

## 5-Megapixel C-Mount Smart Camera F440-F

### User-configurable smart camera.

The **F440-F C-Mount Smart Camera with AutoVISION 5.3.0** user interface is a highly configurable smart camera with a 35 frame-per-second 5 megapixel monochrome global shutter sensor. The C-mount lens, external lighting options, and 5 megapixel sensor optimize the F440-F for virtually any machine vision applications.

The F440-F is pin-compatible with the MicroHAWK F430-F smart camera, ensuring a clear upgrade path with all the same wiring accessories.

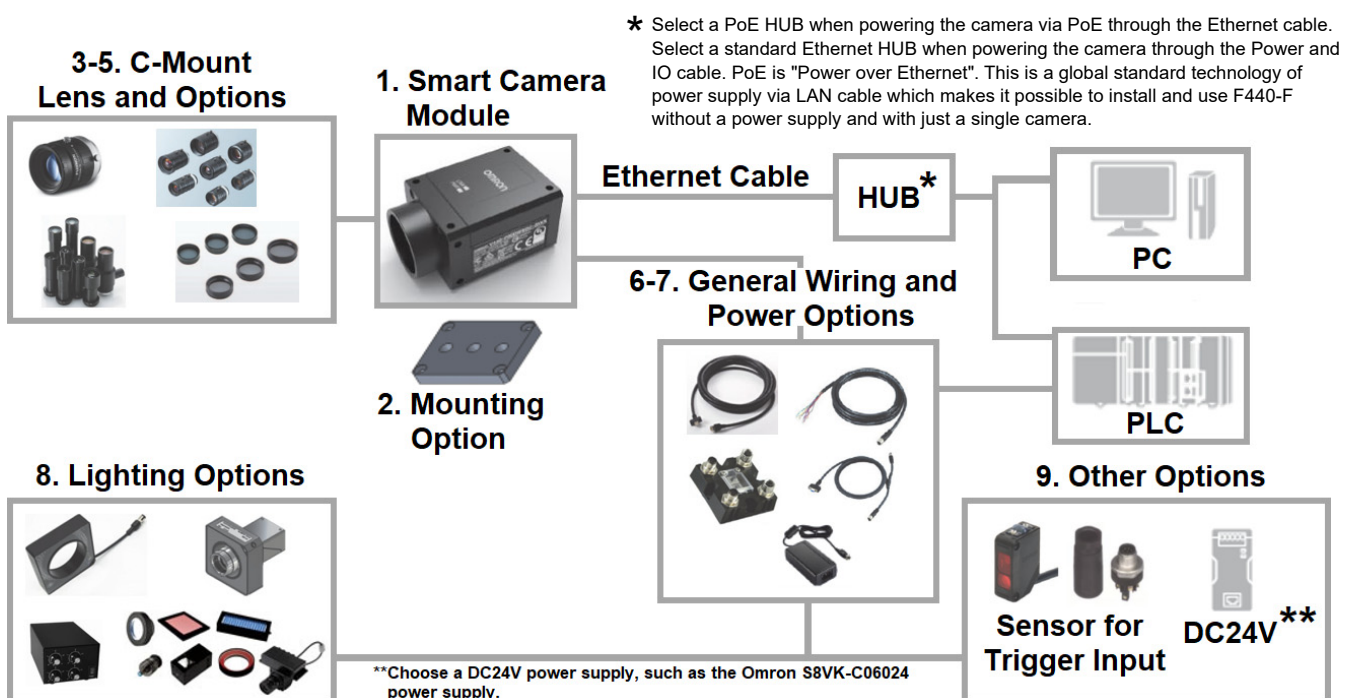
**AutoVISION** – the intuitive setup tool for the F440-F – allows you to configure highly complex applications quickly and easily.



### Features

- 5 MP monochrome global shutter sensor.
- 35 FPS image acquisition.
- Higher FPS using pixel binning and region of interest (ROI) modes.
- C-mount lens-compatible.
- External lighting-compatible (dedicated strobe output).
- Smallest smart camera in its class.
- IP40-rated.
- Support for Digital I/O, RS-232, Ethernet TCP/IP, EtherNet/IP™, and PROFINET communications.
- PoE (Power over Ethernet) or direct 24V.


### System Configuration



# F440-F

## Ordering Information

### 1. Camera Models and Software Licenses

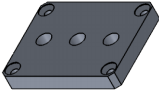
Appearance	Description	Part Number
	F440-F, No Optics, 5 MP, Mono, No Light, AutoVISION Sensor	F440-FXXX50M-NNS
	F440-F, No Optics, 5 MP, Mono, No Light, AutoVISION + Verification	F440-FXXX50M-NNA
	F440-F, No Optics, 5 MP, Mono, No Light, AutoVISION + Verification + Visionscape	F440-FXXX50M-NNV

**Note 1:** F440-F cameras are sold without lenses, lights, cables, or mounting. All of these items can be found in later sections of this datasheet.

**Note 2:** The F440-F uses all the same cables and interconnect accessories as the V440-F. The F440-F uses standard Ethernet cables. High-Flex TPE cables and Robot Ethernet cables are shown later in this datasheet.

Software License	Vision Toolset
F440-FXXX50M-NNS: AutoVISION Sensor	Locate Tool, Presence/Absence Tool, Count Tool, Measure Tool, Logic Tool
F440-FXXX50M-NNA: AutoVISION + Verification	All of the Above + Decode Tool, OCR Tool, Match Strings Tool, String Format Tool, OCV Tool, Symbol Quality Verification Tool
F440-FXXX50M-NNV: AutoVISION + Verification + Visionscape	All of the Above + Visionscape Extensive Machine Vision Tool Set

### 2. Mounting Options

Appearance	Type	Part Number
	¼-20 Camera Mounting Block Kit (F440-F series only)	V440-AM0

### 3. C-Mount Lens Options

The F440-F has a C-mount, and can be used with standard C-mount, telecentric, and macro lenses. Omron offers a variety of lenses at a variety of prices and resolutions for standard reading and code grading applications.

Three different C-mount lens sets are listed below for general reading and code grading. The tables include cross references to compatible polarizing filters and Smart Series Ring Lights.

When using the F440-F with Smart Series Ring Lights and a polarizer, the appropriate polarizing filter must be used on the lens.

#### Compact C-Mount Reading Lenses\*

- Low Cost
- Small Size
- Reading Lens – 85 lp/mm
- Locking Screws for Focus and Iris
- F-Number of 1.2 to 16



Part Number	Focal Length	Minimum Working Distance (mm)	Size (mm) – Length x Diameter	Filter Size	Polarizer Part Number	Smart Ring Light Compatibility
98-9000167-01	6 mm	100	36.7 x 29.5	M27 P0.5	3Z4S-LE SV-PL270-SS	R-70/R-100
98-9000168-01	9 mm	100	35 x 29.5	M27 P0.5	3Z4S-LE SV-PL270-SS	R-70/R-100
98-9000169-01	12.5 mm	100	29.5 x 29.5	M25.5 P0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000170-01	16 mm	100	29.5 x 29.5	M25.5 P0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000171-01	25 mm	150	29.5 x 29.5	M25.5 P0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000172-01	35 mm	250	29.5 x 29.5	M25.5 P0.5	3Z4S-LE SV-PL255-SS	R-70/R-100

\*For working distances shorter than the minimum working distance specified for the lens, an extension tube is required to focus the lens.

**Standard C-Mount Reading Lenses\***

- Medium Size
- Reading Lens – 100 lp/mm
- Locking Screws for Focus and Iris
- F-Number of 1.4 to 16



Part Number	Focal Length	Minimum Working Distance (mm)	Size (mm) – Length x Diameter	Filter Size	Polarizer Part Number	Smart Ring Light Compatibility
3Z4S-LE SV-0614H	6 mm	100	57.5 x 42	M40.5 P0.5	3Z4S-LE SV-PL405-SS	R-100
3Z4S-LE SV-0814H	8 mm	100	52.5 x 39	M35.5 P0.5	3Z4S-LE SV-PL355-SS	R-100
3Z4S-LE SV-1214H	12 mm	100	51 x 30	M27 P0.5	3Z4S-LE SV-PL270-SS	R-70/R-100
3Z4S-LE SV-1614H	16 mm	100	47.5 x 30	M27 P0.5	3Z4S-LE SV-PL270-SS	R-70/R-100
3Z4S-LE SV-2514H	25 mm	150	36 x 30	M27 P0.5	3Z4S-LE SV-PL270-SS	R-70/R-100
3Z4S-LE SV-3514H	35 mm	200	45.5 x 44	M35.5 P0.5	3Z4S-LE SV-PL355-SS	R-100
3Z4S-LE SV-5014H	50 mm	300	57.5 x 44	M40.5 P0.5	3Z4S-LE SV-PL405-SS	R-100
3Z4S-LE SV-7525H	75 mm	1200	54.6 x 36	M34.0 P0.5	3Z4S-LE SV-PL340-SS	R-100
3Z4S-LE SV-10028H	100 mm	2000	71.6 x 39	M37.5 P0.5	3Z4S-LE SV-PL375-SS	R-100

\*These are the standard lenses offered in the Omron Vision Accessories Catalog.

\*For working distances shorter than the minimum working distance specified for the lens, an extension tube is required to focus the lens.

**High-Resolution Code Reading / Grading C-Mount Lenses\***

- Medium Size
- Reading / 1D and 2D Code Grading Lens – 145 lp/mm
- Locking Screws for Focus and Iris
- F-Number of 1.4 to 16



Part Number	Focal Length	Minimum Working Distance (mm)	Size (mm) – Length x Diameter	Filter Size	Polarizer Part Number	Smart Ring Light Compatibility
98-9000192-01	6 mm	100	51 x 39	M37.5 x 0.5	3Z4S-LE SV-PL375-SS	R-100
98-9000165-01	8 mm	100	51.5 x 29.5	M25.5 x 0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000166-01	12 mm	100	51.5 x 29.5	M25.5 x 0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000154-01	16 mm	100	46.0 x 29.5	M25.5 x 0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000164-01	25 mm	100	46.5 x 29.5	M25.5 x 0.5	3Z4S-LE SV-PL255-SS	R-70/R-100
98-9000163-01	35 mm	200	41.5 x 29.5	M25.5 x 0.5	3Z4S-LE SV-PL255-SS	R-70/R-100

\*For working distances shorter than the minimum working distance specified for the lens, an extension tube is required to focus the lens.

**C-Mount Lens Polarizing Filters (only for Standard C-Mount Reading Lenses)**



Model	Filter Size
3Z4S-LE SV-PL225-SS	M22.5 P0.5
3Z4S-LE SV-PL255-SS	M25.5 P0.5
3Z4S-LE SV-PL270-SS	M27.0 P0.5
3Z4S-LE SV-PL305-SS	M30.5 P0.5
3Z4S-LE SV-PL340-SS	M34.0 P0.5
3Z4S-LE SV-PL355-SS	M35.5 P0.5
3Z4S-LE SV-PL375-SS	M37.5 P0.5
3Z4S-LE SV-PL405-SS	M40.5 P0.5
3Z4S-LE SV-PL520-SS	M52.0 P0.75
3Z4S-LE SV-PL550-SS	M55.0 P0.75
3Z4S-LE SV-PL620-SS	M62.0 P0.75

#### 4. Non-Telecentric Macro C-Mount Lens Options for Small Codes

- Macro Lens – Low Cost, Small Size
- 0.5x Magnification – 17 × 14.2 mm Field of View
  - Able to Capture 2 mil (0.05 mm) Code at 7 PPE
- 1x Magnification – 8.5 × 7.1 mm Field of View
  - Able to Capture 1 mil (0.025 mm) Code at 7 PPE
- Use with External Lighting



Part Number	Description	Opt. Mag.	Working Distance (mm)	F#	Depth of Field (mm)	TV Distortion	F440-F FOV (mm)
3Z4S-LE VS-MC05-130	0.5x Macro Lens	0.5x	126.3	6.1	2.0	0.00% max.	17 × 14.2
3Z4S-LE VS-MC1-80	1x Macro Lens	1x	82.4	8.14	0.7	0.00% max.	8.5 × 7.1

#### 5. Telecentric C-Mount Lens and Lighting Options for Small Codes

- High-Resolution Telecentric Lens – 150 lp/mm
- 1x Magnification – 8.5 × 7.1 mm Field of View
  - Able to capture 1 mil (0.024 mm) Code Size at 7 PPE
- 2x Magnification – 4.25 × 3.55 mm Field of View
  - Able to capture 0.5 mil (0.012 mm) Code Size at 7 PPE
- 65 or 110 mm Working Distance
- Coaxial Lighting Option or use with External Lighting



Part Number	Description	Opt. Mag.	Working Distance (mm)	F#	NA	Depth of Field (mm)	TV Distortion	F440-F FOV (mm)
3Z4S-LE VS-TCH1-65-O	1x Telecentric Lens	1x	68.8	9.9	0.05	0.6	0.01%	8.5 × 7.1
3Z4S-LE VS-TCH1-110-O	1x Telecentric Lens	1x	110.3	10.5	0.048	0.6	0.02%	8.5 × 7.1
3Z4S-LE VS-TCH2-65-O	2x Telecentric Lens	2x	65	13.6	0.074	0.3	0.01%	4.25 × 3.55
3Z4S-LE VS-TCH2-110-O	2x Telecentric Lens	2x	110.3	13.6	0.074	0.3	0.02%	4.25 × 3.55
3Z4S-LE VS-TCH1-65CO-O	1x Telecentric Lens with Coaxial Light	1x	68.8	9.9	0.05	0.6	0.03%	8.5 × 7.1
3Z4S-LE VS-TCH1-110CO-O	1x Telecentric Lens with Coaxial Light	1x	110.8	10.5	0.048	0.6	0.03%	8.5 × 7.1
3Z4S-LE VS-TCH2-65CO-O	2x Telecentric Lens with Coaxial Light	2x	65	13.5	0.074	0.3	0.03%	4.25 × 3.55
3Z4S-LE VS-TCH2-110CO-O	2x Telecentric Lens with Coaxial Light	2x	110.8	13.5	0.074	0.3	0.03%	4.25 × 3.55

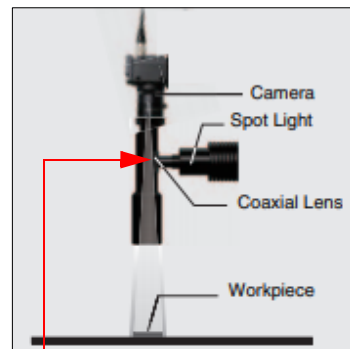
### Telecentric Lens Coaxial Lighting – Option 1

- Red, White, or Blue Spot Light for Coaxial Lens (8 mm dia.)
- Analog Lighting Controller
- Extension Cable

Part Number	Description*
FLV-EP0803R	Spot Light, Red (Fits TCH Telecentric Lens)
FLV-EP0803W	Spot Light, White (Fits TCH Telecentric Lens)
FLV-EP0803B	Spot Light, Blue (Fits TCH Telecentric Lens)
FLV-ATC10405	Analog Lighting Controller for FLV-EP Series
FLV-XC1EP	Extension Cable (between Light and Controller) 1 Meter
FLV-XC2EP	Extension Cable (between Light and Controller) 2 Meters
FLV-XC3EP	Extension Cable (between Light and Controller) 3 Meters
FLV-XC5EP	Extension Cable (between Light and Controller) 5 Meters

\*Note: See the **Omron Vision Accessories Catalog** for full descriptions.

**Important:** This option uses standard components available in Japan. Please note that this power supply cannot be sold in the U.S. or the EU. Refer to **Telecentric Lens Coaxial Lighting – Option 2** for alternate components.

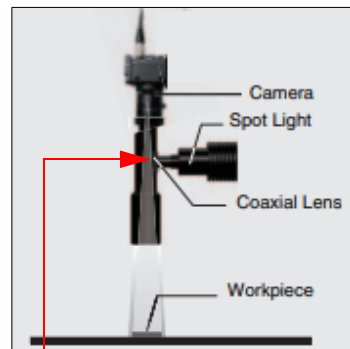


### Telecentric Lens Coaxial Lighting – Option 2

- Blue Spot Light for Coaxial Lens (8 mm dia.)
- 24V DC / 0.7W
- Flying Leads Extension Cable to Power Source
- Optional Power Supply

Part Number	Description
98-9000304-01	Kit, Spotlight, Blue, Telecentric Lens with Flying Leads Extension Cable
NER-011504100	24VDC 2.5A DIN Mount Power Supply*
NER-030028300	AC Power Cord for DSPxx Power Supply, U.S.*
NER-030028400	AC Power Cord for DSPxx Power Supply, EU*

\*Important: This option can be sold in the U.S., EU, and all other regions, as it can be powered directly from 24V, or can use the listed UL-compliant and CE-compliant **S8VK-C06024** power supply.





## 6. Cables

### General Wiring Options

Appearance	Category	Length / Spec	Part Number
	Standard Ethernet Cables - Industrial High-Flex GigE Ethernet Cables with Jack Screws and RJ45 Connector*	2 Meters	98-000133-01
		5 Meters	98-000134-01
		7 Meters	98-000134-02
	Camera to QX-1 Interconnect Cables M12 Socket to M12 Plug QX-1 is used as breakout module for common IO signals and power.	1 Meter	V430-WQ-1M
	M12 Socket to M12 Plug, with Power Filter	300 mm	V430-WQF-1M
	Camera to QX-1 Interconnect Cables M12 Socket to M12 Plug QX-1 is used as breakout module for common IO signals and power.	3 Meters	V430-WQ-3M
		5 Meters	V430-WQ-5M
	QX-1 M12 to Smart Light Power and Strobe Control Cables M12 Plug on QX-1 to 5 Pin Socket on Light	3 Meters – Continuous Power	61-000204-01
		3 Meters – Strobe Control	61-000218-01
	Y Cable, Camera/Power and Smart Light Power (Continuous On)	1 Meter	61-9000135-01
	Y Cable, Camera/Power and Smart Light Strobe Control	1 Meter	61-9000137-01
	M12 to Flying Leads Cable, Straight Power, IO, RS-232, USB	3 Meters	V430-W8-3M
	M12 to Flying Leads Cable, with Power Filter		V430-W8F-3M
	M12 to Flying Leads Cable, Straight Power, IO, RS-232, USB	5 Meters	V430-W8-5M
	M12 to Flying Leads Cable, with Power Filter		V430-W8F-5M
	M12 to RS-232 Breakout	1 Meter	V430-WR-1M
		3 Meters	V430-WR-3M
	Camera to QX-1 Interconnect Cables with RS-232 Breakout	2.7 Meters	V430-WQR-3M
	Camera to QX-1 Interconnect Cables with USB Keyboard Wedge Breakout	2.7 Meters	V430-WQK-3M

\*Important: Standard Omron FJ-VSG Ethernet cables are available in alternative and longer lengths.

## 7. Power Supply and PoE Injector

Appearance	Category	Length / Spec	Part Number
	Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket	1 Meter US/Euro Plug	97-000012-01
	Single Port PoE Injector, 30W, IEEE802.3at Compliant, 2 x RJ45 Connector, 90 to 264VAC	Power Cord NOT Included (C13 Connector Required)	98-9000311-01 (Coming Soon)

## 8. Lighting Options

The F440-F is designed for use with external lighting. It can be equipped with any vendor's continuous power or strobe lighting. Strobe lights are triggered using Output 3 on the M12 IO connector through a flying leads cable.

Omron also offers a line of Smart Lights that can be used in continuous or strobed mode. NERLITE Smart Series Lights have a built-in strobe controller, so no external strobe controller is needed. Dedicated cable sets allow you to wire the NERLITE Smart Series Lights directly to the F440-F.

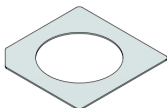
NERLITE Smart Series Lights include Ring Lights, DOALs, Large Area Bar Lights (MAX Lights), and a dedicated label-reading light called Pharmalite. Ring Lights, Ring Light accessories, and mounting brackets are show below.

### NERLITE Smart Series R-70 and R-100 Ring Lights

Product	Appearance	Type	Part Number
<b>F440-F Smart Series Ring Light Kits</b> 		<b>R-70, 70 mm RED Ring Light</b>	<b>NER-011660900G*</b>
		R-70, 70 mm WHITE Ring Light	NER-011660910G
		R-70, 70 mm BLUE Ring Light	NER-011660920G
		<b>R-100, 100 mm RED Ring Light</b>	<b>NER-011661100G*</b>
		R-100, 100 mm WHITE Ring Light	NER-011661110G
		R-100, 100 mm BLUE Ring Light	NER-011661120G


**\*Note:** The R-70 and R-100 Red Ring Lights are normally stock lights with short lead times. Blue and White Ring Lights are subject to standard NERLITE lead times. Check on availability before placing order.

### NERLITE Smart Series R-70 and R-100 Ring Light Polarizer Kits

Appearance	Type	Part Number
	R-70 Smart Series Ring Light Polarizer Kit	98-9000301-01*
	R-100 Smart Series Ring Light Polarizer Kit	98-9000302-01*

**\*Note:** Smart Series Ring Light Polarizer Kits must be used in conjunction with a cross-polarizer on the lens. See lens polarizer section of the datasheet to determine the correct part number to match the filter thread size of the lens.

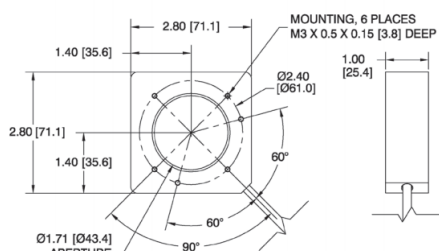
### NERLITE Smart Series R-70 and R-100 Ring Light Mounting Kits

Appearance	Type	Part Number
	R-70 Smart Series Ring Light Mounting Kit	V440-AM1*
	R-100 Smart Series Ring Light Mounting Kit	V440-AM2*

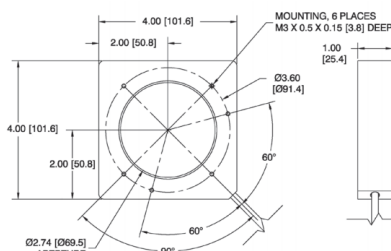
**\*Note:** The C-Mount lens nests down inside the light aperture. The R-70 has a 43.4 mm opening. The R-100 has a 69.5 mm opening. Larger diameter lenses may not fit inside the R-70 ring light. Please see light size compatibility chart in the lens tables.

### NERLITE Smart Series R-70 and R-100 Ring Light Specifications, Dimensions, Connections

Size	Part Number	Description	Wavelength	Current @ 24 V	Strobe Current	Millicandela Continuous	Millicandela Strobe
<b>R-70</b>	NER-011660900G	70 mm, RED	623 nm	172 mA	1.2 A	349281	3062913
	NER-011660910G	70 mm, WHITE	6700 K	160 mA	850 mA	352205	1739631
	NER-011660920G	70 mm, BLUE	470 nm	160 mA	850 mA	143217	618814
<b>R-100</b>	NER-011661100G	100 mm, RED	623 nm	255 mA	1.7 A	516015	4370388
	NER-011661110G	100 mm, WHITE	6700 K	235 mA	1.1 A	495814	2338577
	NER-011661120G	100 mm, BLUE	470 nm	235 mA	1.1 A	201005	848215






Smart Series R-70 Ring Light Dimensions



Smart Series R-100 Ring Light Dimensions

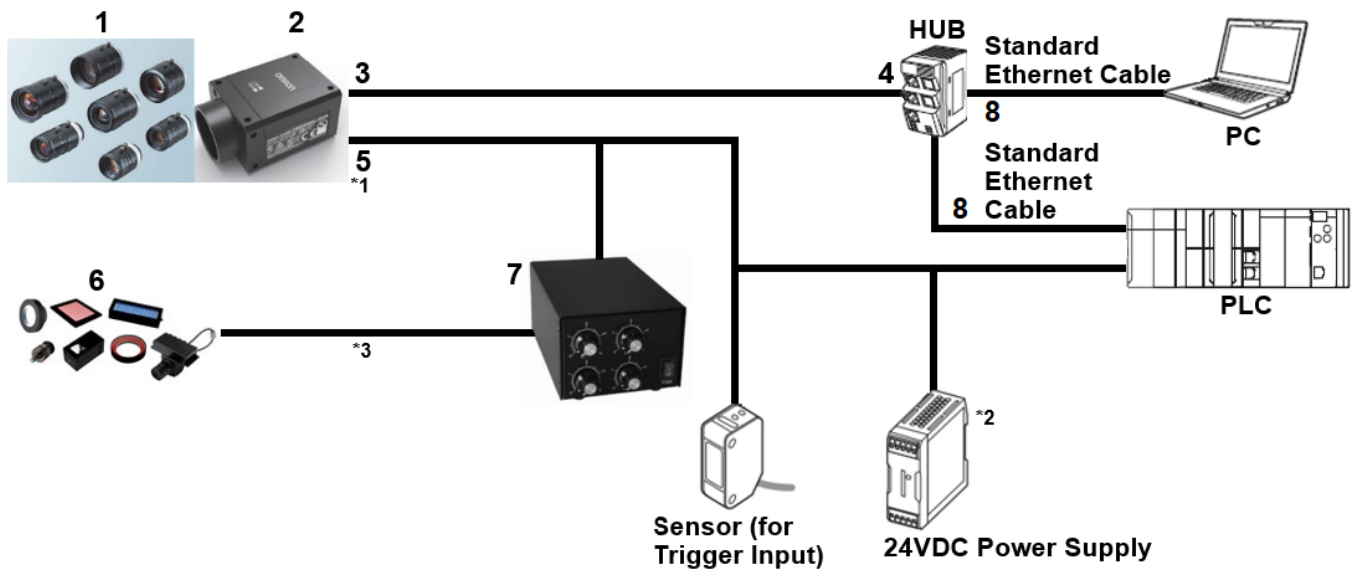
**9. Other Accessories**

Appearance	Category	Length / Spec	Part Number
	QX-1 Interconnect Module – Power, Trigger, Smart Light Control Breakout	N/A	98-000103-02
	QX-1 Photo Sensor, M12 4-Pin Plug, NPN	2 Meters – Light ON/ Dark ON	99-9000016-01
	QX-1 Field-Wireable M12 4-Pin Plug for Any Trigger Source or Photo Sensor	Screw Terminals	98-9000239-01



## System Configuration Examples

### System Configuration Example 1: FLV Series or Other External Lighting



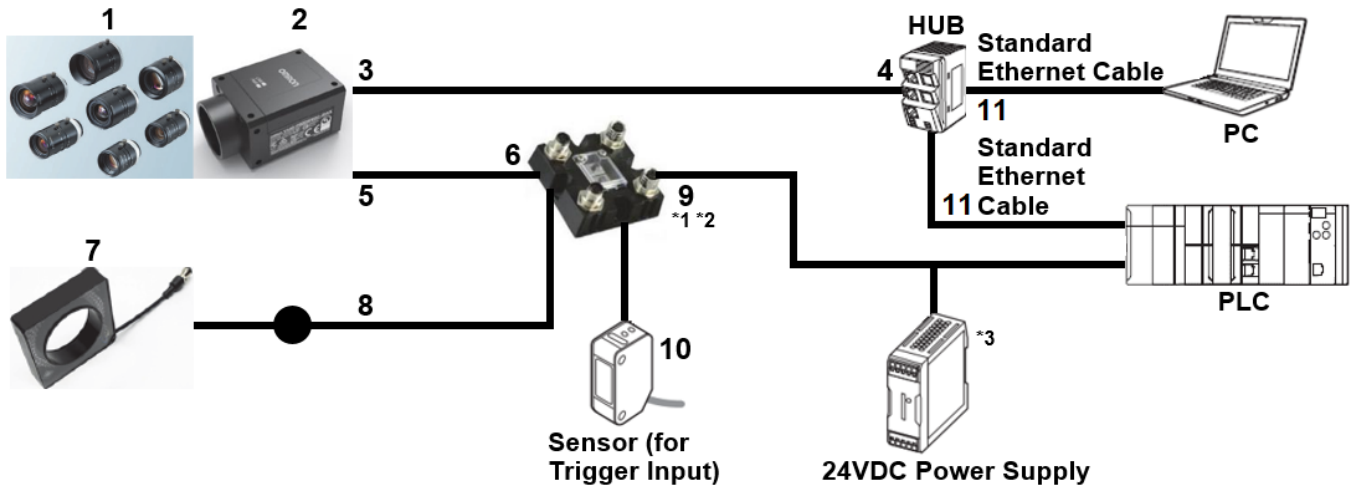
Drawing Reference	Category	Part Number
1	C-Mount Lens	3Z4S-□□, 98-9000□□□-01
2	F440-F C-Mount 5 MP Camera	F440-FXXXY50M-NN□
3	Industrial High-Flex GigE Ethernet Cable with Jack Screws and RJ45 Connector	98-00013□-0□
4	Industrial Switching HUB	Example: W4S1- □□□Series
5	M12-to-Flying Leads Cable	V430-W8□□□-□M
6	FLV Lighting	FLV-□
7	Lighting Controller	FLV-ATC□, 3Z4S-LT IDGB□
8	Industrial Ethernet Network Cable	XS6W-5PUR8SS□□□□CM-G

\*1. The V430-WQ cable (excluding V430-WQR / V430-WQK) can be used as an extension of the V430-W8 cable.

\*2. A 24VDC power supply is not needed for the F440-F if a PoE switching HUB is used.

\*3. Any vendor's lighting and power supply can be used with the F440-F. The I/O cable provides strobe signal to light power supply.

System Configuration Example 2: NERLITE Smart Series Light with QX-1



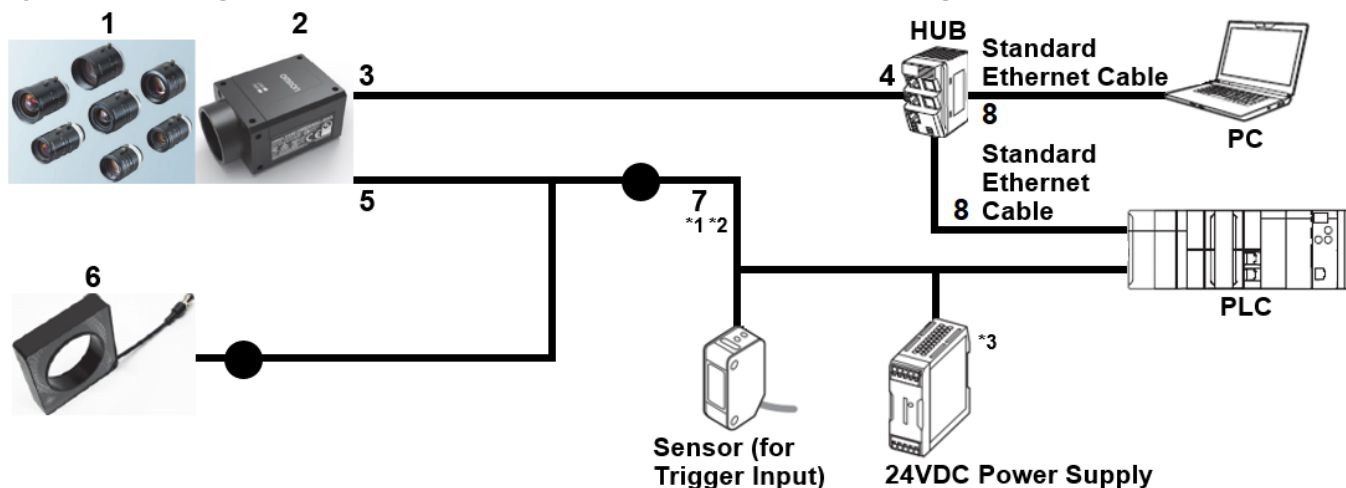
Drawing Reference	Category	Part Number
1	C-Mount Lens	3Z4S-□□, 98-9000□□□-01
2	F440-F C-Mount 5 MP Camera	F440-FXXXY50M-NN□
3	Industrial High-Flex GigE Ethernet Cable with Jack Screws and RJ45 Connector	98-00013□-0□
4	Industrial Switching HUB	Example: W4S1-□□□ Series
5	Camera-to-QX-1 Interconnect Cable	V430-WQ-1M
6	QX-1 Interface Device	98-000103-02
7	NERLITE Smart Series R-70 or R-100 Ring Light	NER-01166□□□□G
8	Integrated Light Cable	61-0002□□-01
9	M12-to-Flying Leads Cable	V430-W8□□□-□M
10	QX-1 Photo Sensor	99-9000016-01
	QX-1 Field-Wireable M12 4-Pin Plug for Any Trigger Source or Photo Sensor	98-9000239-01
11	Industrial Ethernet Network Cable	XS6W-5PUR8SS□□□□CM-G

\*1. The V430-WQ cable (excluding V430-WQR / V430-WQK) can be used as an extension of the V430-W8 cable.

\*2. It is possible to connect a 97-000012-01 power supply instead of V430-W8. However, since there is no I/O line, you cannot connect to the sensor or PLC.

\*3. A 24VDC power supply is not needed for the F440-F if a PoE switching HUB is used.

**System Configuration Example 3: NERLITE Smart Series Light without QX-1**



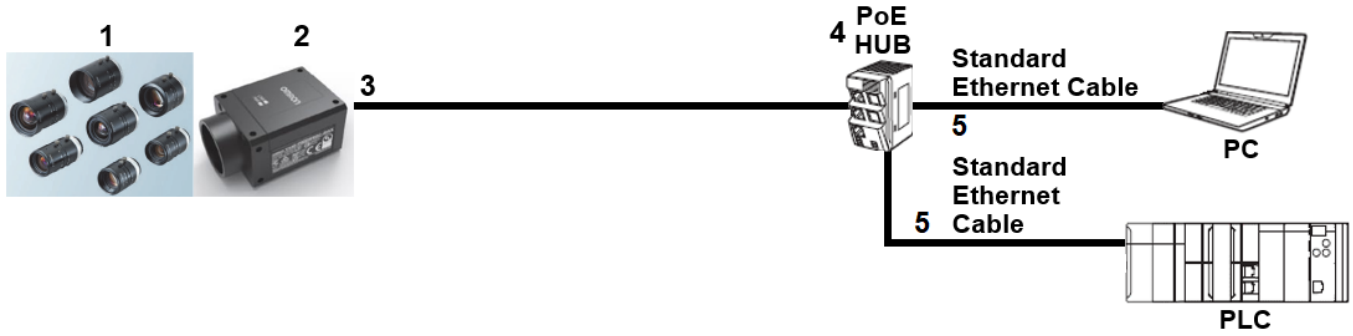
Drawing Reference	Category	Part Number
1	C-Mount Lens	3Z4S-□□, 98-9000□□□□-01
2	F440-F C-Mount 5 MP Camera	F440-F□□□□50M-NN□
3	Industrial High-Flex GigE Ethernet Cable with Jack Screws and RJ45 Connector	98-00013□-0□
4	Industrial Switching HUB	Example: W4S1-□□□ Series
5	Integrated Light Y Cable	61-900013□-01
6	NERLITE Smart Series R-70 or R-100 Ring Light	NER-01166□□□□G
7	M12-to-Flying Leads Cable	V430-W8□□□-□M
8	Industrial Ethernet Network Cable	XS6W-5PUR8SS□□□□CM-G

\*1. The V430-WQ cable (excluding V430-WQR / V430-WQK) can be used as an extension of the V430-W8 cable.

\*2. It is possible to connect a 97-000012-01 power supply instead of V430-W8. However, since there is no I/O line, you cannot connect to the sensor or PLC.

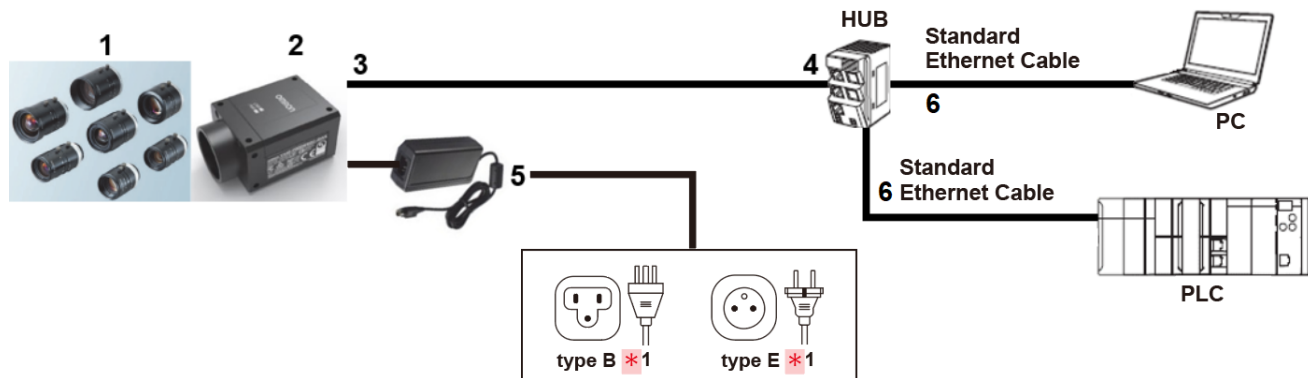
\*3. A 24VDC power supply is not needed for F440-F if a PoE switching HUB is used.

**System Configuration Example 4: Minimum Power over Ethernet (PoE) Configuration**



Drawing Reference	Category	Part Number
1	C-Mount Lens	3Z4S-□□, 98-9000□□□-01
2	F440-F C-Mount 5 MP Camera	F440-FXXXY50M-NN□
3	Industrial High-Flex GigE Ethernet Cable with Jack Screws and RJ45 Connector	98-00013□-0□
4	PoE (Power over Ethernet) HUB	
5	Industrial Ethernet Network Cable	XS6W-5PUR8SS□□□□CM-G

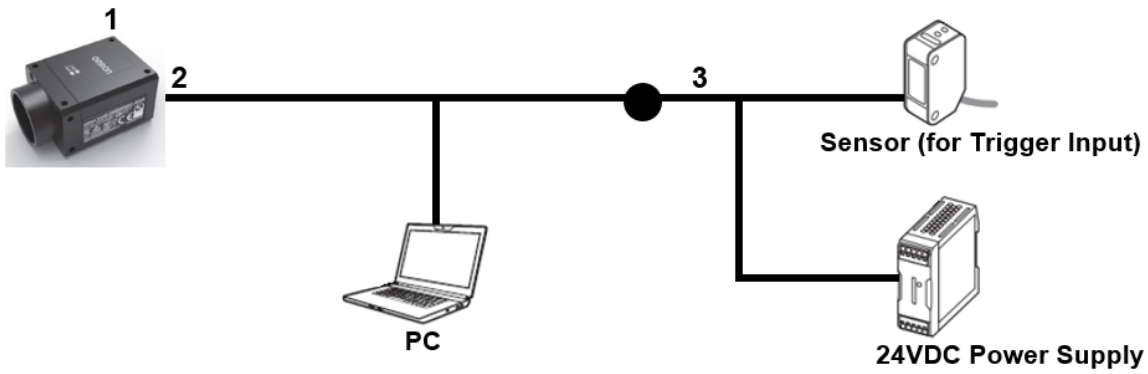
### System Configuration Example 5: Minimum External Power Configuration



Drawing Reference	Category	Part Number
1	C-Mount Lens	3Z4S-□□, 98-9000□□□-01
2	F440-F C-Mount 5 MP Camera	F440-FXXXY50M-NN□
3	Industrial High-Flex GigE Ethernet Cable with Jack Screws and RJ45 Connector	98-00013□-0□
4	Industrial Switching HUB	Example: W4S1-□□□ Series
5	Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket	97-000012-01
6	Industrial Ethernet Network Cable	XS6W-5PUR8SS□□□□CM-G

\*There are many types of outlet plugs for the power supply. Select a suitable plug type for your environment. (Example: type B for Japan, type E for Europe.)

System Configuration Example 6: USB Configuration

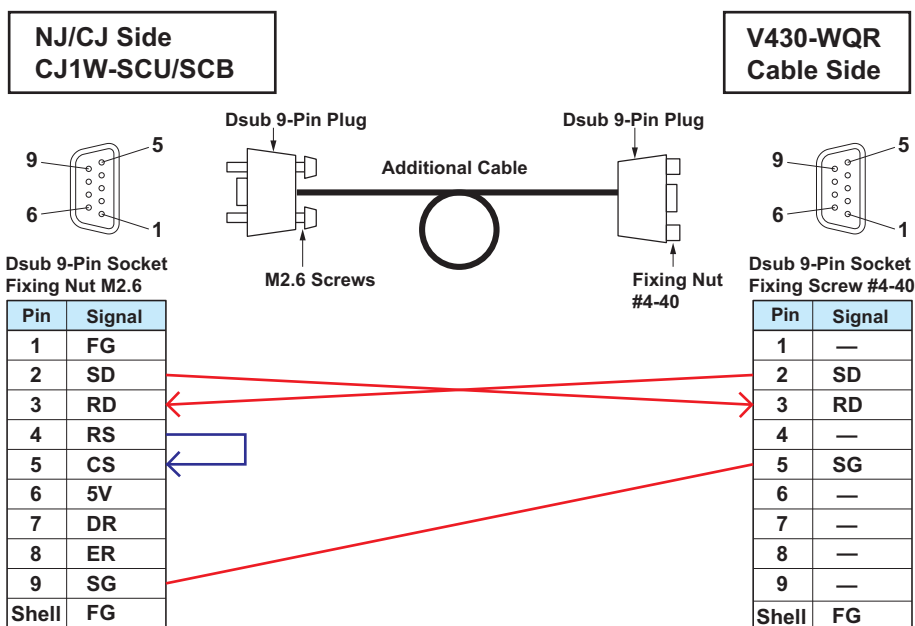
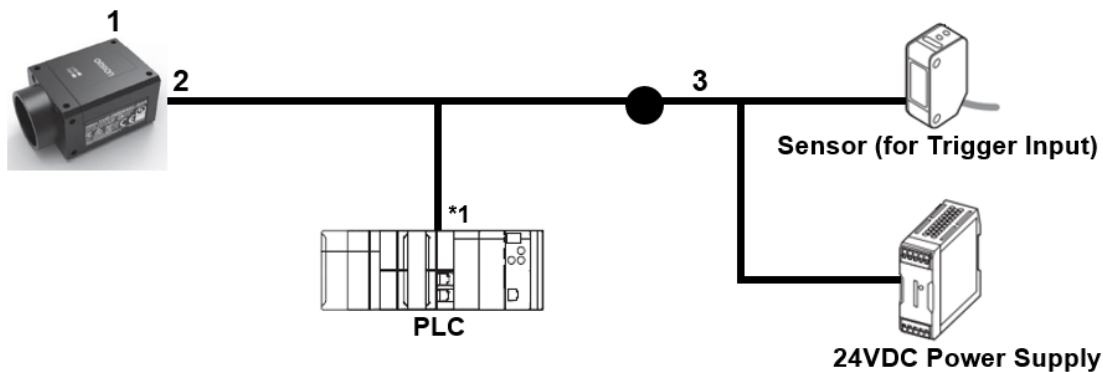


Drawing Reference	Category	Part Number
1	F440-F C-Mount 5 MP Camera	F440-FXXX50M-NN□
2	Camera-to-QX-1 Interconnect Cable with USB Keyboard Wedge Breakout	V430-WQK-3M*
3	M12-to-Flying Leads Cable	V430-W8□□□-□M

\*Insert the V430-WQK-3M cable between the F440-F and the V430-W8□□□-□M cable.

\*Standard Ethernet cable required to PC for initial job download to F440-F Smart Camera.

### System Configuration Example 7: RS-232C Configuration



**Note:** If the communication is non-procedural, only the three red connections are required.

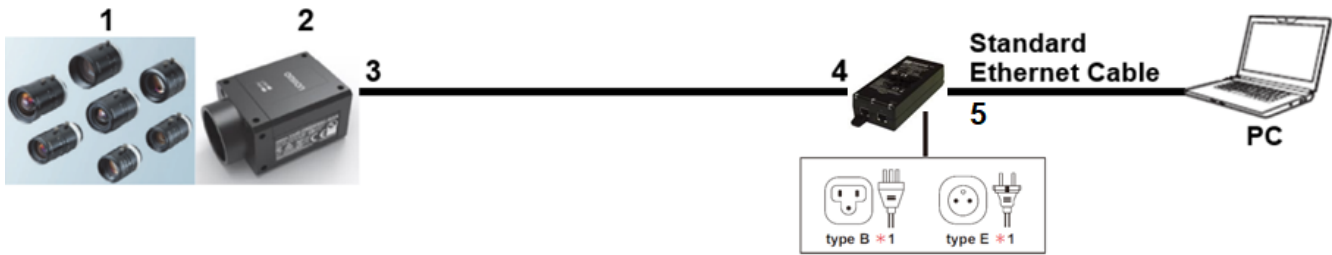
Drawing Reference	Category	Part Number
1	F440-F C-Mount 5 MP Camera	F440-FXXX50M-NN□
2	Camera-to-QX-1 Interconnect Cable with RS-232 Breakout	V430-WQR-3M*
3	M12-to-Flying Leads Cable	V430-W8□□□-□M

\*1. If connecting Omron's CS/CJ/NJ Controller, check the connector shape and signal lines (pin assignments) and prepare the additional RS-232C conversion cable. If connecting to Omron's NX Machine Automation Controller, no additional RS-232C cable is required.

\*Insert the V430-WQR-3M cable between the F440-F and the V430-W8 cable.

\*Standard Ethernet cable required to PC for initial job download to F440-F Smart Camera.

**System Configuration Example 8: Power over Ethernet (PoE) Standalone Configuration**

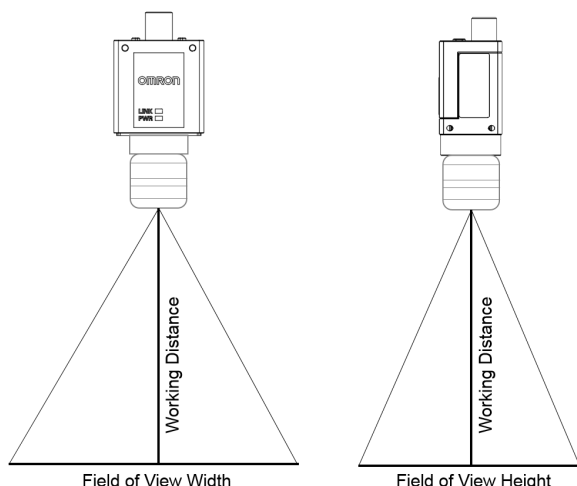


Drawing Reference	Category	Part Number
1	C-Mount Lens	3Z4S-□□, 98-9000□□□-01
2	F440-F C-Mount 5 MP Camera	F440-FXXX50M-NN□
3	Industrial High-Flex GigE Ethernet Cable with Jack Screws and RJ45 Connector	98-00013□-0□
4	Single Port PoE Injector, 30W, IEEE802.3at Compliant*	98-9000311-01 (Coming Soon)
5	Industrial Ethernet Network Cable	XS6W-5PUR8SS□□□□CM-G

\*Power cord NOT included with 98-9000311-01. There are many types of outlet plugs for the PoE Injector (C13 connector required). Select a suitable plug type for your environment. (Example: Type B for Japan, type E for Europe.)



## 10. Determining the Optical Setup



**General lens formulas for any combination, given working distance, focal length, or field of view width:**

**Field of View Width = 8.5 x Working Distance / Focal Length**

**Field of View Height = 7.093 x Working Distance / Focal Length**

**Focal Length = 8.5 x Working Distance / Field of View Width**

**Working Distance = Field of View Width x Focal Length / 8.5**

### Field of View for 25\* to 500 mm Working Distance

Field of View (mm x mm) at Specific Working Distances (mm)												
Lens FL	25	50	75	100	150	200	250	300	350	400	450	500
F = 6	35 x 30	71 x 59	106 x 89	142 x 118	213 x 177	283 x 236	354 x 296	425 x 355	496 x 414	567 x 473	638 x 532	708 x 591
F = 8	27 x 22	53 x 44	80 x 66	106 x 89	159 x 133	213 x 177	266 x 222	319 x 266	372 x 310	425 x 355	478 x 399	531 x 443
F = 9	24 x 20	47 x 39	71 x 59	94 x 79	142 x 118	189 x 158	236 x 197	283 x 236	331 x 276	378 x 315	425 x 355	472 x 394
F = 12.5	17 x 14	34 x 28	51 x 43	68 x 57	102 x 85	136 x 113	170 x 142	204 x 170	238 x 199	272 x 227	306 x 255	340 x 284
F = 16	13 x 11	27 x 22	40 x 33	53 x 44	80 x 66	106 x 89	133 x 111	159 x 133	186 x 155	213 x 177	239 x 199	266 x 222
F = 25	9 x 7	17 x 14	26 x 21	34 x 28	51 x 43	68 x 57	85 x 71	102 x 85	119 x 99	136 x 113	153 x 128	170 x 142
F = 35	6 x 5	12 x 10	18 x 15	24 x 20	36 x 30	49 x 41	61 x 51	73 x 61	85 x 71	97 x 81	109 x 91	121 x 101
F = 50	4 x 4	9 x 7	13 x 11	17 x 14	26 x 21	34 x 28	43 x 35	51 x 43	60 x 50	68 x 57	77 x 64	85 x 71
F = 75	3 x 2	6 x 5	9 x 7	11 x 9	17 x 14	23 x 19	28 x 24	34 x 28	40 x 33	45 x 38	51 x 43	57 x 47
F = 100	2 x 2	4 x 4	6 x 5	9 x 7	13 x 11	17 x 14	21 x 18	26 x 21	30 x 25	34 x 28	38 x 32	43 x 35

\*For working distances shorter than the minimum working distance specified for the lens, an extension tube is required to focus the lens.

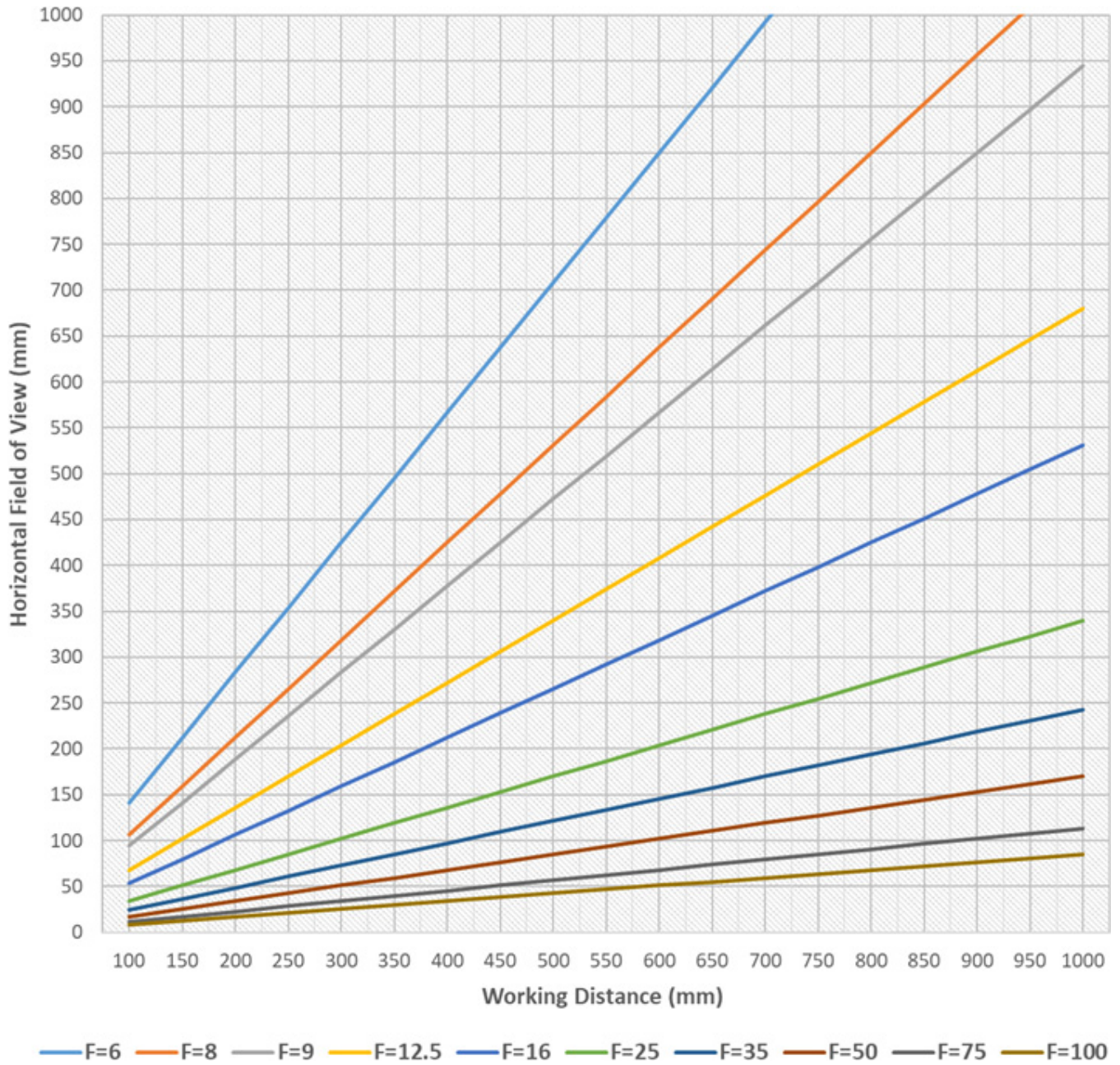
### Field of View at 600 to 2500 mm Working Distance

Field of View (mm x mm) at Specific Working Distances (mm)											
Lens FL	600	700	800	900	1000	1250	1500	1750	2000	2500	
F = 6	850 x 709	992 x 828	1133 x 946	1275 x 1064	1417 x 1182	1771 x 1478	2125 x 1773	2479 x 2069	2833 x 2364	3542 x 2956	
F = 8	638 x 532	744 x 621	850 x 709	956 x 798	1063 x 887	1328 x 1108	1594 x 1330	1859 x 1552	2125 x 1773	2656 x 2217	
F = 9	567 x 473	661 x 552	756 x 631	850 x 709	944 x 788	1181 x 985	1417 x 1182	1653 x 1379	1889 x 1576	2361 x 1970	
F = 12.5	408 x 340	476 x 397	544 x 454	612 x 511	680 x 567	850 x 709	1020 x 851	1190 x 993	1360 x 1135	1700 x 1419	
F = 16	319 x 266	372 x 310	425 x 355	478 x 399	531 x 443	664 x 554	797 x 665	930 x 776	1063 x 887	1328 x 1108	
F = 25	204 x 170	238 x 199	272 x 227	306 x 255	340 x 284	425 x 355	510 x 426	595 x 497	680 x 567	850 x 709	
F = 35	146 x 122	170 x 142	194 x 162	219 x 182	243 x 203	304 x 253	364 x 304	425 x 355	486 x 405	607 x 507	
F = 50	102 x 85	119 x 99	136 x 113	153 x 128	170 x 142	213 x 177	255 x 213	298 x 248	340 x 284	425 x 355	
F = 75	68 x 57	79 x 66	91 x 76	102 x 85	113 x 95	142 x 118	170 x 142	198 x 166	227 x 189	283 x 236	
F = 100	51 x 43	60 x 50	68 x 57	77 x 64	85 x 71	106 x 89	128 x 106	149 x 124	170 x 142	213 x 177	

Important: See F440-F Lens Selection Based on Focal Length on the next page.

# F440-F

## F440-F Lens Selection Based on Focal Length



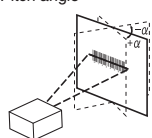
## Ratings and Specifications

F440-F		
Symbologies *1	1D Symbologies	Code 39, Code 128, BC412, Interleaved 2 of 5, UPC/EAN, Codabar, Code 93, Pharmacode, PLANET, Postnet, Japanese Post, Australian Post, Royal Mail, Intelligent Mail, KIX
	2D Symbologies	Data Matrix (ECC 0-200), QR Code, Micro QR Code, Aztec Code, DotCode, DMRE
	Stacked Symbologies	PDF417, MicroPDF417, GS1 Databar (Composite and Stacked)
Reading Performance *2	Number of Reading Digits	No Upper Limit (depending on bar width and reading distance)
	Reading Distance / Field of View	Based on Lens Selection and Code Size
	Pitch Angle ( $\alpha$ ) *3	$\pm 30^\circ$
	Skew Angle ( $\beta$ ) *3	$\pm 30^\circ$
	Tilt Angle ( $\gamma$ ) *3	$\pm 180^\circ$
Vision Tools		Locate, Decode, Optical Character Recognition (OCR), Count, Presence/Absence, Measure, Match String, String Format, Logic, Optical Character Verification (OCV), Symbol Quality Verification
Image	Resolution, Pixel Size	2464 (H) x 2056 (V) – 3.45 $\mu\text{m}$ Pixel Size
	Monochrome	Monochrome CMOS
	Shutter	Global Shutter
	Frames per Second	35 FPS for 5 MP
	Exposure	16 $\mu\text{s}$ to 400 msec
Image Logging		FTP
Trigger		External Trigger (Edge or Level), Communication Trigger (Ethernet, RS-232C)
Trigger to Strobe Latency + Jitter		320 $\mu\text{s}$ + 65 $\mu\text{s}$
I/O Specifications	Input Signals	Trigger Input, Input 1, and Default – Bi-Directional Inputs, Optoisolated, 4.5 – 28 V rated (10 mA @ 28 VDC)
	Output Signals	3 Signals: Bi-Directional, Optoisolated, 1 – 28 V rated, ( $I_{CE} < 100 \text{ mA}$ at 24 VDC, current limited by user)
Communication	Connectivity	RS-232C, Ethernet TCP/IP, EtherNet/IP™, PROFINET
	Ethernet Specifications	1000BASE-T
Indicator LEDs		LINK (Amber), PWR (Green)
Power Supply Voltage		Power over Ethernet (IEEE 802.3af) / 24 VDC +/- 20%, External Input via IO *4
Current Consumption		PoE (44-57 VDC): 0.10 A or 24 VDC: 0.15 A
Environmental / Immunity *5	Ambient Temperature Range	Operating: 0 to 40° C; Storage: -25 to 65° C (No Icing or Condensation)
	Ambient Humidity Range	Operating and Storage: 25% to 85% (Non-Condensing)
	Ambient Atmosphere	No Corrosive Gases
	Vibration Tolerance	Oscillation Frequency: 10 to 150 Hz; Half Amplitude: 0.35 mm; Vibration Direction: X/Y/Z; Sweep Time: 8 Minutes/Count; Sweep Count: 10 Times
	Shock Resistance (Destructive)	Impact Force: 150 m/s <sup>2</sup> , Test Direction: 6 Directions, 3 Times Each (Up / Down, Front / Behind, Left / Right)
	Degree of Protection	IEC 60529 – IP40
Weight	Main Body Only	103.4 g
	Packaging Weight	219.1 g
Dimensions		40 mm (W) x 61 mm (D) x 30 mm (H) <b>Note:</b> Depth measurement excludes connector
Accessories		ReadMeFirst, CE Compliance Sheet, Protocol Support Table
EMC / Safety		FCC part 15 Subpart B, ICES-003, EN 55032, EN 55035, AS/NZS CISPR32, CNS 13438, KN32, KN35, UL 62368-1, UL 60950-1 FCC, UL, CE, UKCA, BIS, RCM, KC, BSMI (Pending) *6
Materials		Aluminum Diecast, Alumite (Black)
Software		AutoVISION

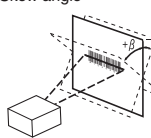
\*1. These symbologies are supported based on Omron's read capability validation standard. Omron recommends that validation be performed for each application.

\*2. Unless otherwise specified, reading performance is defined with center of field of view, angle  $R = \infty$ .

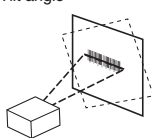
\*3. Pitch angle



Skew angle



Tilt angle



\*4. Camera operates External Input at 24 VDC when supplied at the same time as PoE.

\*5. In an electrically noisy environment, use only the F440-F in combination with a noise filter cable (V430-W□F-□M) to ensure proper operation.

\*6. FCC = United States

UL = United States

CE = European Union

UKCA = Great Britain (England / Wales / Scotland)

BIS = India

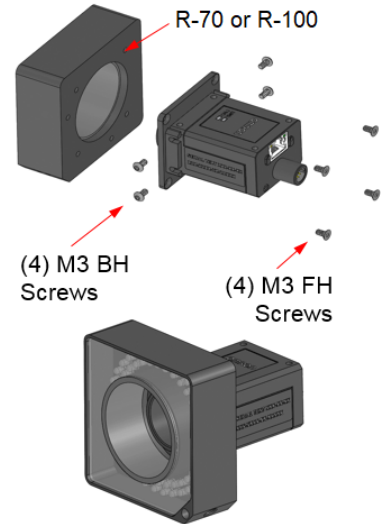
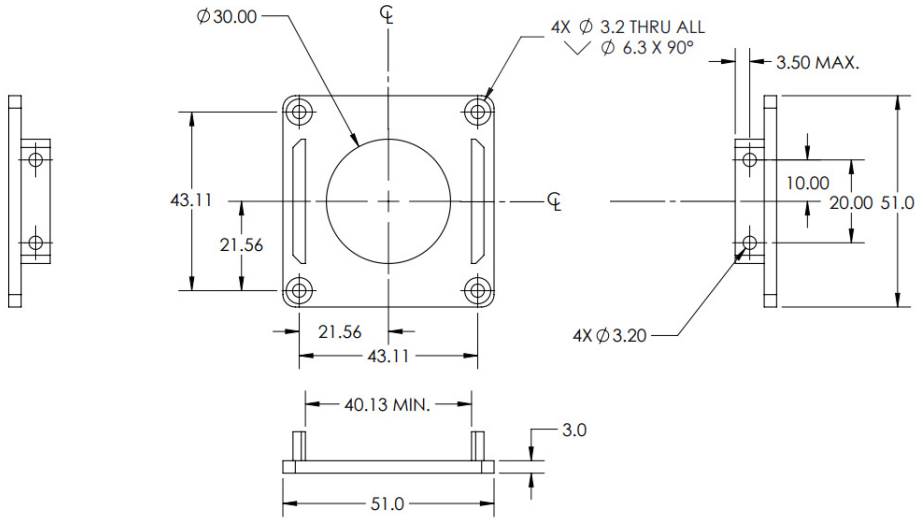
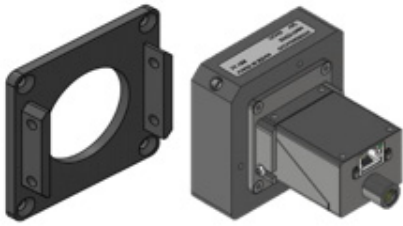
RCM = Australia / New Zealand

KC = South Korea

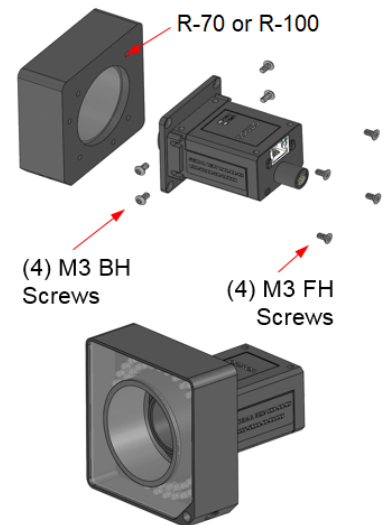
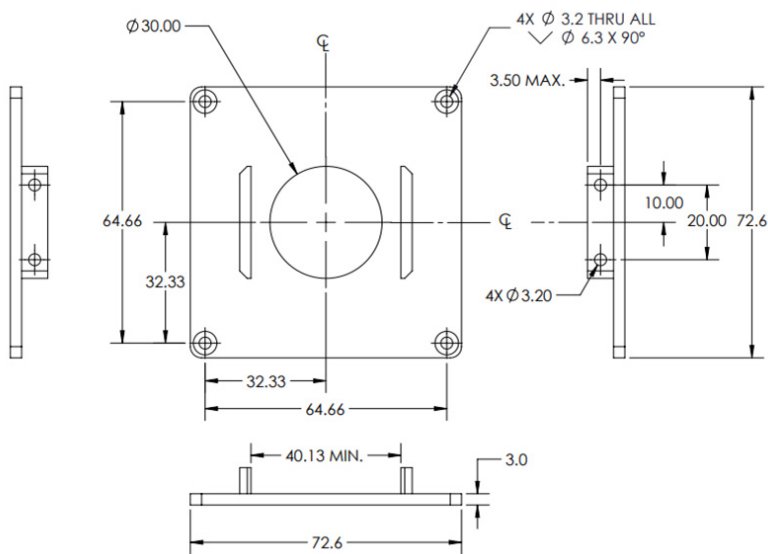
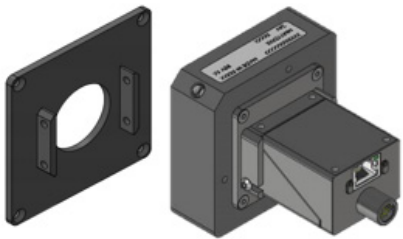
BSMI = Taiwan



Smart Series R-70 Ring Light to F440-F Mounting Bracket Kit  
V440-AM1

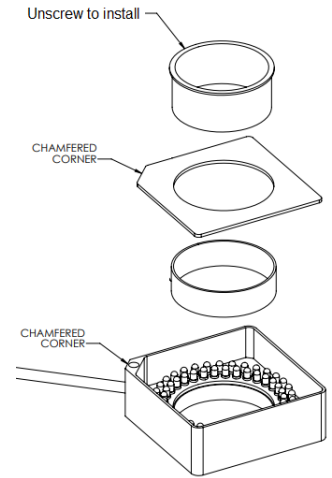
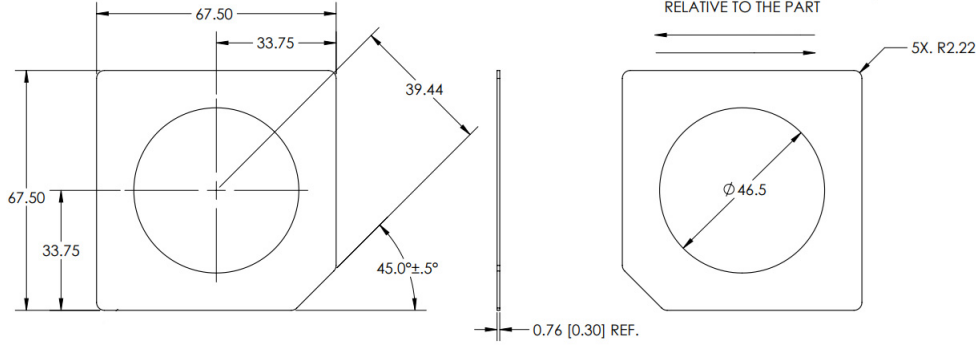
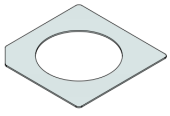


Smart Series R-100 Ring Light to F440-F Mounting Bracket Kit  
V440-AM2

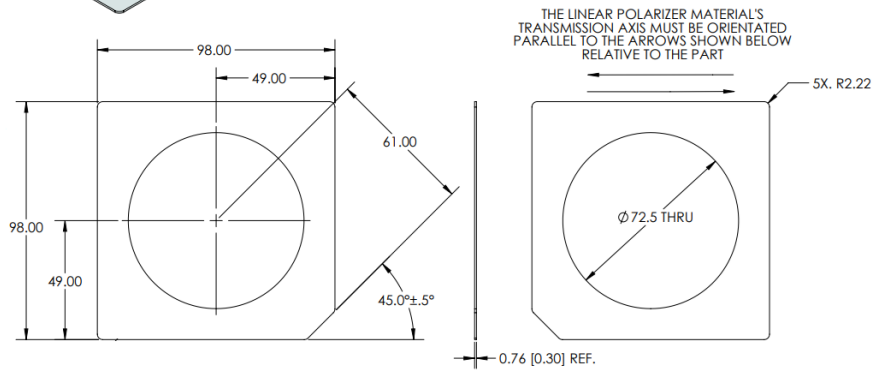
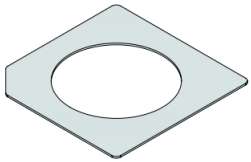


# F440-F

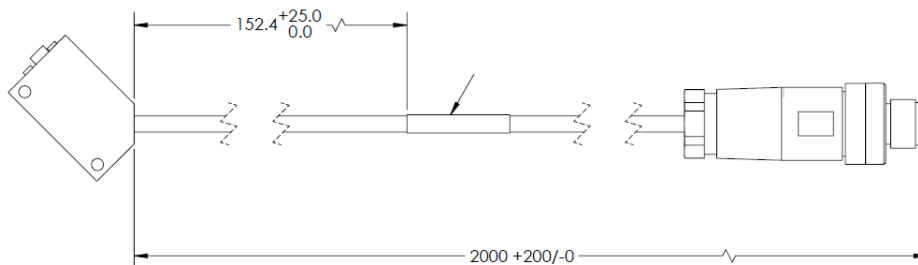
## Smart Series R-70 Ring Light Polarizer Kit 98-9000301-01



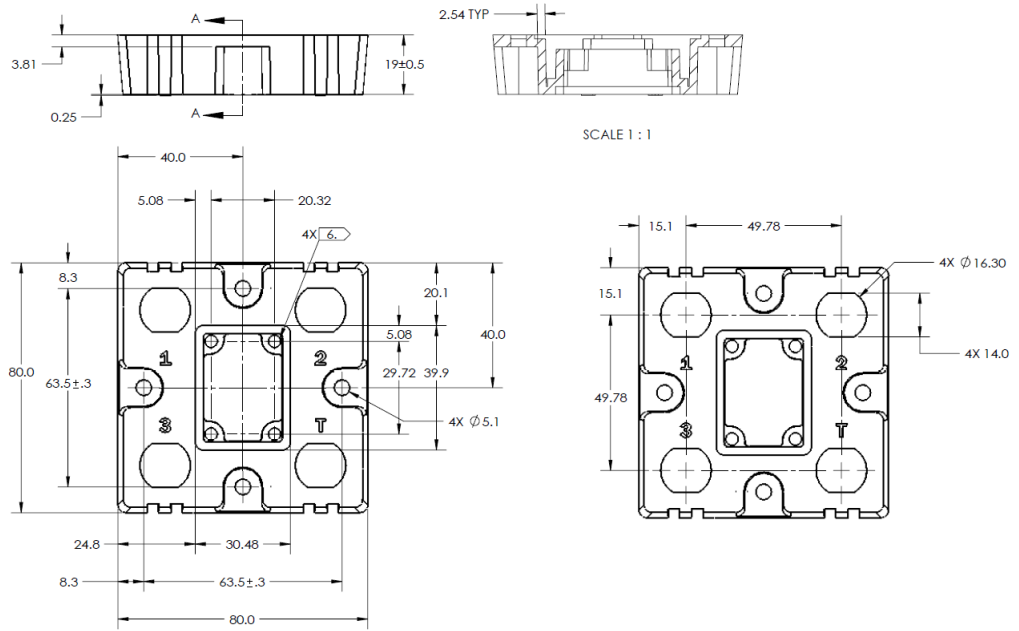
## Smart Series R-100 Ring Light Polarizer Kit 98-9000302-01



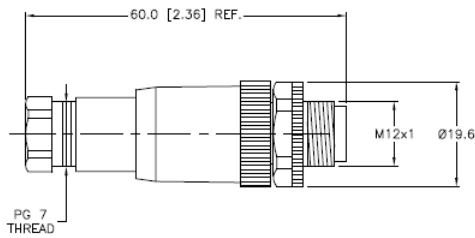
## QX-1 Photo Sensor, M12 4-Pin Plug, NPN – 2 Meters – Light ON / Dark ON 99-9000016-01



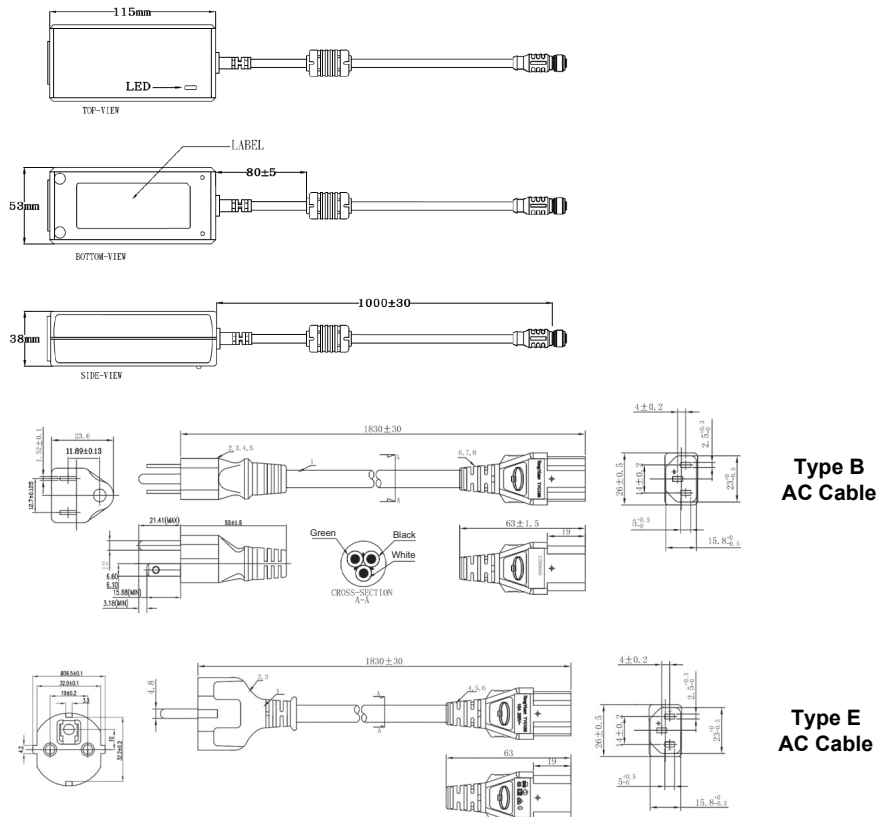
**QX-1 Interconnect Module – Power, Trigger, Smart Light Control Breakout**  
 98-000103-02



**QX-1 Field-Wireable M12 4-Pin Plug for Any Trigger Source or Photo Sensor – Screw Terminals**  
 98-9000239-01

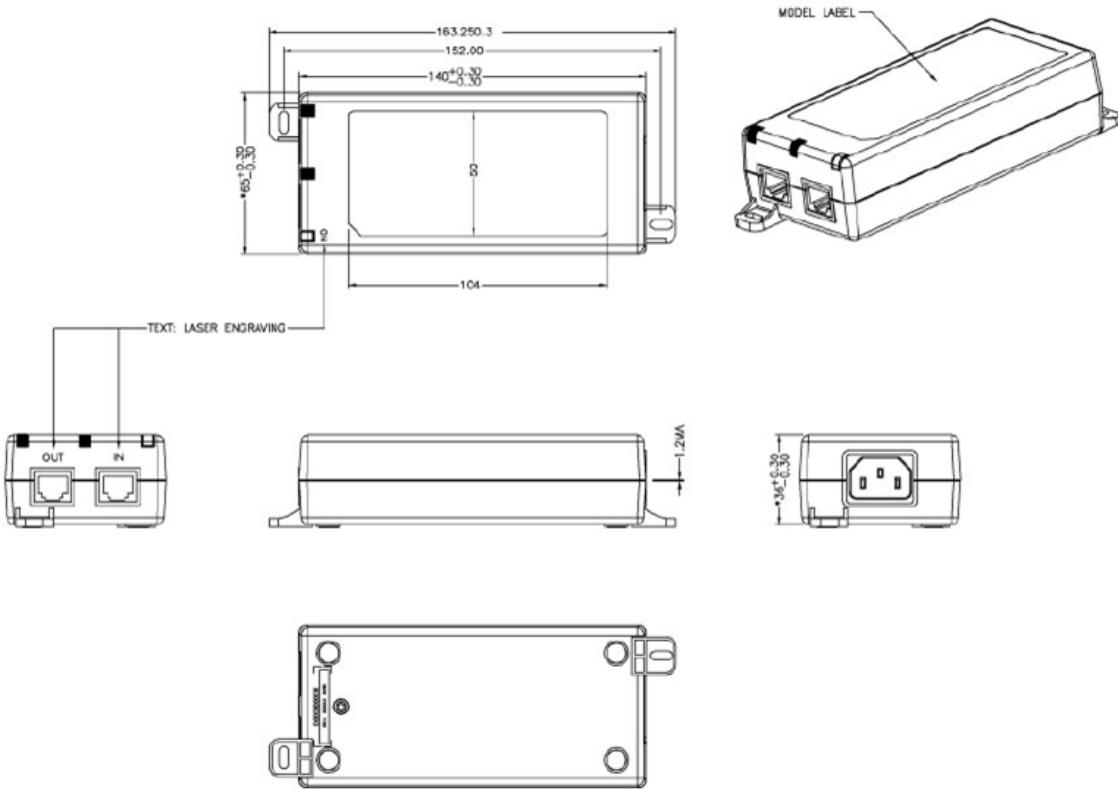


**Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket – 1 Meter – U.S. / Euro Plug**  
 97-000012-01



# F440-F

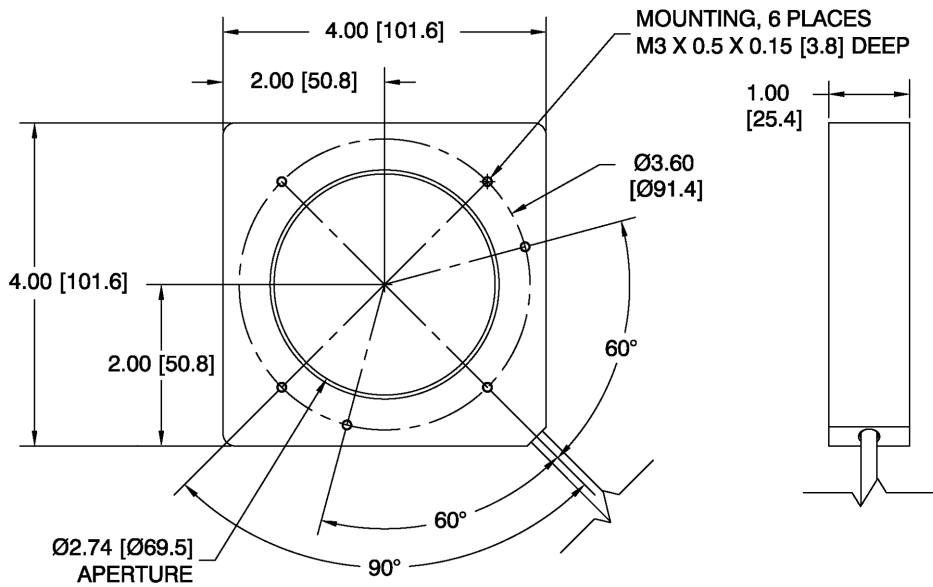
Single Port PoE Injector, 30W, IEEE802.3at Compliant, 2 x RJ45 Connector, 90 to 264VAC (Coming Soon)  
98-9000311-01



**Important:** Power cord NOT included. (C13 connector required.)

## Omron Microscan Smart Light Series – Integrated Power and Strobe Control Module

See Omron Microscan Smart Light Offering – Ring, DOAL, Large Area Lighting





Camera to QX-1 Interconnect Cables – 1 Meter, 3 Meters, or 5 Meters

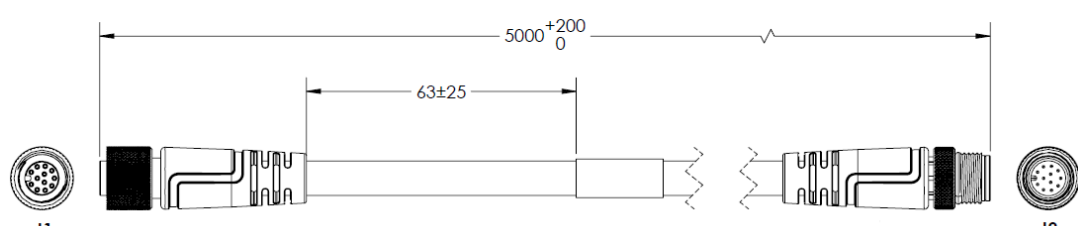
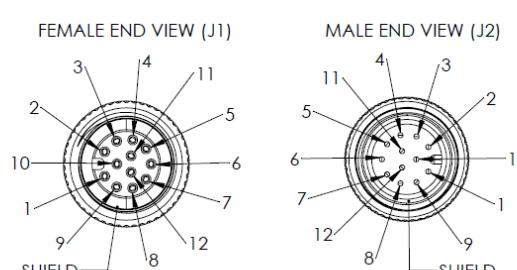
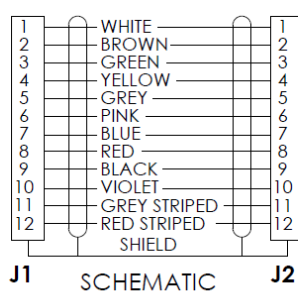
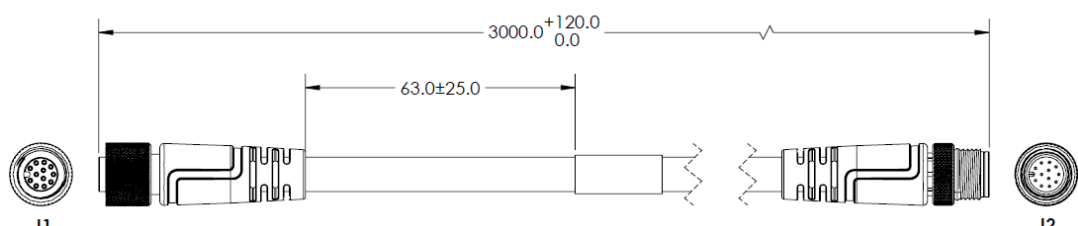
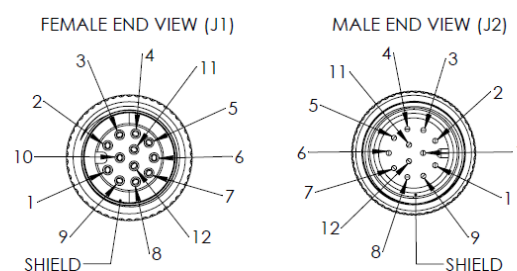
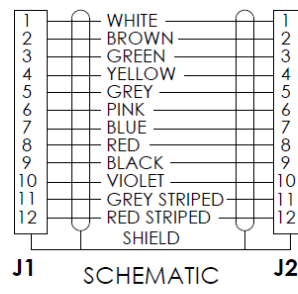
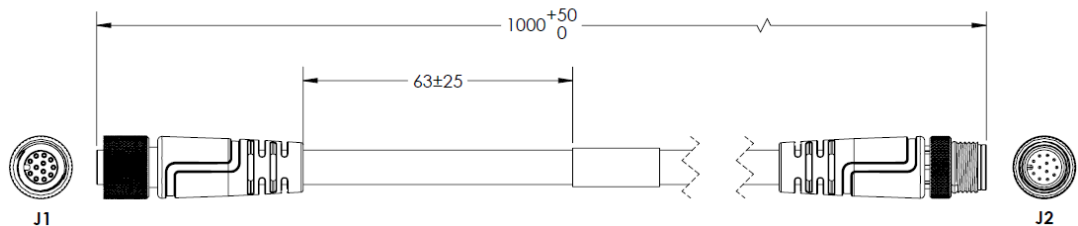
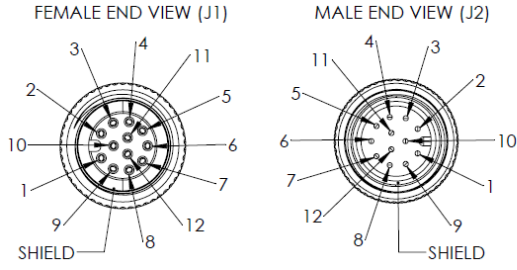
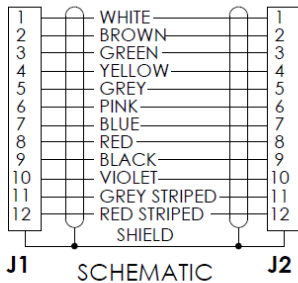
M12 Socket to M12 Plug

QX-1 is used as breakout module for common IO signals and power.

V430-WQ-1M

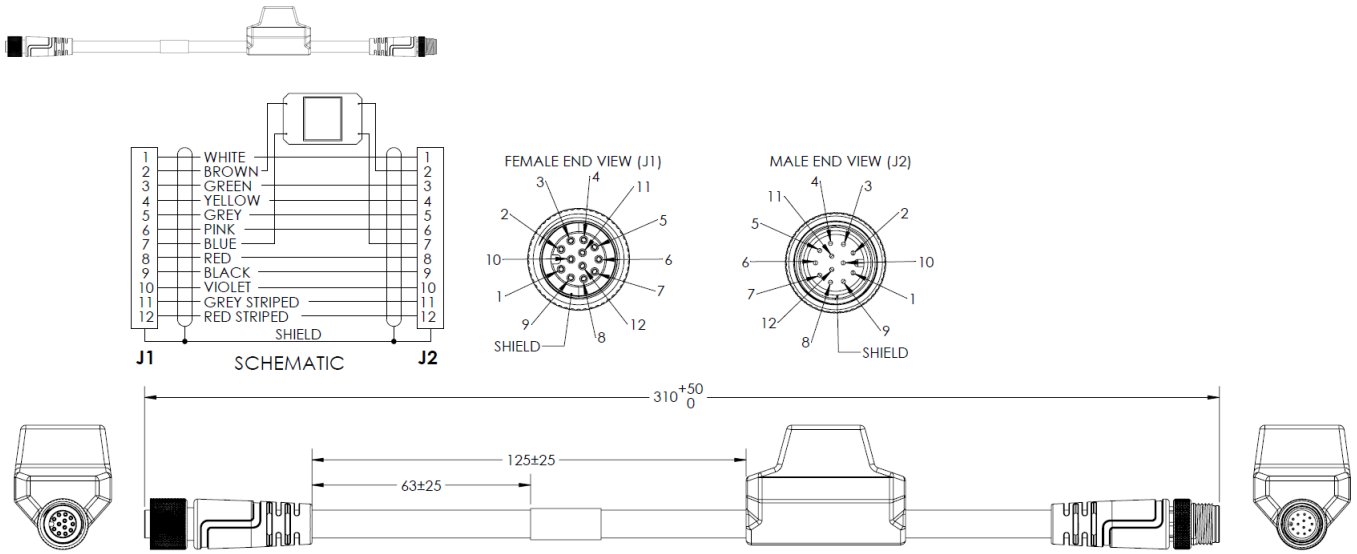
V430-WQ-3M

V430-WQ-5M

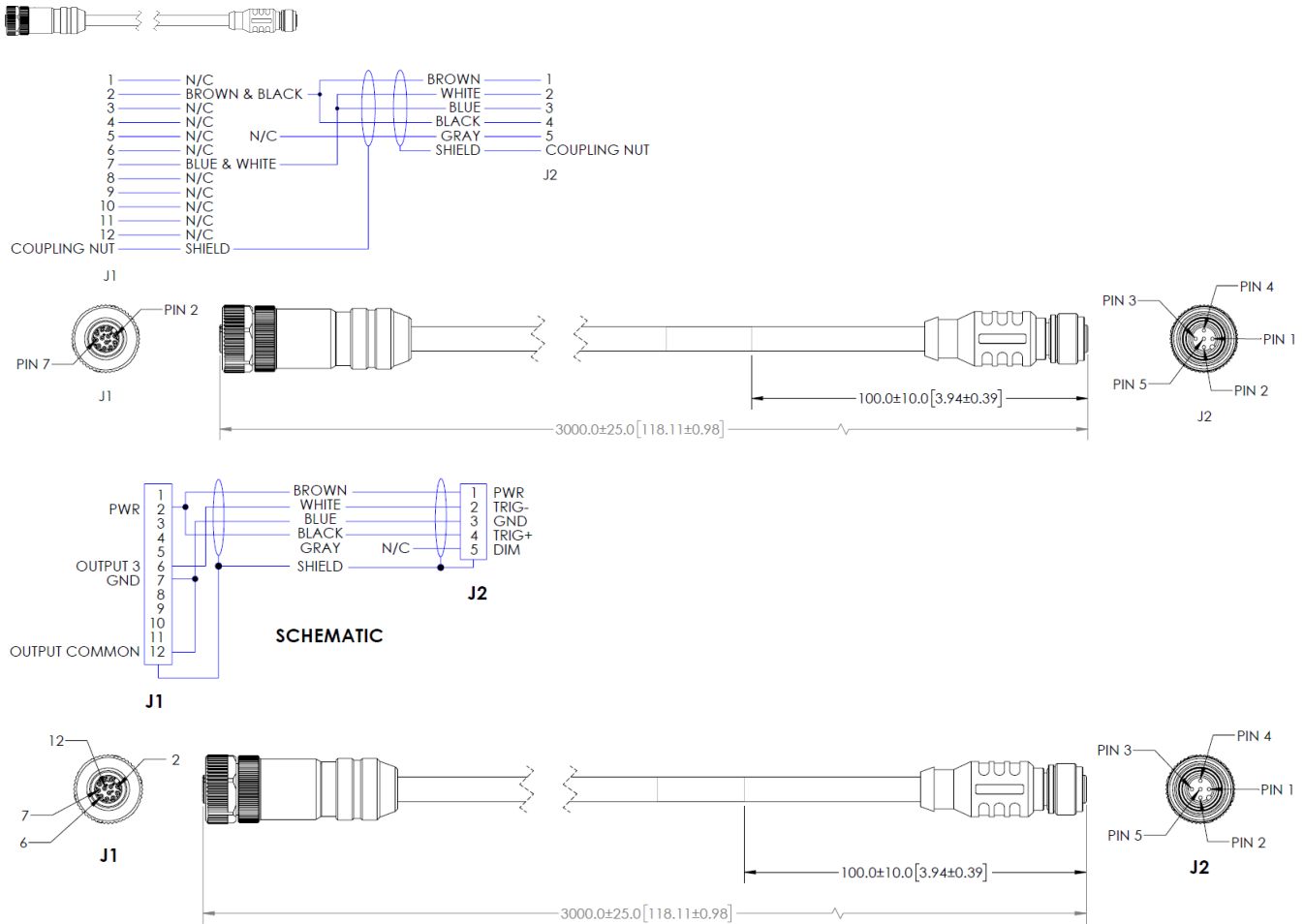


# F440-F

## M12 Socket to M12 Plug, with Power Filter – 300 mm V430-WQF-1M

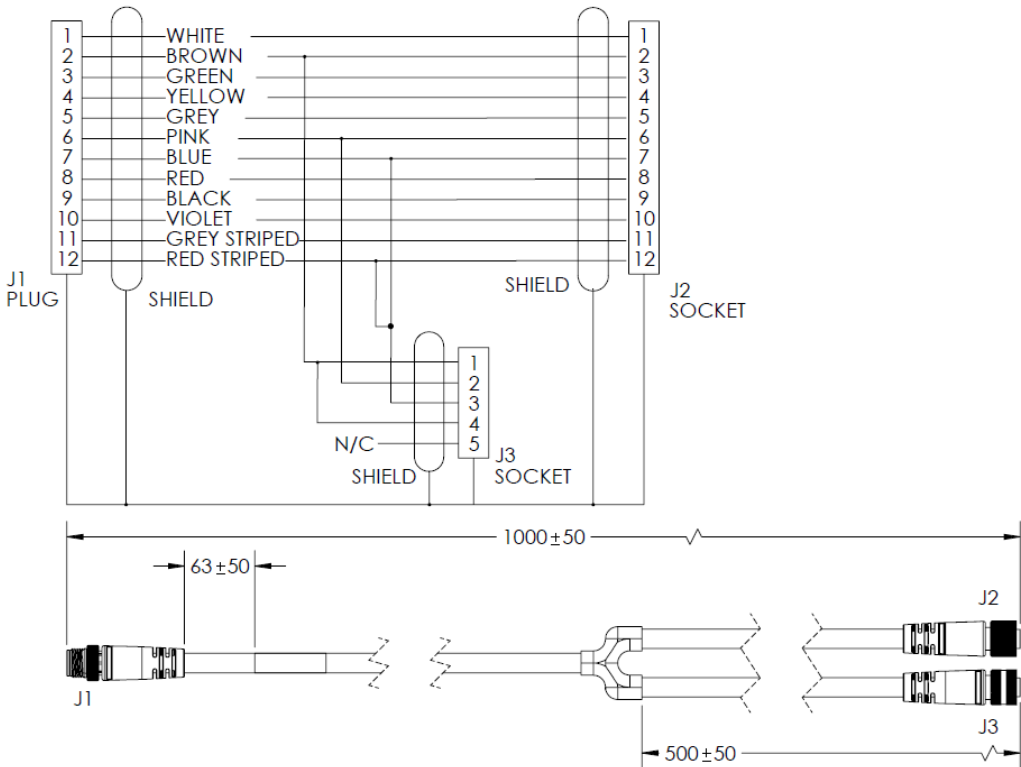
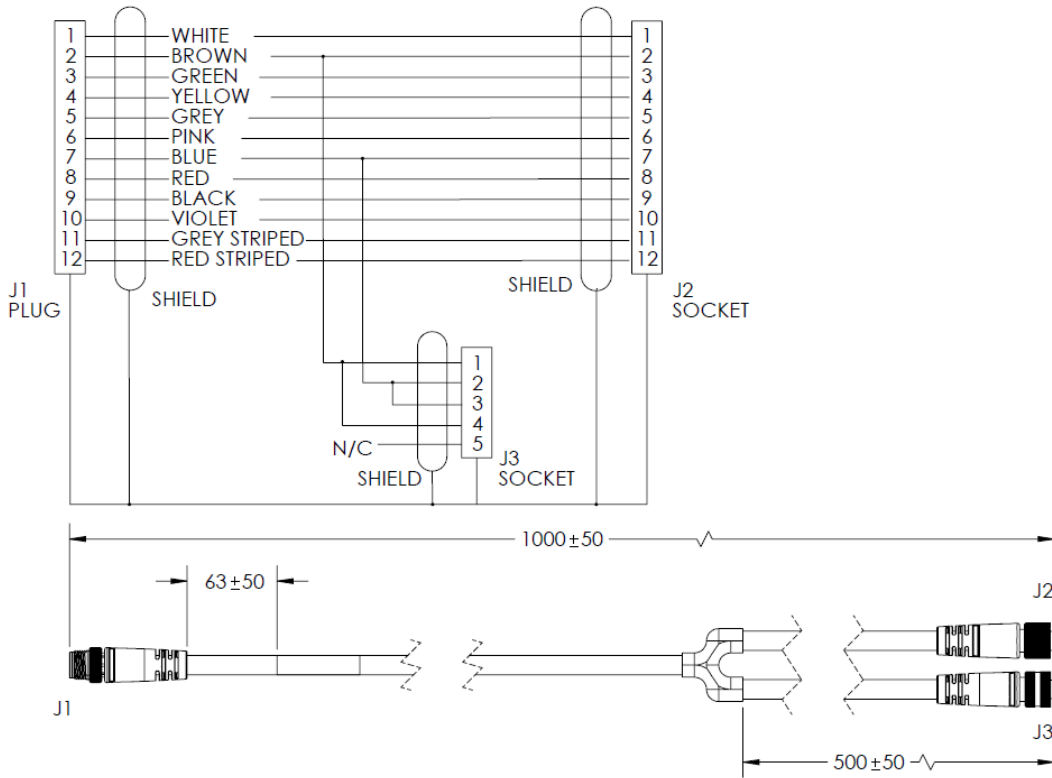
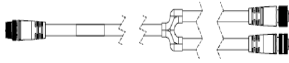


## QX-1 M12 to Smart Light Power and Strobe Control Cables – 3 Meters M12 Plug on QX-1 to 5 Pin Socket on Light 61-000204-01 (Continuous Power) 61-000218-01 (Strobe Control)



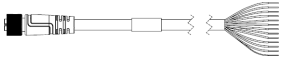
**Y Cable, Camera/Power and Smart Light Power (Continuous On) – 1 Meter**  
**61-9000135-01**

**Y Cable, Camera/Power and Smart Light Strobe Control – 1 Meter**  
**61-9000137-01**

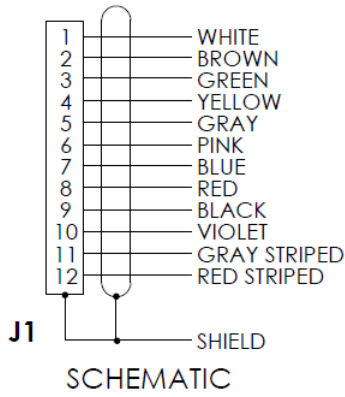


# F440-F

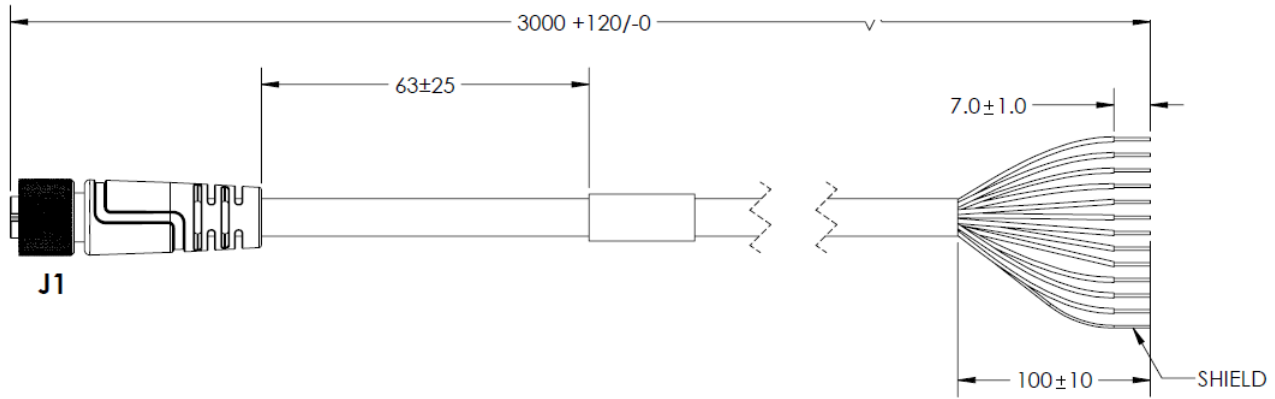
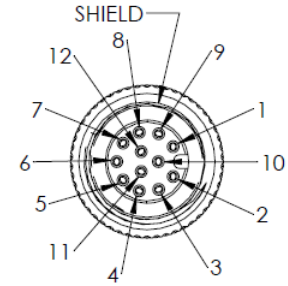
M12 to Flying Leads Cable, Straight Power, IO, RS-232, USB – 3 Meters or 5 Meters  
 V430-W8-3M  
 V430-W8-5M



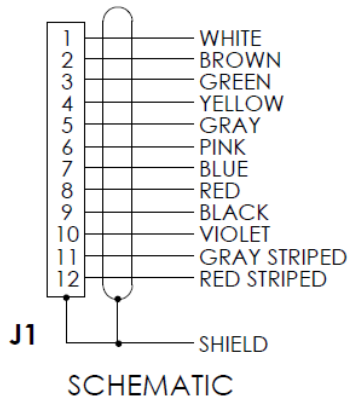
Pin	Function
1	Trigger
2	Power (+VIN)
3	Default
4	New Master
5	Output 1
6	Output 3
7	Ground (-VIN)
8	Input Common
9	RS-232 (Host) RxD
10	RS-232 (Host) TxD
11	Output 2
12	Output Common



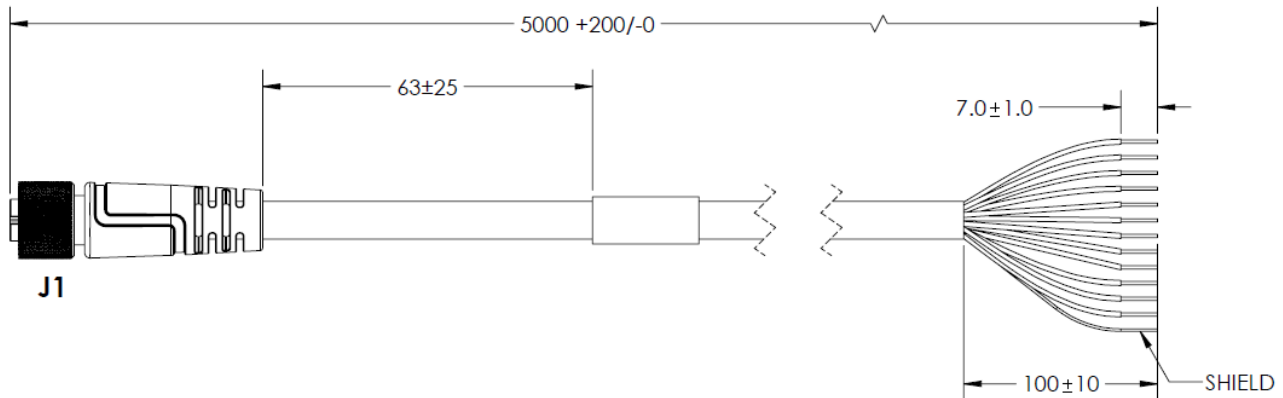
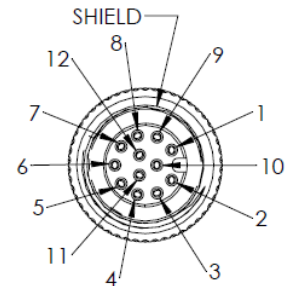
FEMALE END VIEW (J1)



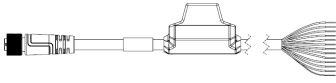
Pin	Function
1	Trigger
2	Power (+VIN)
3	Default
4	New Master
5	Output 1
6	Output 3
7	Ground (-VIN)
8	Input Common
9	RS-232 (Host) RxD
10	RS-232 (Host) TxD
11	Output 2
12	Output Common



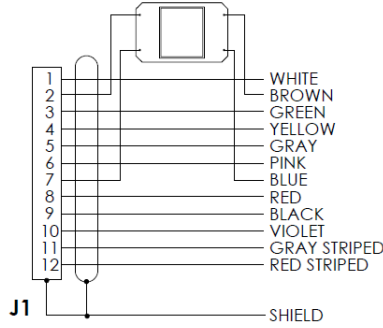
FEMALE END VIEW (J1)



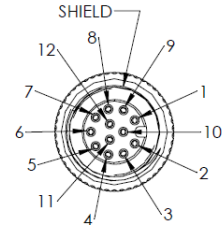
**M12 to Flying Leads Cable, with Power Filter – 3 Meters or 5 Meters**  
**V430-W8F-3M**  
**V430-W8F-5M**



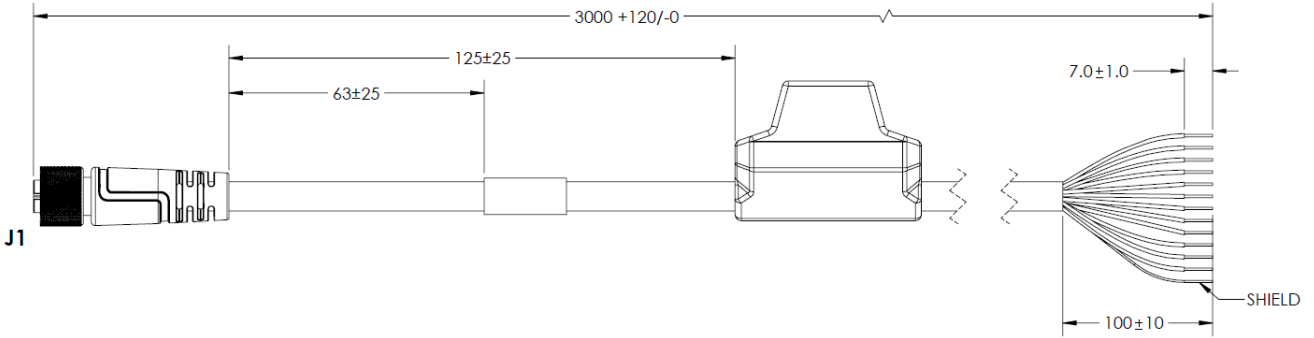
Pin	Function
1	Trigger
2	Power (+VIN)
3	Default
4	New Master
5	Output 1
6	Output 3
7	Ground (-VIN)
8	Input Common
9	RS-232 (Host) RxD
10	RS-232 (Host) TxD
11	Output 2
12	Output Common



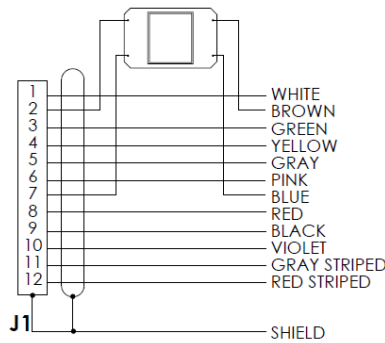
FEMALE END VIEW (J1)



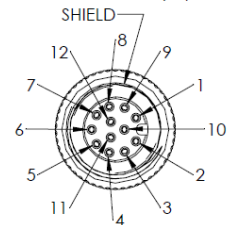
SCHEMATIC



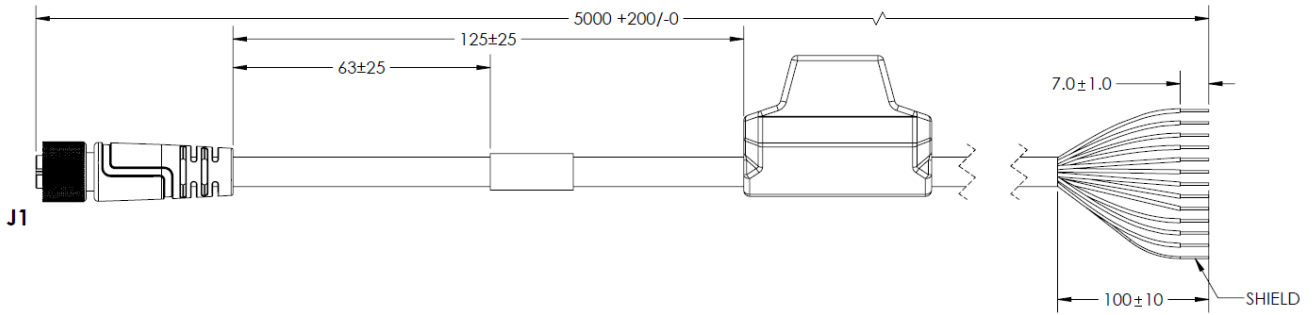
Pin	Function
1	Trigger
2	Power (+VIN)
3	Default
4	New Master
5	Output 1
6	Output 3
7	Ground (-VIN)
8	Input Common
9	RS-232 (Host) RxD
10	RS-232 (Host) TxD
11	Output 2
12	Output Common



FEMALE END VIEW (J1)

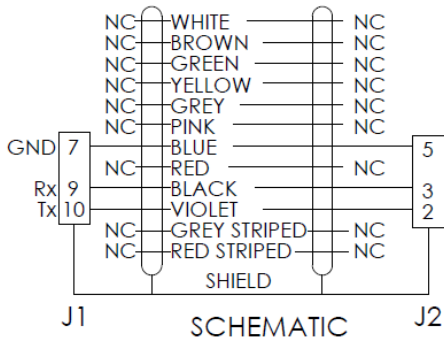


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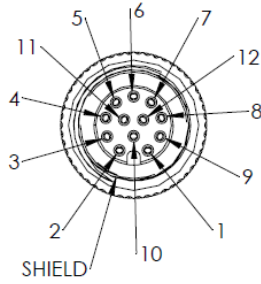


# F440-F

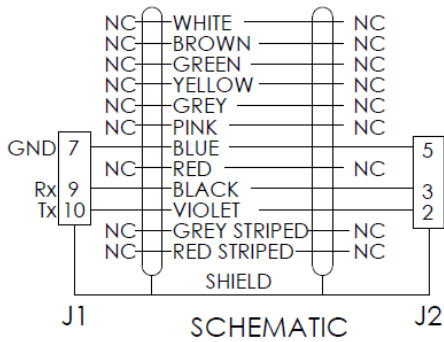
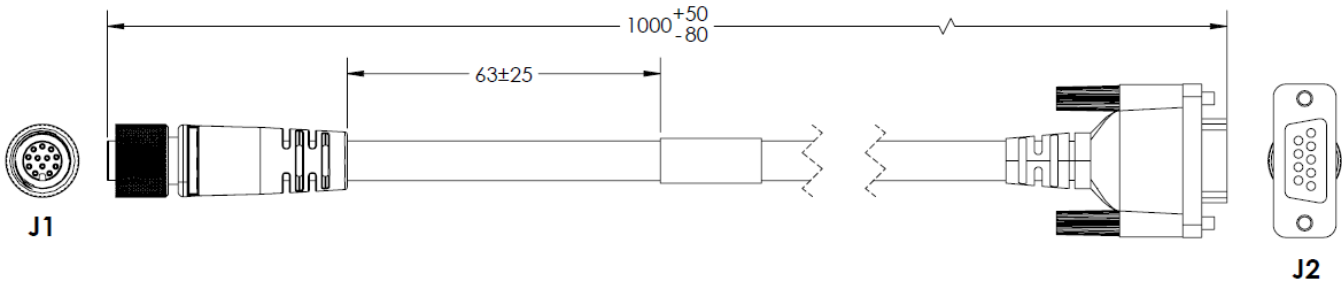
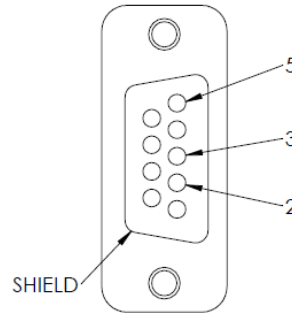
## M12 to RS-232 Breakout – 1 Meter or 3 Meters V430-WR-1M V430-WR-3M



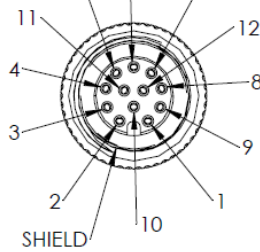
M12 END VIEW (J1)



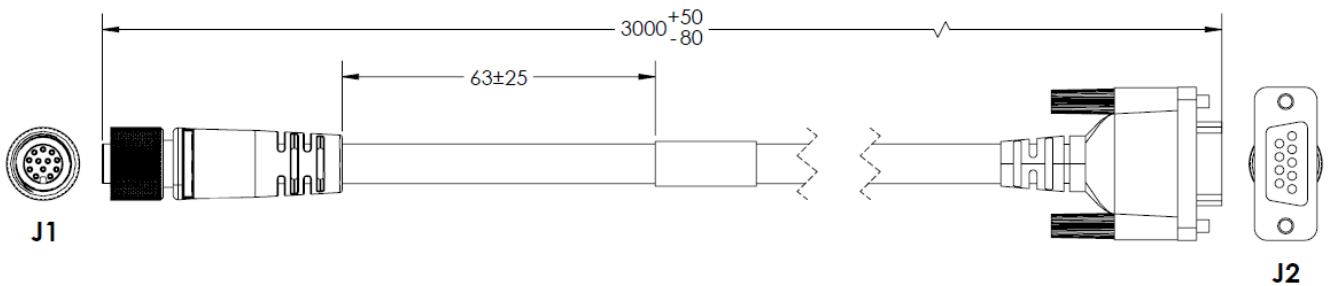
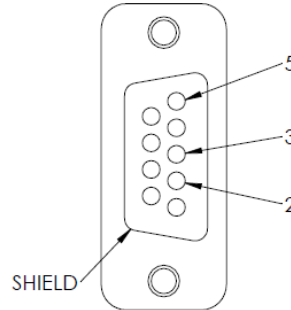
DB9 END VIEW (J2)



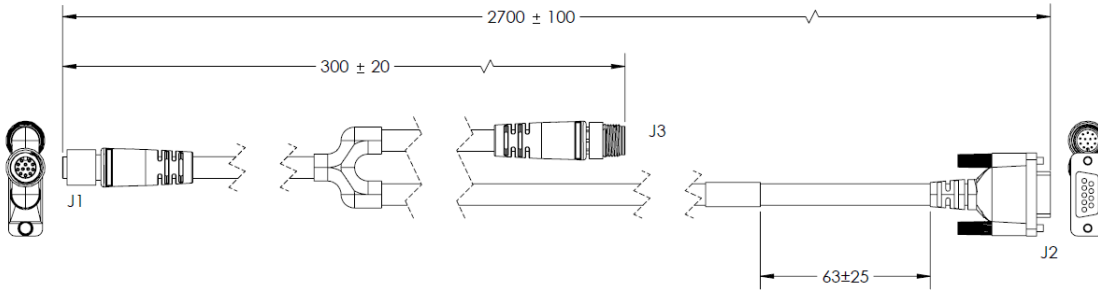
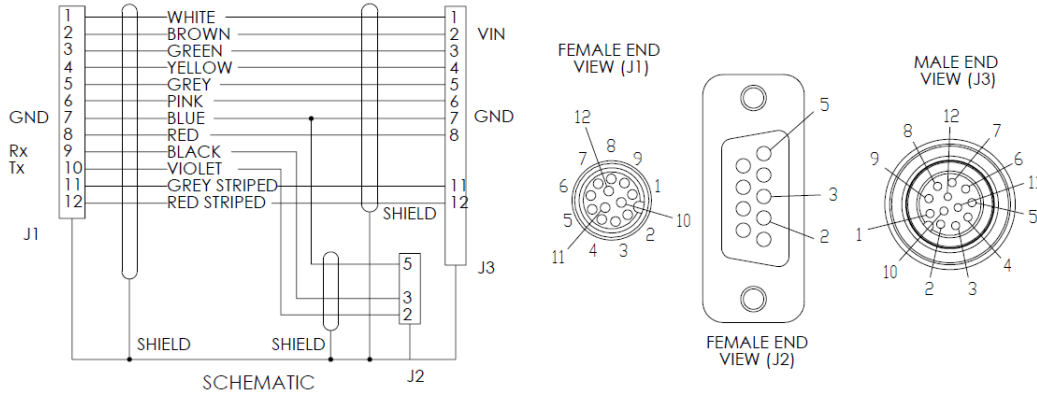
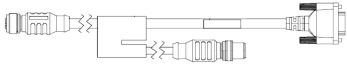
M12 END VIEW (J1)



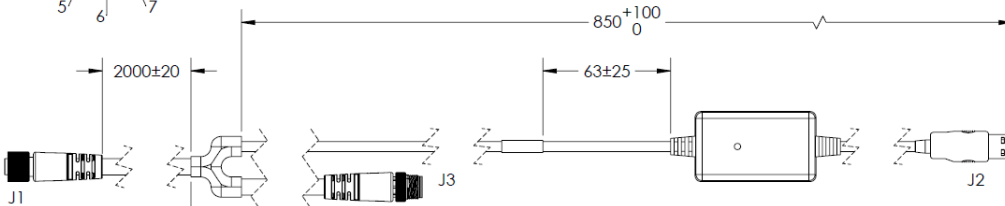
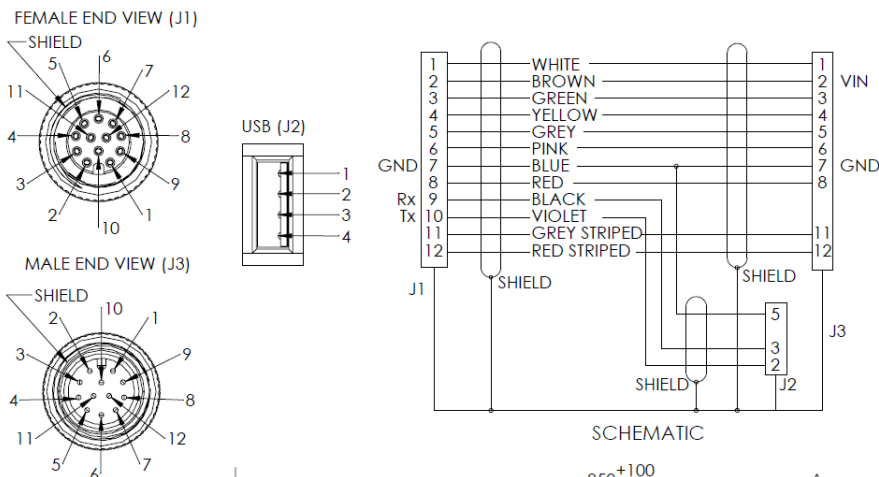
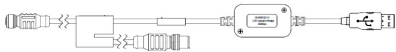
DB9 END VIEW (J2)



**Camera to QX-1 Interconnect Cables with RS-232 Breakout – 2.7 Meters  
V430-WQR-3M**



**Camera to QX-1 Interconnect Cables with USB Keyboard Wedge Breakout – 2.7 Meters  
V430-WQK-3M**

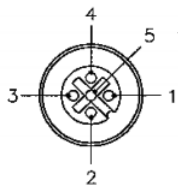


# F440-F

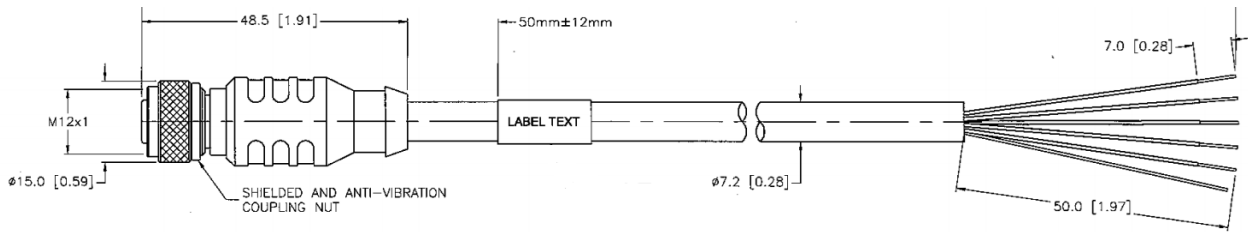
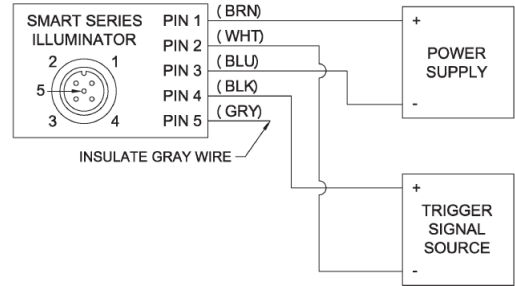
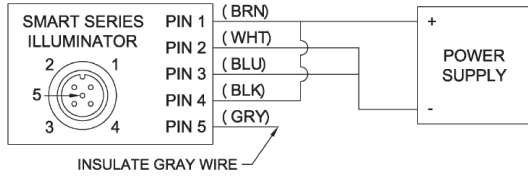
## Smart Series Light Cable 5 Pin M12 Female to Flying Leads, 3 Meters and 5 Meters

61-000186-01

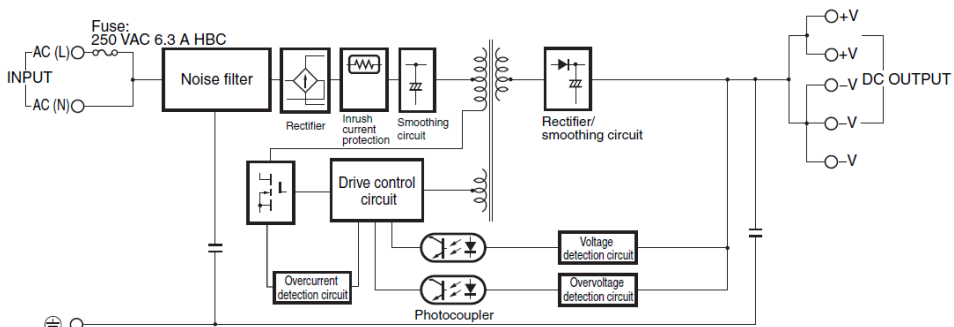
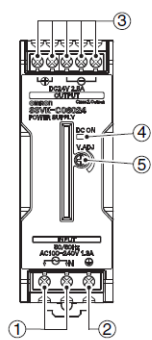
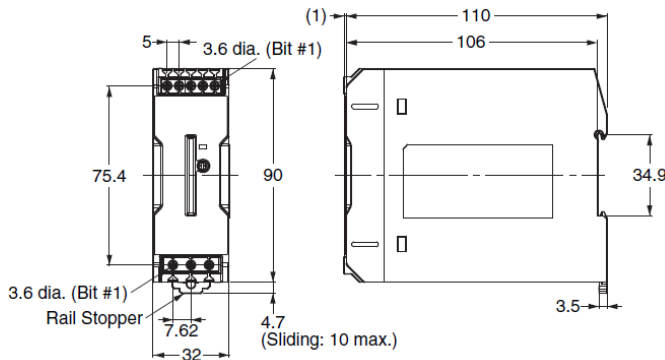
61-000187-01



- 1 = BROWN
- 2 = WHITE
- 3 = BLUE
- 4 = BLACK
- 5 = GRAY



## Omron S8VK-C06024 Power Supply



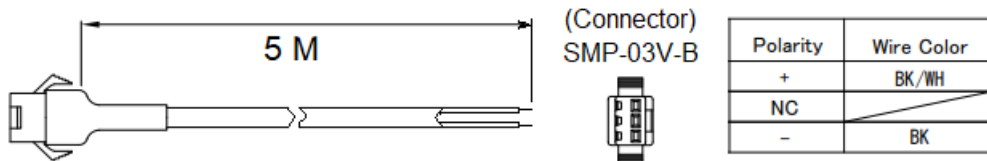
No.	Name	Function
1	Input terminals (L), (N)	Connect the input lines to these terminals. *1
2	Protective Earth terminal (PE)	Connect the ground line to this terminal. *2
3	DC Output terminals (-V), (+V)	Connect the load lines to these terminals.
4	Output indicator (DC ON: Green)	Lights while a direct current (DC) output is ON.
5	Output voltage adjuster (V.ADJ)	Use to adjust the voltage.

\*1. The fuse is located on the (L) side. It is not user-replaceable. For a DC input, connect the positive voltage to the L terminal.

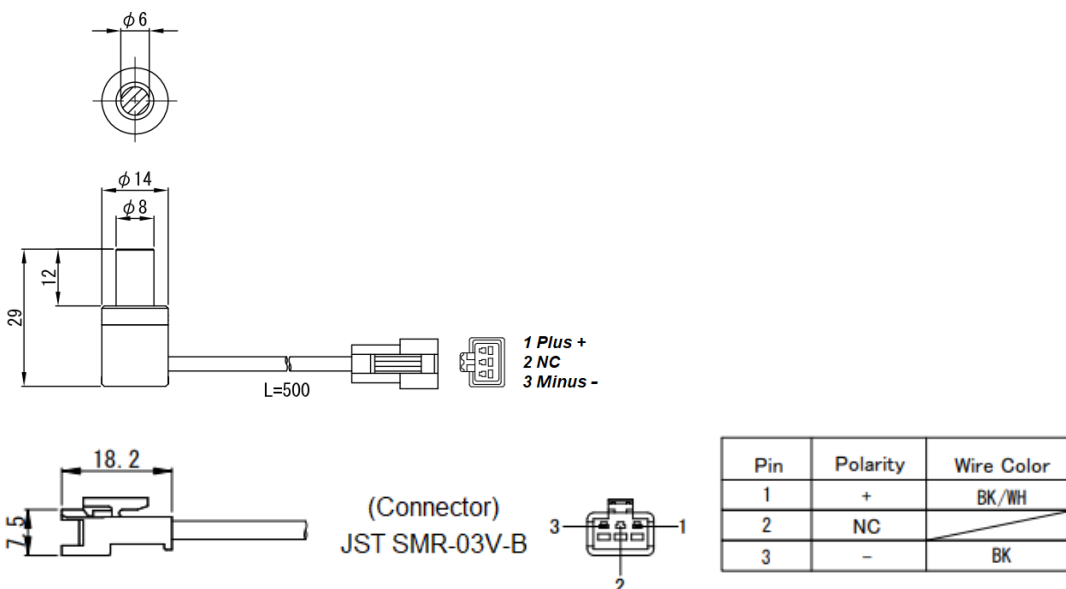
\*2. This is the protective earth terminal specified in the safety standards. Always ground this terminal.



**Spot Light Extension Cable, Flying Leads, 5M**



**Kit, Spot Light, Blue, Telecentric Lens with Flying Leads Extension Cable  
98-9000304-01**



**Industrial High-Flex Ethernet Cables with Jack Screws and RJ45, 2 Meters, 5 Meters, and 7 Meters**

- 98-000133-01
- 98-000134-01
- 98-000134-02



**Industrial High-Flex Ethernet Cables**

Industrial High-Flex cables provide an interface between F440-F cameras and other devices. These cables are designed for harsh environments that could damage a traditional CAT 5 cable. The overmold design provides increased strain relief. Thumbscrew locking keeps the connection secure despite shock and vibration. The double-shielded design provides extra protection in industrial applications. High-Flex cables are designed to withstand 12 million+ flex cycles. The TPE jacket provides additional protection from elements such as oil, water, and abrasion.

Cable Specifications	
Overall Diameter	.245 Inches
Max. Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	2.45 Inches
Flame Rating	FT-1

Primary Components	
Cable	4 Twisted Pairs
Connector A	Standard RJ45
Connector B	Standard RJ45

# F440-F

## Related Manuals

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Model	Part Number	Manual
F440-F	Z475-E-01 (84-9007434-02)	F440-F C-Mount Smart Camera User Manual
	Z444-E1-03	F440-F C-Mount Smart Camera Communication Manual
	84-9100000-03	AutoVISION Help (Accessible from the Help menu in the AutoVISION user interface)
FLV3Z4S-LE	O198	Vision Accessory Catalog

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