

## Vision

Banner's extensive line of vision sensors helps you find defects earlier in the manufacturing process. Banner offers standard and high-resolution gray scale and color vision sensors. Add inspection capabilities where you need them.

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Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com



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# iVu TG and iVu Plus TG

## Image Sensor

- Image sensor combines the simplicity of a photoelectric sensor and the intelligence of a vision sensor, providing high-performance inspection capabilities at your fingertips
- All-inclusive image sensor with lens, light, IO and touch screen programming
- Optional remote touch screen for programming
- Profinet® communication protocol to simplify communications with some of the most commonly used industrial controllers in factory automation
- IVu Plus TG supports the ability to obtain results and command rapid product changeovers over TCP/IP, EtherNet/IP, Modbus/TCP protocols or PROFINET
- Ability to change parameters on the fly
- IVu Plus TG models have additional sort tools, multi-tool and the ability to store up to 30 inspections

#### No PC required to configure, change or monitor

- Built-in or remote touch screen
  Self-contained sensor with easy configuration and
- convenient monitoring right on the sensor



Installation and configuration in four easy steps

- 1. Install and connect the sensor
- 2. Select the sensor or bar code type,
- depending on model 3. Acquire a good image
- Set inspection parameters

Intuitive operation with menu driven tools to guide you through setup

- Define region of interest
- Adjust intensity/contrast
- Define the pass criteria



### iVu TG Sensor Types

#### Sensor Type



Match Sensor — Compares a part to a reference to determine if there is a match



Area Sensor — Detects whether a particular feature (features) are present



Blemish Sensor - Finds flaws on parts



Screen Interface Pass



#### Screen Interface Fail







#### iVu TG Example Model Number: IVU2PTGR04



\* Remote display is required for set up and viewing of sensors with a remote touch screen. See page 346. \*\* Requires C-mount lens. See page 362.

#### Additional iVu Plus TG (in addition to Standard TG Sensor Types)



Sort Sensor (Plus only) - Recognize and sort up to ten different patterns in the same inspection

For more specifications see page 345.

Display and cordsets ordered separately. † Barcode models available. See page 272.

### VISION SENSORS VISION CAMERAS VISION CONTROLLERS



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97.6 mm RDM35 V

24.4 mm

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#### iVu & iVu Plus Specifications

General						
Supply Voltage	10-30 V dc					
Demo Mode	Full tool functionality on canned images					
Sensor Lock	Optional password protection					
Integrated Ring Light	Red, IR, Green, Blue, White, UV or no integrated ring light					
Imager	1/3 inch CMOS 752 x 480 pixels; adjustable Field-of-View (FOV)					
Lens Mount	M12 X 1 mm thread (c-mount lens); microvideo lens 4.3, 6, 8, 12	2, 16, 25 mm				
Output Rating	150 mA					
Exposure Time	0.1 milliseconds to 1.049 seconds					
Construction	Black Valox™ sensor housing; acrylic window iVu Plus Inte	grated: Die cast zinc and Black Valox™				
External Strobe Output	+ 5 V dc					
Environmental Rating	IP67					
Model Specific						
Power Connection	iVu TG (integrated and remote touch screen): 8-pin Euro-style (M12) male connector	iVu Plus TG (integrated and remote touch screen): 12-pin Euro-style (M12) male connector				
Supply Current	iV. TC: 800 mA max (avaluative of 1/0 load)	iVu Plus TC: 850 mA max (avaluative of 1/0 load)				
USB 2.0 Host	iVu TG (integrated touch screen): 8-pin Euro-style (M12) female connector         iVu TG (remote touch screen): 4-pin Pico-style (M8) female connector         iVu FG (remote touch screen): 4-pin Pico-style (M8) female connector         iVu FG (order tequired for operation of USB Thumb Drive, OD cordsets are ordered separately.					
Ethernet Connection	iVu Plus TG: 4-pin Pico-style (M8) male connector. Ethernet cordsets are ordered separately.					
Output Configuration	NPN or PNP, software on-screen selectable					
Tools	iVu TG: Area, Blemish and Match	iVu Plus TG: Area, Blemish, Match and Sort				
Display	Integrated touch screen: 68.5 mm (2.7") LCD Color Integrated Display 320 x 240 pixels Remote touch screen: See RD35 Remote Display specifications					
Acquisition	iVu TG: 100 fps (frames per second) max.	iVu Plus TG: 100 fps (frames per second) max.				
Operating conditions	Stable Ambient Temperature:					
	<b>TG:</b> 0 to + 50 °C	iVu Plus TG (integrated touch screen): 0 to +45 °C iVu Plus TG (remote touch screen): 0 to +40 °C				
Remote Display connection (Remote Touch Screen Models Only)	8-pin Euro-style (M12) female connector Accessory cordset required for remote display; QD cordsets are ordered separately.					
Certifications	CE NOTE: IVU Plus remote must use Euro QD power cordset for CE compliance.	US STED				

#### iVu Remote Display Specifications

Screen Size	3.5" diagonal
LCD Aspect Ratio	4:3
Display Resolution	320 x 240 RGB
Viewing Angle	60 degrees left, and 60 degrees right, 50 degrees up, and 55 degrees down
Housing Material	Zinc Zamac #3 (RDM35), Polycarbonate (RD35)
Bracket Material	Delrin (RD35), ABS (RDM35)
Stylus	Delrin
Display Weight	4.8 oz (RD35), 12 oz (RDM35)
Bracket & Stylus Weight	1.1 oz
Connection	Molex HandyLink connector
Operating Temperature	0° to + 40° C

#### VISION SENSORS VISION CAMERAS VISION CONTROLLERS

#### Remote Display Touch Screen

Description	Model
3.5" diagonal remote touch screen — Machine-mountable	RDM35
3.5" diagonal remote touch screen — Handheld	RD35

#### RDM35 Accessory Kits



RDM35 Machine-mountable Remote Display Used for- programming & monitoring



**RD35** Handheld Remote Display Used for programming

#### **RD35 Accessory Kits**

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-803	IVURD-MXK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-806	IVURD-MXK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-815	IVURD-MXK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-830	IVURD-MXK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-850	IVURD-MXK-850RA

#### Cordsets for Remote Display

#### Hand Held Remote Display (RD35)

	8-Pin
Double Ended M12/Euro-Style Straight connector models listed; for right-angle, add RA to the end of the model number (example, IVURD-QD-803RA)	IVURD-QD 1 m (3') IVURD-QD 2 m (6') IVURD-QD 5 m (15') IVURD-QD 9 m (30')

-QD-803 -QD-806 -QD-815 -QD-830 IVURD-QD-850 16 m (50')

#### Machine Mountable Remote Display (RDM35)

Euro-Style to Molex Straight connector models listed; for right-angle, add RA to the end of the model number (example, IVURD-MX-803RA)

8-Pin IVURD-MX-803 1 m (3' IVURD-MX-806 2 m (6' IVURD-MX-815 5 m (15 IVURD-MX-830 9 m (30' IVURD-MX-850 16 m (50')

Additional cordset information is available See page 758





SMBKS



SMBRD35

SMBRDM35

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Lens cover 75 mm -IVUSLC75-P plastic window

#### Accessories for C-Mount Lenses\*

#### Description Format Size Model Used With Extension Kit (0.5, 1.0 , 5.0, 10, 20 and 40 mm) LEK All Extension Kit (0.25 and 0.5 mm) LEKS Lenses Lens Extender (increases focal length 2X) LCF2X Tamron UV Lens Filter, Clear Glass 2/3" FLTUV Megapixel Lenses

#### C-Mount Color Filters\*

Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	<b>FLTI</b> ( > 760 nm)	FLT1850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	<b>FLTR</b> ( > 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	-	FLTR660 (650-680 nm)

\* For C-Mount lenses see page 362

#### Bandpass Filters Example Model Number: FLTB470-27

Description	Model	Diameter
Blue	FLTB470-	
Green	FLTG525-	25.5
Infrared	FLTI850-	27
Red	FLTR635-	30.5
Dark Red	FLTBR660-	43
Polarizing filter	FLTPR032-	



## Vision Cameras

Banner's Vision Cameras include a comprehensive family of vision systems that addresses a wide range of application needs, including high resolution and high speed inspections. One- or two-piece systems are available with a complete suite of location, inspection and analysis tools that can be used simultaneously for inspecting multiple features and solving complex applications.

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Series	Description	Integrated I/O	Memory	Protection Rating	Construction	Power Supply
	VE Series Smart Camera Combine powerful inspection tools and capabilities with ease of use to maximize inspection uptime and facilitate rapid implementation. page 350	6	500 MB	IEC IP67	Housing: Aluminum Display Label: Polyester	12 to 30 V dc
	<b>PresencePLUS P4</b> One piece sensor with a complete suite of location, inspection and analysis of tool can be used simultaneously for inspecting multiple features and solving complex applications. page 354	7	64 MB	IEC IP20 NEMA 1 IP68	Housing: Black anodized aluminum, die cast nickel-plated aluminum Lens: Glass	10 to 30 V dc
Sector Sector	PresencePLUS Pro II Camera Heads One part of a two piece system with a complete suite of location, inspection and analysis tools can be used simultaneously for inspecting multiple features and solving complex applications. page 358	14	64 MB	Camera: IP20 or IP68 Controller: IP20	Camera: Black anodized aluminum, Nickel-plated aluminum, 316 stainless Controller: Steel with zinc plating	10 to 30 V dc

# **VE** Series



## Versatile, Easy-To-Use Smart Cameras

- Available in 2MP (1600 x 1200 pixels), 1.3MP (1280 x 1024 pixels) and WVGA (752 x 480 pixels) models, all with the same powerful inspection capabilities
- Runtime editing capability reduces costly downtime and the software emulator allows for offline building and troubleshooting of applications
- Factory communications (EtherNet/IP, Modbus/TCP, PROFINET and RS-232 Serial) for integration on the manufacturing floor
- Two-line, eight-character onboard display provides inspection information and focus number and makes it easy to update sensor settings, facilitating fast product changeover
- Robust metal housing with optional lens covers to achieve IP67 rating for use in harsh environments with heat, vibration, or moisture



VE Vision Manager software: Easy configuration, powerful functions.



#### **Runtime Editing**

Easy-to-use configuration software with full runtime editing allows for changes to be made quickly with no costly downtime from stopping and starting inspections. Start using today by downloading at <a href="http://www.bannerengineering.com/vision-manager">www.bannerengineering.com/vision-manager</a>.



Full Software Emulator

Connect to multiple cameras or full software emulator for building inspections offline



#### Inspection Analysis

Review past inspection results, view system logs, and quickly configure inputs and outputs

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#### Factory Communications

Seamlessly interface with the factory floor using EtherNet/IP, Modbus/TCP, PROFINET and RS-232 Serial communications

## VISION SENSORS VISION CAMERAS VISION CONTROLLERS



Additional cordset information is available.

MQDC2S-1206 MQDC2S-1215 MQDC2S-1230 MQDC2S-1250 15 m (50') MQDC2S-1275

12-Pin



Euro (Cat5e

shielded)

STP-M12-806 2 m (6') STP-M12-815 4 m (15') STP-M12-830 9 m (30')





SMBVERA

SMBVEMP Mounting plate with M8x1.25, 10-32, and 1/2-20 adapter holes

Additional bracket information is available. See page 726



Optional filters create additional contrast

See page 758

Description

Bandpass Filters Example Model Number: FLTB470-27

Description		Model	Diameter
Blue		FLTB470-	25.5
Green		FLTG525-	20.0
Infrared		FLTI850-	21
Red		FLTR635-	30.5
Dark Red		FLTBR660-	34
Polarizing Filter		FLTPR032-	43
	Used with:	iVu, <i>Presence</i> l	PLUS, VE



Additional C-mount Lens information is available See page page 362

#### Sealed Lens Covers

Туре	Model
60 mm cover with polycarbonate window	VELC60-PC
60 mm cover with borosilicate glass window	VELC60-BG
85 mm cover with polycarbonate window	VELC85-PC
85 mm cover with borosilicate glass window	VELC85-BG



**Display Cover** 

Туре	Model
Protective display cover with borosilicate glass window	VEDC-BG



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#### **VE Series Specifications**

Power	12 to 30 V dc <b>Current:</b> 400 mA maximum (exclusive of load and lights) Use only with a suitable Class 2 power supply, or current limiting power supply rated 12 V dc to 30 V dc, 1 A		
Discrete I/O	1 Trigger IN 5 programmable I/O		
Output Configuration	Optically isolated		
Output Rating	Output Resistance: < 2 ΩStrobe Output Resistance: < 13 ΩProgrammable Output: 100 mAExternal Strobe Output: 100 mAOff-State Leakage Current: < 100 μA		
External Light Max. Current Draw	600 mA		
Exposure Time	0.02 ms to 500 ms		
Imager	VE200G1A:         6.9 mm × 5.5 mm, 8.7 mm diagonal (1/1.8-inch CMOS)         VE201G1A:         6.9 mm × 5.5 mm, 8.7 mm diagonal (1/1.8-inch CMOS)           VE202G1A:         7.2 mm × 5.4 mm, 9.0 mm diagonal (1/1.8-inch CMOS)         VE201G1A:         6.9 mm × 5.4 mm, 9.0 mm diagonal (1/1.8-inch CMOS)		
Lens	C-mount		
Pixel Size	VE200G1A: 5.3 μm         VE201G1A: 5.3 μm           VE202G1A: 4.5 μm         VE202G2A: 4.5 μm		
Communication	10/100/1000 Mbps Ethernet, Serial RS-232		
Memory	Device Settings and Inspection Storage Memory: 500 MB Number of Inspection Files: 999		
Acquisition	256 grayscale levels Frames per Second: VE202G1A: 50 fps, max. depending on inspection settings VE202G2A: 50 fps, VE200G1A: 60 fps, VE201G1A: 60 fps Image Size: 752 x 480 pixels = VE200G1A		
	1280 x 1024 pixels = VE201G1A 1600 x 1200 pixels = VE202G1A, VE202G2A		
Construction	Housing: Aluminum Display Label: Polyester		
Connections	Communications: M12, 8-pin Euro-style male Light Connector: M8, 3-pin Pico-style female Power, Discrete I/O: M12, 12-pin Euro-style female		
Environmental Rating	IEC IP67 with optional lens cover		
Operating Conditions	Temperature:       0 °C to +50 °C (+32 °F to +122 °F) 95% maximum relative humidity (non-condensing)         Stable Ambient Lighting:       No large, quick changes in light level; no direct or reflected sunlight         Storage Temperature:       -30 to +70 °C (-22 to +158 °F)		
Vibration and Mechanical Shock	Meets EN 60947-5-2: 30 G Shock per IEC 60068-2-27; 1 mm amplitude from 10-60 Hz per IEC 60068-2-6		
Software Tools	Average Gray, Bead, Blemish, Blob, Edge, Locate, Logic, Match, Math, Measure, Object, Line Detect, Circle Detect		
Certifications			



VISION SENSORS VISION CAMERAS VISION CONTROLLERS

# P4 OMNI



• Economical one-piece design

- Premium tools for enhanced inspection capabilities
- VGA, color and 1.3 MP models available
- Three bright bicolor LED indicators
- Seven configurable discrete I/O (NPN/PNP)
- Cordsets and brackets see page 356

P4 OMNI Example Model Number: P40R-BD



<b>P40</b> = 640 x 480 Gray Scale
<b>P401.3</b> = 1280 x 1024 Gray Scale
<b>P4CO</b> = 752 x 480 Color & Gray Scale

Housing R

 $\mathbf{R} = \text{Right-Angle}$ I = In-Line

**Premium Tools** 



BC = Bar Code Reader **BD** = Bead Tool OC = OCR/OCVBCBD = Bar Code Reader & Bead Tool **BCOC** = BarCode & OCR/OCV BDOC = Bead Tool & OCR/OCV BCBDOC = Bar Code Reader, Bead Tool & OCR/OCV

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# P4 OMNI Sealed

## Rugged Full-Featured Vision System



#### • Economical one-piece design

- IP68-rated nickel-plated aluminum housing
- Premium tools for enhanced inspection capabilities
- VGA, color and 1.3 MP models available
- Three bright bicolor LED indicators
- Seven configurable discrete I/O (NPN/PNP)
- Cordsets and brackets see page 356

#### IP68 P4 OMNI Example Model Number: P40RS-BD





	Shielded	Crossover		
RJ45 to RJ45	<b>STP07</b> 2 m (6.5') <b>STP25</b> 7 m (23')	<b>STPX7</b> 2 m (6.5') <b>STPX25</b> 7 m (23')	RJ45 to 8-pin Euro QD—Sealed Straight connector models listed; for right-angle, add RA at the end of the model number (example, STP-MAQDC-806RA)	<b>STP-MAQDC-806</b> 2 m (6.5') <b>STP-MAQDC-815</b> 5 m (15')
	<b>STP50</b> 15 m (50') <b>STP75</b> 23 m (75')	<b>STPX50</b> 15 m (50') <b>STPX75</b> 23 m (75')		<b>STP-MAQDC-830</b> 9 m (30')

Shielded

Used for: Ethernet Communication (P4)

Additional cordset information is available. See page 758

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**Used for:** Ethernet Communication (Sealed *P4*)



#### More information online at **bannerengineering.com**

#### PresencePLUS® P4 OMNI Specifications

Supply Voltage and Current	10 to 30 V dc (24 V dc ±10% if the sensor powers a light source) P4OR, P4OI & P4ORS: less than 650 mA (exclusive of lights and I/O load) P4O1.3R, P4O1.3I, P4COR, P4COI, P4CORS & P4O1.3RS: less than 550 mA (exclusive of lights and I/O load)
Memory	32 MB or 64 mb Inspection (jobs): 999 max.
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 μA ON-state saturation voltage: NPN—less than 1 V @ 150 mA max. PNP—greater than V+ -2 V
Bicolor Status Indicators	PASS/FAIL: Green ON steady—PASS         Red ON steady—FAIL
	POWER/ERROR: Green ON steady—POWER     Red ON steady—ERROR       READY/TRIGGER: Green ON steady—READY     Yellow ON steady—TRIGGER
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)
Discrete I/O	1 Trigger IN 1 Strobe OUT 4 Programmable I/O 1 Product Change IN 1 Remote TEACH IN
Communications	10/100 Ethernet connection for running <i>Presence</i> PLUS <i>P4</i> software and/or output inspection results <b>P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR &amp; P4COI:</b> RJ-45 connector <b>P4ORS, P401.3RS &amp; P4CORS:</b> 8-pin M12/Euro-style (female) connector RS-232 connection for output of inspection results
Imager Resolution	P4OR, P4OI & P4ORS: 640 x 480 pixels P4O1.3R, P4O1.3I & P4O1.3RS: 1280 x 1024 pixels P4COR, P4COI & P4CORS: 752 x 480 pixels
Pixel Size	<b>P4OR, P4OI, P4COR, P4COI &amp; P4ORS:</b> 7.4 x 7.4 μm <b>P4O1.3R, P4O1.3I &amp; P4O1.3RS:</b> 6.7 x 6.7 μm <b>P4CORS:</b> 6.0 X 6.0 μm
Imager Size	P4OR, P4OI & P4ORS: 4.8 x 3.6 mm, 5.9 mm diagonal (1/3 inch CCD) P4O1.3R, P4O1.3I & P4O1.3RS: 8.6 x 6.9 mm, 11 mm diagonal (2/3 inch CMOS) P4COR, P4COI & P4CORS: 4.5 x 2.9 mm, 5.4 mm diagonal (1/3 inch CMOS)
Levels of Gray Scale or Color	P4OR, P4OI, P4O1.3R, P4O1.3I, P4ORS & P4O1.3RS: 256 Gray Scale P4COR, P4COI & P4CORS: 256 Red, Green and Blue
Exposure Time	P4OR, P4OI & P4ORS: 0.1 to 2830 milliseconds P4O1.3R, P4O1.3I & P4O1.3RS: 0.1 to 1670 milliseconds P4COR, P4COI & P4CORS: 0.1 to 1000 milliseconds
Full Image Acquisition	P4OR, P4OI & P4ORS: 48 frames per second max.* P4O1.3R, P4O1.3I & P4O1.3RS: 26.8 frames per second max.* P4COR, P4COI & P4CORS: 17 frames per second max.*
Lens Mount	Standard C-mount (1 inch—32 UN)
Construction	P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: Black anodized aluminum housing, glass lens P4ORS, P4O1.3RS & P4CORS: Die-cast nickel-plated aluminum housing, glass or acrylic window
Weight	P4OI, P4O1.3I & P4COI: 293 g P4OR, P4O1.3R & P4COR: 385 g P4ORS, P4O1.3RS & P4CORS: 430 g
Environmental Rating	P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: IEC IP20; NEMA 1 P4ORS, P4O1.3RS & P4CORS: IEC IP68
Operating Conditions	Stable ambient temperature: 0 to +50 °C         Stable ambient lighting: No large, quick changes in light level; no direct or reflected sunlight         Relative humidity:         P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: 35-90% (non-condensing)
Tools	Color Only: Average Color, Color Blob, Color Match Standard: Average Grascale, Blob Detect, Edge, GEO Count, Object, Pattern Count, Circle Detect. Line Detect, GEO Find, Locate, Pattern Find, Blob Find, Communication, Math, Measure, Test, String Premium: Bar Code, Bead Tool, OCR/OCV
Certifications	CE

\* A reduced Field-of-View (FOV) dramatically increases acquisition rates.



# PresencePLUS<sup>®</sup> Proll

## Full-Featured Vision System

- Compact camera with separate DIN-mountable controller
- Ethernet, serial and flexible discrete I/O
- A choice of standard or mini anodized aluminum camera, or washdown, IP68-rated nickel-plated aluminum or stainless steel cameras
- VGA, color and 1.3 MP models available
- Six bright bicolor LED indicators
- Premium tools for enhanced inspection capabilities



Euro QD to DB15 Straight connector models listed; for right-angle, add RA after the "S" in the model number (example, PPC06SRAHF)	12-Pin PPC06SHF 2 m (6.5') PPC13SHF 4 m (13') PPC23SHF 7 m (23') PPC32SHF 10 m (32')	BNC to BNC	BNC06 2 m (6.5') BNC15 5 m (16') BNC30 9 m (30') BNC48 15 m (49')	DB9 to DB9	<b>DB9P06</b> 2 m (6.5') <b>DB9P15</b> 5 m (16') <b>DB9P30</b> 9 m (30')
Used for: Camera-to-Contro	oller	Used for: Video		Used for: Serial (	Communication

Shielded Shielded Crossover STP07 STPX7 2 m (6.5') 2 m (6.5') STP25 STPX25 7 m (23') 7 m (23') RJ45 to RJ45 STP50 STPX50 15 m (50') 15 m (50') STP75 STPX75 23 m (75') 23 m (75')

Used for: Ethernet Communication

Additional cordset information is available. See page 758



## BANNER

### PresencePLUS® Proll Controller Specifications

Supply Voltage and Current	PPROCTL: 10 to 30 V dc @ less than 1.5 A (exclusive of load) PPROCTL1.3 & PPROCTLC: 10 to 30 V dc @ less than 1.2 A (exclusive of load)			
Supply Protection Circuitry	Protected against reverse polarity and transient voltages			
Memory	Storage: 64 MB Inspections (jobs): 999 max.			
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable			
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 μA ON-state saturation voltage: NPN—less than 1 V @ 150 mA PNP—greater than V+ -2 V			
Input Specifications	NPN: ON-less than 3 V     PNP: ON-greater than (+V -2)V @ 1 mA max.       OFF-state voltage-greater than 10 V @ 4 mA max     OFF-state voltage-less than 3 V @ 6 mA max.			
Indicators	6 LED indicators: Trigger, Ready, Power, Pass, Fail, Error			
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)			
Discrete I/O	1 Trigger IN (pin 3), 1 Strobe OUT (pin 4), 1 Remote TEACH IN (pin 6), 6 Programmable I/O (pins 9-14), 1 Product Change IN (pin 15), 4 Product Select IN (pins 16-19)			
Communications	1 RJ-45 10/100 Ethernet connection for running <i>Presence</i> PLUS Pro software and/or output inspection results 1 RS-232 DB-9 port for output of inspection results			
Construction	Steel with black zinc plating			
Weight	Approx. 0.55 kg			
Environmental Rating	IEC IP20; NEMA 1			
Operating Conditions	Stable Ambient Temperature:       0 to +50 °C       Relative Humidity:       90% (non-condensing)         Stable Ambient Lighting:       No large, quick changes in light level; no direct or reflected sunlight			
Certifications	CE			

#### PresencePLUS® Proll Camera Specifications

	•
Image Resolution	PPROCAMQ & PPROCAMS(S): 640 x 480 pixels PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 752 x 480 pixels PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 1280 x 1024 pixels
Pixel Size	PPROCAMQ & PPROCAMS(S): 7.4 x 7.4 μm PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 6.0 x 6.0 μm PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 6.7 x 6.7 μm
Imager Size	PPROCAMQ & PPROCAMS(S): 4.8 x 3.6 mm, 6 mm diagonal (1/3 inch CCD) PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 4.5 x 2.9 mm, 5.4 mm diagonal (1/3 inch CMOS) PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 8.6 x 6.9 mm. 11 mm diagonal (2/3 inch CMOS)
Levels of Gray Scale or Color	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROCAMS(S) & PPROCAM1.3S(S): 256 Gray Scale PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 256 Red, Green and Blue
Exposure Time	PPROCAMQ & PPROCAMS(S): 0.10 to 2830 milliseconds PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 0.10 to 1040 milliseconds PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 0.10 to 1670 milliseconds
Full Image Acquisition*	PPROMCAMQ, PPROCAMQ & PPROCAMS(S): 48 frames per second PPROMCAMCQ: 55 frames per second max. PPROCAMCQ & PPROCAMCS(S): 17 frames per second max. PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 18 frames per second max.
Interface	LVDS
Construction	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: black anodized aluminum and black painted die cast zinc PPROCAMS, PPROCAM1.3S & PPROCAMCS: nickel-plated aluminum (Lens covers and ring lights are nickel-plated aluminum with glass or polycarbonate window) PPROCAMS, PPROCAM1.3SS & PPROCAMCSS: 316 stainless steel (Lens covers and ring lights are stainless steel with glass or polycarbonate window)
Environmental Rating	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: IEC IP20; NEMA 1 PPROCAMS, PPROCAM1.3S & PPROCAMCS: IEC IP68; NEMA 6P PPROCAMSS, PPROCAM1.3SS & PPROCAMCSS: IEC IP68; NEMA 6P and NEMA 4X
Outside Temperature	0 to +50 °C
Relative Humidity	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: 90% (non-condensing)
Certifications	CE

\* A reduced Field-of-View (FOV) dramatically increases acquisition rates.

















SMBPPDH SMBPPDE

SMBPPLU Used with: Proll Controller

Used with: Proll Cameras

SMBPPRA

SMBPPU **SMBPPROMRA** Used with: Proll

SMBPPSU Used with: Proll Mini Camera Camera

SMBP4RAB

Used with: P4

SMBP4RAS

SMBP4SRAF Used with: Sealed P4

Additional bracket information is available See page 726

#### Lens Covers



Length	Material	With	Model
	Nickel-plated aluminum	P4	P4SLC50-G
50 mm			P4SLC50-P
50 mm		Pro	PPSLC50-G
			PPSLC50-P
75 mm	Nickel-plated aluminum	Pro & P4	PPSLC75-G
			PPSLC75-P
50 mm	Stainless Steel	Pro	PPSSLC50-G
			PPSSLC50-P

Works



#### Adjustable Mounting System

- 3" and 6" column, base and knuckle kits for positioning of sensor and lights
- Bogen arm with clamp for added flexibility in mounting
- 2" pivoting knuckle assembly for positioning spot light



#### Sensor Interface Modules and Power Supplies

- Sensor interface modules for simplified wiring of P4 sensors in an electrical box
- Lighting interface for strobe operation of Banner lighting with any vision sensor
- Strobe control module for control of specialty strobe lights

#### Video Monitor



Description Model\*

PPM8

8" Flat Panel NTSC

\* Monitors require a BNC cordset for connection to a PresencePLUS Sensor (see page 356).



#### Enclosures

- Offers models for sensors and lights
- Provides protection in rugged or harsh environments
- Prevents tampering





# VISION SENSORS VISION CAMERAS VISION CONTROLLERS

#### Accessories for C-Mount Lenses\*

	Description	Format Size	Model	Used With
	Extension Kit (0.5, 1.0 , 5.0, 10, 20 and 40 mm)		LEK	
6	Extension Kit (0.25 and 0.5 mm)	_	LEKS	All Lenses
	Lens Extender (increases focal length 2X)		LCF2X	
	UV Lens Filter, Clear Glass	2/3"	FLTUV	Tamron Megapixel Lenses

Example Model Number: FLTB470-27				
Description		Model	Diameter	
Blue		FLTB470-		
Green		FLTG525-	25.5	
Infrared		FLIB850-	27	
Red		FLTR635-	30.5	
Dark Red		FLTBR660-	34 43	
Polarizing filter		FLTPR032-	10	
	and with	N/U. 8 Drocono		

Bandpass Filters

Used with: iVu & PresencePLUS, VE

#### C-Mount Color Filters\*

Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	<b>FLTI</b> ( > 760 nm)	FLTI850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	<b>FLTR</b> ( > 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	-	FLTR660 (650-680 nm)

#### C-Mount Standard Lenses

Description		Format Size	Model	Used With
	4 mm		LCF04	
	8 mm	1 /0"	LCF08	Camera resolutions < 1 MP
	12 mm with Focus Locking	1/3	LCF12	
	16 mm with Focus Locking		LCF16	
	25 mm with Focus Locking (Goyo)	-1 11	LCF25R*	
	25 mm with Focus and Aperture Locking, Metal Housing (Goyo)	Ι	LCF25LR**	
	50 mm with Focus and Aperture Locking (Goyo)	2/3"	LCF50L1R**	
	50 mm with Focus Locking, Metal Housing (Goyo)	-1 11	LCF50L2R*	
	75 mm with Focus and Aperture Locking, Metal Housing (Goyo )		LCF75LR*	

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#### C-Mount Specialty Lenses

Description

Jz	

	Format Size	Model	Used With
3.5 mm with Focus and Aperture Locking (Kowa)		LCF03LT**	
6 mm with Focus and Aperture Locking (Kowa)	1/2"	LCF06LK**	Camera resolutions
10 – 40 mm with Zoom, and Focus and Aperture Locking (Tamron)		LCF1040LT*	< 1 MP
50 mm Telecentric (Navitar)	2/3"	LCF50TELN*	

#### C-Mount Megapixel Lenses with Focus and Aperture Locking



	Format Size	Model	Filter Diameter (mm)	Used With
8 mm (Tamron)		LCF08LTMP**		
16 mm (Tamron)		LCF16LTMP**	25.5	
25 mm (Tamron)	1/1.0 (± 213)	LCF25LTMP**		
50 mm (Tamron)		LCF50LTMP <sup>†</sup>		
16 mm (Ricoh)		LCF16LMP**		
25 mm (Ricoh)	0/0 mm (+ 07.0 mm)	LCF25LMP**	27.3	
35 mm (Ricoh)	2/3 mm (± 27.3 mm)	LCF35LMP**		
50 mm (Ricoh)		LCF50LMP**		
5 mm (Computar)	1/2"	LCF05LCMP*	43	
 8 mm (Computar)		LCF08LMP**		
12 mm (Computar)		LCF12LMP**		
16 mm (Computar)		LCF16LCMP**		Camera resolutions
25 mm (Computar)	2/3"	LCF25LCMP**	30.5	> 1 MP
35 mm (Computar)		LCF35LCMP <sup>†</sup>		
50 mm (Computar)		LCF50LCMP <sup>†</sup>		
75 mm (Computar)		LCF75LCMP <sup>†</sup>		
6 mm (Evetar)	1/1.8"	LCF06LEVMP	34	
8.5 mm (Evetar)	1/1.8"	LCF08LEVMP	27	
12 mm (Evetar)	2/3"	LCF12LEVMP	27	
16 mm (Evetar)	2/3"	LCF16LEVMP	27	
25 mm (Evetar)	2/3"	LCF25LEVMP	27	
35 mm (Evetar)	2/3"	LCF35LEVMP	27	
50 mm (Evetar)	2/3"	LCF50LEVMP	30.5	
75 mm (Evetar)	1"	LCF75LEVMP	34	

Lens will not fit in High Intensity Banner Ring Lights with aperture and/or focal ring thumb screws installed (example, LEDRR70XD5-XM)
 Lens will not fit inside any ring light or sealed camera lens cover as the lens body diameter is too large

† Lenses require a 75 mm cover when used with a Sealed Pro or P4 Camera (see page 361)



# Vision Lighting

Vision lighting is the key to creating all-important contrast between the feature of interest and its background.







#### Area Lights

page 366

Provides even illumination in a concentrated area page 378



Backlights Installs behind the target, directly facing the sensor; has a highly diffused surface and uniform brightness page 370



Linear Array Backlights Diffused backlights that can be used for any vision system or as a highly diffused area light page 371



Linear Array Lights Provides high-intensity illumination of large areas, at long distances page 372



On-Axis Lights Provides collimated illumination along the same optical path as the camera page 373



Spot Lights Provides even illumination in a small concentrated spot page 374



#### Low-Angle Ring Lights Illuminates nearly perpendicular to the direction of an inspection page 376

Laser Line Generator Laser Line Generators have dynamic line balancing for repeatable performance page 377





# **Ring Lights**

# LED Vision Lights

- Connects directly to *Presence*PLUS or VE vision sensors or an external power supply
- Brightly illuminates small objects
- Mounts directly to the camera and centers the light on the image
- Includes models to withstand washdown environments (IP68 rated)
- Cordsets and brackets see page 378

#### IP50 High-Intensity

Example Model Number: LEDRR70XD5-XM



Connection options:	
<ul> <li>Pico QD model required for P4 or VE sensors.</li> <li>Pico QD models include a built-in mounting bracket for use with P4 or VE sensors.</li> <li>Models require a mating cordset (see page 378).</li> <li>Optional bracket SMBPPRHI required for use with Pro cameras (see page 378).</li> <li>Optional bracket SMBPPRHI required for use with Pro Mini cameras (see page 378).</li> </ul>	

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#### IP20 LED Ring Lights, 24 V DC Example Model Number LEDRR80X80W



#### IP68 (for sealed *Pro* II and *P4* Models) Example Model Number LEDRR90S-G



Connection options:

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRR80X80W W/30).

For replacement windows and diffusers (see page 379).

\* Splitter cordsets available for powering two lights (see page 378).



# Area Lights

# LED Vision Lights

- Provides even illumination in a concentrated area
- Creates shadows or glare to detect changes in depth, depending on mounting
- High-intensity lighting for distances greater than 12 inches
- Cordsets and brackets see page 378

#### IP50 High-Intensity Area Light Example Model Number: LEDRA70XD5-XM



Connection options:

\* Pico QD model required for P4 or VE sensors.

Models require a mating cordset (see page 378).

†† For replacement windows and diffusers (see page 379).

### IP68 Sealed High-Intensity Area Light

Example Model Number: LEDRA70AD5-XQ



#### IP40 LED Area Light

Example Model Number LEDRA80X80W



Connection options:

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRA80X80W W/30).

QD models can be connected directly to P4 sensors; splitter cordset available for powering two lights (see page 378).

\* Models require a mating cordset (see page 378)

\*\* UV365 can only be used with glass window

† For replacement windows and diffusers (see page 378)

BANNER

# Back Lights

# LED Vision Lights

- Determines the shape and size of target objects
- Offers a highly diffused surface and uniform brightness, with lower intensity than other lights
- Provides the most robust lighting for measuring and gauging
- Highlights through-holes in target objects
- Cordsets and brackets see page 378

#### IP67 Sealed LED Backlights

Example Model Number LEDRB75X150PW2-XQ



#### IP40 LED Backlights

Example Model Number LEDRB70X70Q



Connection options: A model with a QD requires a mating cordset (see page 378)

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRB70X70W W/30).

QD models can be connected directly to P4 sensors; splitter cordsets available for powering two lights (see page 378).

\* Models require a mating cordset (see page 378).

† For replacement windows and diffusers (see page 379).



# Linear Array Backlights

## LED Vision Lights

- Built-in constant current regulation with very even light pattern
- Optically isolated strobe signal with selectable Active High or Active Low strobe option
- Maintenance-free, rugged construction
- Four high-intensity, visible wavelengths, plus IR
- Cordsets and brackets see page 378

#### IP50 High Power LED Linear Array Backlights

Example Model Number LEDRLB145XW6-XQ



Connection options: A model with a QD requires a mating cordset (see page 378).

\* Models require a mating cordset (see page 378).

† For replacement windows and diffusers (see page 379).

# Linear Array Lights

# LED Vision Lights

- Provides maintenance-free LED illumination of large objects from far away
- Provides superior high-intensity illumination of large areas
- Available in sealed (IP68) nickel-plated and non-sealed (IP50) housings
- Provides optically isolated strobe signal
- Cordsets and brackets see page 378

#### IP50 High-Intensity LED Linear Array Example Model Number: LEDRA70XD5-XM



#### IP68 High-Intensity LED Linear Array Example Model Number: LEDRA70XD5-XM

Type of Relative Intensity Light Window<sup>††</sup> Color Light Size Housing Intensity Adjustment Connector LED R LA 290 Α D 6 Х Q LA = Linear Array A = Nickel-plated P = Plastic clear  $\mathbf{X} = Fixed$ **Q** = 5-pin Integral Aluminum G = Glass clear Euro QD\*\* SS = 316 Stainless D = Diffused clear  $\mathbf{B} = Blue$ 290 mm Steel plastic 435 mm G = Green 580 mm I = Infrared R = Red W = White UV365 = UV 365 nm\* UV395 = UV 395 nm Connection options: A model with a QD requires a mating cordset (see page 378) \* UV365 can only be used with glass window \*\* Models require a mating cordset (see page 378). Intensity adjustment not available on 145 mm length ++ For replacement windows and diffusers (see page 379).

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# **On-Axis Lights**

## LED Vision Lights



- Provides more uniform illumination than a ring light
- Delivers collimated illumination in the same optical path as camera
- Evenly illuminates flat reflective surfaces
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 378

#### IP40 LED On-Axis Light Example Model Number LEDRA100W



Connection options: A model with a QD requires a mating cordset (see page 378).

QD cordsets with flying leads are available for connecting to models other than P4 (see page 378). \* Models require a mating cordset (see page 378).

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# Spot Lights

# LED Vision Lights

- Low-cost, compact washdown spot lights for PresencePLUS® sensors
- Continuous or strobed operation is selectable via sensor software
- Provides extremely bright, even light with high-power LEDs
- Adjustable spot size
- Direct connection to *Presence*PLUS® *Pro* sensor or to an external power supply using 3 discrete wires
- Cordsets and brackets see page 378

#### IP68 Sealed LED Spot Light Example Model Number LEDRSW



Connection options: A model with a QD requires a mating cordset (see page 378).

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

QD models can be connected directly to P4 sensors; splitter cordsets available for powering two lights (see page 378).

\* Models require a mating cordset (see page 378).



# High-Intensity Spot Lights

# LED Vision Lights

- Provides more uniform illumination than a ring light
- Delivers collimated illumination in the same optical path as camera
- Evenly illuminates flat reflective surfaces
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 378

#### IP69K Sealed High Intensity LED Spot Lights

	Color	Lumana	Lux		Connection	Madala	
Lens Angle	Color	Lumens	0.5 m 1 m		Connection	Wodels	
	Red	110	8,000	2,000	5-pin Euro integral QD connector (use	LEDRS50L5-XQ	
	White	295	13,780	3,445		LEDWS50L5-XQ	
± 5°	Blue	85	4,880	1,220		LEDBS50L5-XQ	
(smaller, more focused spot)	Green	210	13,000	3,250	with a 5-wire mating	LEDGS50L5-XQ	
	IR	760*	4.40**	1.10**	cordset)	LEDIS50L5-XQ	
	UV	480*	2.10**	0.52**		LEDUV395S50L5-XQ	
	Red	105	2,500	625		LEDRS50L11-XQ	
	White	285	5,460	1,365	5-pin Euro integral	LEDWS50L11-XQ	
± 11° (larger spot)	Blue	80	1,540	385	QD connector (use with a 5-wire mating	LEDBS50L11-XQ	
	Green	200	3,900	975	cordset)	LEDGS50L11-XQ	
	UV	420*	0.78**	0.19**		LEDUV395S50L11-XQ	
± 14° (larger spot)	IR	665*	1.16**	0.29**	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDIS50L14-XQ	
	Red	100	1,040	260		LEDRS50L20-XQ	
	White	270	2,000	500	5-pin Euro integral	LEDWS50L20-XQ	
± 20° (largest spot)	Blue	75	700	175	with a 5-wire mating	LEDBS50L20-XQ	
	Green	190	1,700	425	cordset)	LEDGS50L20-XQ	
	UV	390*	0.42**	0.10**		LEDUV395S50L20-XQ	

Connection options: A model with a QD requires a mating cordset (see page 378).

For 2 m cable, omit suffix XQ from model number (example, LEDRS50L5).

\* Values listed in milliwatts

\*\* Values listed in mW/cm<sup>2</sup>



# Low Angle Ring Lights

# LED Vision Lights

- Highlights surface irregularities
- Highlights slight height differences such as etching, sodder balls and embossing
- Illuminates from an angle nearly perpendicular to object
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 378

#### LED Low Angle Ring Lights

Example Model Number LEDRI1503M



# Laser Line Generator



- Laser line uniformity up to 95% on 100% of the line
- External user focus mechanism
- Robust thermal management, providing better stability and longer lifetime
- Remote laser monitoring and control via RS232 communication
- Brackets see page 378

Laser Line Generat	or, 5-24 V DC	Visible Red Laser
Description		Models
Laser Line Generator: 660 nm Class II Flying le	; 10mW, 60 degree fan angle CDRH, RS232 Communication ads	LLG660P10A60II
Laser Line Generator: 660 nm Class III Flying le	; 50mW, 60 degree fan angle A CDRH eads	LLG660P50A60111
Laser Line Power Supply Gen	erator: 660 nw, 10 mW 60 degree fan angle, Class II CDRH Flying leads	PSLLG12V

Connection options: A model with a QD requires a mating cordset (see page 378).

QD cordsets with flying leads are available for connecting to models other than P4 (see page 378). \* Models require a mating cordset (see page 378).

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<sup>†</sup> Powers 2 lights from one P4 sensor

CSB-UNT213M831F1241\*\* Branches = 0.3 m (1ft) Trunk = Flying leads

\*\* Enables strobe signal from P4 while obtaining power from an external source

Pico-Style Double-Ended Straight connector models listed

PKG3M-.35-PSG3M 0.35 m (1 ft) PKG3M-2-PSG3M 2 m (6.5 ft)

Additional cordset information is available. See page 758



Used with: Area Lights & Backlights

Additional bracket information is available

SMBLASRA Used with: Linear Array Used with: Ring Lights

SMBPMPRHI

SMBPPOAL. SMBP40AL Used with: On-Axis

See page 726

#### Polarizing Filters

Polarizing Filters		Polarizing Filters		
Description	Models	Description	Models	
Linear Polarizing filter kit for 62 x 62 Ring Lights	LEDRRPFKS	Linear Polarizing filter kit for 290 mm Linear Array Lights (IP50)	LEDLAPFK290	
Linear Polarizing filter kit for 80 x 80 Area Lights and 70 x 70 $Racklights$	LEDAPFK	Linear Polarizing filter kit for 435 mm Linear Array Lights (IP50)	LEDLAPFK435	
Linear Polarizing filter kit for 62 v 62 Area Lights		Linear Polarizing filter kit for 580 mm Linear Array Lights (IP50)	LEDLAPFK580	
Linear Polarizing filter kit for Social Ding Lights	LEDRPEKOO	Linear Polarizing filter kit for 870 mm Linear Array Lights (IP50)	LEDLAPFK870	
Linear Polarizing litter kit for Sealed Ring Lights	LEDRPFK90	Linear Polarizing filter kit for 1160 mm Linear Array Lights (IP50)	LEDLAPFK1160	
replacements	LEDFLTK	Linear Polarizing filter kit for 70 mm High-Intensity Area Lights	LEDAPFK70	
Linear Polarizing filter kit for 290 mm Linear Array Lights (IP68)	LEDLAPFK290S	Linear Polarizing filter kit for 70 mm High-Intensity Ring Lights	LEDRPFK70	
Linear Polarizing filter kit for 580 mm Linear Array Lights (IP68)	LEDLAPFK580S	Linear Polarizing filter kit for 70 mm IP68 High-Intensity Area Lights	LEDAPFK70S	
Linear Polarizing filter kit for 145 mm Linear Array Lights (IP50)	LEDLAPFK145	Linear Polarizing filter kit for 50mm High-Intensity Spot Lights	LEDS50PFK	

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### Window Replacements and Lighting Diffusers

Use With	Models
Clear Plastic	
62 x 62 mm Ring Lights	LEDRCWS
80 x 80 mm Ring Lights	LEDRCW
62 x 62 mm Area Lights	LEDAWS
80 x 80 mm Area Lights	LEDAW
70 mm Sealed High-Intensity Area Lights	LEDA70SW-P
145 mm IP50 Linear Array Lights	LEDLA145XW-P
290 mm IP50 Linear Array Lights	LEDLA290XW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SW-P
435 mm IP50 Linear Array Lights	LEDLA435XW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SW-P
580 mm IP50 Linear Array Lights	LEDLA580XW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SW-P
870 mm Sealed IP50 Linear Array Lights	LEDLA870XW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XW-P
Clear Plastic Diffuse	
80 x 80 mm Ring Lights	LEDRCDW
62 x 62 mm Right Lights	LEDRCDWS
70 mm High-Intensity Ring Lights	LEDR70CDW
70 mm High-Intensity Area Lights	LEDA70CDW
70 mm Sealed IP68 High-Intensity Area Lights	LEDA70SCDW-P
145 mm IP50 Linear Array Lights	LEDLA145XCDW-P
290 mm IP50 Linear Array Lights	LEDLA290XCDW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SCDW-P
435 mm IP50 Linear Array Lights	LEDLA435XCDW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SCDW-P
580 mm IP50 Linear Array Lights	LEDLA580XCDW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SCDW-P
870 mm IP50 Linear Array Lights	LEDLA870XCDW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XCDW-P

#### Clear Glass

70 mm Sealed IP68 High-Intensity Area Lights	LEDA70SW-G
145 mm IP50 Linear Array Lights	LEDLA145XW-G
290 mm IP50 Linear Array Lights	LEDLA290XW-G
290 mm Sealed IP68 Linear Array Lights	LEDLA290SW-G
435 mm IP50 Linear Array Lights	LEDLA435XW-G
435 mm Sealed IP68 Linear Array Lights	LEDLA435SW-G
580 mm IP50 Linear Array Lights	LEDLA580XW-G
580 mm Sealed IP68 Linear Array Lights	LEDLA580SW-G
870 mm IP50 Linear Array Lights	LEDLA870XW-G
1160 mm IP50 Linear Array Lights	LEDLA1160XW-G

Use With	Models
White Plastic	
70 x 70 mm Red Backlights	LEDBW
70 x 70 mm Infrared Backlights	LEDBIW
85 x 220 mm Red Backlights	LEDBWL
85 x 220 mm Infrared Backlights	LEDBIWL
White Plastic Diffuse	
62 x 62 mm Ring Lights	LEDRDWS
80 x 80 mm Ring Lights	LEDRDW
62 x 62 mm Area Lights	LEDADWS
80 x 80 mm Area Lights	LEDADW
70 mm Sealed High-Intensity Area Lights	LEDA70SWDW-P
145 mm IP50 Linear Array Lights	LEDLA145XWDW-P
290 mm IP50 Linear Array Lights	LEDLA290XWDW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SWDW-P
435 mm IP50 Linear Array Lights	LEDLA435XWDW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SWDW-P
580 mm IP50 Linear Array Lights	LEDLA580XWDW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SWDW-P
870 mm IP50 Linear Array Lights	LEDLA870XWDW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XWDW-P