

Lens Cover (Included)

Lenses

The NI High-Performance Smart Cameras have a C lens mount. National Instruments offers a number of C mount lenses. These lenses include both low and high resolution options to accommodate the different camera models.

NI 1772, 1772C, NI 1774, NI 1774C

Computar M0814-MP, 8mm, F1.4, Megapixel	780024-01
Computar M1214-MP, 12mm, F1.4, Megapixel	780025-01
Computar M1614-MP, 16mm, F1.4, Megapixel	780026-01
Computar M2514-MP, 25mm, F1.4, Megapixel	780027-01
Computar M3514-MP, 35mm, F1.4, Megapixel	780033-01

NI 1776, NI 1776C, NI 1778

Computar M1620-MPV, 16mm, F2.0, 2/3 inch, 3MP	782023-01
Computar M2518-MPV, 25mm, F1.8, 2/3 inch, 3MP	782024-01
Computar M3520-MPV, 35mm, F2.0, 2/3 inch, 3MP	782025-01
Fujinon HF12.5SA-1, 12.5mm, F1.4, 5 MP	782525-01
Fujinon HF16SA-1, 16mm, F1.4, 5 MP	782424-01
Fujinon HF25A-1, 25mm, F1.4, 5 MP	782423-01

Ethernet

Utilize Ethernet for enterprise connectivity, Modbus, EtherNet/IP, and TCP/IP.

M12 Ethernet Connector

M12 to RJ45 Cable (5m)	153130-05
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USB and VGA Video

View inspection images and connect additional storage via USB.

M12 VGA and USB Connector

M12 to VGA/USB Splitter Cable (1m)	153064-01
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NI 177x Smart Camera Accessories

Mounting and Lighting

Utilize industry standard mounting for the following mount and lighting options:

Mounting	
Tripod Adaptor	199173-01
Pan and Tilt Mount	748182-02
Light Bracket for 177x Smart Cameras	782570-01
Lighting for Monochrome Cameras	
Advanced Illumination RL127, Red Ring Light	782026-01
Lighting for Color Cameras	
Advanced Illumination RL127, White Ring Light	782027-01

Power and I/O

There are two main options for connecting power and I/O to the camera.

The first is to use the starter kit for NI 177x Smart Cameras. The starter kit includes all accessories listed in the table, and is the easiest way to start using the NI 177x Smart Camera.

Starter Kit for NI 177x Smart Cameras	
Power & I/O Accessory	782043-01
Power Supply	
M12 to DSUB cable for Power & I/O Accessory	
M12 to RJ45 cable	
M12 to VGA/USB cable	

The second option is to use the following M12 to Pigtail cable. This cable provides a way to connect the smart camera power and I/O lines to custom termination. The Power Supply for NI 177x Smart Cameras can also be connected to custom termination utilizing the M12 to Pigtail cable to connect to the Smart Camera.

Cable	
M12 to Pigtail cable (3m)	153131-03
Power Supply	
Power Supply for NI 177x Smart Cameras	782032-01

Lens Cover

The lens cover protects the smart camera lens from dust and damage and is rated for IP67. The lens cover keeps the aperture and focus settings from being changed. The following figures show the dimensions of the lens cover included with the NI 177x Smart Camera.

Figure 1-1. Lens Cover Dimensional Drawing

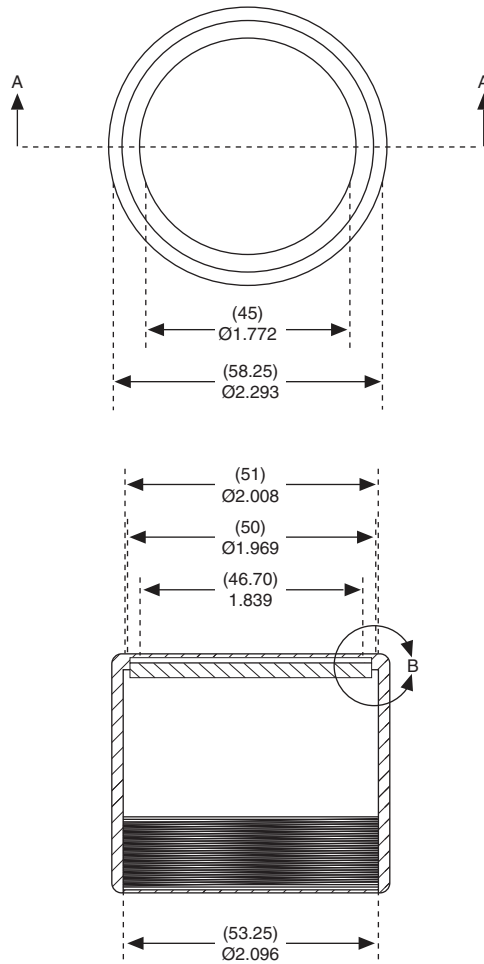
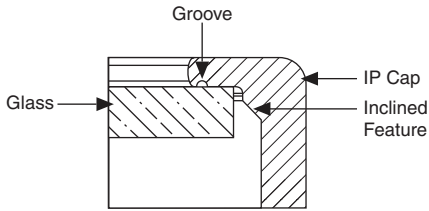


Figure 1-2. Detailed View of Lens Cover



Lens Cover Physical Characteristics

Material Aluminum alloy 6061-T6
Finish Black anodic coating, per MIL-A-8625F, Type II, class 2

The glass window is glued to the IP cap using one component UV cure adhesive.

Lenses

National Instruments offers low and high resolution lenses to accommodate the different NI 177x Smart Cameras. All lenses are 2/3 inch and C mount. Refer to the following pages for detailed specifications about each lens.

Table 2-1. Lenses for NI 1772, NI 1772C, NI 1774, and NI 1774C Smart Cameras

Model	Focal Length (mm)	Aperture	Dimensions (mm)	Weight (g)
Computar M0814-MP	8	F1.4—F16C	33.5 x 28.2	70
Computar M1214-MP	12	F1.4—F16C	33.5 x 28.2	65
Computar M1614-MP	16	F1.4—F16C	33.5 x 28.2	65
Computar M2514-MP	25	F1.4—F16C	33.5 x 36	75
Computar M3514-MP	35	F1.4—F16C	33.5 x 38.2	87

Table 2-2. Lenses for NI 1776, NI 1776C, and NI 1778 Smart Cameras

Model	Focal Length (mm)	Aperture	Dimensions (mm)	Weight (g)
Computar M1620-MPV	16	F2.0—F16.0	29 x 33.53	53
Computar M2518-MPV	25	F1.8—F16.0	29 x 36.7	60
Computar M3520-MPV	35	F2.0—F22.0	29 x 37.34	59
Fujinon HF12.5SA-1	12.5	F1.4—F22	83 x 62	295

Model	Focal Length (mm)	Aperture	Dimensions (mm)	Weight (g)
Fujinon HF16SA-1	16	F1.4—F22	69 x 51	285
Fujinon HF25SA-1	25	F1.4—F22	44 x 33	315

M0814-MP

8mm F1.4

for 2/3" format cameras

C-Mount

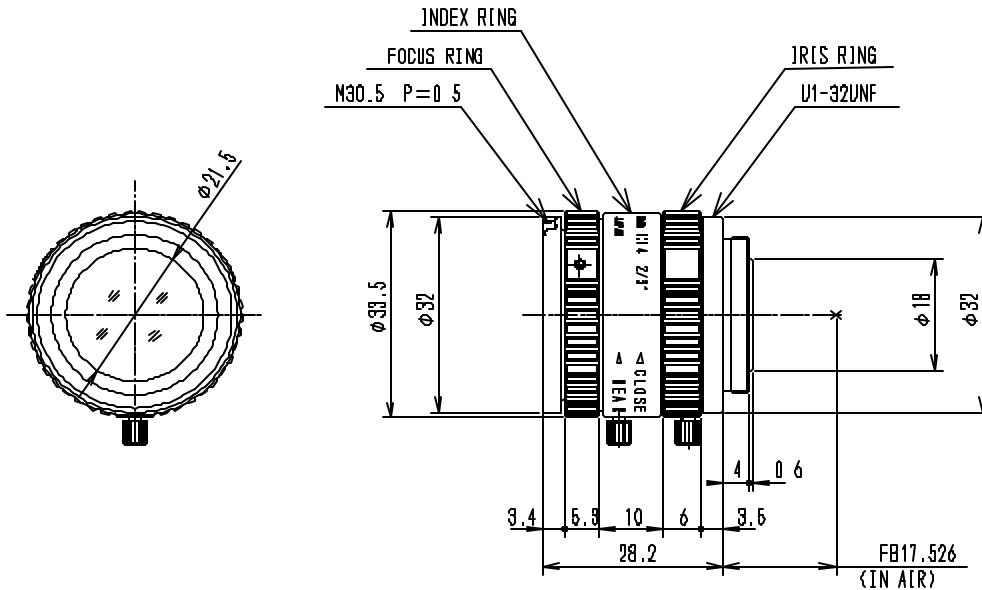
Model No.	M0814-MP		Effective	Front	f 21.5mm
Focal Length	8mm		Lens Aperture	Rear	f 12.0mm
Max. Aperture Ratio	1 : 1.4		Distortion	-1.1%(y=4.0)	
Max. Image Format	8.8 x 6.6mm (f11mm)		Back Focal Length	13.1mm	
Operation Range	Iris	F1.4 - 16C	Flange Back Length	17.526mm	
	Focus	0.3m - Inf.	Mount	C-Mount	
Control	Iris	Manual	Filter Size	M30.5 P=0.5mm	
	Focus	Manual	Dimensions	f33.5 x 28.2mm	
Object Dimension at M.O.D.	32.1 x 24.1cm		Weight	70g	
Angle of View	D	67.1°	1/2"	51.9°	
	H	56.3°		42.5°	
	V	43.7°		32.4°	
Operating Temperature	-20°C ~ +50°C				

2/3

C

M.O.D. : Minimum Object Distance

Dimensions



F

M1214-MP

12mm F1.4

for 2/3" format cameras

C-Mount

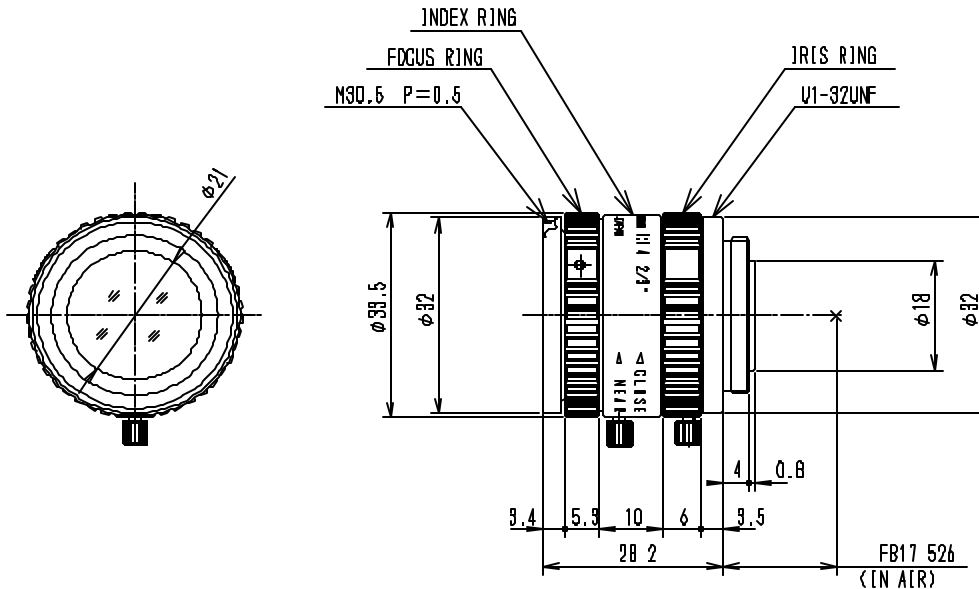
Model No.	M1214-MP	Effective	Front	f 21.0mm
Focal Length	12mm	Lens Aperture	Rear	f 13.0mm
Max. Aperture Ratio	1 : 1.4	Distortion	-0.35%(y=4.0)	
Max. Image Format	8.8 x 6.6mm (f11mm)	Back Focal Length	13.1mm	
Operation Range	Iris	F1.4 - 16C	Flange Back Length	17.526mm
	Focus	0.3m - Inf.	Mount	C-Mount
Control	Iris	Manual	Filter Size	M30.5 P=0.5mm
	Focus	Manual	Dimensions	f33.5 x 28.2mm
Object Dimension at M.O.D.	22.1 x 16.5cm	Weight	65g	
Angle of View	D	49.2°	37.0°	
	H	40.4°	30.0°	
	V	30.8°	22.7°	
Operating Temperature	-20°C ~ +50°C			

2/3

C

M.O.D. : Minimum Object Distance

Dimensions



F

M1614-MP

16mm F1.4

for 2/3" format cameras

C-Mount

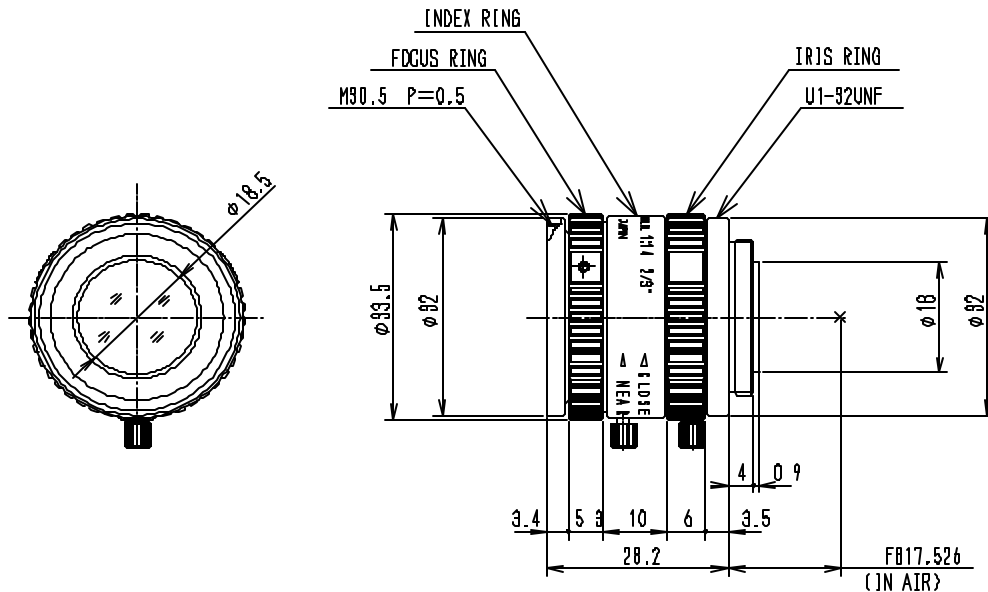
Model No.	M1614-MP	Effective	Front	f 18.5mm
Focal Length	16mm	Lens Aperture	Rear	f 13.2mm
Max. Aperture Ratio	1 : 1.4	Distortion	-0.3%(y=4.0)	
Max. Image Format	8.8 x 6.6mm (f11mm)	Back Focal Length	13.1mm	
Operation Range	Iris	F1.4 - 16C	Flange Back Length	17.526mm
	Focus	0.3m - Inf.	Mount	C-Mount
Control	Iris	Manual	Filter Size	M30.5 P=0.5mm
	Focus	Manual	Dimensions	f33.5 x 28.2mm
Object Dimension at M.O.D.	16.5 x 12.4cm	Weight	65g	
Angle of View	D	38.0°	28.2°	
	H	30.8°	22.7°	
	V	23.4°	17.1°	
Operating Temperature	-20°C ~ +50°C			

2/3

C

M.O.D. : Minimum Object Distance

Dimensions



F

M2514-MP

25mm F1.4

for 2/3" format cameras

C-Mount

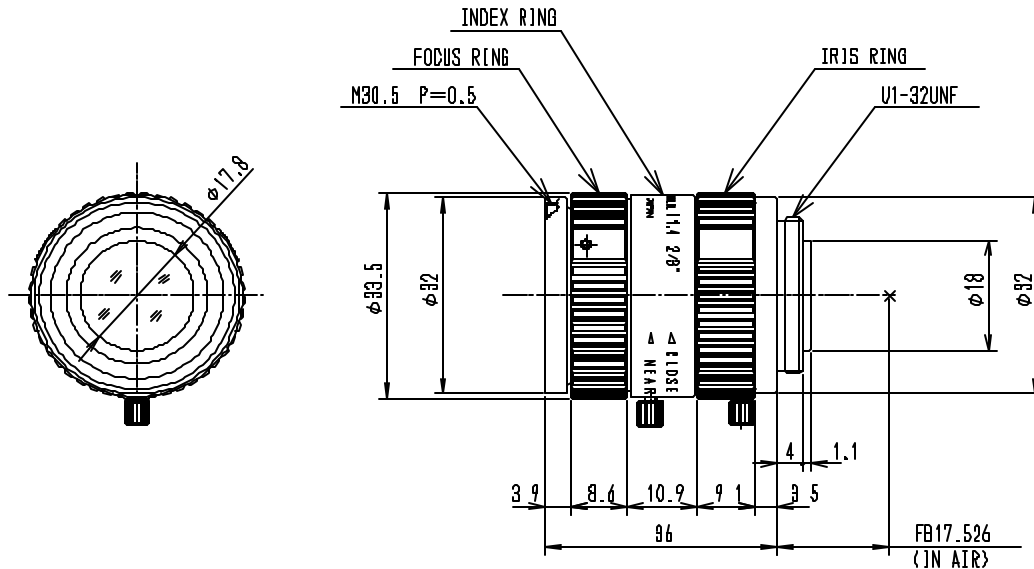
Model No.	M2514-MP		Effective	Front	f 17.8mm
Focal Length	25mm		Lens Aperture	Rear	f 12.0mm
Max. Aperture Ratio	1 : 1.4		Distortion	-0.1%(y=4.0)	
Max. Image Format	8.8 x 6.6mm (f11mm)		Back Focal Length	13.1mm	
Operation Range	Iris	F1.4 - 16C	Flange Back Length	17.526mm	
	Focus	0.3m - Inf.	Mount	C-Mount	
Control	Iris	Manual	Filter Size	M30.5 P=0.5mm	
	Focus	Manual	Dimensions	f33.5 x 36.0mm	
Object Dimension at M.O.D.	10.6 x 8.0cm		Weight	75g	
Angle of View	D	24.9°	1/2"	18.2°	
	H	20.0°		14.6°	
	V	15.1°		11.0°	
Operating Temperature	-20°C ~ +50°C				

2/3

C

M.O.D. : Minimum Object Distance

Dimensions



F

M3514-MP

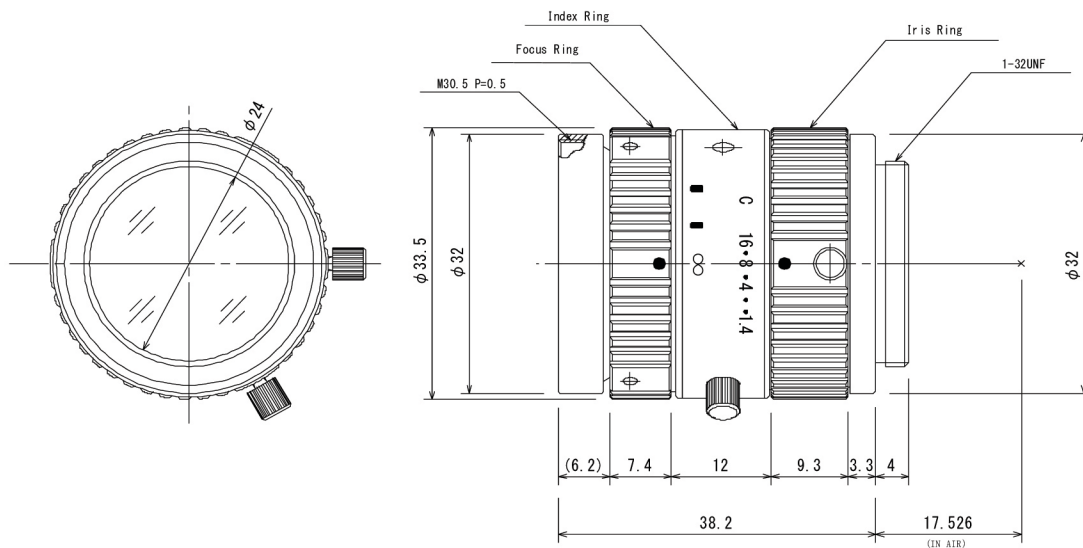
f=35mm F1.4
for 2/3 type Megapixel Cameras
C-Mount



Model No.		M3514-MP		Effective	Front	φ 24mm		
Focal Length		35mm		Lens Aperture	Rear	φ 12mm		
Max. Aperture Ratio		1:1.4		Distortion	2/3 type	-0.8%(γ=5.5)		
Max. Image Format		8.8mm x 6.6mm(φ 11mm)			1/2 type	-0.39%(γ=4.0)		
Operation Range	Iris	F1.4 - F16C		Back Focal Length		17.1mm		
	Focus	0.3m - Inf.		Flange Back Length		17.526mm		
Control	Iris	Manual		Mount		C-Mount		
	Focus	Manual		Filter Size		M30.5 P=0.5mm		
Object Dimension at M.O.D	2/3 type	8.1cm x 6cm		Dimensions		φ 33.5mm x 38.2mm		
	1/2 type	5.9cm x 4.4cm		Weight		87g		
Angle of View	D	2/3 type	17.3°	1/2 type	12.6°			
			13.9°					10.1°
			10.4°					
H								
V								
Operating Temperature		-10°C - +50°C						

M.O.D : Minimum Object Distance

Dimensions



Specifications are subject to change without notice.

M1620-MPV

f=16mm F2.0

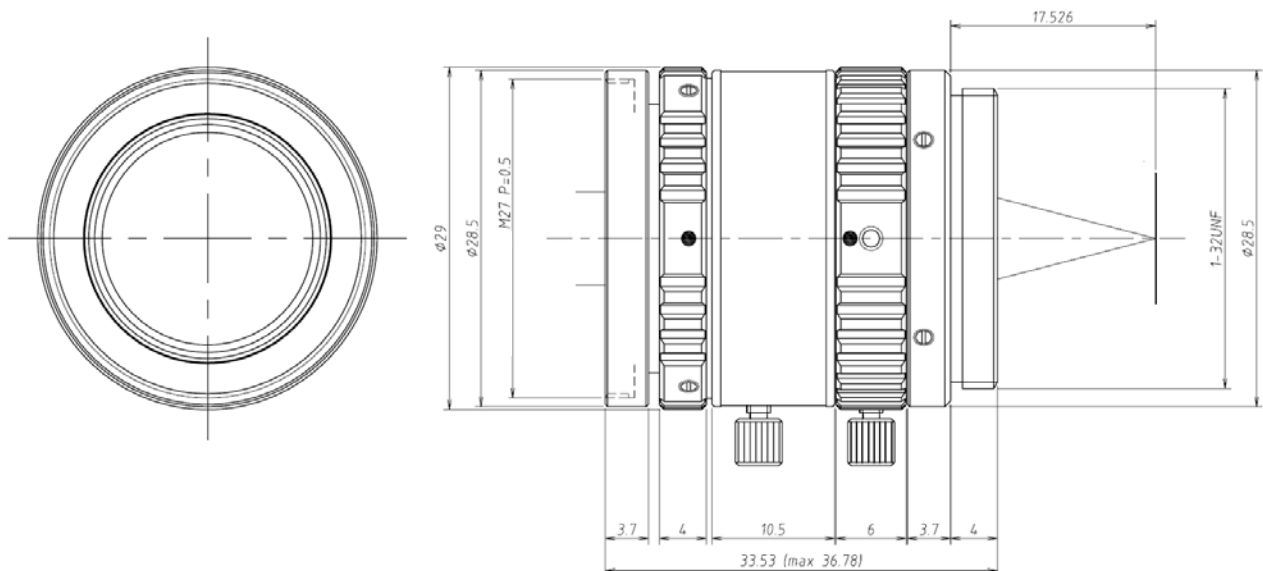
for 2/3 type Cameras, 3 Megapixel

C-Mount

Model No.		M1620-MPV		Effective	Front	φ 18.0mm	
Focal Length		16mm		Lens Aperture	Rear	φ 11.0mm	
Max. Aperture Ratio		1:2.0		Distortion	2/3 type	0.09%(y=5.5)	
Max. Image Format		8.8mm x 6.6mm(φ 11mm)			1/1.8 type	-0.06%(y=4.32)	
Operation Range		Iris	F2.0 - F16.0		1/2 type	-0.07%(y=4.0)	
		Focus	0.2m - Inf.	Back Focal Length		14.7mm	
Control	Iris	Manual		Flange Back Length		17.526mm	
	Focus	Manual		Mount		C-Mount	
Object Dimension at M.O.D.	2/3 Type	8.8cm x 11.74cm		Filter Size		M27.0 P=0.5mm	
	1/1.8 Type	6.93cm x 9.20cm		Dimensions		φ 29mm x 33.53mm	
	1/2 Type	6.40cm x 8.53cm		Weight		53.0g	
Angle of View	D	2/3 Type	37.7°	1/1.8 Type	30.1°	1/2 Type	28.0°
	H		30.7°		24.3°		22.6°
	V		23.3°		18.5°		17.1°
Operating Temperature		-10°C - +50°C					

M.O.D. : Minimum Object Distance

Dimensions



M2518-MPV

f=25mm F1.8

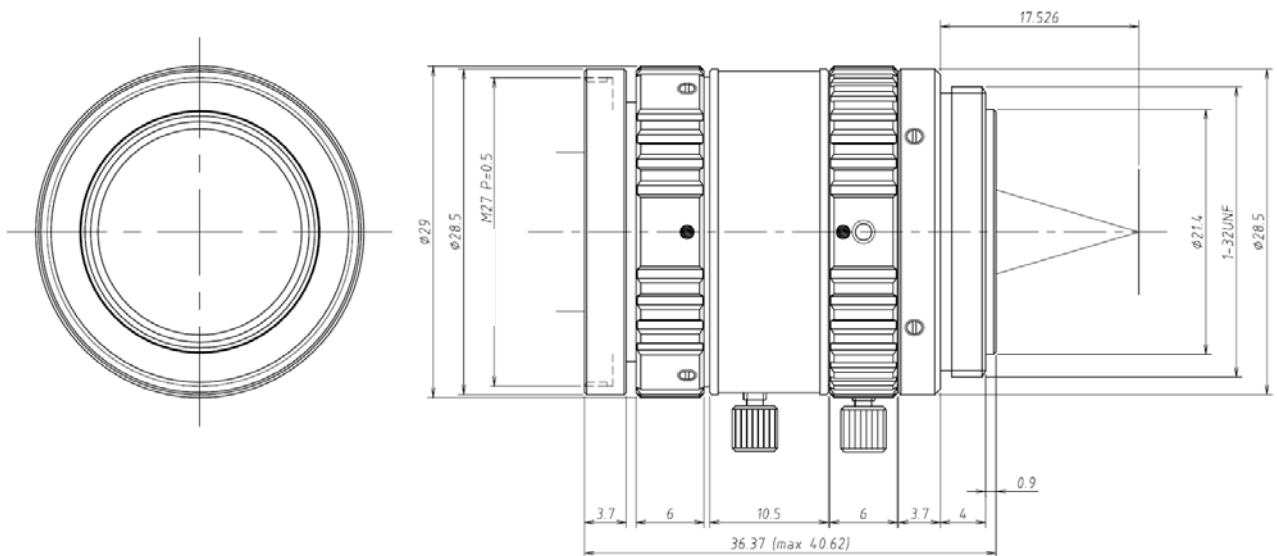
for 2/3 type Cameras, 3 Megapixel

C-Mount

Model No.		M2518-MPV		Effective	Front	φ 18.0mm	
Focal Length		25mm		Lens Aperture	Rear	φ 13.0mm	
Max. Aperture Ratio		1:1.8		Distortion	2/3 type	0.03%(γ=5.5)	
Max. Image Format		8.8mm x 6.6mm(φ 11mm)			1/1.8 type	-0.02%(γ=4.32)	
Operation Range		Iris	F1.8 - F16.0		1/2 type	-0.02%(γ=4.0)	
		Focus	0.2m - Inf.	Back Focal Length		13.8mm	
Control	Iris	Manual		Flange Back Length		17.526mm	
	Focus	Manual		Mount		C-Mount	
Object Dimension at M.O.D.	2/3 Type	5.48cm x 7.31cm		Filter Size		M27.0 P=0.5mm	
	1/1.8 Type	4.32cm x 5.73cm		Dimensions		φ 29mm x 36.37mm	
	1/2 Type	3.98cm x 5.31cm		Weight		60.0g	
Angle of View	D	2/3 Type	24.6°	1/1.8 Type	19.5°	1/2 Type	18.1°
	H		19.9°		15.7°		14.5°
	V		15.0°		11.8°		10.9°
Operating Temperature		-10°C - +50°C					

M.O.D. : Minimum Object Distance

Dimensions



M3520-MPV

f=35mm F2.0

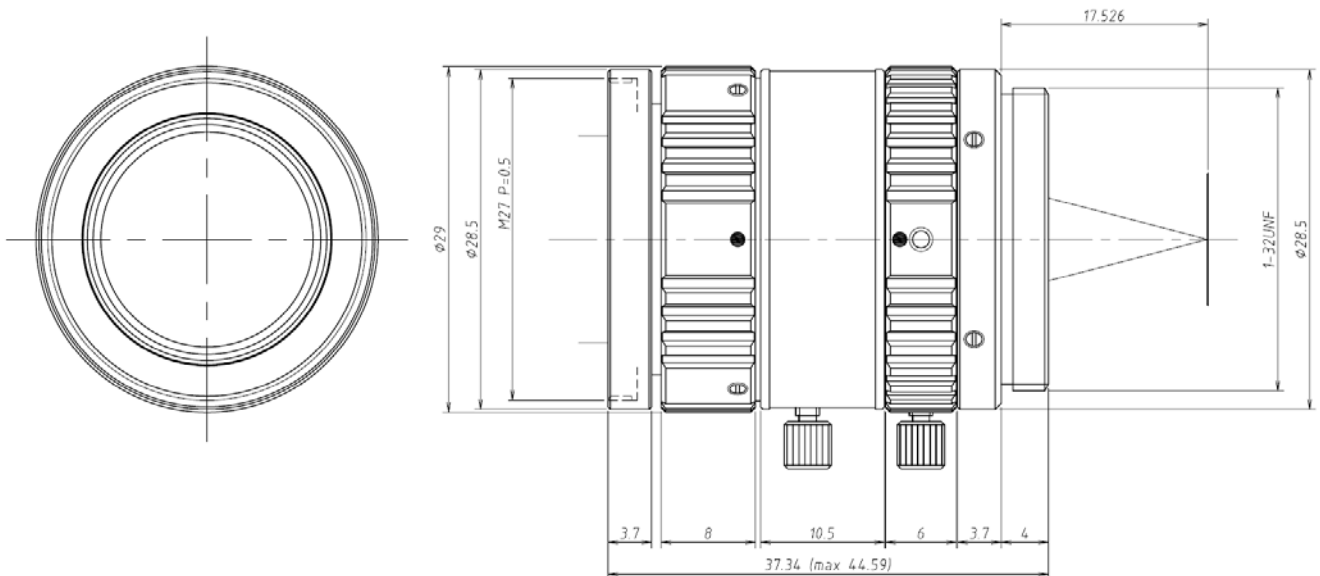
for 2/3 type Cameras, 3 Megapixel

C-Mount

Model No.		M3520-MPV		Effective	Front	φ 18.0mm	
Focal Length		35mm		Lens Aperture	Rear	φ 12.0mm	
Max. Aperture Ratio		1:2.0		Distortion	2/3 type	0.011%(γ=5.5)	
Max. Image Format		8.8mm x 6.6mm(φ 11mm)			1/1.8 type	0.010%(γ=4.32)	
Operation Range	Iris	F2.0 - F22.0			1/2 type	0.009%(γ=4.0)	
	Focus	0.2m - Inf.		Back Focal Length		18.0mm	
Control	Iris	Manual		Flange Back Length		17.526mm	
	Focus	Manual		Mount		C-Mount	
Object Dimension at M.O.D.	2/3 Type	3.48cm x 4.63cm		Filter Size		M27.0 P=0.5mm	
	1/1.8 Type	2.74cm x 3.63cm		Dimensions		φ 29mm x 37.34mm	
	1/2 Type	2.53cm x 3.37cm		Weight		59.0g	
Angle of View	D	2/3 type	17.8°	1/1.8 tyoe	14.0°	1/2 type	13.0°
	H		14.3°		11.2°		10.4°
	V		10.7°		8.5°		7.8°
Operating Temperature		-10°C - +50°C					

M.O.D. : Minimum Object Distance

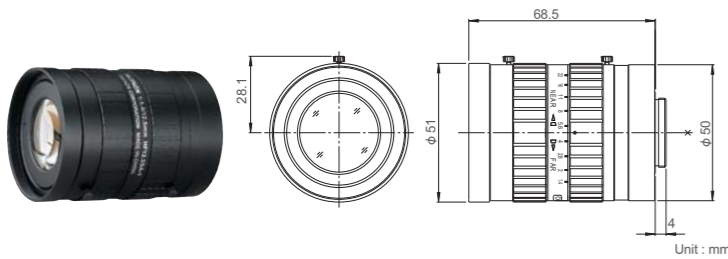
Dimensions



For FA/Machine Vision Fixed Focal

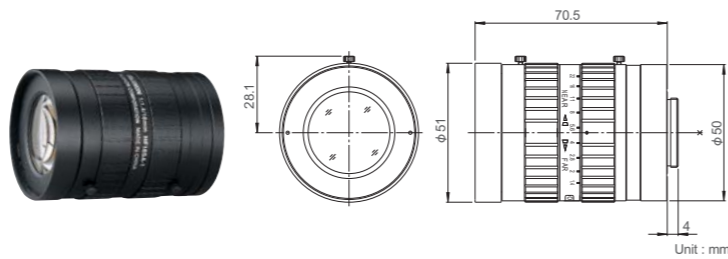
HF12.5SA-1

FIXED 5 Mega MANUAL C-mnt METAL F1.4



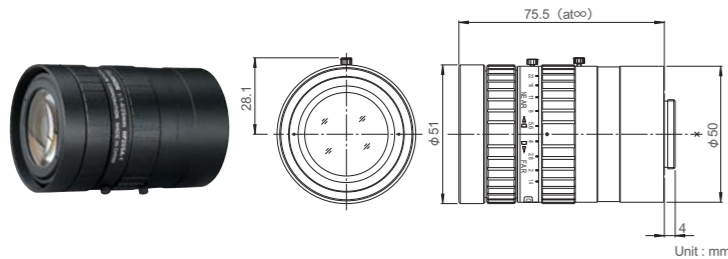
HF16SA-1

FIXED 5 Mega MANUAL C-mnt METAL F1.4



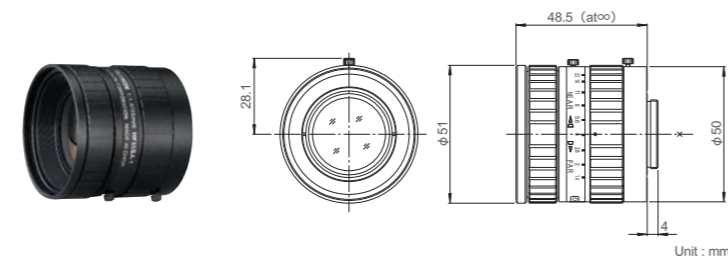
HF25SA-1

FIXED 5 Mega MANUAL C-mnt METAL F1.4



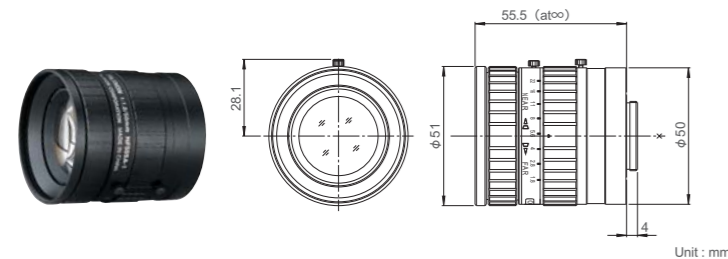
HF35SA-1

FIXED 5 Mega MANUAL C-mnt METAL F1.4



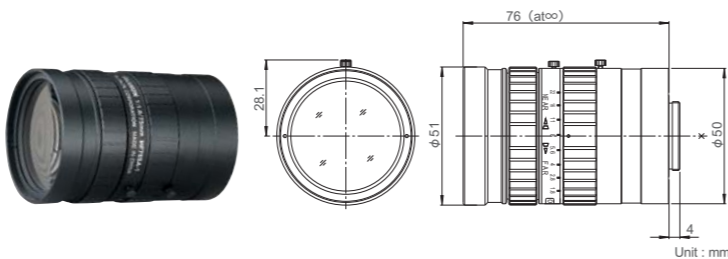
HF50SA-1

FIXED 5 Mega MANUAL C-mnt METAL



HF75SA-1

FIXED 5 Mega MANUAL C-mnt METAL



Feature Indications

FIXED

Fixed Focal
High performance single focal lens for the best image quality

MANUAL

Manual Iris
Manually-operated iris

F1.4

Wide Aperture Rate
Lens with the wide aperture rate, optimizing the sensitivity of cameras

5 Mega

For Megapixel Camera
For 5 Megapixel Camera

C-mnt

C Mount
Screw-in mounting commonly used in FA lenses

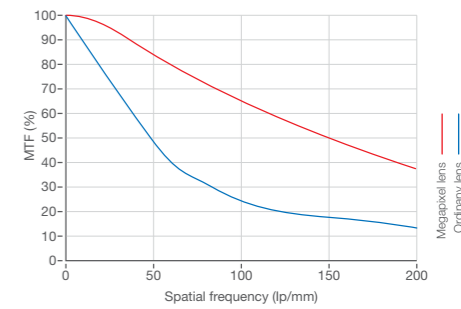
METAL

Metal Mount
Metal mounting with high accuracy and durability

- ... With locking knob for iris and focus
- ... Using an extension tube longer than 5mm the M.O.D. will increase to 0.3m
- ... Using an extension tube longer than 5mm the M.O.D. will increase to 0.5m

Megapixel Supporting Lens

We have realized a high resolution, compact, and lightweight lens supporting to megapixel by thoroughly reducing aberrations based on design technology cultivated from broadcast TV lenses. The chart shown at the right compares megapixel supporting lens and the MTF of an ordinary CCTV lens. As the number of TV lines increases, the disparity in MTF becomes bigger.

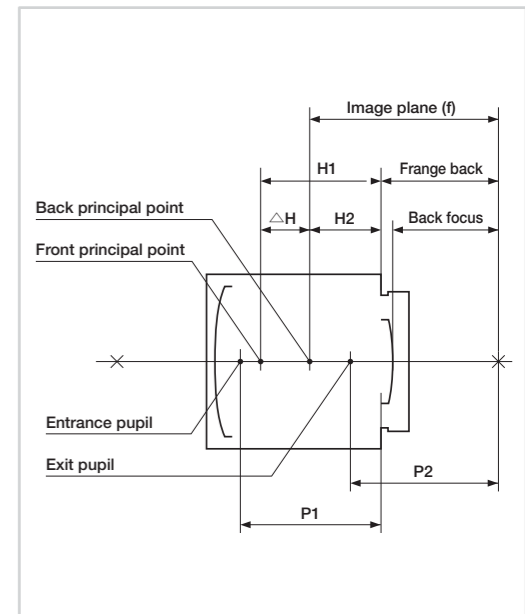


	HF12.5SA-1	HF16SA-1	HF25SA-1	HF35SA-1	HF50SA-1	HF75SA-1
Focal Length (mm)	12.5	16	25	35	50	75
Iris Range	F1.4-F22	F1.4-F22	F1.4-F22	F1.4-F22	F1.8-F22	F1.8-F22
Operation	Focus	Manual	Manual	Manual	Manual	Manual
	Iris	Manual	Manual	Manual	Manual	Manual
Angle Of View (H×V)	2/3"	38°47' × 29°35'	30°45' × 23°18'	19°58' × 15°02'	14°20' × 10°46'	10°03' × 7°33'
	1/2"	28°43' × 21°44'	22°37' × 17°04'	14°35' × 10°58'	10°27' × 7°51'	7°19' × 5°30'
	1/3"	21°44' × 16°23'	17°04' × 12°50'	10°58' × 8°14'	7°51' × 5°53'	5°30' × 4°07'
Focusing Range (From Front Of The Lens) (m)	∞ ~ 0.1	∞ ~ 0.1	∞ ~ 0.1	∞ ~ 0.2	∞ ~ 0.4	∞ ~ 0.9
	2/3"	83 × 62	69 × 51	44 × 33	50 × 38	70 × 52
Object Dimensions at M.O.D. (H×V) (mm)	1/2"	60 × 45	50 × 37	32 × 24	37 × 27	51 × 38
	1/3"	45 × 34	37 × 28	24 × 18	27 × 21	38 × 28
	1/3"	45 × 34	37 × 28	24 × 18	27 × 21	38 × 28
Back Focal Distance (in air) (mm)	16.07	17.99	22.32	14.99	17.81	24.43
Exit Pupil Position (From Image Plane) (mm)	-101	-172	-140	-37	-49	-52
Filter Thread (mm)	M49 × 0.75	M49 × 0.75	M49 × 0.75	M49 × 0.75	M49 × 0.75	M49 × 0.75
Mount	C	C	C	C	C	C
Mass (g)	295	285	315	185	240	305
Remarks	With Metal Mount	With Metal Mount	With Metal Mount	With Metal Mount	With Metal Mount	With Metal Mount

OPTICAL DATA (FA/Machine Vision LENS)

Sensor size	Product name	Focal Length	Aperture/Full open	Front principal point H1 (from Mount)	Back principal point H2 (from Mount)	Distance between the principal points ΔH
1/2"	DF6HA-1B	6.15	1.2	-16.45	11.38	27.82
	HF9HA-1B	9.23	1.4	-12.91	8.30	21.21
	HF12.5HA-1B	12.88	1.4	-2.85	4.64	7.49
	HF16HA-1B	16.49	1.4	3.05	1.03	-2.02
	HF25HA-1B	25.81	1.4	1.82	-8.28	-10.10
	HF35HA-1B	34.99	1.6	-9.00	-17.47	-8.46
	HF50HA-1B	49.57	2.3	-42.64	-32.04	10.59
2/3"	HF75HA-1B	75.01	2.8	-100.77	-57.48	43.29
	HF12.5SA-1	12.83	1.4	-33.68	4.70	38.37
	HF16SA-1	16.33	1.4	-24.15	1.20	25.35
	HF25SA-1	24.00	1.4	-23.47	-6.47	17.00
	HF35SA-1	35.74	1.4	-1.27	-18.21	-16.94
	HF50SA-1	51.72	1.8	-1.87	-34.19	-32.32
	HF75SA-1	74.97	1.8	-34.56	-57.45	-22.89
	HF35SR4A-SA1L	35.00	2.0	-19.33	-17.47	1.85
	HF50SR4A-SA1L	50.00	2.8	18.09	-32.47	-50.56
	1"	CF12.5HA-1	12.83	1.4	-33.68	4.70
CF16HA-1		16.33	1.4	-24.15	1.20	25.35
CF25HA-1		24.00	1.4	-23.47	-6.47	17.00
CF35HA-1		35.74	1.4	-1.27	-18.21	-16.94
CF50HA-1		51.72	1.8	-1.87	-34.19	-32.32
CF75HA-1		74.97	1.8	-34.56	-57.45	-22.89
1/3" (3CCD)	TF2.8DA-8	2.86	2.2	-33.74	14.67	48.41
	TF4DA-8	4.15	2.2	-28.46	13.37	41.83
	TF8DA-8B	8.23	2.2	-10.81	9.30	20.10
	TF15DA-8	15.26	2.2	-0.33	2.27	2.60
	TF25DA-8B	24.94	2.2	14.49	-7.42	-21.91
Fish-Eye	FE185C046HA-1	1.43	1.4	-38.26	16.10	54.36
	FE185C057HA-1	1.78	1.4	-37.55	15.75	53.30
	FE185C086HA-1	2.68	1.8	-35.00	14.85	49.85

Entrance pupil position P1 (from Mount)	Exit pupil position P2 (from Image plane)	Back focal distance (in air)	Distortion	Relative illumination (Aperture: at full open. Image height: at diagonal)
-21.8	-46	11.44	-1.93%	39
-19.1	-28	13.48	-2.09%	32
-10.3	-31	15.09	-2.01%	35
-4.5	-30	15.15	-0.96%	35
-3.0	-32	14.58	-0.27%	46
2.1	-27	15.00	0.03%	56
5.8	-25	15.25	0.04%	61
35.4	-27	15.75	0.27%	63
-44.9	-101	16.07	-0.30%	68
-38.9	-172	17.99	-0.08%	78
-43.3	-139	22.32	-0.18%	72
-2.1	-37	14.99	-0.07%	62
0.5	-49	17.81	-0.03%	75
-2.2	-52	24.43	-0.03%	72
-37.8	-74	19.65	-0.02%	74
-26.7	-484	19.16	0.07%	80
-44.9	-101	16.07	0.17%	40
-38.9	-172	17.99	0.31%	34
-43.3	-139	22.32	0.02%	39
-2.1	-37	14.99	-0.15%	43
0.5	-49	17.81	-0.06%	62
-2.2	-52	24.43	-0.06%	67
-36.7	101	14.51	-6.25%	51
-32.8	88	14.61	-3.78%	53
-18.6	-178	14.83	-1.32%	30
-12.9	-89	16.32	-0.33%	34
-5.1	-120	15.12	-0.12%	30
-39.7	-227	9.70	-0.47% ※	75
-39.3	-66	9.70	-0.80% ※	74
-37.5	-41	9.75	-0.53% ※	84



※ $y=f\theta$

M12 to RJ45 Cable

Use the M12 to RJ45 cable to connect the NI 177x Smart Camera to the development computer. The cable is 5 meters long.

Figure 3-1. M12 to RJ45 Cable



M12 to Ethernet Cable Specifications

Mechanical Characteristics

Number of positions.....	8
Shielded	Yes
Cable diameter	6.40 mm
Cable exit	Straight
Cable structure	4x2xAWG26/7; S-FTP
Smallest bending radius, fixed installation min.	32 mm
Smallest bending radius, movable installation min.	32 mm (cable, flexible installation)
Ambient temperature (operation).....	-25 °C to 60 °C (cable, fixed installation) -5 °C to 60 °C (cable, flexible installation)

Material Data

Inflammability class acc. to UL 94.....	HB
Outer sheath, material	PUR
External sheath, color	water blue RAL 5021

Line Characteristics

Conductor cross section	0.14 mm ²
AWG signal line.....	26
Conductor structure signal line	7 x 0.16 mm
Core diameter including insulation.....	1 mm
External cable diameter	6.4 mm
Wire colors.....	White-blue, white-orange, white-green, white-brown
External sheath, color water blue.....	RAL 5021
Insulation resistance.....	≥ 5 GΩ*km
Conductor resistance.....	≤ 150 mΩ/m
Transmission characteristics (category).....	CAT6A
Working capacitance.....	42 pF
Wave impedance.....	100 Ω ± 5% (at 100 MHz)
Signal speed	0.72 c
Signal runtime.....	46 ns/m
Shield attenuation	60 dB (Up to 1000 MHz)
Interference suppression	90 dB (Up to 1000 MHz)

Nominal voltage, conductor	125 V
Test voltage, conductor.....	1000 V
Twisted pairs.....	2 cores to the pair
Type of pair shielding.....	Aluminum-lined polyester foil
Overall twist	2 cores with 2 fillers to the core
Shielding.....	Tinned copper braided shield
Optical shield covering.....	65%
Outer sheath, material.....	PUR
Material conductor insulation.....	Cell PE
Conductor material	Bare Cu litz wires
Cable weight	44 kg/km
Smallest bending radius, fixed installation min.	32 mm
Smallest bending radius, movable installation min.	32 mm

M12 VGA/USB Cable

Use the M12 VGA/USB cable to view inspection images via a VGA monitor, and to connect additional storage via USB. Refer to the *NI 177x Smart Camera User Manual* for signal assignments. The cable is 1 meter long.

Figure 4-1. M12 to VGA/USB Splitter Cable



Figure 4-2. View of the VGA and USB Connectors



Mounting and Lighting

NI 177x Smart Cameras use industry-standard mounting and lighting.

Figure 5-1. Smart Camera with lens cover, light mounting bracket, and ring light



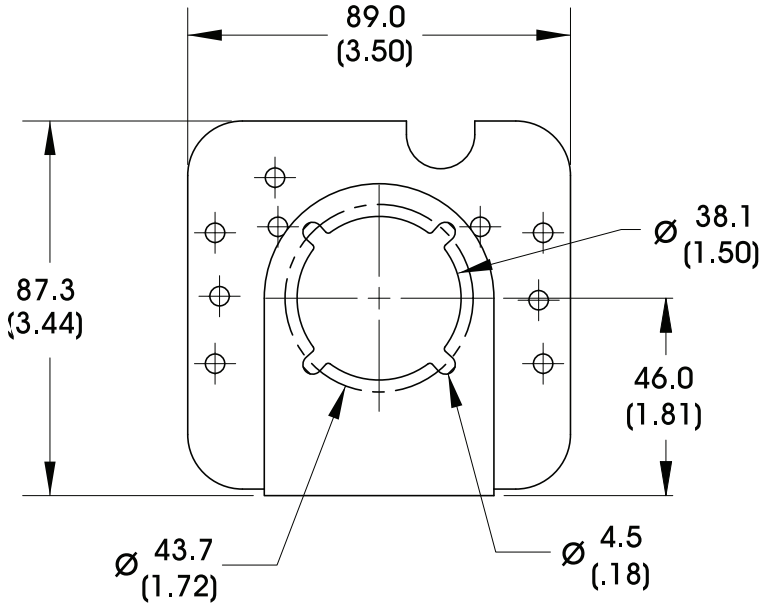
Lights

The lights for the NI 177x Smart Camera are manufactured by Advanced Illumination. Because the lights are current-driven light heads, you can connect the lights to smart cameras with built-in direct drive lighting controls. Refer to the following page for specifications for the RL 127 white ring light and RL 127 red ring light.

Light Mounting Bracket

Use the light mounting bracket to connect the Advanced Illumination ring lights to the NI 177x Smart Camera.

Figure 5-2. Light Mounting Bracket



Tripod Adapter and Pan and Tilt Mount

Refer to the following pages for the mechanical drawings for the tripod adapter and the pan and tilt mount.

RL127

High Brightness LED Ring Light



- Aii** Intense illumination in a compact (4.6" diameter) housing
- Aii** IP65 Compliant Design
- Aii** Axial light source designed for inspecting non-specular objects

Ordering Information

Standard Product:
Shipped Next Day

Standard Product Variation:
Shipped Within Two Weeks

RL127-WHIC

Configured with inline
Current Source

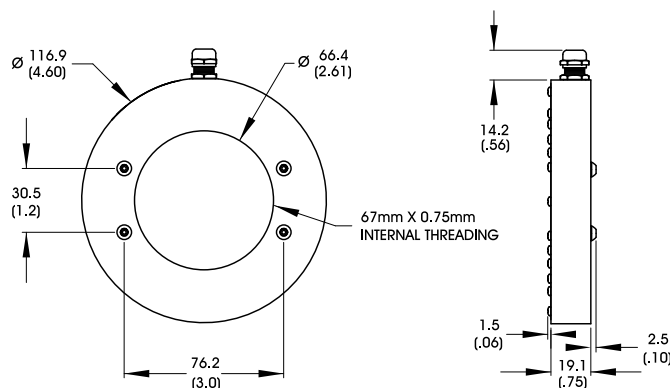
RL127-WHIC5

Configured for use with the
Pulsar 320

RL127	-	XXX	XX	X	XXX
		(blue) 470 (red) 625 (white) WHI	IC IS C2 C3 C5	P (Diffuser) D (Polarizer)	M12* (male)

IC = iCS (requires 24v power supply)
IS = iSU (requires 24v power supply)
C2 = Ai Connector
C5 = Pulsar 320 Connector
* Available with IC and IS options only

Dimensional Information



[Click for Installation Models & Drawings](#)

The RL127 can be mounted using brackets: LB101, LB103, or LB105 (not included)

[Click for Brackets Spec Sheet](#)

Cable Length: 1.5 Meter (59")

Current Specifications

	blue	red	white	
@24	320	320	320	mA

Standard Product Information

Weight:	304 g (11 oz.)
Finish:	Black Anodized
Operating Temperature:	0-60°C
Meets Specifications:	CE, RoHS
Product Lifetime:	50,000 hours

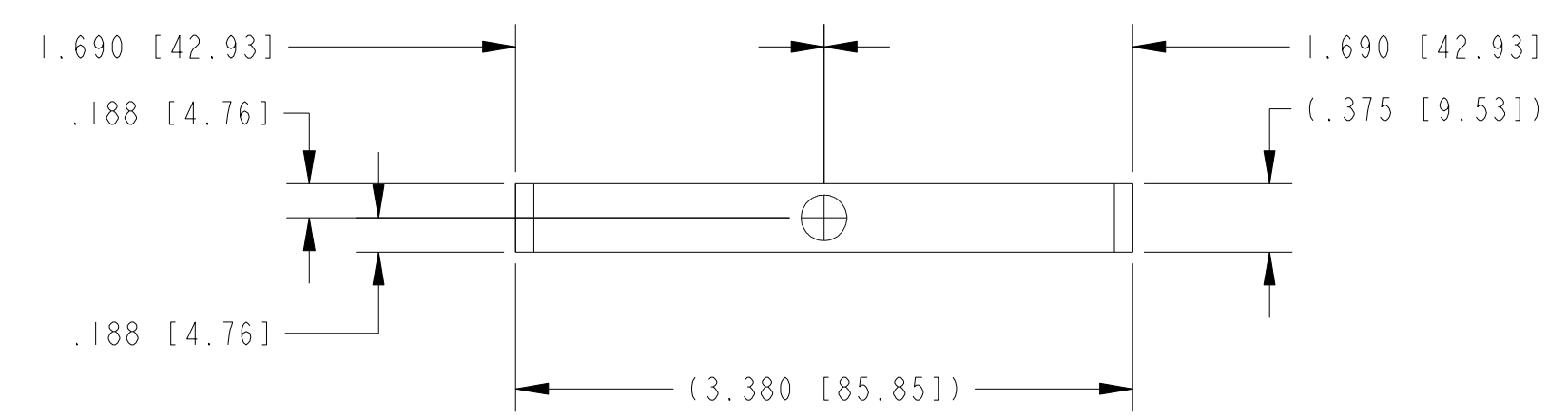
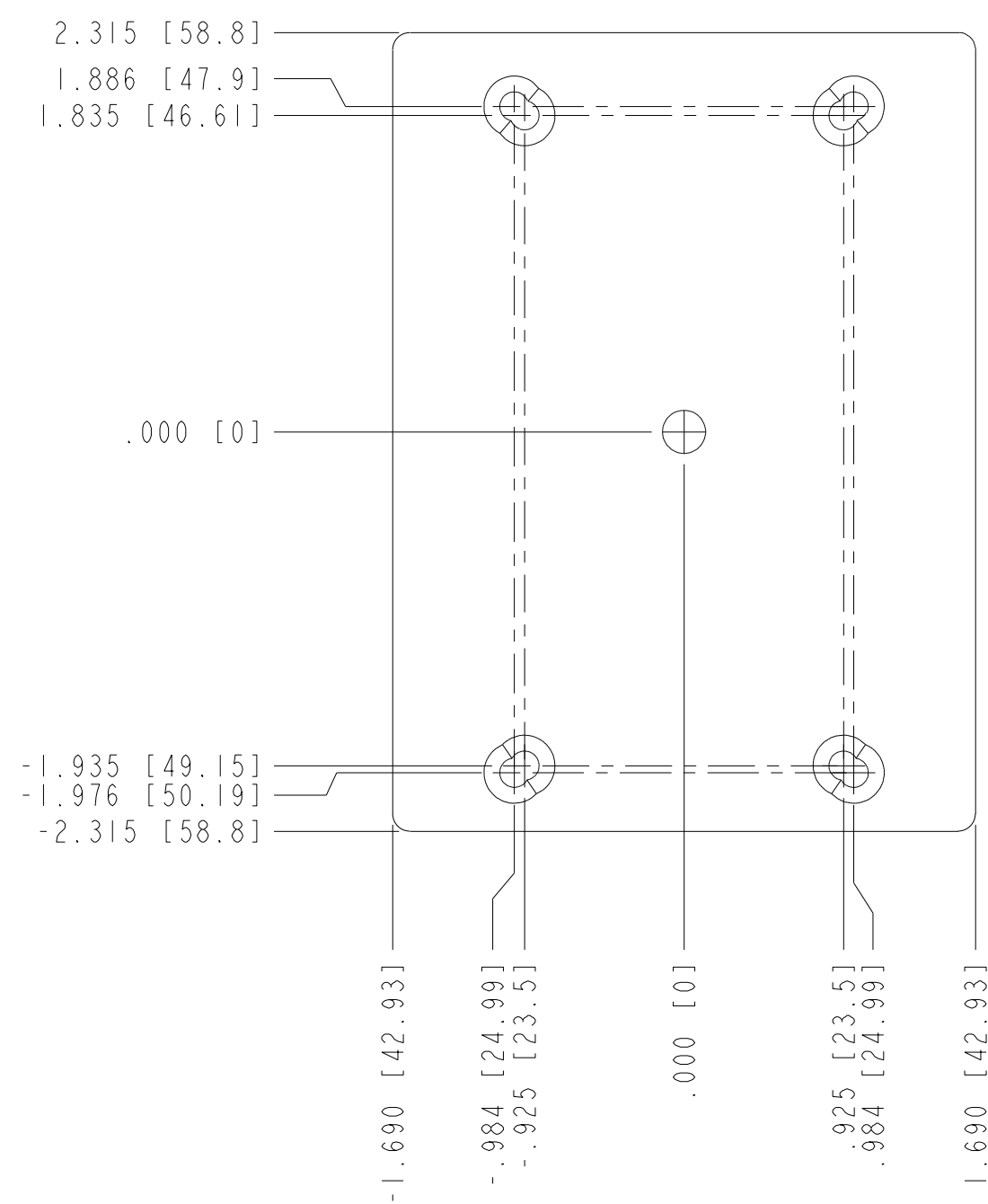
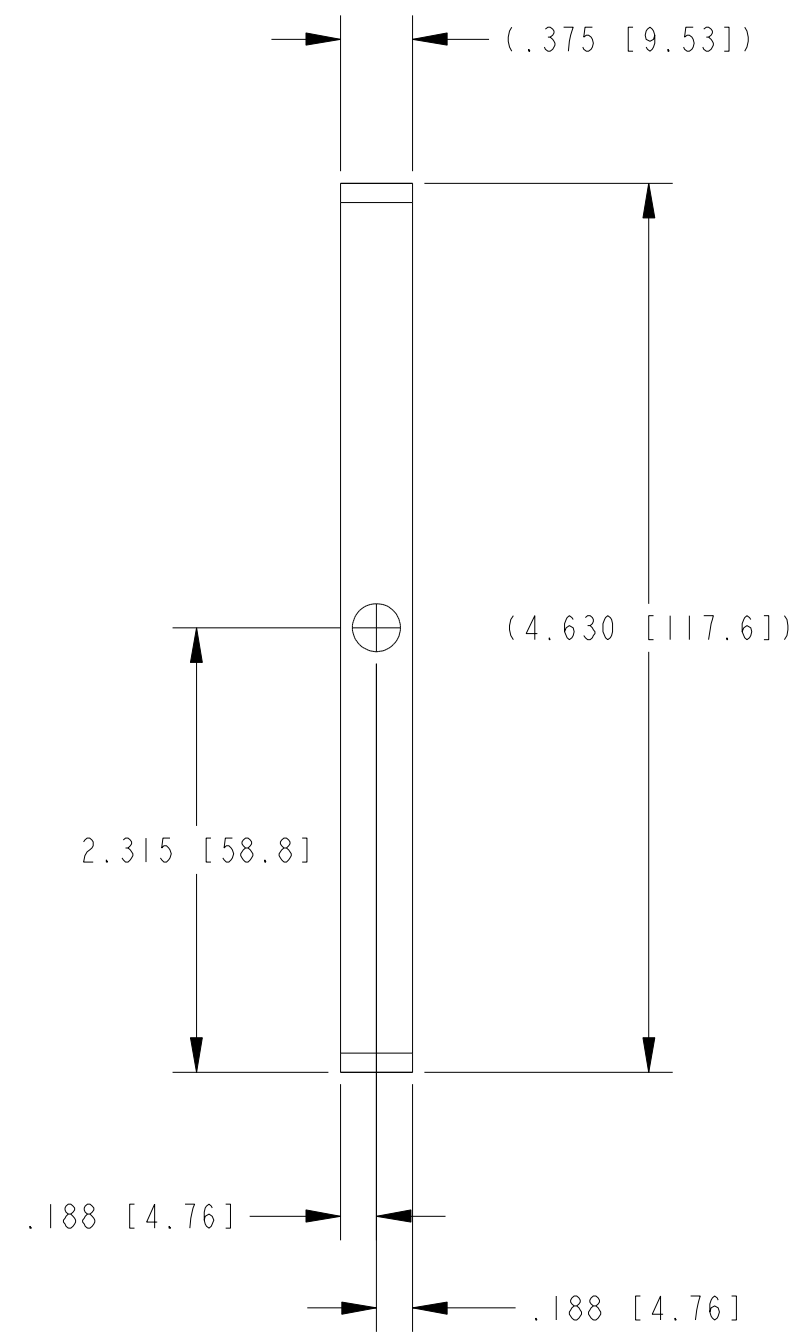
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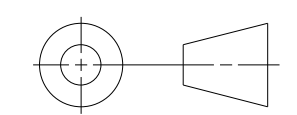


CUSTOMER DRAWING

UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN INCHES AND
 [MILLIMETERS].

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION



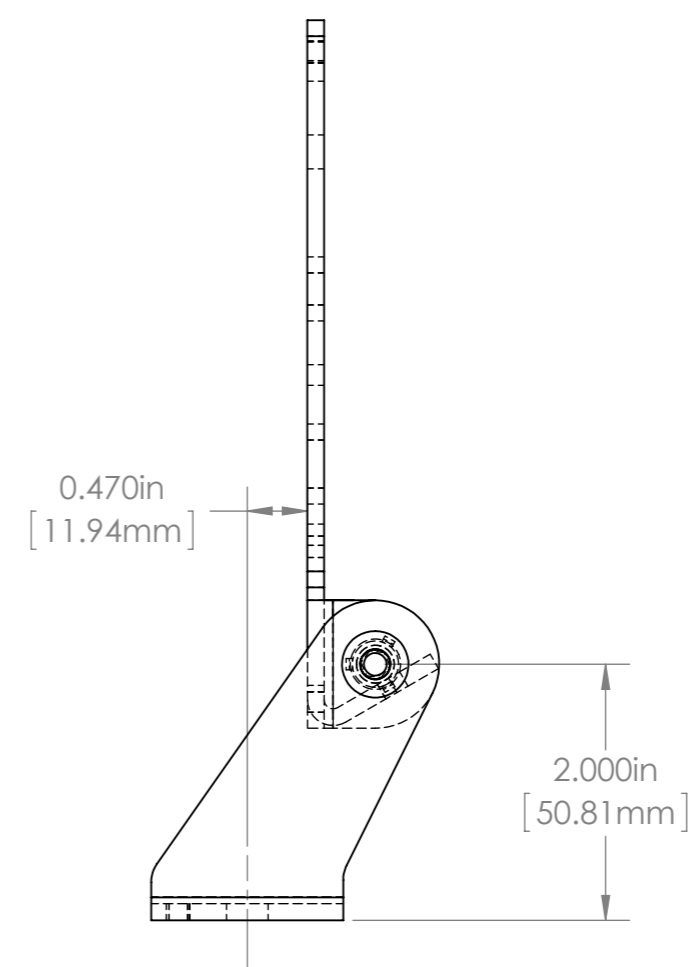
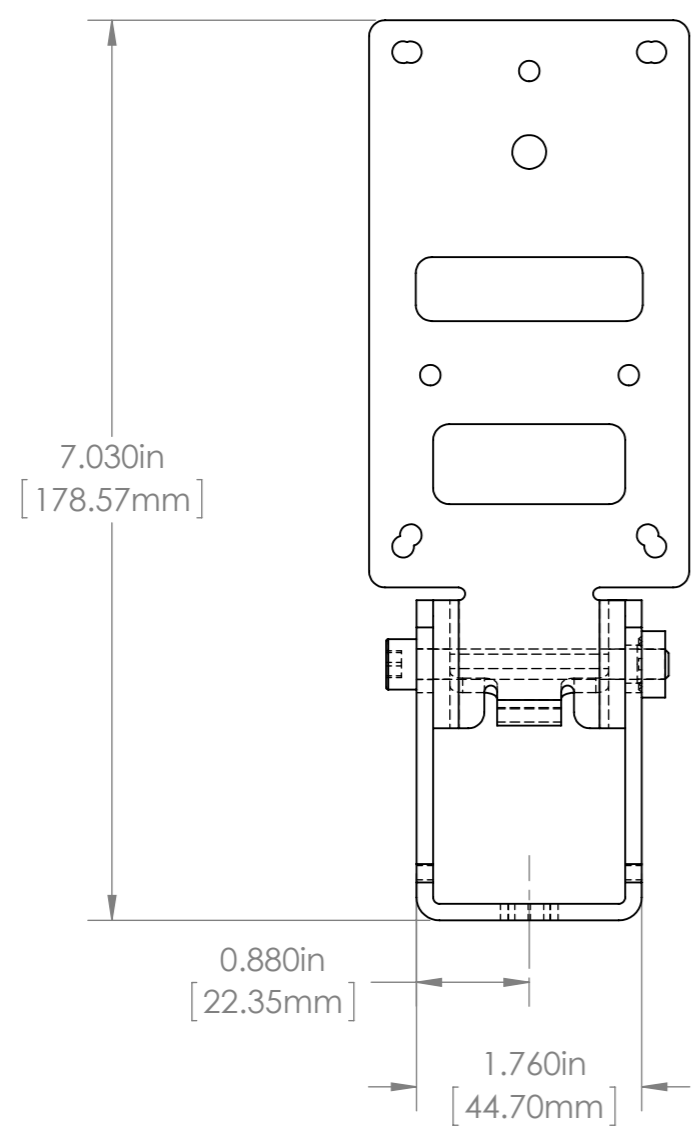
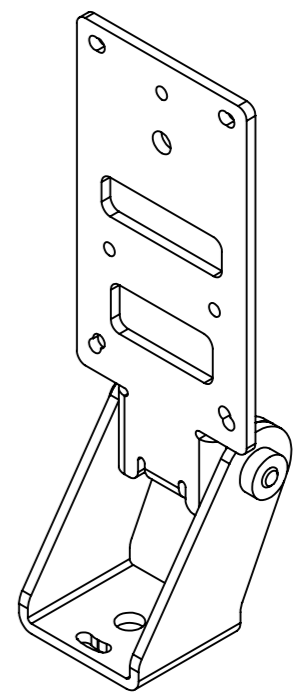
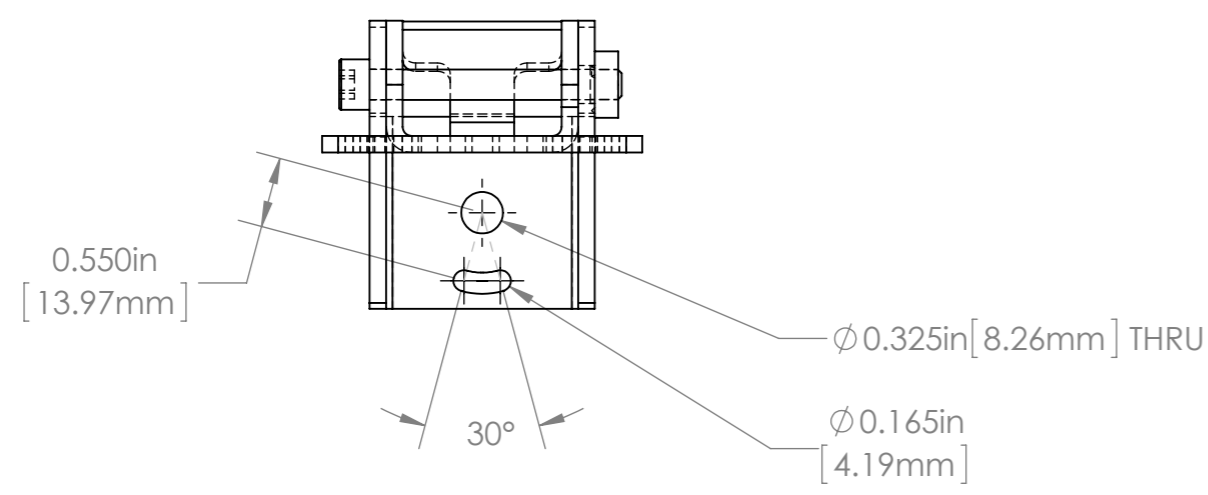
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4

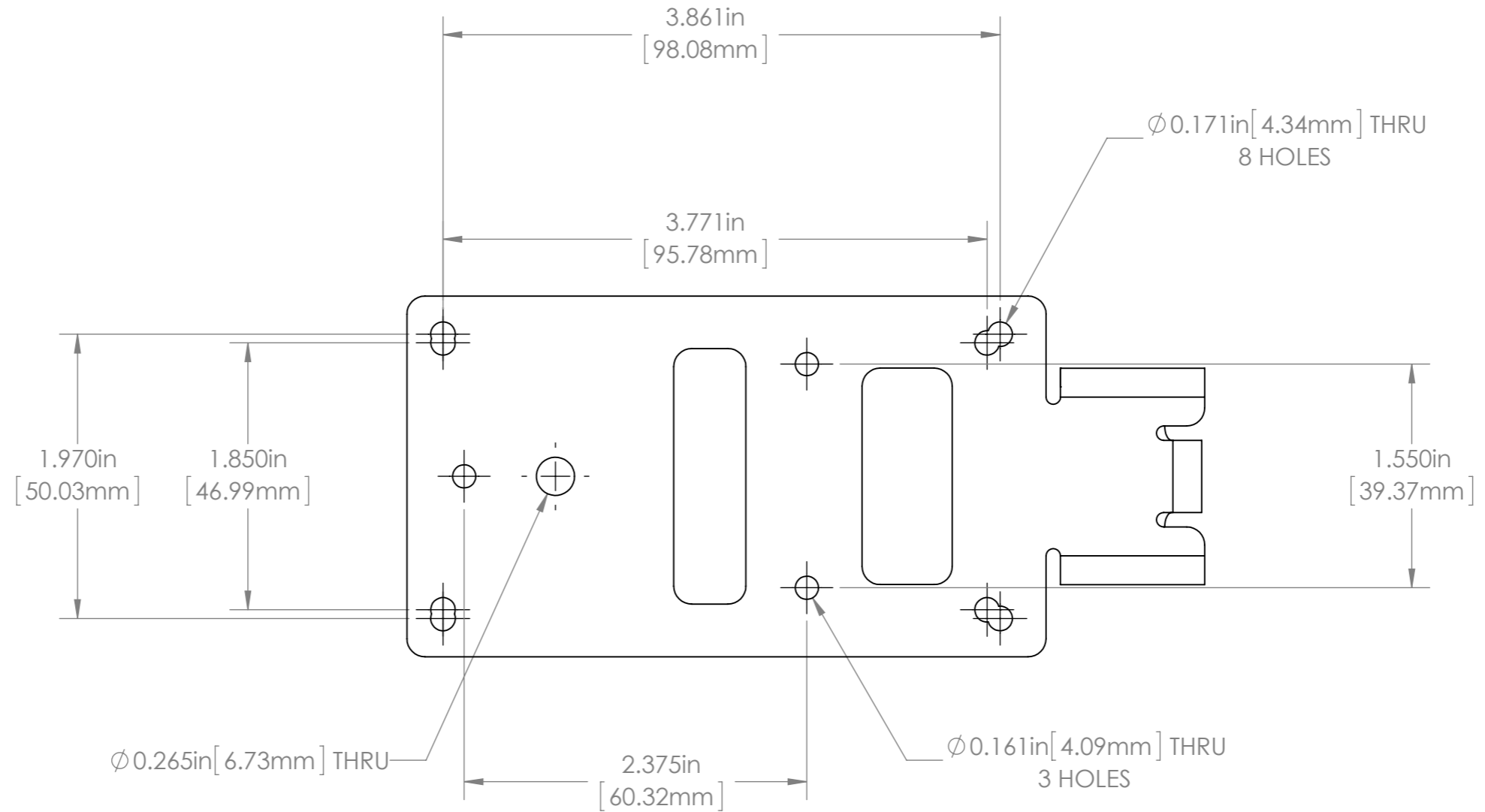
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				UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES SURFACE FINISH: TOLERANCES: .000= +/- 0.005" .00= +/- 0.010"		FINISH: BURNISHED		Allison Park Group, Inc. (APG) 4055 Alpha Drive Allison Park, PA 15101 USA		DO NOT SCALE DRAWING		REVISION	
				LINEAR:		DEBUR AND BREAK SHARP EDGES		Phone +1 (412) 487-8211 Fax +1 (412) 486-3157		TITLE: NI Smart Camera Pan and Tilt Mount			
				DRAWN		SIGNATURE		www.apgvision.com		DWG NO.		A3	
				SCHUBERT		5/2/2012		MATERIAL: 304 STAINLESS STEEL		748182-01			
				CHK'D				WEIGHT:		SCALE: 1:2		SHEET 1 OF 2	
				APP'VD				NOTES:					
				MFG									
				Q.A									
				NO.		CHANGE		DATE		INIT.			



				UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES SURFACE FINISH: TOLERANCES: .000= +/- 0.005" .00= +/- 0.010"		FINISH: BURNISHED		Allison Park Group, Inc. (APG) 4055 Alpha Drive Allison Park, PA 15101 USA		DO NOT SCALE DRAWING		REVISION			
				LINEAR:		DEBUR AND BREAK SHARP EDGES		Phone +1 (412) 487-8211 Fax +1 (412) 486-3157		TITLE: NI Smart Camera Pan and Tilt Mount					
				DRAWN SCHUBERT		SIGNATURE		DATE 5/2/2012		www.apgvision.com		DWG NO. 748182-01		A3	
				CHK'D						MATERIAL: 304 STAINLESS STEEL		SCALE: 1:2		SHEET 2 OF 2	
				APPVD						NOTES:					
				MFG											
				Q.A											
				NO.		CHANGE		DATE		INIT.					

Power and I/O

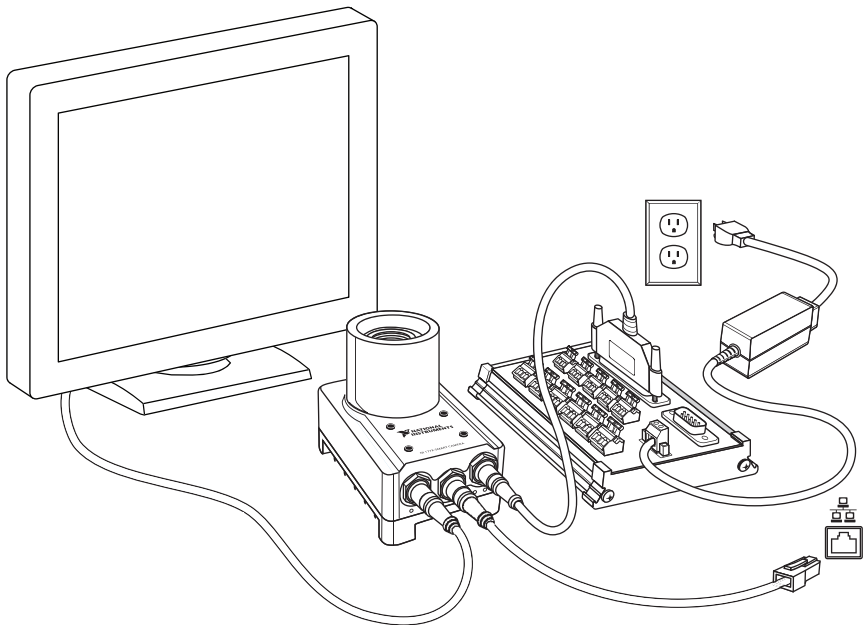
There are two options for connecting power and I/O to the NI 177x Smart Camera. The easiest method is to use the Starter Kit for NI 177x Smart Cameras, which includes the Power & I/O Accessory, the power supply, and the 3 cables you need: the M12 to DSUB, the M12 to RJ45, and the M12 to VGA/USB.

The second option is to use the M12 to Pigtail cable and the power supply for custom termination.

Using the Starter Kit

The following figure shows the complete setup using the Starter Kit.

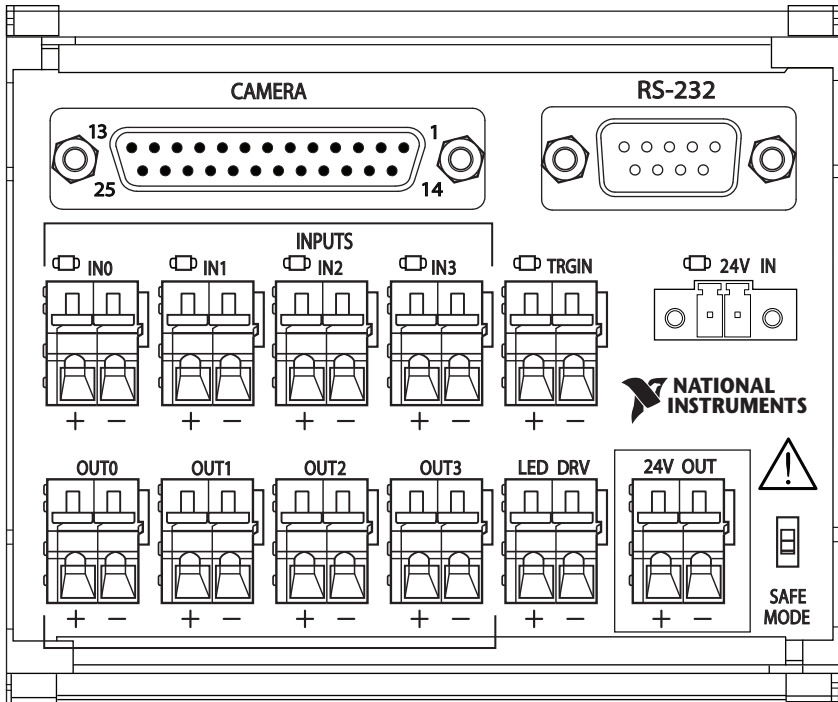
Figure 6-1. Connecting the NI 177x Smart Camera to the Power & I/O Accessory



Power & I/O Accessory for NI 177x Smart Cameras

The Power & I/O Accessory for NI 177x Smart cameras is a terminal block that simplifies power and I/O signal configuration. It uses a 25-pin D-SUB connector and a 17-pin M12 to 25-pin D-SUB cable. Provides spring termination for accessing digital I/O, trigger lines, direct drive LED output, 9-pin D-SUB for RS232, and 2-pin power connector. Refer to the [Power and I/O Accessory for NI 177x Smart Cameras User Guide](#) for operation instructions and specifications. The following figure shows the accessory.

Figure 6-2. Power & I/O Accessory for NI 177x Smart Cameras



Power Supply for NI 177x Smart Cameras

Use the 24 V power supply to connect to the Power & I/O Accessory.

Figure 6-3. Power Supply



Power Supply Specifications

Length..... 2 m

Input Requirements

Input Voltage Range..... 100 (-10%) VAC to 240 (+10%) VAC

Input Frequency Range..... 47 Hz to 63 Hz

Input Power Consumption at no load 0.3 W Max

Input In-rush Current 50 A Max

Input Current..... 0.8 A Max

Output Requirements

Output Voltage +24 V

Output Regulation..... 22.8 V to 25.2 V

Output Load Range..... 0 to 1.25 A

Output Ripple and Noise.....	240 mV Max at 20 Mhz bandwidth with 10 UF/50 V capacitance and 104/50 V ceramic capacitor.
Efficiency.....	≥83.62% at average of 25/50/75/100% loads 115 and 230 VAC input
Line Regulation.....	2% Max
Hold Up Time.....	10 ms Min at 110 VAC full load
Turn On Time.....	2 s Max at 110 VAC full load

M12 to 25-pin DSUB Cable

The I/O connector is a 17-pin male M12 connector that provides power to the smart camera and transmits digital I/O signals. This cable is included with the Power & I/O Accessory for NI 177x Smart Cameras.

Figure 6-4. M12 to DSUB Cable



Using Custom Termination

You can use the power supply from above in conjunction with the M12 to Pigtail cable, which enables you to connect the smart camera power and I/O lines to custom termination. The following figure shows the M12 to Pigtail cable.

Figure 6-5. M12 to Pigtail Cable



Cable Specifications

General Data

Rated current at 40°C.....	1.5 A
Rated voltage	30 V
Number of positions.....	17
Volume resistance.....	≤5 mΩ
Insulation resistance.....	≥10 MΩ
Stripping length of the free conductor end	35 mm
Ambient temperature (operation).....	-25 °C to 90 °C (female)

General Characteristics

Standards/regulations.....	M12 connector IEC 61076-2-101
Coding.....	A - standard
Surge voltage category.....	II
Pollution degree	3
Degree of protection	IP65/IP68/IP69K
Torque.....	0.4 Nm (M12 connector)
Contact material	CuZn
Contact surface material	Ni/Au
Contact carrier material	TPU GF
Material of grip body	TPU, hardly inflammable, self-extinguishing
Material, knurls.....	Zinc die-cast, nickel-plated
Sealing material	NBR
Status display	No

Conductor Data

Cable type	PVC black
Conductor cross section.....	0.14 mm ²
AWG signal line.....	26
Conductor structure signal line	18x 0.10 mm
Core diameter including insulation.....	1 mm ±0.05 mm
External cable diameter	6.40 mm
Wire colors color-coded.....	DIN 47100
External sheath, color	Black RAL 9005
Overall twist.....	Wires twisted in layers
Outer sheath, material	PVC
Material conductor insulation	PVC
Conductor material	Bare Cu litz wires

Smallest bending radius, movable installation.....	96 mm
Ambient temperature (operation)	-5 °C to 80 °C (cable, flexible installation) -25 °C to 80 °C (cable, fixed installation)