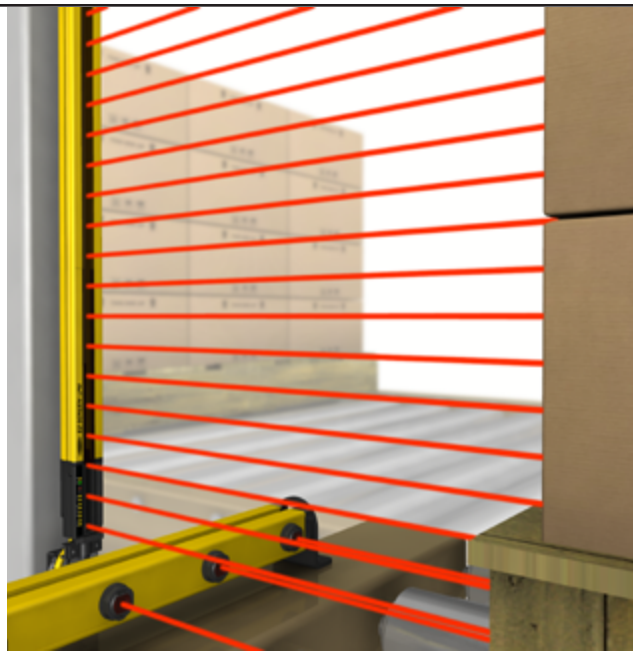
EZ-SCREEN® Low-Profile (LPM)

Type 4 Point-of-Operation with Muting

- Built-in muting function, no third box required; Easy set up, less wiring and lower installation costs
- Seven different, predefined, muting configuration options, including Bypass, Mute-Dependent Override, Mute Enable, and Mute-cycle time extensions (4 seconds) for "L"-style cell exit applications
- Mute Lamp and Status Outputs to EZ-LIGHT (or other indicating devices)
- Lower power consumption allows energy saving and fewer/smaller power supplies
- Available in 14 mm resolution for finger, hand and ankle detection or 25 mm resolution for hand and ankle detection
- Features space saving design to fit perfectly into machinery
- Offers reduced resolution (2-beam floating blanking) and fixed blanking to ignore tooling or constant inflow of materials
- Identifies clear and blocked beam using zone indicators
- Features user-configurable trip or latch outputs, and Scan Code 1 or 2
- Provides External Device Monitoring (EDM), TEST function and Aux outputs
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certified to Type 4, Cat 4 PLe, and SIL 3



ACCESSORIES
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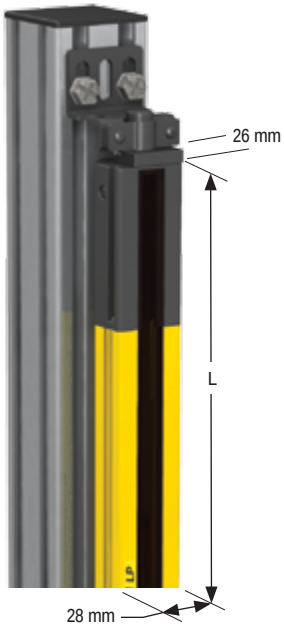


EZ-SCREEN LPM Systems

Available Finishes

Yellow Painted Aluminum

ONLINE

AUTOCAD, STEP, IGES & PDF

Interface multiple devices with the SC22-3 Safety Controller. See page 555.

EZ-SCREEN® Low-Profile with Muting Systems, 14 and 25 mm Resolution Model Key, 24V dc

Model Style

SLPM
- SLP = Emitter
- SLPM = Muting Receiver or Pair

R
- E = Emitter
- R = Receiver
- P = Pair †

Resolution

14
- 14 = 14 mm
- 25 = 25 mm

Defined Area

410

	Housing Length	Response Time*	# of Beams		Housing Length	Response Time*	# of Beams
410 =	410 mm	13.5 ms	41	1250 =	1248 mm	31.5 ms	125
550 =	549 mm	16.5 ms	55	1390 =	1388 mm	34.5 ms	139
690 =	689 mm	19.5 ms	69	1530 =	1528 mm	37.5 ms	153
830 =	829 mm	22.5 ms	83	1670 =	1667 mm	40.5 ms	167
970 =	969 mm	25.5 ms	97	1810 =	1807 mm	43.5. ms	181
1110 =	1108 mm	28.5 ms	111				

Finish
- Blank = Yellow powder coat
- N = Nickel-plated ESD
- A = Clear Anodized Aluminum

Connection

Emitter/Receiver

P12
- Blank = Integral RD
- P8 = 8-pin Pigtail QD (SLP Emitter)
- P12 = 12 pin Pigtail QD (SLPM receiver)

or

Pair †

Blank
- Blank = Emitter with Integral RD Receiver with Integral RD
- P128 = Emitter with 8-pin pigtail QD Receiver with 12-pin pigtail QD (SLPM receiver)

† A pair includes an emitter and receiver (example, SLPMP14-410P128)

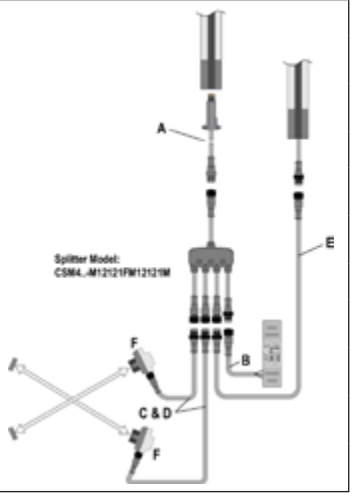
Contact Banner Engineering Corp. for additional information and/or verification of valid model numbers.

QD models: A model with a QD requires a mating cordset (see page 533).

QD models: Pigtail QD models require mating cordsets with an 8 or 12-pin M12/Euro-style connector (such as QDE-8..D, QDE-12..E, DEE2R-8..D; see page 533).
Integral RD models require mating cordsets with a removable disconnect connector (such as RDLP-8..D or RDLP-11..E; see page 533).

EZ-SCREEN® LPM Cordset Overview*

Muting Splitter Cordsets	
3-Branch models	Banner sensors (PNP)
CSM3DO-M12121FM12121M	Dark Operate (pin 2)
CSM3LO-M12121FM12121M	Light Operate (pin 4)
4-Branch models (Emitter hookup)	
CSM4DO-M12121FM12121M	Dark Operate (pin 2)
CSM4LO-M12121FM12121M	Light Operate (pin 4)
Muting Sensor Cordsets (D)	Length
DEE2R-51D	0.3 m (1')
DEE2R-53D	1 m (3')
DEE2R-58D	2.5 m (8')
DEE2R-815D	4.5 m (15')



"A" (Receiver cordset): On RD models = DELPE-12xxE; On P12 models cordset "A" is a preinstalled DELPE-121E.
"B": Machine interface cordset = QDE-12xxE.
"C" and "D": Muting Sensor cordsets = DEE2R-5xxD. Ensure sensors connected to Cordsets C & D are PNP output with Dark Operate on pin 2 or Light Operate on pin 4.
"E" (Emitter cordset): On RD models = DELPE-12xxE; On P8 models (shown), use a DEE2R-8xxD double-ended cordset. If using a 3-Branch Muting Splitter cordset, use appropriate Emitter cordset.
"F": QS18VP6LPQ8 (4-pin M12/Euro QD) sensor shown as example. Other sensors or switches may be used.

* Note: See EZ-SCREEN Low Profile with Muting manual (p/n 150216) for complete information.

EZ-SCREEN® Muting Indicators

Muting Splitter Cordsets	
TL50WQ	Single Color (White)
DELPEF-40D	Single Color Cordset 0.05 m
DELPEF-41D	Single Color Cordset 0.3 m
DELPEF-43D	Single Color Cordset 1 m
K50LGRW2PQ-18886	Three Color (Green/Red/White)
TL50GYRWQ	Four Color (Green/Yellow/Red/White)
DELPEF-50D	Multi-Color Cordset 0.05 m
DELPEF-51D	Multi-Color Cordset 0.3 m
DELPEF-53D	Multi-Color Cordset 1 m
LPA-MBK-15	Optional mounting bracket (Used with DELPEF-..0D cordset)

ACCESSORIES PAGE 533

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.
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

See 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.

EZ-SCREEN® Low-Profile Systems 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
- SLPM = Muting

Kit
- K = Kit

Resolution
- 14 = 14 mm
- 25 = 25 mm

Defined Area

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

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

Connection
- P88 = Two 300 mm pigtail with 8-pin M12/Euro 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 M12/Euro 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 (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

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

* 270 mm not available in cascade or muting models

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

QD models: A model with a QD requires a mating cordset (see page 533).

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 IEC 60950) (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: 60 mA max., exclusive of fault load Receiver: 150 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 (see model number tables) Cascade safety stop interface (CSSI): 40 milliseconds max. (contacts must be open for 60 milliseconds min.)
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. 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 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 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)
External Remote Indicator Outputs (SLPMR models only)	Current sourcing (PNP), solid-state, 24 Vdc outputs for the connection of remote indicator lamps such as EZ-LIGHTs. See EZ-LIGHT™ for EZ-SCREEN® Low Profile with Muting in manual 150216 for compatible EZ-LIGHTs and associated cordsets. Rated Current: 100 mA maximum at 24 Vdc
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. Factory default position is OFF (Standard display). Fault: 2-position switch. Factory default position 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-channel monitoring. (SLPMR models: 1-channel monitoring only) Mute Lamp Monitoring: ON/OFF switch. Factory default position is ON (SLPMR models only) 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 position is OFF.
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common

More on next page

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

Electrical Safety Class (IEC 61140)	III
Operating Range	0.1 to 7 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 655, 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 Bicolor (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 Bicolor (Red/Green) Status indicator – indicates general system and output status Bicolor (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 Yellow Mute Device Input Indicators – indicates status of mute device inputs (SLPMR models only)
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.
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 61496-1/-2; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL3 per IEC 62061
Certifications	CE TUV Rheinland of North America, a Nationally Recognized Test Laboratory (NRTL) in the United States according to OSHA 29 CFR 1910.7, and accredited by the Standards Council of Canada to test and certify products to Canadian National Standards, has certified the EZ-SCREEN Low Profile to all applicable U.S. and Canadian National Standards. The cTUVus mark is recognized throughout the United States and Canada by OSHA and the SCC. C US Actual certification mark on EZ-SCREEN Low Profile product labels. This simplified certification mark is used on the product labels due to limited space.
Wiring Diagrams	WD002, WD003, WD004, WD005, WD006, WD007, WD013, WD014, WD015, WD016, WD017, WD018, WD019 (pp. 820-830)

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 SLPC... emitter/receiver (included with sensor)
EZA-RR-1	External normally open reset switch with 8-pin M12/Euro-style QD
MGA-KSO-1	Panel-mount keyed normally open reset switch

Model	Description
MGA-K-1	Replacement key for switch MGA-HSO-1
DELPE-81D	Replacement for M12-terminated pigtail QD, as shipped with standard pigtail QD models; 8-conductor cable, 22 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 installation manual p/n 112852 for complete list of replacement parts and accessories.

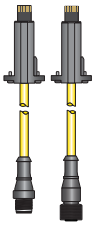
Cordsets

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	
See page 738	
Length	8-Wire*
4.57 m	RDLP-815D
7.62 m	RDLP-825D
15.2 m	RDLP-850D
22.9 m	RDLP-875D
30.5 m	RDLP-8100D

* For connection of E-Stop or other hard/relay contacts see page 695.

RD to Euro QD*		
See page 737		
Length	8-Pin Male	8-Pin Female
0.31 m	DELPE-81D	DELPEF-81D
0.91 m	DELPE-83D	DELPEF-83D
2.44 m	DELPE-88D	DELFEF-88D
4.57 m	DELPE-815D	DELPEF-815D
7.62 m	DELPE-825D	—
15.2 m	DELPE-850D	—
22.9 m	DELPE-875D	—
30.5 m	DELPE-8100D	—



RD to RD	
See page 738	
Length	Cascade
0.05 m	DELP-110E
0.30 m	DELP-111E
0.91 m	DELP-113E
2.44 m	DELP-118E
4.57 m	DELP-1115E
7.62 m	DELP-1125E
15.2 m	DELP-1150E
22.9 m	DELP-1175E
30.5 m	DELP-11100E

Additional cordsets and information available. See page 721.

* Requires mating 8-pin M12/Euro cordset. 8-pin Male used for Machine Interface connection (indicator end of sensor). 8-pin Female used for cascade connection when using M12/Euro QDs. See page 529 for EZ-SCREEN® LPM cordset overview.

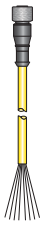
Note: See page 545 for interfacing solutions, additional accessories are listed on page 655.

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

Euro QD–Double-Ended	
See page 733	
Length	8-Pin*
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D

* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 733.

Euro QD	
See page 732	
Length	8-Pin
4.57 m	QDE-815D
7.62 m	QDE-825D
15.3 m	QDE-850D
22.9 m	QDE-875D
30.5 m	QDE-8100D



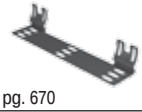
Euro QD Splitter	
See page 735	
Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281

Brackets

Low-Profile 14 & 25 mm

 pg. 669	 pg. 669	 pg. 670	 pg. 671
LPA-MBK-11*	LPA-MBK-12*	LPA-MBK-20	LPA-MBK-22

Low-Profile 14 & 25 mm–Cascade

 pg. 670	 pg. 671	 pg. 669	 pg. 670	 pg. 670
LPA-MBK-21	LPA-MBK-90	LPA-MBK-120	LPA-MBK-135	LPA-MBK-180

Additional brackets and information available. See page 656.

* Standard brackets included with emitter/receiver.

Remote Fixed Blanking Switch

Allows frequent configuration of a fixed blanked area, without using the receiver DIP switches.

EZA-RBK-1

STANDS PAGE 766

MIRRORS PAGE 770

LENS SHIELDS PAGE 776

INTERFACE PAGE 545