA-12B**	• The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery. • The module uses redundant microcontroller-based logic. • MMD Modules can be used as dual controllers when muting function is not used.	Page 94	63517
		MMD-TA-12B			116390
		MMD-TA-11B			
Receiver AC Interface Boxes		**EZAC-R9-QE8**	• Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources. • Models are available to accommodate receivers only, emitters only, or both. • Receiver models include 8 amp safety relay output.	Page 189	120321
		EZAC-R11-QE8			
		EZAC-R15A-QE8-QS83			
		EZAC-R8N-QE8-QS53			
		EZAC-R10N-QE8-QS53			
Emitter AC Interface Boxes		**EZAC-E-QE8**			
		EZAC-E-QE5			
		EZAC-E-QE8-QS3			
		EZAC-E-QE5-QS5			
Contactors		**Mechanically Linked Contactors**	• Pairs of contactors create safety stop circuits with two normally open contacts in series. • EZ-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design. • Contactors add 10 or 18 amp current carrying capability to any safety system. • Auxiliary contacts add 3 or 4 normally open contacts • Suppressors extend the life of an actuating device that uses a contactor. • Modular design simplifies assembly and installation.	Page 191	111881
		11-BG00-31-D-024			
		BF1801L-024			
		Aux. Contacts			
		11-BGX10-40			
		11-G484-30			
		Suppressors			
		11-BGX77-048			
		11-G318-48			

NC = Normally closed, NO = Normally open

LIGHT SCREENS

PICO-GUARD™ Grids & Points

page 61

- Fiber optic elements are for use with PICO-GUARD Controllers and fiber optic cables in personnel safety and equipment-protection applications.
- Choices include compact 12 or 30 mm non-contact fiber optic Point elements or Grid systems for perimeter and access guarding.
- Each fiber optic channel is one emitter/receiver (up to 4 pairs per controller).
- Grid system features rugged anodized aluminum construction, with 2, 3 or 4 beams and beam spacing from 300 to 584 mm.
- Each Point or Grid element can function as emitter or receiver, depending on installation.
- 12 mm Point has impact-resistant polycarbonate plastic construction.
- 30 mm Point has robust 304 stainless steel housing with tempered glass lens window.
- Environmental rating is IP65 for Grids and IP67 for Points.
- Grids and Points meet Type 4 per IEC 61496-2 and Safety Category 4 per EN 954-1 applications when used with a PICO-GUARD controller.
- Grid and Points are ATEX, CSA and FM approved for use in explosive environments when used with a PICO-GUARD controller.

GLANDS PAGE 69
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Grid Systems

- Two-, three- or four-beam systems
- Protected heights of 500 to 1066 mm
- Five lengths of fiber cable

Page 61

Point Systems

- 12 or 30 mm threaded barrel housings
- Use multiple points for a customized grid system
- Three integral fiber types in five lengths

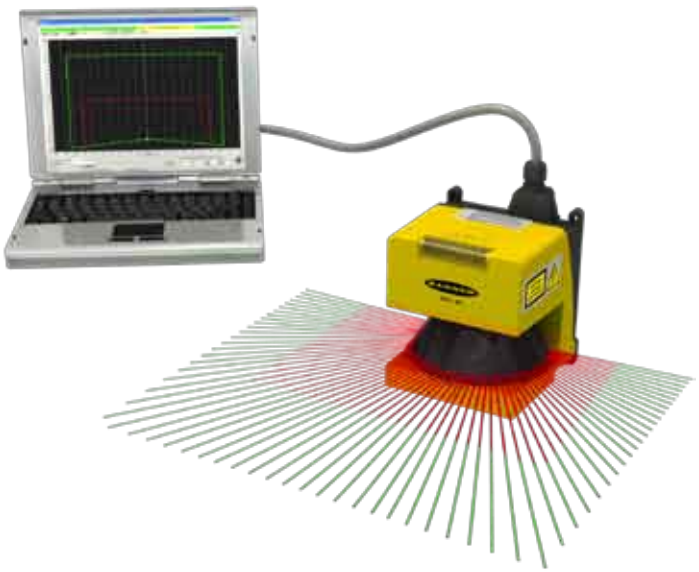
Page 63

AG4-4E
Safety Laser Scanner

- Two-dimensional laser scanner effectively protects personnel, as well as stationary and mobile systems within a user designated area.
- Persons or objects entering the protection field will be detected and a protective (safety) stop signal will be generated.
- Eight protective and warning field pairs are individually defined using a PC.
- Protection field resolution is from 30 to 150 mm with ranges up to 4 m.
- The warning field can be set for up to 15 m with a resolution of 150 mm.
- Scanner has a 0.36° lateral resolution and detects any object in a 190° working zone.
- The highly flexible protective and warning fields can be set to match the shape of the work area.
- System meets all requirements for Type 3 applications per IEC 61496-1/-2 and Safety Integrity Level (SIL) 2 per IEC 61508.
- Response time is 80 milliseconds (default), adjustable to 640 milliseconds.
- Compact design, simple installation and easy-to-use software provide efficient integration into work zones.
- 5-LED display presents system status and diagnostics of devices.

CORDSETS PAGE 56
BRACKETS PAGE 56
INTERFACE PAGE 56

Configuration and diagnostic software



Graphically adjust all device parameters and the protective field contours to both local conditions and required safety distances.

Configuration parameters are permanently stored in the configuration plug, providing easier storage and device replacement without a PC.

AG4-4E Safety Laser Scanner

- 24V dc supply voltage
- Two solid-state OSSD safety outputs and two solid-state auxiliary outputs
- RS-232 and RS-422 PC interface connection
- Five LED diagnostic display
- Aluminum die-cast housing
- Integral mounting holes for flat mounting
- Includes scanner, plugs and CD with diagnostic and configuration software (cordset not included)

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AG4-4E Safety Laser Scanner

Model	Range		Safety Output	Aux. Outputs	Scanning Angle	Response Time	Data Sheet
	Protective Fields	Warning Fields					
AG4-4E	30 mm Resolution = 1.6 m 40 mm Resolution = 2.20 m 50 mm Resolution = 2.80 m 70 mm Resolution = 4.0 m 150 mm Resolution = 4.0 m	150 mm Resolution = 15 m	**2 PNP OSSD**	2 PNP	190°	80 ms (Default) adjustable to 340 ms	AG4 Soft Manual 144923 Product Manual 144924

AG4-TB1 Test Box

With the test box it's possible to test the following Scanner functions without hooking it up to the machine interface:

- Switch over between the different field pairs
- Correct reaction of the Safety OSSD outputs (When entering protective field)
- Correct reaction of the Alarm outputs (When entering warning field)
- Power supply is not included

AG4-TB1

AG4-4E Safety Laser Scanner Kits

You can purchase a kit that contains a laser scanner, optional interfacing solutions and cordsets.

To Order:

1. Choose an optional interfacing solution, such as an **UM-FA-9A** or -**11A** universal module.
2. Choose a DB15 configuration/machine interface cordset, such as AG4-CPD15...
3. Choose a PC communication cordset, such as AG4-PCD9...

See AG4-4E manuals (p/n 144923 & 144924) or www.bannerengineering.com for complete information and a current listing of accessories.

Kit Model Key

Scanner	Kit		Range		Interfacing Options	Configuration/ Machine Interface Cordset Options	PC Cordsets
AG4	K	—	4E	—	10	M10	P10

Kit
- **K** = Kit

Range
- **4E** = 4 m

Interfacing Options
- **Blank** = None
- **10** = UM-FA-9A
- **11** = UM-FA-11A
- **12** = MMD-TA-11A
- **13** = MMD-TA-12A

Configuration/ Machine Interface Cordset Length Options
- **M5** = 5 m
- **M10** = 10 m
- **M25** = 25 m
- **M50** = 50 m

PC Cordsets
- **P3** = 3 m
- **P5** = 5 m
- **P10** = 10 m

AG4-4E Interfacing Products

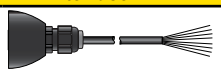
Models			Description	Product Information	Data Sheet
Interface Modules and Controllers		**UM-FA-9A** (3 NO)	• Universal modules monitors both contact based and PNP solid-state input devices. • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing.	Page 89	141249
		UM-FA-11A (2 NO)			
		**SC22-3-S...**	• One controller provides configurable monitoring of multiple safety devices. • 22 input terminals can monitor both contact-based and PNP solid-state input devices. • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring. • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • SC22-3 modules use 24V dc. • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models).	Page 76	133487
		SC22-3-C...			
		SC22-3E-S...			
		SC22-3E-C...			
Muting Modules		**MM-TA-12B**	• The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery. • The module uses redundant microcontroller-based logic.	Page 94	63517
		MMD-TA-12B			116390
		MMD-TA-11B			

NC = Normally closed, NO = Normally open

Accessories AG4-4E Laser Scanner

Cordsets

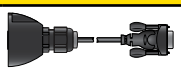
DB15 Configuration/Machine Interface



pg. 185

Length	Model Number
5 m	AG4-CPD15-5
10 m	AG4-CPD15-10
25 m	AG4-CPD15-25
50 m	AG4-CPD15-50

DB9 PC Communication



pg. 185

Length	Model Number
3 m	AG4-PCD9-3
5 m	AG4-PCD9-5
10 m	AG4-PCD9-10

Bracket

Swivel

pg. 166

AG4-MBK-1

Test Box

Configuration & Test Box

AG4-TB1

Misc. Replacement Parts

Model	Description
AG4A-SW-A	Software
AG4-WIN	Replacement window
AG4-CPD15	Replacement configuration plug, straight
AG4-CPD15-RA	Replacement configuration plug, right-angle

Model	Description
AG4-PD9	Replacement PC plug, straight
AG4-PD9-RA	Replacement PC plug, right-angle
AG4-CLN1	Cleaning set (small)
AG4-CLN2	Cleaning set (large)

AG4 Laser Scanner Specifications

Supply Voltage (UB)	24V dc +20%/-30% (IEC 60742)
Supply Current	420 mA approx. (use 2.5 A power supply)
Fuse (power supply)	1.6A normal blow, medium time lag fuse
Response Time	Min. 80 milliseconds (2 scans) Max. 640 milliseconds (16 scans)
Wavelength	905 nm
Protection Zone	**150 mm resolution:** 200 mm to 4.0 m (radius) **70 mm resolution:** 200 mm to 4.0 m (radius) **50 mm resolution:** 200 mm to 2.8 m (radius) **40 mm resolution:** 200 mm to 2.2 m (radius) **30 mm resolution:** 200 mm to 1.6 m (radius) **Sensing object reflectance:** Minimum 1.8%
Warning Zone	**Min. object size:** 150 mm x 150 mm **Sensing range (radius):** 200 mm to 15 m **Sensing object reflectance:** Minimum 20%
Measurement Zone	0-50 m
Scanning Angle	max. 190°
Control Outputs (OSSD1, OSSD 2)	**PNP open-collector transistor 2 outputs:** short circuit proofed **Rated operating voltage:** supply voltage (UB) -3.2 V **Max. source current**: 250 mA **Residual voltage:** 3.2 V or less **Operation mode:** **No object in detection zone:** ON **Object inside detection zone:** OFF **Response Time:** Min. 80 ms (2 scans) to max. 640 milliseconds (16 scans) switching method
Warning Output 1 (Alarm 1) & Warning Output 2 (Alarm 2)	PNP open-collector transistor **Rated operating voltage:** supply voltage (UB) -4 V **Max. source current:** 100 mA **Residual voltage:** 4 V or less **Operation mode:** Switching method of operation mode (set below) **Scanner at normal operation:** ON **Abnormal operation:** OFF **No object inside warning zone:** ON **Object inside warning zone:** OFF **Response Time:** Min. 80 ms (2 scans) to max. 640 milliseconds (16 scans) switching method
Laser Protection Class	Class 1 (IEC 60825-1)
Number of Field Pair (Zone) Settings	7 +1 (without detection zone). Zone pairs in combination of detection zone and warning zone can be switched over by external input.
Environmental Rating	IP65 (per IEC 60529)
Housing Material	Die-cast aluminum with a thermoplastic resin window
Weight	2.1 kg
Operating Conditions	**Temperature:** 0 to 50°C **Humidity:** Max. 95%
Indicators	Five LEDs on front show Safety Sensor Status

More on next page

AG4 Laser Scanner Specifications (cont'd)

Shock and Vibration	10 to 150 Hz frequency, 5 G max. (50 m/s^2 approx.) in X, Y and Z directions for twenty times each
Max Cordset Length	**15-pin plug:** 50 m **9-pin plug:** 10 m (RS-232C), 50 m (RS-422)
Design Standards	Designed to comply with IEC 61496-1/3 (Type 3), ISO 13849-1 (Category 3, PLd), IEC 61508-1 to 7 (SIL2) and IEC 62061 (SIL2)
Certifications	C US (all approvals are pending)
Wiring Diagrams	WD020, WD021, WD022 (pp. 230-231)

PICO-GUARD™
Fiber Optic Safety Systems

PICO-GUARD™ optical safety systems provide a control-reliable, non-contact and low-cost optical alternative to traditional machine safeguarding methods.

- Compact, economical and Category 4-rated safety system for personnel and equipment protection
- Easy installation: reduces need for expensive electrical wiring
- System includes Controller, flexible optical fiber, optional protective sheathing and interchangeable optical elements for a variety of safeguarding applications (see below)
- Optical elements never wear out and are easy to align
- Category 4 interlocking with one switch per guard, even with multiple switches per optical channel
- Rated for use in explosive environments: ATEX, FM and CSA certifications
- Rated for Class 1/Division 1 & 2, Groups A, B, C, D; Zone 0, Group IIC and Zone 22

Grid systems
- Two-, three- or four-beam systems
- Protected heights of 500 to 1066 mm
- Five lengths of fiber cable

Page 61

Point systems
- 12 or 30 mm threaded barrel housings
- Use multiple points for a customized grid system
- Three integral fiber types in five lengths

Page 63

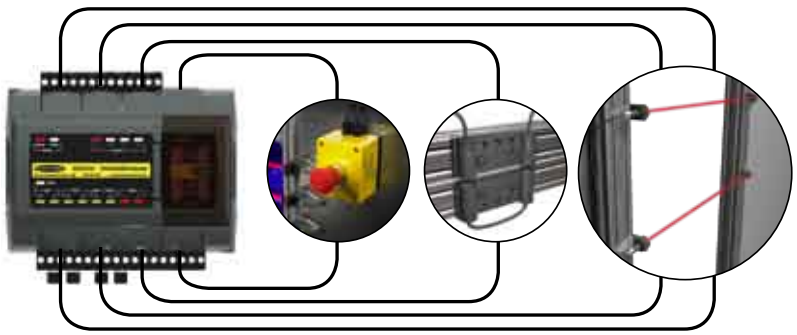
Interlock systems
- Non-contact optical safety switches
- Six housing styles
- Integral fibers or quick-release fiber connectors

Page 64

E-Stop buttons
- Push-to-stop, twist-to-release optical E-Stop button
- Models with fiber connection on same or opposite side of enclosure

Page 66

Controllers
- Four optical channels on all models
- DIN rail or panel/wall mounting
- Models with Universal Safety Stop Input (USSI), auxiliary outputs and muting function
- Quick-disconnect fiber optic interface and removable terminal blocks
- Selectable trip or latch output, external device monitoring and auto/manual power-up



Four optical channels for monitoring multiple points with one controller
- Interlock up to sixteen guards or gates
- Create one four-beam grid or two individual two-beam grids for perimeter and access guarding
- Combine grids, points, interlocks and E-Stop buttons for multiple application requirements

Compact fiber optic technology for explosive environments

- Paint booths
- Gaseous fill areas (example, cigarette lighters)
- Cosmetic and perfume manufacturing
- Pharmaceutical manufacturing
- Battery manufacturing
- Semiconductor processing
- Film and web processing
- Chemical processing
- Explosives manufacturing

CONTROLLERS

PICO-GUARD™ Fiber Optic

- Four optical channels to protect personnel from hazardous equipment and to protect critical tooling or processes.
- Controller signals the machine control circuit to stop when the system detects a loss in light signal or receives a safety stop request from its Universal Safety Stop Interface (USSI) input.
- Each channel can control several optical elements in the same fiber loop.
- Each channel can monitor a separate part of a machine, such as doors, points of entry and E-stops.
- USSI connects multiple PICO-GUARD™ Controllers and other safety devices in a single safety circuit, when required.
- Controllers are available with optical channel auxiliary outputs and muting.
- Controllers interface with PICO-GUARD Grids, Points, Interlock Switches and Optical E-Stop Buttons to solve numerous applications.
- Diverse-redundant and self-checking design exceeds control reliability requirements and meets Safety Category 4 per EN 954-1 and IEC 61496-1 Type 4 requirements.

BRACKETS PAGE 69
FIBERS PAGE 68

PICO-GUARD™ Controller

- Bi-color LED indicators for easy status monitoring
- Four optical channels
- Removable terminal blocks
- Quick-disconnect fiber optic interface
- Three options for fiber optic cables
- DIN rail or panel/wall mounting
- Two Universal Safety Stop Input (USSI), one trip and latch with reset input or muting device inputs

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PICO-GUARD™ Controller Models, 24V dc

Model	Inputs	Safety Outputs	Output Rating	Aux. Outputs	Muting	Output Response Time	Data Sheet
SFCDT-4A1	4 Optical Channels & 2 NC USSI (dual) x2	**2 PNP OSSD**	0.5 amps	3 PNP (Aux., Fault, Weak)	-	13 ms (optical channels) 7 ms (USSIs)	69761, 69763
SFCDT-4A1C				7 PNP (Aux., Fault, Weak & Ch 1-4)	-		
SFCDT-4A1CM1	4 Optical Channels, Mute Inputs, Mute Enable			7 PNP (Aux./Mute lamp, Fault, Weak & Ch 1-4)	Yes	13 ms (optical channels)	122801, 69761, 69763

NOTE: A complete system requires a controller and optical elements, such as Interlocking Switches (see page 64), Grids and Points (see page 62), or E-Stop buttons (see page 66).

GRIDS & POINTS

PICO-GUARD™ Fiber Optic

- Grid and Point optical elements are for use with PICO-GUARD™ Controllers and fiber optic cables in personnel safety and equipment-protection applications.
- Choices include compact 12 or 30 mm non-contact fiber optic Point elements, or Grid systems for perimeter and access guarding.
- Each fiber optic channel uses one Emitter/Receiver pair (up to 4 pairs per controller).
- Each Point or Grid element can function as emitter or receiver, depending on installation.
- Grid system features rugged anodized aluminum construction, with two, three or four beams and beam spacing from 300 to 584 mm.
- 12 mm Point has impact-resistant polycarbonate plastic construction.
- 30 mm Point has robust stainless steel housing with tempered glass lens window.
- Environmental rating is IP65 for Grids and IP67 for Points.
- Grids and Points meet Type 4 per IEC 61496-2 and Safety Category 4 per EN 954-1 applications when used with a PICO-GUARD controller.
- Grid and Points are ATEX, FM and CSA approved for use in explosive environments when used with a PICO-GUARD controller.

CONTROLLERS
GRIDS & POINTS
INTERLOCKS
E-STOP BUTTONS

GLANDS PAGE 69
BRACKETS PAGE 69
MIRRORS PAGE 194
STANDS PAGE 198

PICO-GUARD™ Grid Systems

- Two-, three- or four-beam models
- PVC-coated integral cable with polished fibers
- IEC IP65 rated
- Robust black anodized housing with field replaceable window
- MEK-resistant housing for paint booth applications
- Optional MEK-resistant conduit and cable gland (see page 69)
- Interchangeable as emitter or receiver with PICO-GUARD™ controller

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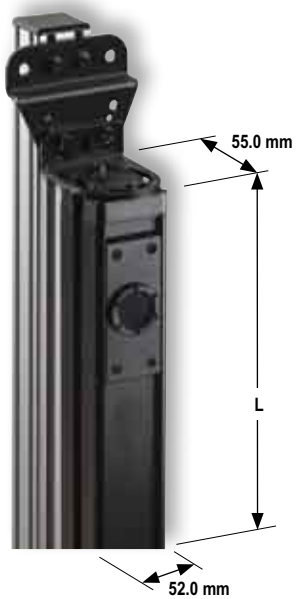

PICO-GUARD Grid

Full View

Black Anodized Aluminum

PICO-GUARD™ Grid Systems

Model*	Beam Spacing	Protected Height	Housing Length (L)	Fiber Description**	Fiber Length	Maximum Range***	Data Sheet
SFG4-300C8	 300 mm 4-Beam Grid	900 mm	1084 mm	Integral Polished-End, PVC Coated Fibers 7 mm diameter	2.4 m	31.1 m	69762 & 69763
SFG4-300C15					4.5 m	27.1 m	
SFG4-300C25					7.5 m	22.6 m	
SFG4-300C50					15 m	14.9 m	
SFG4-300C100					30 m	7.0 m	
SFG3-400C8	 400 mm 3-Beam Grid	800 mm	984 mm		2.4 m	31.1 m	
SFG3-400C15					4.5 m	27.1 m	
SFG3-400C25					7.5 m	22.6 m	
SFG3-400C50					15 m	14.9 m	
SFG3-400C100					30 m	7.0 m	
SFG3-533C8	 533 mm 3-Beam Grid	1066 mm	1251 mm		2.4 m	31.1 m	
SFG3-533C15					4.5 m	27.1 m	
SFG3-533C25					7.5 m	22.6 m	
SFG3-533C50					15 m	14.9 m	
SFG3-533C100					30 m	7.0 m	
SFG2-500C8	 500 mm 2-Beam Grid	500 mm	684 mm		2.4 m	31.1 m	
SFG2-500C15					4.5 m	27.1 m	
SFG2-500C25					7.5 m	22.6 m	
SFG2-500C50					15 m	14.9 m	
SFG2-500C100					30 m	7.0 m	
SFG2-584C8	 584 mm 2-Beam Grid	584 mm	768 mm		2.4 m	31.1 m	
SFG2-584C15					4.5 m	27.1 m	
SFG2-584C25					7.5 m	22.6 m	
SFG2-584C50					15 m	14.9 m	
SFG2-584C100					30 m	7.0 m	

* Order any two Grid optical elements with the same housing length.
** MEK-resistant conduit is available to protect fiber (see page 69).
*** Maximum range is based on using an emitter and receiver with the same length fiber. Using an emitter and receiver with different length fibers may decrease or increase range. Using corner mirrors reduces range. See specifications on page 71 for detailed range information.

PICO-GUARD™ Point Systems

- 12 or 30 mm threaded barrel fiber optic interchangeable as emitter or receiver with PICO-GUARD™ controller
- Multiple Points create customized grid system
- Polished-end integral fiber
- Moisture and dirt resistant
- 304 stainless steel (30 mm) or impact-resistant polycarbonate (12 mm) housing
- Type 4 effective aperture angle (EAA)
- IEC IP67 rated
- A complete system requires a controller (see page 60)

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PICO-GUARD Point (30 mm Barrel)

PICO-GUARD Point (12 mm Barrel)

PICO-GUARD™ Point Systems

Model*	Housing Material	Orientation/Type		Fiber Description	Fiber Length	Maximum Range**	Data Sheet
SFP30SXP8	304 Stainless Steel	Straight 30 mm Barrel Mounting (25 mm beam diameter)		Integral Polished-End, PVC Coated Fibers 5 mm Diameter	2.4 m	28.7 m	111390 & 69763
SFP30SXP15					4.5 m	24.4 m	
SFP30SXP25					7.5 m	21.9 m	
SFP30SXP50					15 m	14.0 m	
SFP30SXP100					30 m	8.5 m	
SFP30SXT8				Integral Polished-End, PTFE Coated Fibers 2.2 mm Diameter	2.4 m	28.7 m	
SFP30SXT15					4.5 m	24.4 m	
SFP30SXT25					7.5 m	21.9 m	
SFP30SXT50					15 m	14.0 m	
SFP30SXT100					30 m	8.5 m	
SFP30SS8				Integral Polished-End, Polyethylene Coated Fibers 2.2 mm Diameter	2.4 m	28.7 m	
SFP30SS15					4.5 m	24.4 m	
SFP30SS25					7.5 m	21.9 m	
SFP30SS50					15 m	14.0 m	
SFP30SS100					30 m	8.5 m	
SFP12PXP8	Plastic	Straight 12 mm Barrel Mounting (9 mm beam diameter)		Integral Polished-End, PVC Coated Fibers 5 mm Diameter	2.4 m	6.4 m	111389 & 69763
SFP12PXP15					4.5 m	4.8 m	
SFP12PXP25					7.5 m	3.4 m	
SFP12PXP50					15 m	1.5 m	
SFP12PXT8				Integral Polished-End, PTFE Coated Fibers 2.2 mm Diameter	2.4 m	6.4 m	
SFP12PXT15					4.5 m	4.8 m	
SFP12PXT25					7.5 m	3.4 m	
SFP12PXT50					15 m	1.5 m	
SFP12PS8				Integral Polished-End, Polyethylene Coated Fibers 2.2 mm Diameter	2.4 m	6.4 m	
SFP12PS15					4.5 m	4.8 m	
SFP12PS25					7.5 m	3.4 m	
SFP12PS50					15 m	1.5 m	

* Order any two Point optical elements with the same beam diameter.
** Maximum range is based on using an emitter and receiver with the same length fiber. Using an emitter and receiver with different length fibers may decrease or increase range. Using corner mirrors reduces range. See specifications on page 71 for detailed range information.

INTERLOCK SWITCHES

PICO-GUARD Fiber Optic

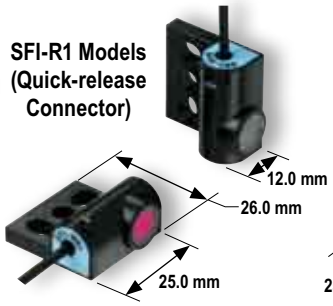
- Interlock switches interface with PICO-GUARD™ fiber optic controllers.
- Compact, non-contact and easy to install, the switches interlock doors, guards, gates and covers.
- Fiber optic interlock switches eliminate the need to run electrical wires to a hazardous area.
- Fibers connect and disconnect quickly.
- Switches meet Safety Category 4 requirements with one switch pair per guard (per ISO 13849-1).
- Impact-resistant polycarbonate plastic, extreme-duty chemically resistant stainless steel or heavy-duty impact-resistant zinc die-cast models are available.
- Switches have an environmental rating of IP67 and are ATEX, FM and CSA approved for use in explosive environments when used with a PICO-GUARD controller.
- Attenuator is available for reducing excess gain in short-run applications.
- Splices are available for easily connecting two fiber sections.

PICO-GUARD™ Fiber Optic Interlock Switches

- Six housing styles
- Easy-to-install housings
- Quick-release connectors or integral fibers, depending on model
- A complete system requires a controller (see page 60)

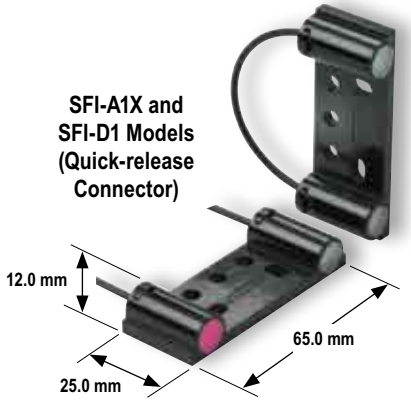
SFI-M12 Models (Integral Fibers)

SFI-R1 Models (Quick-release Connector)

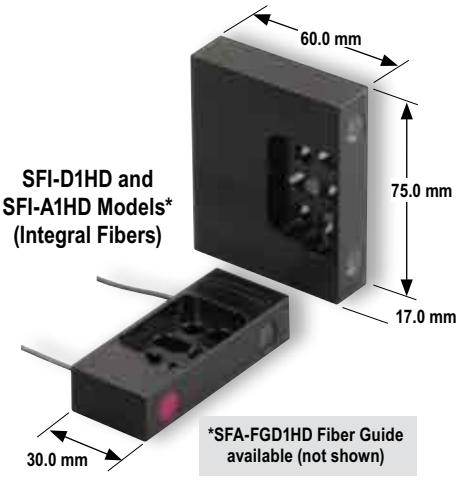


SFI-S1 Models (Quick-release Connector)

SFI-A1X and SFI-D1 Models (Quick-release Connector)

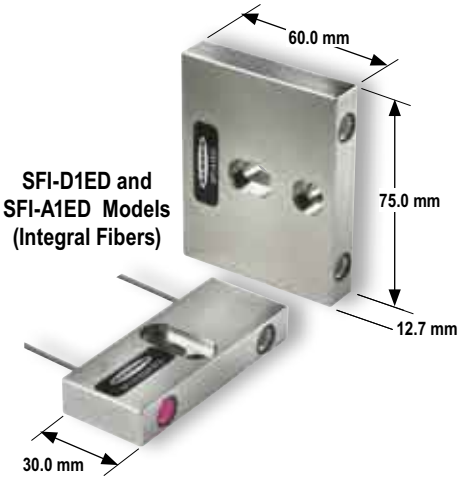


SFI-D1HD and SFI-A1HD Models* (Integral Fibers)



*SFA-FGD1HD Fiber Guide available (not shown)

SFI-D1ED and SFI-A1ED Models (Integral Fibers)



PICO-GUARD™ Fiber Optic Interlock Switches

Models	Housing Material	Orientation/Type		Fiber Length*	Separation and Max. Switching Distance	Data** Sheet
SFI-S1R	Plastic	Straight, Right Mounting		Bulk or Precut	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	109909
SFI-S1L		Straight, Left Mounting				
SFI-R1R	Plastic	Right-angle, Right Mounting		Bulk or Precut	1 mm = ± 11 mm 25 mm = ± 21 mm 50 mm = ± 33 mm	109907
SFI-R1L		Right-angle, Left Mounting				
SFI-D1	Plastic	Dual, Center Mounting		Bulk or Precut	1 mm = ± 7 mm 25 mm = ± 8 mm 50 mm = ± 9 mm	109908
SFI-A1		Actuator, Polyethylene Jacket, Center Mounting				
SFI-A1XP		Actuator, Polyethylene Jacket, PVC Sheath, Center Mounting				
SFI-A1XT		Actuator, Polyethylene Jacket, Fluoropolymer Sheath, Center Mounting				
SFI-M12SS06UXT	316 Stainless Steel	Straight, Polyethylene Jacket, Fluoropolymer Sheath, 12 mm Barrel Mounting		1.8 m	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	117201
SFI-M12SS15UXT				4.5 m		
SFI-M12SS30UXT				9.0 m		
SFI-D1EDPXT6	316 Stainless Steel	Straight, Polyethylene Jacket, Fluoropolymer Sheath, Center Mounting		1.8 m	1 mm = ± 7 mm 25 mm = ± 8 mm 50 mm = ± 9 mm	120125
SFI-D1EDPXT15				4.5 m		
SFI-D1EDPXT30				9.0 m		
SFI-D1EDPXT50				15.3 m		
SFI-A1ED		Actuator, Center Mounting		–		
SFI-D1HDPS6†	Zinc	Straight, Polyethylene Jacket, Center Mounting		1.8 m	1 mm = ± 7 mm 25 mm = ± 8 mm 50 mm = ± 9 mm	121307
SFI-D1HDPS15†				4.5 m		
SFI-D1HDPS30†				9.0 m		
SFI-D1HDPS50†				15.3 m		
SFI-D1HDPXT6†		Straight, Polyethylene Jacket, Fluoropolymer Sheath, Center Mounting		1.8 m		
SFI-D1HDPXT15†				4.5 m		
SFI-D1HDPXT30†				9.0 m		
SFI-D1HDPXT50†				15.3 m		
SFI-A1HD		Actuator, Center Mounting		—		

* Fibers available in bulk to be cut to length or precut lengths with polished ends. Order fibers separately (see page 68). Integral fiber lengths are listed.
† Optional fiber guide available (**SFA-FGD1HD**). See data sheet p/n 123560.
** Also see the Application and Design Guide p/n 69763.

Emergency Stop Push Buttons

PICO-GUARD™ Fiber Optic

- Features bright red push-to-stop, twist-to-release, direct opening button with yellow background (per ANSI NFPA 79 and IEC 60204-1)
- Provides choice of models with fiber connections on same side or opposite sides of enclosure
- Delivers easy connection for 2 mm OD (1 mm core) plastic fibers
- Accommodates up to 3 E-Stops in a series on a single channel (all PICO-GUARD™ controllers have four channels)
- Constructed of impact-resistant polycarbonate resin—rated IP65
- Can be used with SFI interlocking switches in same optical loop
- Offers easy mounting and installation
- Meets Safety Category 4 applications (per ISO 13849-1) applications when used with a PICO-GUARD controller
- Up to 125 m of fiber (polished) with one E-Stop button
- Certified to EN ISO 13850 and EN 60947-5-5 Emergency Stop button requirements
- Certified to ATEX, FM and CSA standards for use in potentially explosive environments

PICO-GUARD™ Optical E-Stop Buttons

- Push-to-stop, twist-to-release optical E-Stop button
- IP65-rated housing
- Fiber connection ports (same side or opposite sides, depending on model)

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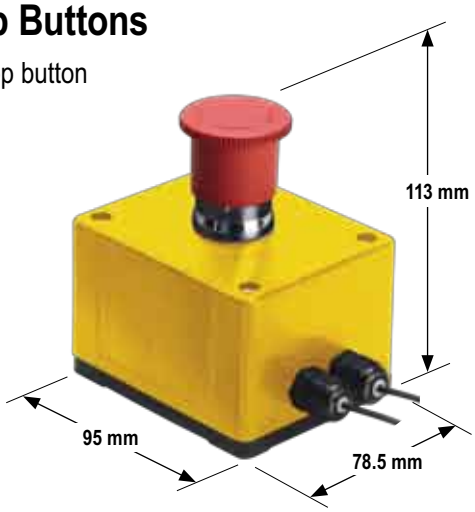
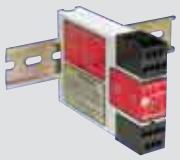


Emergency Stop Push Button with Enclosure

Models	Housing Description	Data Sheet
SFS-EMB-01E1	One-sided fiber connection	129342 & 69763
SFS-EMB-01E2	Two-sided fiber connection (opposite sides)	

Accessories PICO-GUARD™

PICO-GUARD™ Interfacing Products

Models			Description	Product Information	Data Sheet
Interface Modules		**IM-T-9A** (3 NO)	• Interface modules provide two or three normally open force-guided relay outputs rated at 6 A. • PICO-GUARD monitors these interface modules when they are connected to the PICO-GUARD External Device Monitoring (EDM) inputs. • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included.	Page 107	62822
		IM-T-11A (2 NO/1 NC)			
Muting Modules		**MM-TA-12B**	• The Muting Module can be used with PICO-GUARD systems and can temporarily inhibit a Grid or Point so materials can safely pass through the beams without stopping the machinery. • The module uses redundant microcontroller-based logic.	Page 94	63517
		MMD-TA-12B			116390
		MMD-TA-11B			
Interface Modules and Controllers		**SC22-3-S...**	• One controller provides configurable monitoring of multiple safety devices. • 22 input terminals can monitor both contact-based and PNP solid-state input devices. • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring. • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • SC22-3 modules use 24V dc. • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models).	Page 76	133487
		SC22-3-C...			
		SC22-3E-S...			
		SC22-3E-C...			
Contactors		**Mechanically Linked Contactors**	• Pairs of contactors create safety stop circuits with two normally open contacts in series. • PICO-GUARD can monitor the circuit because of the contacts' force-guided mechanically linked design. • Contactors add 10 or 18 amp current carrying capability to any safety system. • Auxiliary contacts add 3 or 4 normally open contacts. • Suppressors extend the life of an actuating device that uses a contactor. • Modular design simplifies assembly and installation.	Page 191	111881
		11-BG00-31-D-024			
		BF1801L-024			
		Aux. Contacts			
		11-BGX10-40			
		11-G484-30			
		Suppressors			
		11-BGX77-048			
		11-G318-48			

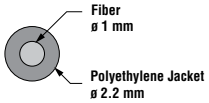
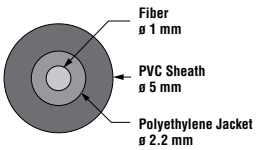
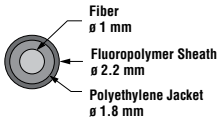
NC = Normally closed, NO = Normally open

PICO-GUARD™ Remote Display

Models		Description	Data Sheet
	**SFA-RD**	• The display provides the same ongoing operating status feedback as the PICO-GUARD controller. • Rated IP67; NEMA 6, it can be conveniently mounted outside enclosure. • Convenient DIN-rail mountable housing; flat-mount and right-angle brackets are included.	109374

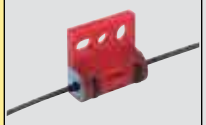
PICO-GUARD™ Plastic Fiber Optics

Plastic optical fiber for use with Banner PICO-GUARD optical elements is available in bulk form (to be cut to length in the field) or precut lengths with polished ends for maximum excess gain.

Length		Standard Polyethylene Jacket	PVC Sheath	Fluoropolymer Sheath
Dimensions				
Bulk	9 m	PIU430U	PIU430UXP	PIU430UXT
	18 m	PIU460U	PIU460UXP	PIU460UXT
	30.5 m	PIU4100U	PIU4100UXP	PIU4100UXT
	61 m	PIU4200U	PIU4200UXP	PIU4200UXT
	100.5 m	PIU4330U	PIU4330UXP	PIU4330UXT
	152.5 m	PIU4500U	PIU4500UXP	PIU4500UXT
	488 m	PIU41600U	PIU41600UXP	PIU41600UXT
Cut Lengths with Polished Ends	0.3 m	PWS43P	PWXP43P	PWXT43P
	0.5 m	PWS45P	PWXP45P	PWXT45P
	0.7 m	PWS47P	PWXP47P	PWXT47P
	1 m	PWS410P	PWXP410P	PWXT410P
	1.5 m	PWS415P	PWXP415P	PWXT415P
	2 m	PWS420P	PWXP420P	PWXT420P
	2.5 m	PWS425P	PWXP425P	PWXT425P
	3 m	PWS430P	PWXP430P	PWXT430P
	3.5 m	PWS435P	PWXP435P	PWXT435P
	4 m	PWS440P	PWXP440P	PWXT440P
	4.5 m	PWS445P	PWXP445P	PWXT445P
	5 m	PWS450P	PWXP450P	PWXT450P
	6 m	PWS460P	PWXP460P	PWXT460P
	7 m	PWS470P	PWXP470P	PWXT470P
	8 m	PWS480P	PWXP480P	PWXT480P
	9 m	PWS490P	PWXP490P	PWXT490P
	10 m	PWS4100P	PWXP4100P	PWXT4100P
	11 m	PWS4110P	PWXP4110P	PWXT4110P
	12 m	PWS4120P	PWXP4120P	PWXT4120P
	13 m	PWS4130P	PWXP4130P	PWXT4130P
	14 m	PWS4140P	PWXP4140P	PWXT4140P
	15 m	PWS4150P	PWXP4150P	PWXT4150P
	20 m	PWS4200P	PWXP4200P	PWXT4200P
	25 m	PWS4250P	PWXP4250P	PWXT4250P
	30 m	PWS4300P	PWXP4300P	PWXT4300P

PICO-GUARD™ Plastic Fiber Optic Accessories

Fiber optic devices used with PICO-GUARD™ optical elements improve performance and simplify installation.

Model			Description	Data Sheet
Attenuator		SFA-FA	• Reduces excess gain in short-run applications • Uses Banner 2.2 mm OD plastic fiber optic cable (1 mm core) • Made of impact-resistant polycarbonate plastic • Rated IP67	109910
Splice		SFA-FS	• Provides easy connection of two fiber sections • Simplifies connecting and disconnecting fibers • Uses Banner 2.2 mm OD plastic fiber optic cable (1 mm core) • Made of impact-resistant polycarbonate plastic • Rated IP67	109910
Fiber Cutter		PFC-2-25	• Used with Banner 2.2 mm OD diameter unterminated fiber optic cable (1 mm core) • Contains 25 fiber cutters	—

PICO-GUARD™ Cable Glands and Conduits

Conduit and gland used with PICO-GUARD™ Grids provide MEK-resistant protection.

Model	Description		
SFA-FCC-008	2.4 m	Conduit	• Made of flexible MEK-resistant polyamide • Protects fiber • Snaps into emitter/receiver • Easily cuts to length
SFA-FCC-015	4.5 m		
SFA-FCC-025	7.5 m		
SFA-FCC-050	15 m		
SFA-FCC-100	30 m		
SFA-FCC-CGM20	M20 Threads	Cable Gland	• Use with MEK-resistant conduit (above) • Made of MEK resistant polyamide • Attaches conduit to emitter/receiver and PICO-GUARD controller

PICO-GUARD™ Brackets

Controller	Grids				12 mm–Points	
						
pg. 166	pg. 166	pg. 167	pg. 168	pg. 168	pg. 172	pg. 172
DIN-35...	EZA-MBK-1	EZA-MBK-2	EZA-MBK-3	EZA-MBK-9	SMB12MM	SMB1812SF

30 mm–Points					Interlock Switches		
							
pg. 173	pg. 173	pg. 173	pg. 173	pg. 174	pg. 171	pg. 172	pg. 172
SMB30A	SMB30MM	SMB30SC	SMBAMS30P	SMBAMS30RA	SFA-IMB1	SFA-IMB2	SMB12MM

PICO-GUARD® Replacement Parts

Model	Description
EZA-LAT-1	Replacement adapter hardware for Grid.
MGA-KS0-1	SPST key reset switch, no wires (includes key)
SFA-CMH	PICO-GUARD controller mounting hardware
SFA-CTB1	PICO-GUARD controller 4-position terminal block
SFA-CTB2	PICO-GUARD controller 9-position terminal block
SFA-CTB3	PICO-GUARD controller 18-position terminal block

Model	Description
SFA-CTB4	PICO-GUARD controller 5-position terminal block
SFA-IAG	Interlock alignment guide
SFA-LAT-12	Replacement adapter hardware for SPF12
SFA-LAT-30	Replacement adapter hardware for SPF30
SFA-W-1	Replacement window for Grid
STP-3	Specified test piece, 45 mm dia. for Grid

PICO-GUARD™ Controller Specifications

System Power Requirements	24V dc ±15%, 10% max. ripple; 250 mA max., exclusive of output loads. External supply must be in accordance with IEC 61558.
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common.
Response Time	**Optical Channel:** 13 milliseconds max. (Time between the opening of an optical switch and the OSSD safety outputs turning off.) **USSI Inputs:** 7 milliseconds max. (Time between actuation of the safety stop input device and the OSSD safety outputs turning off.)
External Device Monitoring (EDM) Input	Two inputs for external device monitoring (EDM). Each input monitors the status of a normally closed, forced-guided monitor contact of an external safety device or MPCE. The EDM inputs must be high (10 to 30V dc) when the external device or MPCE is OFF, and must be low (less than 3V dc) when the external device or MPCE is ON. External devices or MPCEs must meet certain timing requirements, depending on the configuration setting.
System Reset Input	The Reset input must be high (10 to 30V dc) for 0.25 to 2 seconds and then low (less than 3V dc) to reset the system from a manual power-up, optical channel latch or system lockout condition.
USSI 1 Reset Input (Not available on SFCDT-4A1CM)	The Reset input must be high (10 to 30V dc) for 0.25 to 2 seconds and then low (less than 3V dc) to reset the system from a USSI 1 latch condition.
USSI 1 Input (Not available on SFCDT-4A1CM1)	Dual-channel, redundant inputs for monitoring output contacts or "handshake" compatible safety solid-state outputs of other safety stop devices. OFF (stop) signals cause the PICO-GUARD OSSDs to latch OFF (Latch condition).
USSI 2 Input (Not available on SFCDT-4A1CM1)	Dual-channel, redundant inputs for monitoring output contacts or "handshake" compatible safety solid-state outputs of other safety stop devices. OFF (stop) signals cause the PICO-GUARD OSSDs to turn OFF (Trip condition).
Muting Device Inputs (SFCDT-4A1CM1)	The muting devices work in pairs (MS1 and MS2, MS3 and MS4) and required to be "closed" within 3 seconds of each other (simultaneity requirement) to intiate a mute (assuming all other conditions are meet). Muting device outputs must be hard contacts (electrical), capable of switching 15 to 30V dc at 10 to 50 mA.
Mute Enable Input (SFCDT-4A1CM1)	When Mute Enable is selected (functional), this input must have +24V dc applied in order to start a mute; opening this input after mute has begun has no effect.
Safety Outputs	Two redundant solid-state 24V dc, 0.5A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake". **ON-state voltage:** ≥ Vin-1.5V dc **OFF-state voltage:** 1.2V dc max. **Max. load resistance:** 1,000 Ω **Max. load capacitance:** 0.1 µF **OSSD test pulse width:** 100 to 300 microseconds **OSSD test pulse period:** 6 milliseconds
Non-Safety Outputs	Solid state 24V dc (≥ Vin – 1.5V dc), 0.25A max. sourcing (PNP) non-safety outputs
Non-muting models:	Aux., weak, fault, Ch 1-4
Muting models:	Aux./Mute temp, fault, Ch 1-4 (-4A1C models only)
Remote Status Interface	Isolated RS-232 non-safety output (4800 Baud rate) for setup or monitoring the system status. Connections provided for a Remote Display unit. See Interfacing Products on page 67.

More on next page

PICO-GUARD™ Controller Specifications (cont'd)

Controls and Adjustments	Redundant switches for Auto/Manual power-up, Trip/Latch output operation and 1- or 2-channel EDM operation. Redundant switches for ON/OFF of each optical channel. (NOTE: At least one optical channel must be ON.)
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe
Emitter Element	Visible red LED, 660 nm at peak emission
Status Indicators	**All models:** **System Status (bi-color Red/Green):** overall status of the PICO-GUARD system **System Reset (bi-color Yellow/Red):** status of the input; indicates system reset needed **Channel (4 bi-color Red/Green):** each shows the status of one optical channel **EDM (bi-color Red/Green):** status of the EDM input channels **OSSD (bi-color Red/Green):** status of the OSSD outputs **Config (bi-color Red/Green):** status of the system configuration **Non-Muting models:** **USSI (2 bi-color Red/Green):** status of the USSI input channels (a-b and c-d) **USSI 1 Reset (bi-color Yellow/Red):** status of USSI 1 reset input; indicates USSI 1 reset needed **EDM (bi-color Red/Green):** status of the EDM input channels **OSSD (bi-color Red/Green):** status of the OSSD outputs **Config (bi-color Red/Green):** status of the system configuration **Muting Models:** **Muting (4 bi-color Red/Green):** status of the muting input **Mute Enable (bi-color) Yellow/Red):** status of the EDM enable
Enclosure Rating	P20
Operating Conditions	**Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing)
Design Standards	Designed to comply with Type 4 per IEC 61496-1; Type 4 per UL 61496-1; Category 4 per EN 954-1
Certifications	**Important Notice:** **European Community Machinery Directive 2006/42/EC** The PICO-GUARD Controllers comply with Machine Directive 98/37/EC. After December 29, 2009, when Machine Directive 2006/42/EC will be in force, the PICO-GUARD Controllers can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.
Wiring Diagrams	WD023, WD024, WD025, WD026, WD027, WD028 (pp. 232-263)

PICO-GUARD™ Grid & Point Systems Specifications

Operating Range

Range information is based on use of the integral polished fibers. The use of SFA-FS Fiber Splice reduces range by 20%. Do not cut polished fiber ends unless absolutely necessary (if the end is damaged or contaminated, or must be cut to length). Use only the Model PFC-2 Fiber Cutter to cut fibers, when necessary. If a polished end is cut, the excess gain is reduced, the advantage of polishing is lost, and the operating range is reduced.

12 mm Point Operating Range:
Minimum operating range: 150 mm
Maximum operating range: see table*

	SFP12..8	SFP12..15	SFP12..25	SFP12..50
SFP12..8	6.4 m	5.5 m	4.6 m	3 m
SFP12..15	5.5 m	4.8 m	4 m	2.7 m
SFP12..25	4.6 m	4 m	3.4 m	2.1 m
SFP12..50	3 m	2.7 m	2.1 m	1.5 m

30 mm Point Operating Range:
Minimum operating range: 800 mm
Maximum operating range: see table*

	SFP30..8	SFP30..15	SFP30..25	SFP30..50	SFP30..100
SFP30..8	28.7 m	25.9 m	23.2 m	20.1 m	13.7 m
SFP30..15	25.9 m	24.4 m	22.9 m	19.5 m	12.8 m
SFP30..25	23.2 m	22.9 m	21.9 m	17.1 m	12.2 m
SFP30..50	20.1 m	19.5 m	17.1 m	14.0 m	11.0 m
SFP30..100	13.7 m	12.8 m	12.2 m	11.0 m	8.5 m

Grids Operating Range:
Minimum operating range: 800 mm
Maximum operating range: see table*

	SFG..8	SFG..15	SFG..25	SFG..50	SFG..100
SFG..8	31.1 m	29.0 m	26.5 m	21.6 m	14.9 m
SFG..15	29.0 m	27.1 m	24.7 m	20.1 m	14.0 m
SFG..25	26.5 m	24.7 m	22.6 m	18.3 m	12.8 m
SFG..50	21.6 m	20.1 m	18.3 m	14.9 m	10.4 m
SFG..100	14.9 m	14.0 m	12.8 m	10.4 m	7.0 m

* In applications using SSM or MSM series corner mirrors, range is reduced by approximately 8 percent for each mirror used.

More on next page

PICO-GUARD™ Grid & Point Systems Specifications (cont'd)

Beam Diameter	**12 mm Point:** 9 mm **30 mm Point:** 25 mm **Grids:** 25 mm
Effective Aperture Angle (EAA)	Type 4 per IEC 61496-2; ±2.5° @ 3 m when used with SFCDT-..
Environmental Rating	**Points:** IP67 **Grids:** IP65
Operating Conditions	**Temperature:** 0° to +70° C **Relative humidity:** 95% (non-condensing)
Construction	**12 mm Point:** black polycarbonate plastic housing; polyethylene, PVC or PTFE coated fibers **30 mm Point:** 304 stainless steel housing, glass window; polyethylene, PVC or PTFE coated fibers **Grids:** black anodized aluminum housing and label; tempered glass window; zinc end caps; PVC coated fibers
Certifications	**Important Notice:** **European Community Machinery Directive 2006/42/EC** The PICO-GUARD Grid and Points comply with Machine Directive 98/37/EC. After December 29, 2009, when Machine Directive 2006/42/EC will be in force, the PICO-GUARD Grid and Points can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.

PICO-GUARD™ Fiber Optic Interlock Switches Specifications

Operating Distance	1-50 mm max.
Mounting	**SFI-S.., SFI-R..., SFI-D1, SFI-A1 and SFI-AIX.. models:** Holes for M4 (#10) screws (not included) **SFI-D1E..., SFI-AIED, SFI-D1H... and SFI-A1H... models:** Holes for M6 screws (not included) **SFI-M12... models:** Two M12 x 1.25 nuts (provided)
Construction	**SFI-S.., SFI-R..., SFI-D1, SFI-A1 and SFI-AIX.. models:** Polycarbonate plastic housing and window; acrylic lens **SFI-M12, SFI-D1E.. and SFI-AIED models:** 316 stainless steel housing, glass window, PTFE-sheathed plastic fiber **SFI-D1H... and SFI-A1H... models:** Cast zinc housing, glass window, PTFE-sheathed or PE plastic fiber
Operating Conditions	**Temperature:** 0° to +70° C **Relative humidity:** 95%
Environmental Rating	IP67
Certifications	**Important Notice:** **European Community Machinery Directive 2006/42/EC** The PICO-GUARD Safety Interlock Switches comply with Machine Directive 98/37/EC. After December 29, 2009, when Machine Directive 2006/42/EC will be in force, the PICO-GUARD Safety Interlock Switches can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.

PICO-GUARD™ E-Stop Button Specifications

Mounting	Holes (x4) for M5 screws (mounting hardware not included)
Construction	**Enclosure and Base:** Polycarbonate **Button:** Polymide **Button Base:** Aluminum/Zinc alloy
Operating Conditions	**Temperature:** 0° to +70° C **Relative humidity:** 95% (non-condensing)
Environmental Rating	IP65
Certifications	**Important Notice:** **European Community Machinery Directive 2006/42/EC** The PICO-GUARD Optical E-Stop Buttons comply with Machine Directive 98/37/EC. After December 29, 2009, when Machine Directive 2006/42/EC will be in force, the PICO-GUARD Optical E-Stop Buttons can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.