di-soric nVision-i Software

Overview

The nVision-i software from di-soric provides a free, easy-to-use camera programming environment that allows you to manage simple as well as more involved vision inspection tasks.

di-soric's nVision-i software gives you more power with less complexity.

This software's wide range of inspection and logic tools helps to make even challenging vision applications easier to handle. For example, you can identify an item's unique feature with one of the Locate tools, and your inspection tools will then track with your workpiece – even if it moves around in the camera's field of view.

Missing hardware, scratches, holes, and many other features unique to your part can be detected and inspected for, counted, and/or measured with this suite of tools to ensure quality for whatever part you are inspecting.

nVision-i Comms

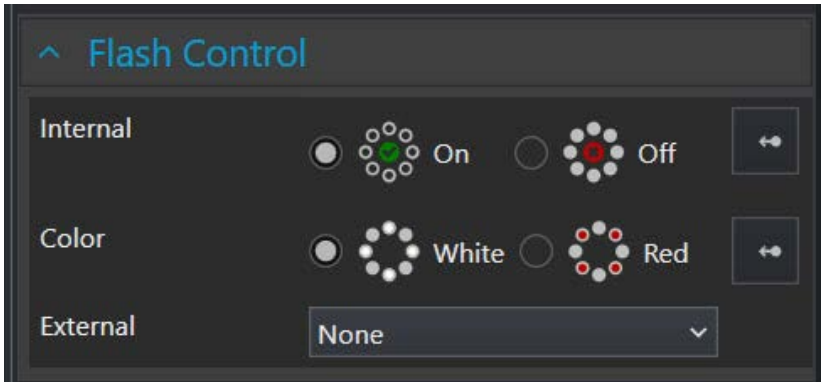
EtherNet/IP™

PROFINET

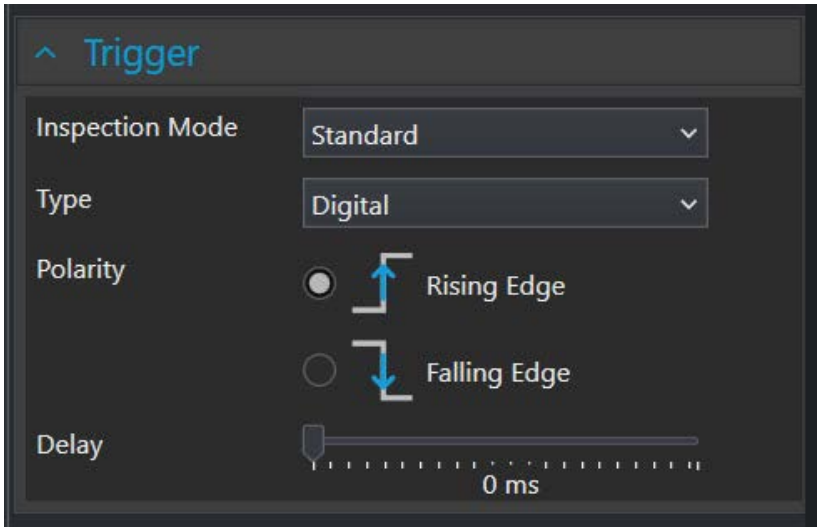
TCP/IP
Digital I/O
FTP/SFTP

Setting Up Internal Lights and Trigger Methods

The di-soric nVision-i software makes it easy to use the camera's internal red or white light or to set up your own external light.

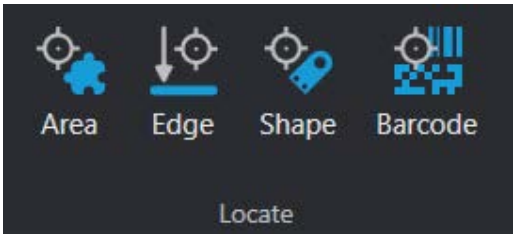


You could use a photoelectric, proximity, or other sensor to send a digital signal to trigger the camera, or you could use an Ethernet/IP, Profinet, or TCP/IP command.

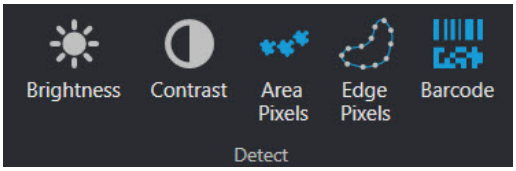


nVision-i Tools

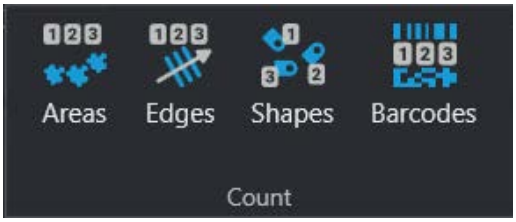
Locate



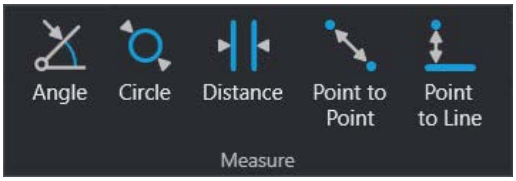
Detect



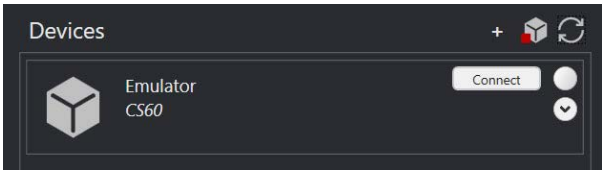
Count



Measure



Simulation Features: Using the Camera Emulator



The built-in emulator allows you to create and test a program on a set of images without being connected to a camera. An internet connection is required for the initial licensing of the emulator. Please refer to the Quickstart guide for specifics.

di-soric Machine Vision 2D Camera

CS60-BM28-EP15/300

The di-soric 2D machine vision camera, working in conjunction with di-soric's nVision-i software, is ideal for use in situations where the application requires increased flexibility or must handle more complex inspection tasks.

Integrated lights, interchangeable lenses, filters, and accessories give you the flexibility to create your own machine vision solution.

Features

- Image correction and calibration
- High-performance image processing tools
- Intuitive software interface
- Manually adjustable S-mount lens (8mm lens included)
- Integrated white or red LED illumination
- Configurable digital and network communications
- Onboard logic engine
- IP67 (with included lens cover installed)

Applications

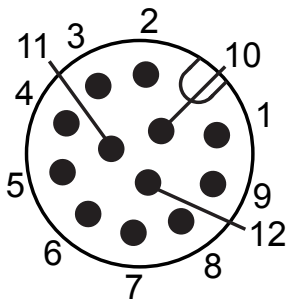
- Defect identification
- Hole detection
- Orientation confirmation
- Presence/absence
- Shape recognition
- Count and measure
- 1D and 2D code reading
- Quality assurance for a wide range of applications

di-soric Machine Vision 2D Camera Selection Guide

Part Number	Price	Lens Mount	Inspection Tools					Response Time	Resolution (pixels)	Sensor Size	Input	Output	Drawing
			Localization	Detection	Counting	Measurement	Read code						
CS60-BM28-EP15/300	$995.00	S-mount	✓	✓	✓			30fps	736x480	1/4 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM28-EP15/400	$1,316.00	S-mount	✓	✓	✓	✓		30fps	736x480	1/4 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM28-EP15/300ID	$1,316.00	S-mount	✓	✓	✓		✓	30fps	736x480	1/4 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM28-EP15/400ID	$1,564.00	S-mount	✓	✓	✓	✓	✓	30fps	736x480	1/4 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM38-EP15/300	$1,294.00	S-mount	✓	✓	✓			30fps	1440x1080	1/2.9 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM38-EP15/400	$1,592.00	S-mount	✓	✓	✓	✓		30fps	1440x1080	1/2.9 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM38-EP15/300ID	$1,592.00	S-mount	✓	✓	✓		✓	30fps	1440x1080	1/2.9 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF
CS60-BM38-EP15/400ID	$1,812.00	S-mount	✓	✓	✓	✓	✓	30fps	1440x1080	1/2.9 in	3 (NPN or PNP)	5 (NPN or PNP)	PDF

Electrical Connections – Supply

12-Pin A-Coded*

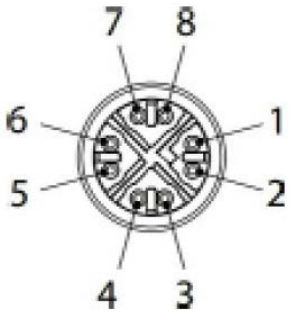


Pin	Color	Description
1	Brown	Input 0
2	Blue	Input 1
3	White	Output 2
4	Green	Output 3
5	Pink	Ready Output
6	Yellow	Common
7	Black	+24VDC
8	Gray	Ground
9	Red	Not Connected
10	Violet	Trigger In
11	Grey/Pink	Output 0
12	Red/Blue	Output 1

** This connection chart is for di-soric VKHM-Z cables*

Electrical Connections – Ethernet

8-Pin X-Coded



Pin	Description
1	LAN A+
2	LAN A-
3	LAN B+
4	LAN B-
5	LAN D+
6	LAN D-
7	LAN C-
8	LAN C+

di-soric Machine Vision 2D Camera

di-soric Machine Vision 2D Camera Technical Specifications									
Product Characteristics									
	Part Number								
	CS60-BM28-EP15/300	CS60-BM28-EP15/400	CS60-BM28-EP15/300ID	CS60-BM28-EP15/400ID	CS60-BM38-EP15/300	CS60-BM38-EP15/400	CS60-BM38-EP15/300ID	CS60-BM38-EP15/400ID
Image Resolution (pixels)	736x480 [0.3 megapixels]				1440x1080 [1.6 megapixels]			
Image Sensor	CMOS - Monochrome (EV76C541)				CMOS - Monochrome (IMX273)			
Sensor Size	1/4 in				1/2.9 in			
Internal Lighting	White (4500K) or red (623nm)							
Shutter Type	Global							
Maximum Frame Rate (FPS)	30							
Electrical Data								
Operating Voltage (V)	18-30 VDC							
Current Consumption (mA)	1000mA (24VDC)							
Reverse Polarity Protection	Yes							
Inputs								
Trigger	Digital, Continuous, EtherNet/IP, Profinet, TCP/IP							
Number of Digital Inputs	3							
Input Function	PNP/NPN (configurable)							
Outputs								
Number of Digital Outputs	5							
Output Function	PNP/NPN							
Max Current Load Per Output (mA)	100							
Monitoring Range								
Operating Distance	50 to 515 mm [1.9 to 20.3 in] with included lens Up to 2000mm [78.7 in] depending on lens used							
Focus Type	Manual, 8mm lens (interchangeable S-mount lens)							
Readable Codes	N/A		**1D:** Code 2 of 5, Codabar, Code 128, Code 39, Databar, UPC / EAN, Pharmacode **2D:** Aztec Code, Data Matrix, Dotcode, QR, PDF 417		N/A		**1D:** Code 2 of 5, Codabar, Code 128, Code 39, Databar, UPC / EAN, Pharmacode **2D:** Aztec Code, Data Matrix, Dotcode, QR, PDF 417	
Interfaces								
Interface Types	Network comms, digital input/output							
Transmission Standard	10 Base-T; 100 Base-TX; 1000 Base-T							
Transmission Rate	10 MBit/s; 100 MBit/s; 1000 MBit/s							
Protocol	TCP/IP, FTP/SFTP, Profinet, EtherNet/IP							
Factory Settings	IP address: 192.168.3.15 – Subnet mask: 255.255.255.0							
Operating Conditions								
Ambient Temperature	0°C to 50°C [32°F to 122°F]							
Storage Temperature	-10°C to 60°C [14°F to 140°F] at 35% to 85% relative humidity							
IP Rating	IP67 (With lens cover installed)							
Mechanical Data								
Weight (g [lb])	(265 [0.58])							
Material	Housing: Die-cast zinc (black, powder-coated) Window/optics: PMMA							
Included Accessories								
Included Accessories (with all models)	O-S1-S-080-40 (8 S-mount lens) and CS60-WINDOW (protective lens cover)							

di-soric Machine Vision Lenses

O-S1-S-080-40

di-soric's range of S-mount lenses provides options when setting up your camera, allowing you to customize the system for your specific application. Use a short focal length lens to inspect a smaller portion of your workpiece up-close under high resolution. Use a longer focal length lens to view a wider field.

Use the table below to get an idea of which lens is right for your application

A Note on Aperture:

A smaller f-stop number indicates a larger aperture opening, letting in more light but creating a shallower depth-of-field. A larger f-stop number indicates a smaller aperture opening, letting in less light but yielding a deeper depth-of-field.

Depth-of-field refers to the distance range over which the portion of the object being viewed is still in focus.

di-soric S-Mount Lens Selection Guide

Part Number	Price	Focal Length	Aperture	Lens Type	Lens Mount	Maximum Sensor Size	Drawing
O-S1-S-036-40	$42.50	3.6 mm	Fixed f/4.0	Wide angle	S-mount	1/2.5 in	PDF
O-S1-S-036-80	$42.50	3.6 mm	Fixed f/8.0	Wide angle	S-mount	1/2.5 in	PDF
O-S1-S-080-40 *	$28.00	8mm	Fixed f/4.0	Standard	S-mount	1/3 in	PDF
O-S1-S-080-80	$28.00	8mm	Fixed f/8.0	Standard	S-mount	1/3 in	PDF
O-S1-S-160-40	$28.00	16mm	Fixed f/4.0	Standard	S-mount	1/3 in	PDF
O-S1-S-160-80	$28.00	16mm	Fixed f/8.0	Standard	S-mount	1/3 in	PDF
O-S1-S-250-40	$33.00	25mm	Fixed f/4.0	Standard	S-mount	1/2 in	PDF
O-S1-S-250-80	$33.00	25mm	Fixed f/8.0	Standard	S-mount	1/2 in	PDF

** Included with camera and also available separately*

di-soric S-Mount Lens Monitoring Range (Field of View)

With O-S1-S-036-XX Lens		
	CS60-BM28 models	CS60-BM38 models
Operating Distance (mm [in])	Field of View (mm [in])	
70 [2.8]	35x22 [1.4x0.9]	92x69 [3.6x2.7]
140 [5.5]	110x67 [4.3x2.6]	202x152 [8.0x6.0]
200 [7.9]	165x102 [6.5x4.0]	271x203 [10.7x8.0]
300 [11.8]	262x165 [10.3x6.5]	410x307 [16.1x12.1]

With O-S1-S-080-XX Lens		
	CS60-BM28 models	CS60-BM38 models
Operating Distance (mm [in])	Field of View (mm [in])	
100 [3.9]	30x19 [1.2x0.8]	57x43 [2.2x1.7]
200 [7.9]	71x46 [2.8x1.8]	120x89 [4.7x3.5]
400 [15.7]	155x100 [6.1x3.9]	243x183 [9.6x7.2]
515 [20.3]	200x130 [7.9x5.1]	306x229 [12.0x9.0]

With O-S1-S-160-XX Lens		
	CS60-BM28 models	CS60-BM38 models
Operating Distance (mm [in])	Field of View (mm [in])	
100 [3.9]	17x11 [0.7x0.4]	26x20 [1.0x0.8]
200 [7.9]	38x25 [1.5x1.0]	43x27 [1.7x1.1]
400 [15.7]	79x52 [3.1x2.0]	119x89 [4.7x3.5]
515 [20.3]	103x67 [4.1x2.6]	150x113 [5.9x4.4]

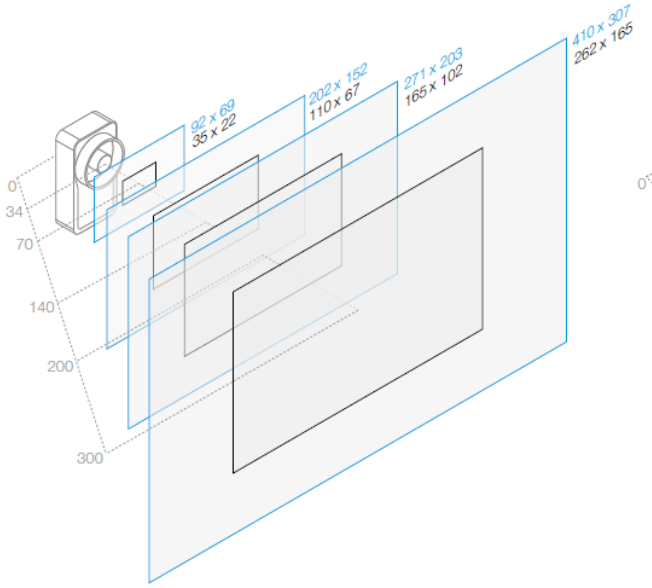
With O-S1-S-250-XX Lens		
	CS60-BM28 models	CS60-BM38 models
Operating Distance (mm [in])	Field of View (mm [in])	
150 [5.9]	12x8 [0.5x0.3]	25x19 [1.0x0.3]
300 [11.8]	28x21 [1.1x0.8]	55x41 [2.2x1.6]
400 [15.7]	39x26 [1.5x1.0]	74x55 [2.9x2.2]
500 [19.7]	52x38 [2.0x1.5]	94x71 [3.7x2.8]

di-soric Machine Vision Lenses

The following illustration shows the representation of fields of view with the available lenses at various working distances for the CS-60 with 736x480 pixels (0.3 MP) and 1440x1080 pixels (1.6 MP).

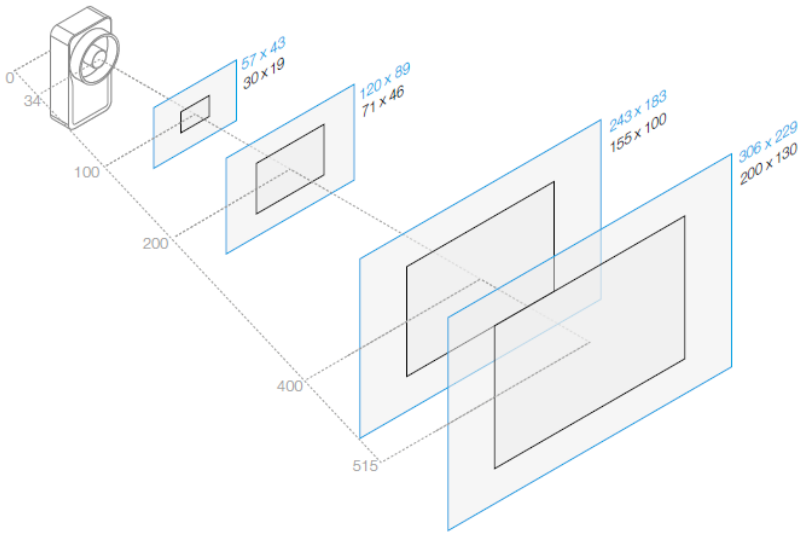
Operating distance: Back of camera body to work piece.

Field of view, 3.6mm lens[1]



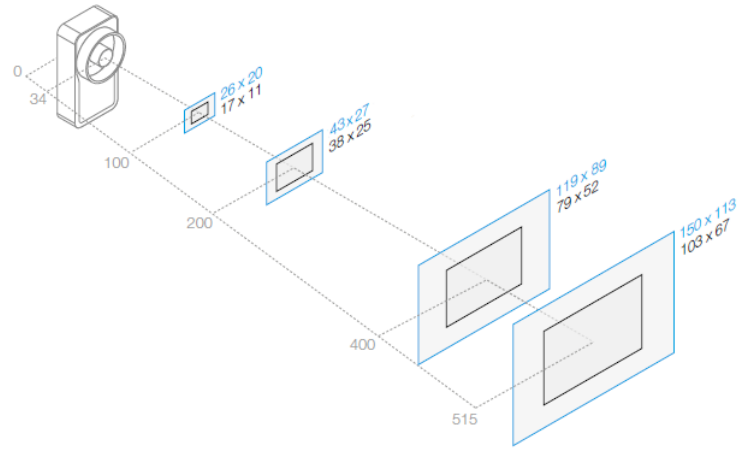
1.58 MP, 1440 x 1080 pixels
0.3 MP, 736 x 480 pixels
Operating distance
All specifications in mm

Field of view, 8mm lens



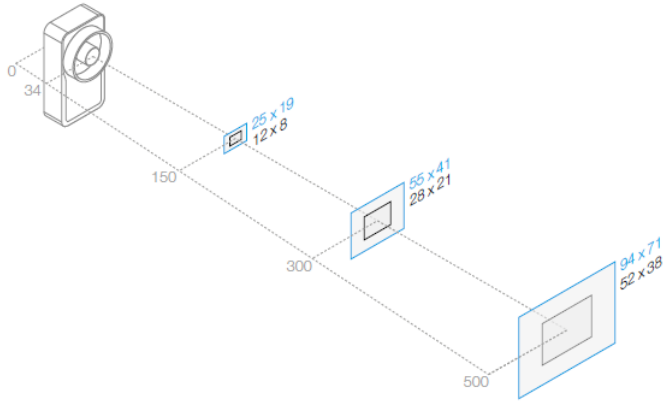
[1] At 3.6 mm, FOV limited at 1.58 MP if lens cover is used. No IP67 protection with complete FOV.

Field of view, 16mm lens



1.58 MP, 1440 x 1080 pixels
0.3 MP, 736 x 480 pixels
Operating distance
All specifications in mm

Field of view, 25mm lens



[2] Below 250 mm, the lens cover can no longer be used and thus no longer ensures IP67 protection.

di-soric Machine Vision Filter Accessories

CS60-BP-635-D11.8

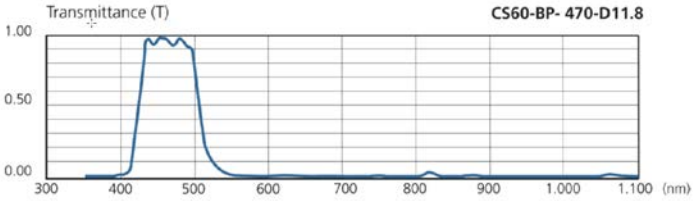
di-soric offers a variety of lens covers and filter accessories to allow you to further customize and optimize a machine vision solution to fit your specific application.

Bandpass Filters: These filters allow you to ensure repeatable lighting during inspection by blocking out unwanted light. They are designed to press-fit inside the lens protector.

di-soric Bandpass Filter Selection Guide						
Part Number	***Price***	***Description***	***Type***	***Angle of Incidence***	***Mounting***	***Drawing***
CS60-BP-470-D11.8	$313.00	Filter	Blue bandpass (470nm)	0 to 15 degrees	Press fit (inside lens protector)	PDF
CS60-BP-635-D11.8	$104.00	Filter	Red bandpass (635nm)	0 to 15 degrees	Press fit (inside lens protector)	PDF
CS60-BP-850-D11.8	$90.00	Filter	Infrared bandpass (850nm)	0 to 15 degrees	Press fit (inside lens protector)	PDF

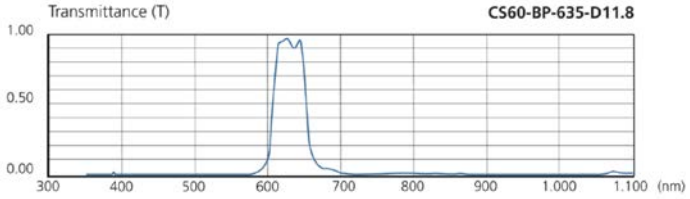
Filter Bandpass Graphs

Blue Bandpass



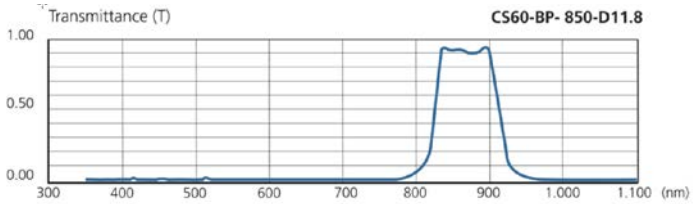
CS60-BP-470-D11.8

Red Bandpass



CS60-BP-635-D11.8

Infrared Bandpass



CS60-BP-850-D11.8

These filters ensure that only the wavelengths of light that you are targeting pass through to the camera. For example, if using a red (635nm) light, choose a filter with a passband centered at 635nm. The bandpass filter will block light at wavelengths outside the passband's range so that only light in the red range comes through the lens to the camera.

CS60-WINDOW-DIFFUS

CS60-WINDOW-POLAR

CS60-WINDOW

CS60-WINDOW-FOKUS

Polarizer: Use the polarizer lens protector/filter to reduce unwanted glare from shiny parts.

Diffuser: Use the diffuser lens protector/filter to spread even lighting across a larger portion your workpiece.

Focus Adjustment Aid: The focus adjustment aid allows you to change the focus of the camera without the risk of inadvertently touching and smudging the lens with your hands.

di-soric Lens Cover Selection Guide						
Part Number	***Price***	***Description***	***Type***	***Size (mm [in])***	***Mounting***	***Drawing***
CS60-WINDOW-DIFFUS	$113.00	Lens protector/filter	Diffuser	45x17 [1.77x0.67]	Press fit (friction fit with O-ring)	PDF
CS60-WINDOW-POLAR	$190.00	Lens protector/filter	Polarizer	45x17 [1.77x0.67]	Press fit (friction fit with O-ring)	PDF
CS60-WINDOW*	$71.00	Lens protector	–	45x17 [1.77x0.67]	Press fit (friction fit with O-ring)	PDF
CS60-WINDOW-FOKUS	$105.00	Focus adjustment aid	–	45x17 [1.77x0.67]	Temporary (no O-ring)	PDF

Included with camera and also available separately

di-soric Machine Vision Mounting Accessoriess

SH-G-CSR

HS-KL-12-20-V

HS-VS-CS60-MP-KK-M3

di-soric's line of machine vision mounting accessories makes it easy for you solidly position your camera in just the right spot for the application at hand. These accessories are compatible with 12mm mounting rods.

di-soric Mounting Accessory Selection Guide

Part Number	Price	Description	Orientation	Adjustment	Material	Mounting	Use With	Drawing
SH-G-CSR	$40.00	Mounting plate	–	–	Aluminum	–	di-soric CS60 cameras and HS-KL-12-20-V mounting bracket	PDF
HS-KL-12-20-V	$10.00	Mounting bracket	Right-angle	–	Stainless steel	12mm rod	SH-G-CSR mounting plate	PDF
HS-VS-CS60-MP-KK-M3	$130.00	Mounting bracket	Ball joint	45 degrees vertical 360 degrees horizonta	Aluminum	–	di-soric CS60 cameras	PDF

E21112

316L Stainless Steel Rod Selection Guide

Part Number	Price	Diameter (mm [in])	Length (mm [in])	Drawing
E21112	$14.50	12 [0.5]	200 [7.9]	PDF
E21113	$16.50	12 [0.5]	300 [11.8]	PDF

di-soric Machine Vision Cables

VKHM-Z-5/12-A

VKHM-Z-10/12-A

CS60-Y-1/12-A

The ***VKHM-Z-5/12-A*** (with a length of 5m [16.4 ft]) and ***VKHM-Z-10/12-A*** (with a length of 10m [32.8 ft]) are combination I/O and power cables designed for use with di-soric machine vision cameras.

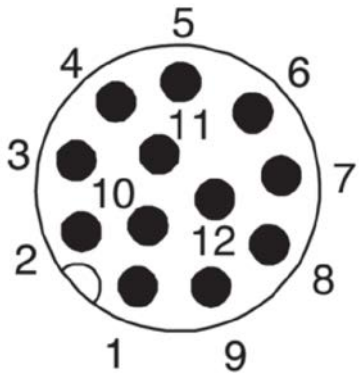
The ***CS60-Y-1/12-A*** is a specialized cable designed to allow the user to easily integrate an external light equipped with a 4-pin connector to sync the light with the camera trigger signal.

di-soric Cables Selection Guide

Part Number	Price	Connection 1	Connection 2	Connection 3	Shielding	Cable Length
VKHM-Z-5/12-A	$93.00	12-pin M12 quick-disconnect	Pigtail	N/A	Shielded	16.4 ft [5m]
VKHM-Z-10/12-A	$100.00	12-pin M12 quick-disconnect	Pigtail	N/A	Shielded	32.8 ft [10m]
CS60-Y-1/12-A	$154.00	12-pin M12 quick-disconnect	12-pin M12 quick-disconnect	4-pin M12 quick-disconnect	Shielded	3.7 ft [1.1 m]

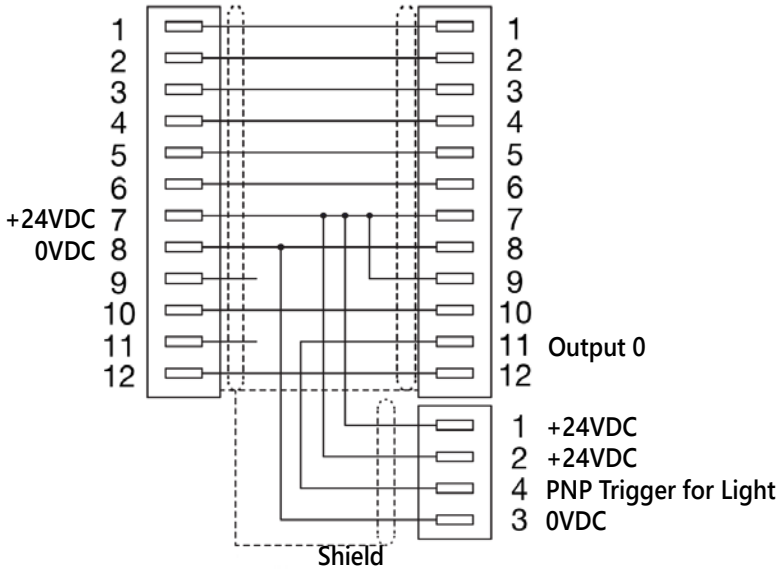
Cable Pinouts

12-Pin A-Coded*



Pin	Color
1	Brown
2	Blue
3	White
4	Green
5	Pink
6	Yellow
7	Black
8	Gray
9	Red
10	Violet
11	Grey/Pink
12	Red/Blue

VKHM-Z-5/12-A and ***VKHM-Z-10/12-A***



CS60-Y-1/12-A

MURR ELEKTRONIK
stay connected

Connection Cables X-Coded Data

Industrial Ethernet Shielded M12 X-Coded Cables

Features

- High flex industrial Ethernet shielded Cat6a cables
- Resistant to welding sparks
- Flame retardant, chemical resistant
- TPE (thermoplastic elastomer) jacket for typical industrial applications

7700-51101 Series

7700-51201 Series

Ethernet Shielded M12 X-coded Cables							
Part Number	*Price*	*Poles/ Pins*	*Connectors*	*Jacket*		*Length*	*Drawing Link*
				Material	*Color*	*m [ft]*	
7700-51101-S4X0100	$66.00	8	Male straight M12 to straight RJ45	TPE Thermoplastic Elastomer	Teal	1.0 [3.2]	PDF
7700-51101-S4X0300	$84.00					3.0 [9.8]	PDF
7700-51101-S4X0500	$103.00					5.0 [16.4]	PDF
7700-51201-S4X0100	$72.00		Male 90-degree M12 to straight RJ45			1.0 [3.2]	PDF
7700-51201-S4X0300	$91.00					3.0 [9.8]	PDF
7700-51201-S4X0500	$109.00					5.0 [16.4]	PDF

Specifications			
Nominal Voltage	60VDC UL rated: 30VDC	*Locking Material*	Zinc die casting, matte nickel plated
Max Current	0.5 A	*Protection Degree*	M12: IP66K/67 ; RJ45: IP20
Rated Surge Voltage	1.0 kV	*Outer Ø*	7.4 mm [0.29 in] ±5%
Transfer Parameters	Cat6a, Class EA (ISO/IEC 11801)	*Bend Radius*	10 x outer Ø*
Transfer Rate	Up to 10Gbps full duplex	*Temperature Range*	Cable: -40 to +80°C [-40 to +176°F] Connector: -25 to 85°C [13 to 185°F]
Connection	Connector 1: M12 X-coded Connector 2: RJ45	*Wire Material*	Copper wire, tin plated
		Approvals	cULus File E362618
Tightening Torque	0.6 N·m	To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.	

***For a linear flex application with a bend radius of 10x of the outside diameter of the cable, you can expect a life of 1 million cycles. For a linear flex application with a bend radius of 20x of the outside diameter of the cable, you can expect a life of 10 million cycles.**