COGNEX

In-Sight® 5000 Series Vision System

Installation Manual

IN-SIGHT
Vision Systems

Legal Notices

Cognex P/N 597-0027-06

Regulations/Conformity

Note:	For the most up-to-date regulations and conformity information, please refer to the In-Sight online support site: http://www.cognexsensors.com/In-Sight

Declaration of Conformity	
Manufacturer:	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this CE-marked Machine Vision System Product	
Product Number:	In-Sight 5100/5110: P/N 800-5870-1R In-Sight 5100C: P/N 800-5837-4R In-Sight 5400/5410: P/N 800-5855-1R In-Sight 5400S/5410S: P/N 800-5855-3R In-Sight 5400C: P/N 800-5837-4R In-Sight 5400CS: P/N 800-5837-6R In-Sight 5401/5411: P/N 800-5838-4R
Complies With:	89/336/EEC Electromagnetic Compatibility Directive
Compliance Standards	EN 55011:1998 + A1:1999 + A2:2002 Class A EN 61000-3-2:2000 + A2:2005 EN 61000-3-3:1995 + A1:2001 EN 61000-6-2:2001
European Representative:	COGNEX INTERNATIONAL Immeuble “Le Patio” 104 Avenue Albert 1er 92563 Rueil Malmaison Cedex - France
Safety and Regulatory	
c UL US LISTED	UL and CUL Certification marks are present on products.
FCC	FCC Part 15, Class A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
RoHS	RoHS 6 Compliant.

Declaration of Conformity	
Manufacturer:	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this CE-marked Machine Vision System Product	
Product Number:	In-Sight 5400R/5410R: P/N 800-5829-1R
Complies With:	89/336/EEC Electromagnetic Compatibility Directive
Compliance Standards	EN 61000-6-4:2001 Class A EN 61000-3-2:2000 + A2:2005 EN 61000-3-3:1995 + A1:2001 EN 61000-6-2:2001
European Representative:	COGNEX INTERNATIONAL Immeuble “Le Patio” 104 Avenue Albert 1er 92563 Rueil Malmaison Cedex - France
Safety and Regulatory	
c UL US LISTED	UL and CUL Certification marks are present on products.
FCC	FCC Part 15, Class A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
RoHS	RoHS 6 Compliant.

Declaration of Conformity	
Manufacturer:	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this CE-marked Machine Vision System Product	
Product Number:	In-Sight 5403/5413: P/N 800-5830-4R In-Sight 5403S: P/N 800-5830-6R
Complies With:	89/336/EEC Electromagnetic Compatibility Directive
Compliance Standards	EN 61000-6-3:2001 + A11:2004 Class B EN 61000-3-2:2000 + A2:2005 EN 61000-3-3:1995 + A1:2001 EN 61000-6-2:2001
European Representative:	COGNEX INTERNATIONAL Immeuble “Le Patio” 104 Avenue Albert 1er 92563 Rueil Malmaison Cedex - France
Safety and Regulatory	
c UL US LISTED	UL and CUL Certification marks are present on products.
FCC	FCC Part 15, Class B This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
RoHS	RoHS 6 Compliant.

Declaration of Conformity	
Manufacturer:	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this CE-marked Machine Vision System Product	
Product Number/Product Type:	In-Sight 5600: P/N 800-5871-1R In-Sight 5603: P/N 800-5873-1R In-Sight 5604: P/N 800-5874-1R
Complies With:	89/336/EEC Electromagnetic Compatibility Directive
Compliance Standards Class A[1]	EN 61000-6-4:2001 Class A EN 61000-3-2:2000 + A2:2005 EN 61000-3-3:1995 + A1:2001 +A2:2005 EN 61000-6-2:2005
Compliance Standards Class B[2]	EN 61000-6-3:2001 +A11:2004 Class B EN 55022:1988 +A1:2000 +A2:2003 Class B EN 61000-3-2:2000 + A2:2005 EN 61000-3-3:1995 + A1:2001 +A2:2005 EN 61000-6-2:2005
European Representative:	COGNEX INTERNATIONAL Immeuble “Le Patio” 104 Avenue Albert 1er 92563 Rueil Malmaison Cedex - France
Safety and Regulatory	
c UL US LISTED	UL and CUL Certification marks are present on products.
FCC Class A[1]	FCC Part 15, Class A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
FCC Class B[2]	FCC Part 15, Class B This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
RoHS	RoHS 6 Compliant.

1. Using Cognex Power Supply ACC-24I or equivalent Class A power supply.
2. Using Cognex Power Supply PS-Kit-1 or equivalent Class B power supply.

Precautions

Observe these precautions when installing In-Sight 5000 series vision systems to reduce the risk of injury or equipment damage:

- In-Sight 5000 series vision systems are intended to be supplied by a Listed, Direct Plug-In Power Unit with a minimum output rated 24VDC, 600mA and marked Class 2, Limited Power Source (LPS). Any other voltage creates a risk of fire or shock and can damage the In-Sight components.
- Do not install In-Sight 5000 series vision systems where they are directly exposed to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
- To reduce the risk of damage or malfunction due to over-voltage, line noise, electrostatic discharge (ESD), power surges, or other irregularities in the power supply, route all cables and wires away from high-voltage power sources.
- The housing of the vision system is internally connected to the system ground wire (pin 8 of the Breakout cable). Therefore, if the mounting surface of the vision system is at a non-zero ground potential, it is strongly recommended that the vision system be mounted on an isolated or non-conductive mount.
- Do not expose the CCD to laser light; CCDs can be damaged by direct, or reflected, laser light. If your application requires the use of laser light that may strike the CCD, a lens filter at the corresponding laser's wavelength is recommended. Contact your local integrator or application engineer for suggestions.
- Do not open the In-Sight 5000 series vision system or remote head camera. These devices do not contain user-serviceable parts.
- Do not make electrical or mechanical modifications to In-Sight components. Unauthorized modifications may violate your warranty.
- Changes or modifications not expressly approved by the party responsible for regulatory compliance could void the user’s authority to operate the equipment.
- Cable shielding can be degraded or cables can be damaged or wear out more quickly if a bend radius or service loop is tighter than 10X the cable diameter.
- Service loops should be included with all cable connections.

Table of Contents

Appendix A

Appendix B

1 Introduction

In This Section

1.1 In-Sight 5000 Series Vision Systems Overview

In-Sight® 5000 series vision systems are compact, network-ready machine vision systems for automated inspection, measurement, identification, alignment and robot guidance applications on the factory floor. For a list of all available vision systems, refer to Table 1-1 on page 2.

All models are configured remotely over a network using an intuitive interface. This interface also allows remote monitoring of the vision system's operation during runtime. These vision systems may also be controlled remotely from custom, user-defined applications using In-Sight Native Mode commands to change settings and retrieve results.

This manual describes how to install In-Sight 5000 series vision systems. When referring to the In-Sight 5000 series vision systems, the term “standard vision system” refers to all vision systems except for the stainless steel, remote head and 5600 series vision systems.

1.2 In-Sight Support

Many information resources are available to assist you in using the In-Sight 5000 series vision systems and their spreadsheet interface:

- *In-Sight®Explorer Help*, an online HTML Help file installed with the In-Sight Explorer software.
- In-Sight computer-based tutorials provided on CD-ROM with selected In-Sight starter accessories kits.
- The In-Sight online support: http://www.cognexsensors.com/In-Sight

1.3 In-Sight 5000 Series Standard Components

In-Sight 5000 series vision systems are shipped with the components listed in Table 1-1; component descriptions are given in Table 1-2.

Note:
- Cables are sold separately.

Table 1-1: In-Sight 5000 Series Vision System Standard Components

Vision System	50mm Lens Cover Kit (P/N 800-5842-x)	IP68 Lens Cover Kit (P/N 800-5892-x)	Thread Guard (P/N 370-0361)	Remote Head Camera (P/N 800-5808-x)
In-Sight 5100 **In-Sight 5110** P/N 800-5870-1R	X		X	
In-Sight 5400 **In-Sight 5410** P/N 800-5855-1R	X		X	
In-Sight 5400S **In-Sight 5410S** P/N 800-5855-3R		X	X	
In-Sight 5400R **In-Sight 5410R** P/N 800-5829-1R				X
In-Sight 5100C **In-Sight 5400C** P/N 800-5837-4R	X		X	
In-Sight 5400CS P/N 800-5837-6R		X	X	
In-Sight 5401 **In-Sight 5411** P/N 800-5838-4R	X		X	
In-Sight 5403 **In-Sight 5413** P/N 800-5830-4R	X		X	
In-Sight 5403S P/N 800-5830-6R		X	X	
In-Sight 5600 **In-Sight 5610** P/N 800-5871-1R	X		X	
In-Sight 5603 **In-Sight 5613** P/N 800-5873-1R	X		X	
In-Sight 5604 P/N 800-5874-1R				

Table 1-1: In-Sight 5000 Series Vision System Standard Components (Cont.)

Vision System	Remote Head Accessory Kit (P/N 800-5813-x)	DIN Rail Mounting Bracket (P/N 800-9007-x)	Lens Cleaning Kit (P/N 195-0519R)	Mounting Screw Kit (P/N 800-5843-x)
In-Sight 5100 **In-Sight 5110** P/N 800-5870-1R			X	X
In-Sight 5400 **In-Sight 5410** P/N 800-5855-1R			X	X
In-Sight 5400S **In-Sight 5410S** P/N 800-5855-3R			X	X
In-Sight 5400R **In-Sight 5410R** P/N 800-5829-1R	X	X	X	X
In-Sight 5100C **In-Sight 5400C** P/N 800-5837-4R			X	X
In-Sight 5400CS P/N 800-5837-6R			X	X
In-Sight 5401 **In-Sight 5411** P/N 800-5838-4R			X	X
In-Sight 5403 **In-Sight 5413** P/N 800-5830-4R			X	X
In-Sight 5403S P/N 800-5830-6R			X	X
In-Sight 5600 **In-Sight 5610** P/N 800-5871-1R			X	X
In-Sight 5603 **In-Sight 5613** P/N 800-5873-1R			X	X
In-Sight 5604 P/N 800-5874-1R			X	X

Table 1-2: In-Sight 5000 Series Standard Components Descriptions

Component	Description
Vision System	Provides image acquisition, vision processing, job storage, serial and Ethernet connectivity and discrete I/O.
Lens Cover Kit (includes lens cover and O-Ring)	Provides environmental protection for the lens.
Thread Guard	Protects the In-Sight vision system lens cover threads when lens cover is not used. Remove the Thread Guard prior to installing the Lens Cover.
Remote Head Camera	Acquires and sends images to the In-Sight 5400R vision system.
Remote Head Accessory Kit	Includes remote head camera mounting hardware and a 5mm extension ring (for use with C-mount lenses).
DIN Rail Mounting Bracket	Includes a bracket for mounting the In-Sight 5400R to a DIN rail.
Lens Cleaning Kit	Includes a lens cleaning cloth and instructions on cleaning the lens.
Mounting Screw Kit	Includes M4 screws for mounting the vision system (quantity 4).

1.4 I/O Module Compatibility

Table 1-3 specifies which I/O modules are compatible with your In-Sight 5000 series vision system, along with the number of discrete inputs/outputs available for each I/O module.

Table 1-3: I/O Module Compatibility

I/O Module	Vision System	Discrete Inputs	Discrete Outputs
CIO-1350 Breakout Module	All In-Sight 5000 series vision systems (except In-Sight 5604)	none	2 general
CIO-1400	All In-Sight 5000 series vision systems (except In-Sight 5604)	7 general	2 high-speed, 6 general
CIO-1450	All In-Sight 5000 series vision systems (except In-Sight 5604)	8 general	2 high-speed, 8 general
CIO-1460	All In-Sight 5000 series vision systems (except In-Sight 5604)	8 general	2 high-speed, 8 general
CIO-MICRO	In-Sight 5600 series vision systems	8 general	2 high-speed, 8 general
CIO-MICRO-CC[1]	In-Sight 5600 series vision systems	8 general	2 high-speed, 8 general

1. The CIO-MICRO-CC I/O module also adds CC-Link networking capability. For more information, refer to the *In-Sight® CIO-MICRO and CIO-MICRO-CC I/O Modules Installation Manual*.

1.5 In-Sight 5000 Series Configurations

In-Sight 5000 series vision systems are designed to operate as a host vision system on an In-Sight Network. For the purposes of the instructions in this manual, an In-Sight Network is an In-Sight vision system connected over Ethernet to at least one other In-Sight vision system or personal computer running In-Sight Explorer software.

These configurations may require additional components, such as an Ethernet switch. Many optional components may be purchased directly from Cognex. A complete catalog of In-Sight products and accessories is available on the Cognex web site at: http://www.cognex.com.

These vision systems may be used in several possible network configurations. For each configuration, the vision system is managed using “jobs” in the In-Sight Explorer software, which also provides a remote display for that vision system. The jobs that can be stored are limited to the amount of local storage available on the vision system. Jobs that exceed this limit, and all image files, can be stored on the local PC.

1.5.1 Standalone Network

A standalone In-Sight network configuration includes a connection between an In-Sight vision system and a PC. In this configuration, the In-Sight network is isolated from the factory network.

The most basic In-Sight network features a vision system connected directly to a PC running In-Sight Explorer software. In-Sight 5000 series vision systems have an Autosense capability, allowing the vision system to connect directly to a PC using either a straight-pinned Ethernet cable or a crossover cable.

Note:	If the Microsoft “Media Sense” feature (which automatically detects whether or not your network interface is linked to a network) is enabled, communication with an In-Sight vision system may not be established. It is recommended to use a hub or switch with a standard Ethernet cable to configure the In-Sight vision system or configure your PC to disable the Media Sense feature. See Microsoft Knowledge Base article 239924 for details on this process.

Figure 1-1 shows a vision system connected directly to a PC using a Ethernet cable. The operator uses the PC, keyboard and mouse to configure applications and monitor runtime operation.

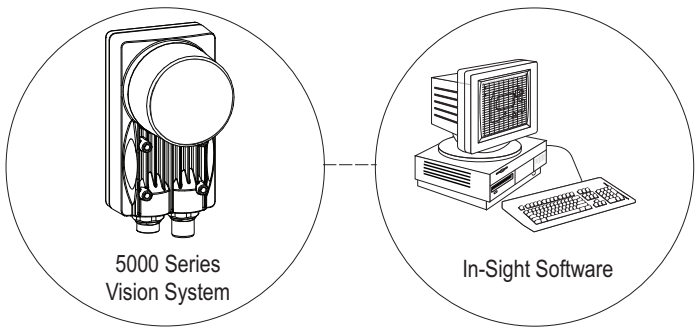


Figure 1-1: Standalone Vision System Configuration

1.5.2 Configurations Using Switches/Routers

An In-Sight network may be extended to include multiple In-Sight vision systems by using a network router or Ethernet switch. The only limit on the size of this type of network is the number of routers or switches connected and the number of connections they provide.

The standalone In-Sight network shown in Figure 1-2 includes two vision systems and a PC running In-Sight Explorer, connected by a switch/router. In this configuration, any In-Sight vision system on the network can be configured using In-Sight Explorer. In-Sight Explorer also provides additional job storage, and image and data archiving for all In-Sight vision systems on the network. The network switch/router may also connect to another network switch/router, which in turn could have a similar complement of network vision systems.

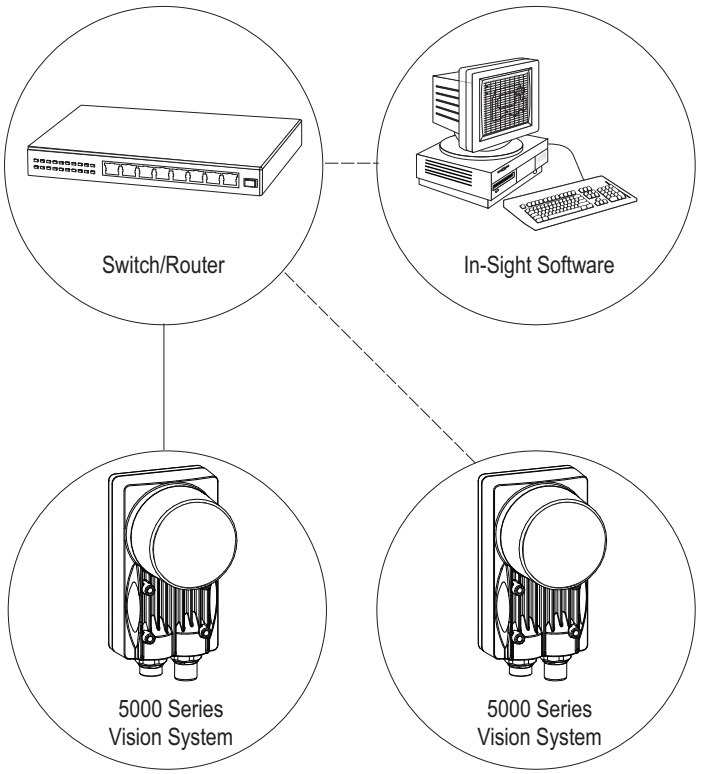


Figure 1-2: Standalone Configuration with Ethernet Switch/Router

1.5.3 Adding an In-Sight Network to the Factory Network

Multiple In-Sight Networks may be connected to the larger, factory network, combining to create an In-Sight network of virtually unlimited size. Connecting an In-Sight network to the factory network allows real-time production data to be accessed remotely from any PC workstation with network access. For networks that cover large physical areas, a PC running In-Sight Explorer located on each In-Sight network provides local job configuration and image display for all In-Sight vision systems.

As in the example in Figure 1-2, the In-Sight network shown in Figure 1-3 includes a vision system and a PC running In-Sight Explorer, connected to the same network switch/router. However, the switch/router for the In-Sight network is now connected to the factory network through another switch/router, which in turn may host connections to additional In-Sight networks.

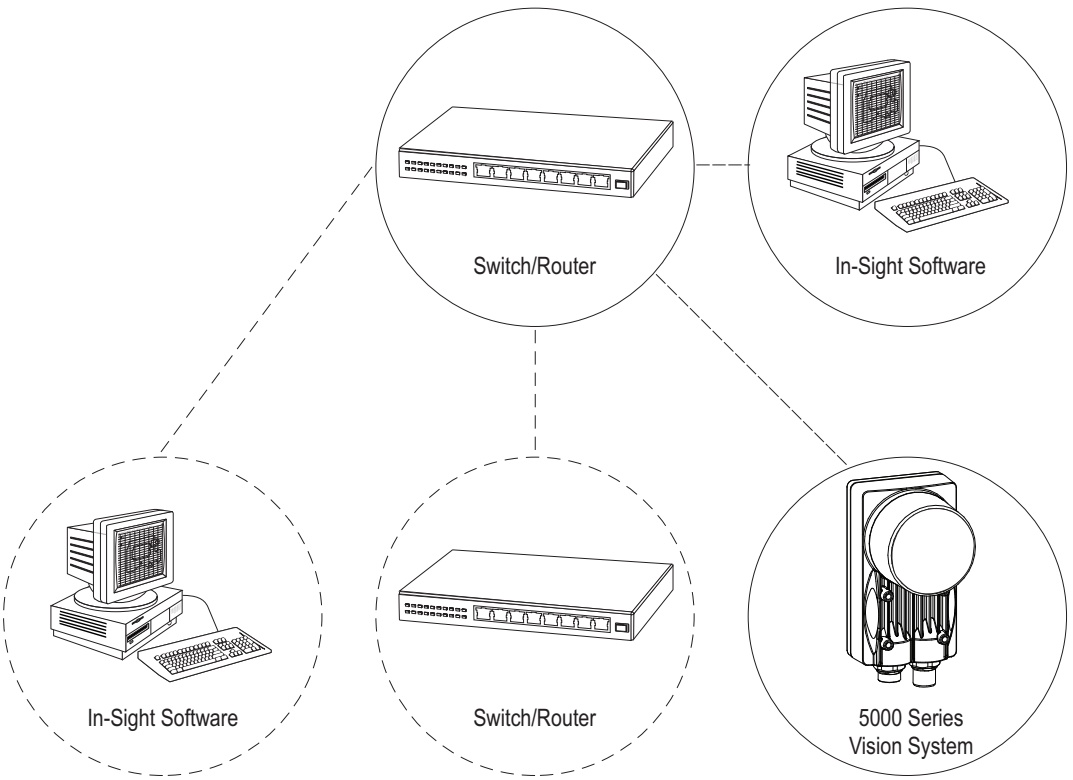


Figure 1-3: Factory Floor Network Installation

2 Installing the Vision System

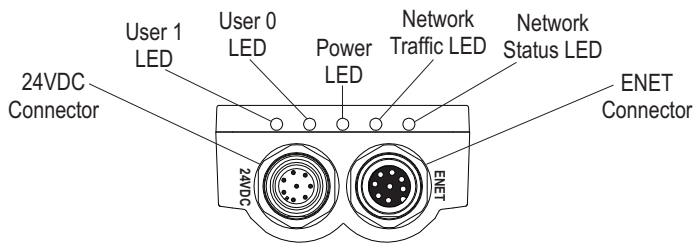
In This Section...

2.1 Connecting the In-Sight 5000 Series Vision System

This section describes the connection of the In-Sight 5000 series vision system to its standard and optional components. For a complete list of options and accessories, contact your local Cognex sales representative.

Note:	When the vision system is powered up, User 0 LED and User 1 LED both momentarily turn on. Then, User 0 LED turns off and User 1 LED stays on. Next, User 0 LED turns on and User 1 LED turns off. Finally, both LEDs momentarily light up and then turn off.

Table 2-1: In-Sight 5000 Series Vision System Connectors and Indicators



Connector/Indicator	Function
24VDC Connector	Connects the In-Sight Breakout cable, which provides connections to an external power supply, the acquisition trigger input, high-speed outputs and RS-232 serial communications. Alternately, this connector is used to attach the I/O Module cable to an optional In-Sight I/O module, which adds general-purpose discrete I/O and light control functionality. Refer to Table 3-11 on page 32 and Table 3-12 on page 33.
User 1 LED	Green when active. User configurable using Discrete Output Line 4 (Line 10 for all I/O modules, except the CIO-1400, which uses Line 9).
User 0 LED	Red when active. User configurable using Discrete Output Line 5 (Line 11 for all I/O modules, except the CIO-1400, which uses Line 10).
Power LED	Green when power is applied.
Network Traffic LED	Flashes Green while transmitting and receiving data.
Network Status LED	Green when a network connection is detected.
ENET Connector	Connects the vision system to a network. The ENET connector provides the Ethernet connection to external network devices. Refer to Table 3-12 on page 33.

2.2 Connecting the In-Sight 5000 Series Components

2.2.1 Install the Lens

Installing a lens allows you to see the vision system acquire live video images. The exact lens focal length needed depends on the working distance and the field of view required for your machine vision application.

In-Sight 5000 Series Vision System (except In-Sight 5604 and 5400R):

1. After removing the protective lens cap, attach a C-Mount lens to the vision system (Figure 2-1).

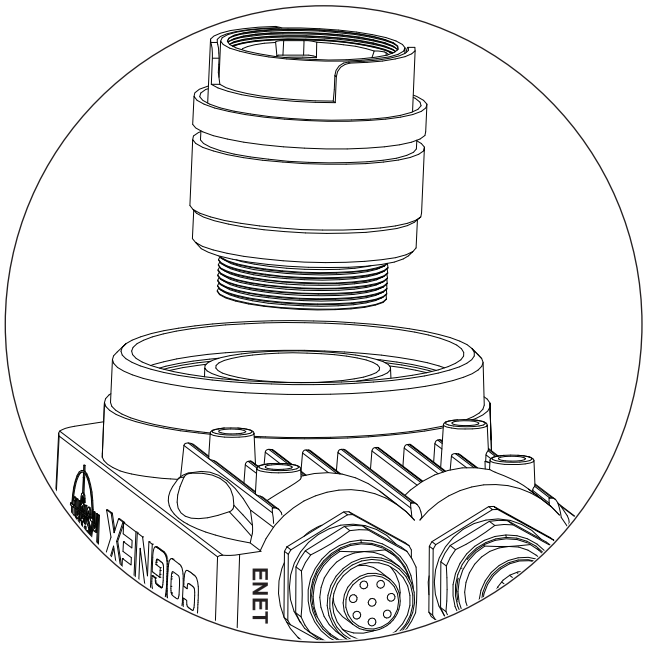


Figure 2-1: Install the Lens

In-Sight 5604 Line Scan Vision System:

1. After removing the protective lens cap and the protective film covering the CCD, attach a C-Mount lens to the vision system (Figure 2-2).

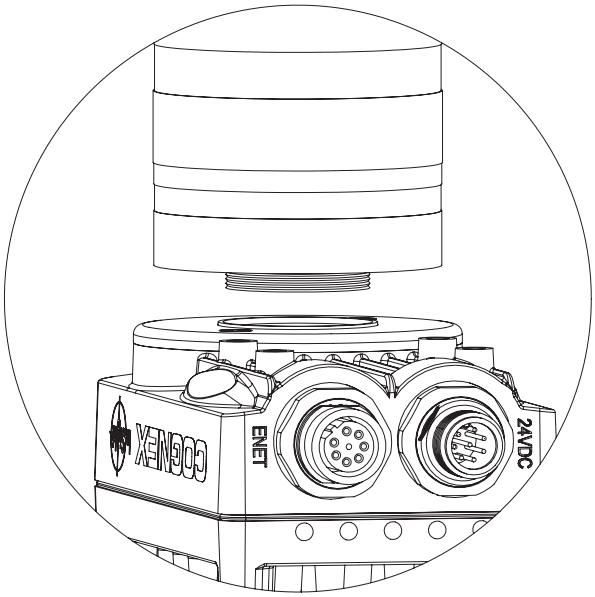


Figure 2-2: Install the Lens

In-Sight 5400R Remote Head Vision System:

1. Attach a CS-Mount or C-Mount (with 5mm extension ring) lens to the remote head camera (Figure 2-3).

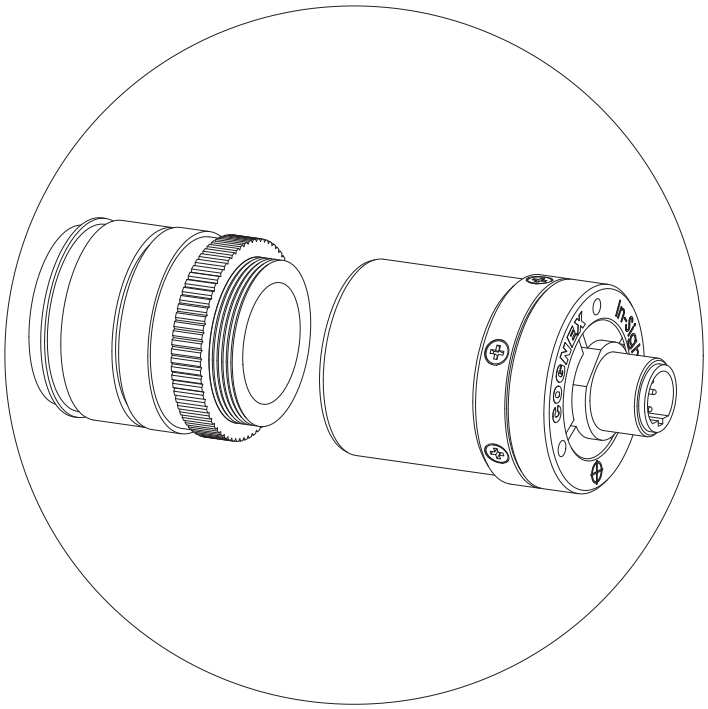


Figure 2-3: Install the Lens

2.2.2 Attach the Remote Head Camera cable

1. Attach the Camera cable's female M12 connector to the remote head camera's male M12 connector.
2. Attach the Camera cable's male M12 connector to the vision system's CAM0 connector (Figure 2-4).

Notes:

- Cables are sold separately.
- Refer to Appendix A for instructions on mounting the remote head camera.

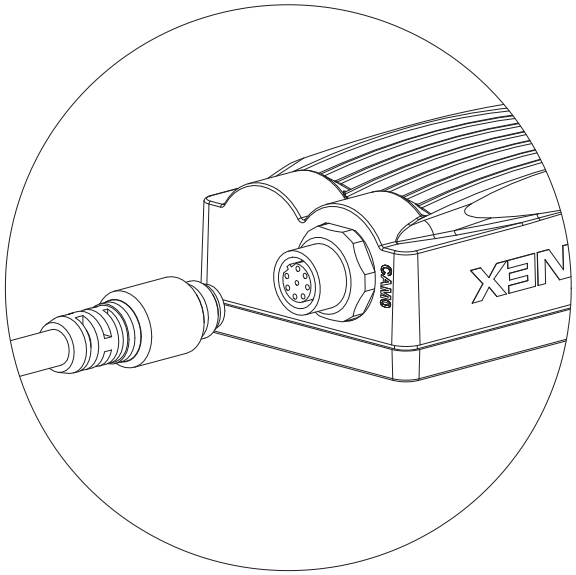


Figure 2-4: CAM0 Connection

Caution:

- Remove power from the vision system before connecting or disconnecting the remote head camera. "Hot plugging" the remote head camera can damage the In-Sight vision system and/or remote head camera.
- The cable connectors are "keyed" to fit the connectors on the vision system; do not force the connection or damage may occur.

2.2.3 Connecting the Network and Breakout Cables

Note:	Cables are sold separately.

The vision system has an ENET connector and 24VDC connector. The ENET connector provides the Ethernet connection for network communications. The 24VDC connector supplies connections for the 24VDC power source, I/O, acquisition trigger, and serial communications.

1. Attach the Ethernet cable's male M12 connector to the vision system's female M12 ENET connector (Figure 2-5).

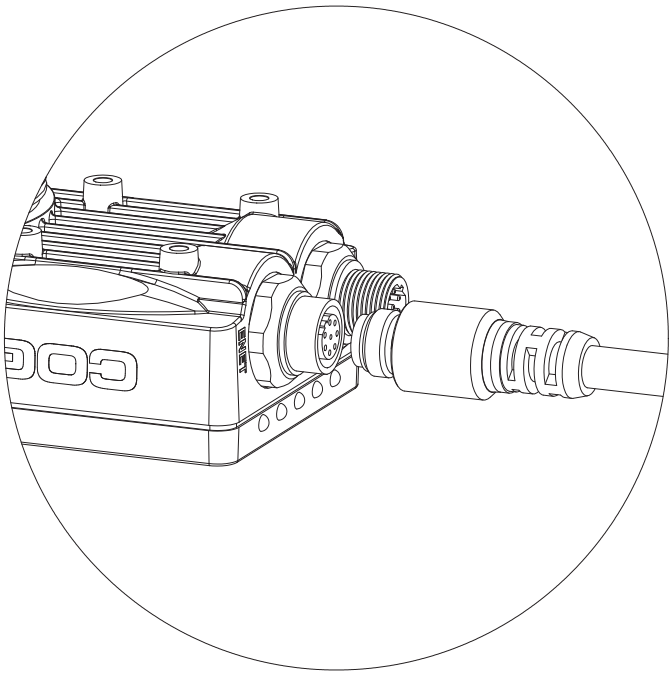


Figure 2-5: Connect the Ethernet cable

2. Connect the Ethernet cable's RJ-45 connector to the PC, switch, or router, as applicable.
3. Verify that the 24VDC power supply is not receiving power.

4. Connect the power supply to the Breakout cable (Figure 2-6). Attach the Breakout cable to the 24VDC connector on the vision system.

Notes:

- Unused bare wires can be clipped short or tied back using a tie made from non-conductive material. Keep all bare wires separated from the +24VDC wire.
- When using an In-Sight 5604 line scan vision system, the RS-232TX wire is used as Encoder A and the RS-232RX wire is used as Encoder B. For In-Sight 5604 line scan vision system encoder input specifications, see section 3.2.2.

Caution:

- Never connect voltages other than 24VDC. Always observe the polarity shown.
- The cable connectors are “keyed” to fit the connectors on the vision system; do not force the connection or damage may occur.

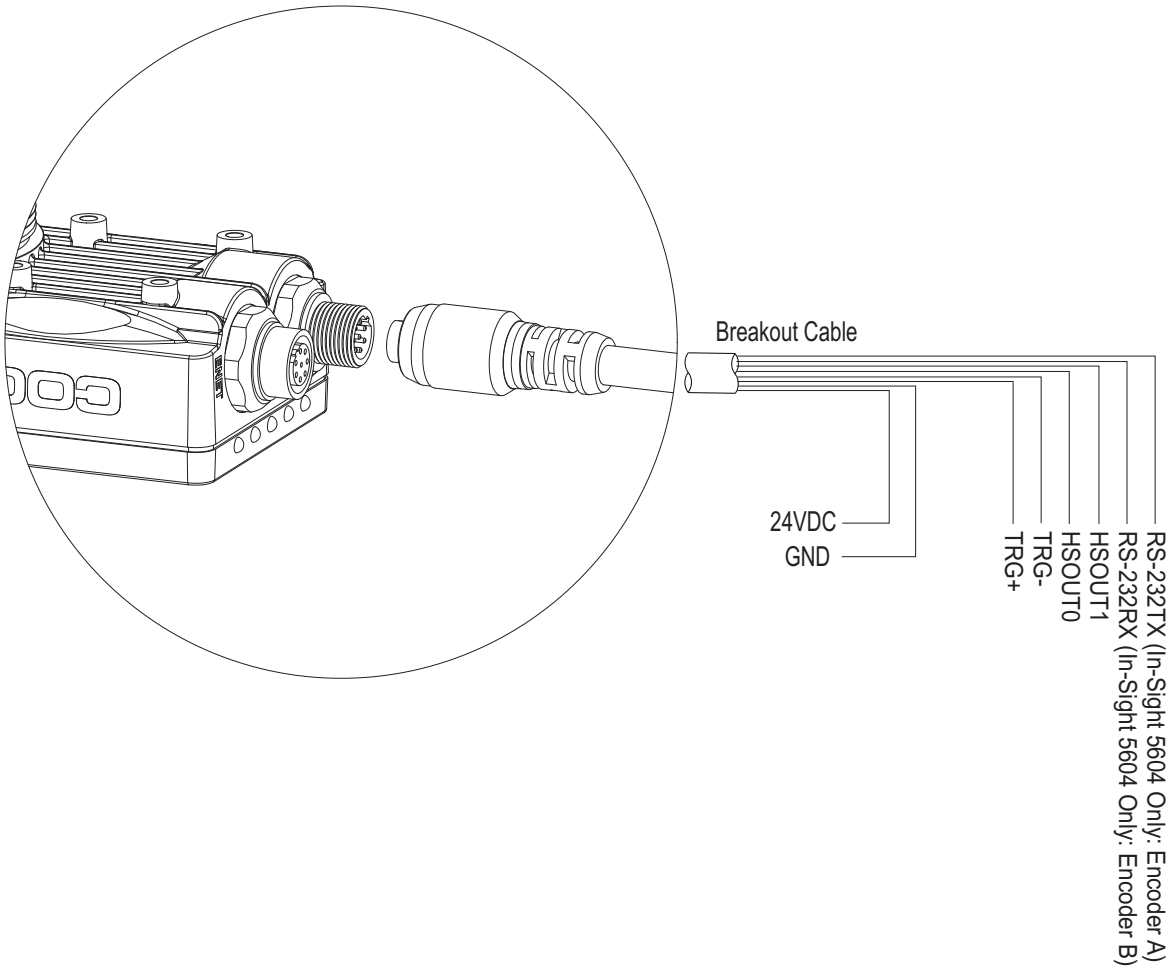


Figure 2-6: Power Connections

3 Specifications

In This Section…

3.1 General Specifications

The following sections list general specifications for the In-Sight 5000 series vision systems.

Note:	The In-Sight 5000 series includes vision systems that support ID tools only (ID Readers). ID Readers can be identified by the In-Sight 5000 series model number. An In-Sight 5000 series model number with a “1” in the third digit (e.g. 5110) is an ID Reader. An ID Reader has the same hardware as the corresponding general purpose vision system.

3.1.1 In-Sight Standard Vision System Specifications

Table 3-1: 5100, 5100C, 5401, 5400C, 5403 and 5400 Vision System Specifications

Specification		In-Sight 5100	In-Sight 5100C[1]	In-Sight 5401	In-Sight 5400C	In-Sight 5403	In-Sight 5400
Minimum Firmware Requirement		In-Sight version 2.80.01 PR1	In-Sight version 3.4.0	In-Sight version 2.80.01 PR1			
Memory	**Job/Program**	32MB non-volatile flash memory; unlimited storage via remote network device.					
	Image Processing	64MB					
Image	**Sensor**	1/3-inch CCD				1/1.8-inch CCD	1/3-inch CCD
	Sensor Properties	5.92mm diagonal, 7.4 x 7.4µm sq. pixels		5.952mm diagonal, 4.65 x 4.65µm sq. pixels	5.92mm diagonal, 7.4 x 7.4µm sq. pixels	8.8mm diagonal, 4.4 x 4.4µm sq. pixels	5.92mm diagonal, 7.4 x 7.4µm sq. pixels
	Resolution (pixels)	640 x 480		1024 x 768	640 x 480	1600 x 1200	640 x 480
	Electronic Shutter Speed	16µs to 1000ms		32µs to 1000ms	16µs to 1000ms	27µs to 1000ms	16µs to 1000ms
	Acquisition	Rapid reset, progressive scan, full-frame integration.					
		256 grey levels (8 bits/pixel)	24 bit color	256 grey levels (8 bits/pixel)	24 bit color	256 grey levels (8 bits/pixel)	
		Gain/Offset controlled by software.					
		60 full frames per second.[3]		17 full frames per second.[2]	60 full frames per second.[3]	14 full frames per second.[3]	60 full frames per second.[3]
	Lens Type	C-mount					
	CCD Alignment Variability[4]	±0.127mm (0.005in), (both x and y) from lens C-mount axis to center of imager.					
I/O	**Trigger**	1 opto-isolated, acquisition trigger input.					
		Remote software commands via Ethernet and RS-232C.					
	Discrete Inputs	None built-in. Additional inputs available using a compatible I/O module (see Table 1-3). Unlimited inputs when using an Ethernet I/O system.					
	Discrete Outputs	2 built-in, high-speed outputs. Additional outputs available using a compatible I/O module (see Table 1-3). Unlimited outputs when using an Ethernet I/O system.					
	Status LEDs	Power, Network Status, Network Traffic, 2 user configurable.					
Communications	**Network**	1 Ethernet port, 10/100 BaseT, TCP/IP protocol. Supports DHCP (factory default) or static IP address.					
	Serial	RS-232C when connected to an optional I/O module.					
Power		24VDC ±10%, 350mA maximum.				24VDC ±10%, 500mA maximum.	24VDC ±10%, 350mA maximum.

Table 3-1: 5100, 5100C, 5401, 5400C, 5403 and 5400 Vision System Specifications (Cont.)

Specification		In-Sight 5100	In-Sight 5100C[1]	In-Sight 5401	In-Sight 5400C	In-Sight 5403	In-Sight 5400
Mechanical	**Material**	Die-cast aluminum housing.					
	Finish	Painted.					
	Mounting	Eight M4 threaded mounting holes (four front and four back).					
	Dimensions	83.3mm (3.28in) x 123.2mm (4.85in) x 61.4mm (2.42in) with Lens Cover installed.					
		43.5mm (1.71in) x 123.2mm (4.85in) x 61.4mm (2.42in) without Lens Cover installed (includes Thread Guard).					
	Weight	350 g (12.3 oz.) Lens cover installed, without lens.					
Environmental	**Temperature**	Operating: 0°C to 45°C (32°F to 113°F) Storage: –30°C to 80°C (22°F to 176°F)					
	Humidity	95%, non-condensing (Operating and Storage)					
	Protection	IP67 (with appropriate Lens Cover properly installed).					
	Shock	80 G Shock with 150 gram lens attached per IEC 68-2-27.					
	Vibration	10 G from 10-500 Hz with 150 gram lens per IEC 68-2-6.					
Regulatory Compliance		CE, UL, CUL, FCC, RoHS					

1. In-Sight 5100C vision systems with P/N 800-5837-1 are compatible with firmware version 2.65.00 and higher. In-Sight 5100C vision systems with P/N 800-5837-4 are compatible with firmware version 3.4.0 and higher. To locate the Part Number, refer to the Part Number label on the back of your vision system.
2. Maximum frames per second are job dependent and based on an 8ms exposure and a full image frame capture.
3. Maximum frames per second are job dependent and based on the minimum exposure for a full image frame capture.
4. Expected variability in the physical position of the CCD, from vision system-to-vision system. This equates to ~ ±17 pixels on a 640 x 480 resolution CCD and ~ ±29 pixels on a 1600 x 1200 resolution CCD.

3.1.2 In-Sight Stainless Steel Vision System Specifications

Table 3-2: 5400CS, 5403S, 5400S Vision System Specifications

Specification		In-Sight 5400CS	In-Sight 5403S	In-Sight 5400S
Minimum Firmware Requirement		In-Sight version 2.80.01 PR1		
Memory	**Job/Program**	32MB non-volatile flash memory; unlimited storage via remote network device.		
	Image Processing	64MB		
Image	**Sensor**	1/3-inch CCD	1/1.8-inch CCD	1/3-inch CCD
	Sensor Properties	5.92mm diagonal, 7.4 x 7.4µm sq. pixels	8.80mm diagonal, 4.4 x 4.4µm sq. pixels	5.92mm diagonal, 7.4 x 7.4µm sq. pixels
	Resolution (pixels)	640 x 480	1600 x 1200	640 x 480
	Electronic Shutter Speed	16µs to 1000ms	27µs to 1000ms	16µs to 1000ms
	Acquisition	Rapid reset, progressive scan, full-frame integration.		
		24 bit color	256 grey levels (8 bits/pixel)	
		Gain/Offset controlled by software.		
		60 full frames per second.[1]	14 full frames per second.[1]	60 full frames per second.[1]
	Lens Type	C-mount		
	CCD Alignment Variability[2]	±0.127mm (0.005in), (both x and y) from lens C-mount axis to center of imager.		
I/O	**Trigger**	1 opto-isolated, acquisition trigger input.		
		Remote software commands via Ethernet and RS-232C.		
	Discrete Inputs	None built-in. Additional inputs available using a compatible I/O module (see Table 1-3). Unlimited inputs when using an Ethernet I/O system.		
	Discrete Outputs	2 built-in, high-speed outputs. Additional outputs available using a compatible I/O module (see Table 1-3). Unlimited outputs when using an Ethernet I/O system.		
	Status LEDs	Power, Network Status, Network Traffic, 2 user configurable.		

Table 3-2: 5400CS, 5403S, 5400S Vision System Specifications (Cont.)

Specification		In-Sight 5400CS	In-Sight 5403S	In-Sight 5400S
Communications	**Network**	1 Ethernet port, 10/100 BaseT, TCP/IP protocol. Supports DHCP (factory default) or static IP address.		
	Serial	RS-232C when connected to an optional I/O module.		
Power		24VDC ±10%, 350mA maximum.	24VDC ±10%, 500mA maximum.	24VDC ±10%, 350mA maximum.
Mechanical	**Material**	ASTM 316L Stainless Steel.		
	Finish	Electropolish Passivated.		
	Mounting	Four M4 threaded mounting holes on back of vision system.		
	Dimensions	90.6mm (3.57in) x 124.0mm (4.88in) x 61.4mm (2.42in) with Lens Cover installed.		
		43.5mm (1.71in) x 124.0mm (4.88in) x 61.4mm (2.42in) without Lens Cover installed.		
	Weight	907 g (32.0 oz.) Lens cover installed, without lens.		
Environmental	**Temperature**	Operating: 0°C to 45°C (32°F to 113°F) Storage: –30°C to 80°C (22°F to 176°F)		
	Humidity	95%, non-condensing (Operating and Storage)		
	Protection	IP68 (with appropriate Lens Cover properly installed).		
	Shock	80 G Shock with 150 gram lens attached per IEC 68-2-27.		
	Vibration	10 G from 10-500 Hz with 150 gram lens per IEC 68-2-6.		
Regulatory Compliance		CE, UL, CUL, FCC, RoHS		

1. Maximum frames per second are job dependent and based on the minimum exposure for a full image frame capture.
2. Expected variability in the physical position of the CCD, from vision system-to-vision system. This equates to ~ ±17 pixels on a 640 x 480 resolution CCD and ~ ±29 pixels on a 1600 x 1200 resolution CCD.

3.1.3 In-Sight Remote Head Vision System Specifications

Table 3-3: 5400R Vision System Specifications

Specification		In-Sight 5400R
Minimum Firmware Requirement		In-Sight version 3.2.0
Memory	**Job/Program**	32MB non-volatile flash memory; unlimited storage via remote network device.
	Image Processing	64MB
I/O	**Trigger**	1 opto-isolated, acquisition trigger input.
		Remote software commands via Ethernet and RS-232C.
	Discrete Inputs	None built-in. Additional inputs available using a compatible I/O module (see Table 1-3). Unlimited inputs when using an Ethernet I/O system.
	Discrete Outputs	2 built-in, high-speed outputs. Additional outputs available using a compatible I/O module (see Table 1-3). Unlimited outputs when using an Ethernet I/O system.
	Status LEDs	Power, Network Status, Network Traffic, 2 user configurable.
Communications	**Network**	1 Ethernet port, 10/100 BaseT, TCP/IP protocol. Supports DHCP (factory default) or static IP address.
	Serial	RS-232C when connected to an optional I/O module.
Power		24VDC ±10%, 250mA maximum.
Mechanical	**Material**	Die-cast aluminum housing.
	Finish	Painted.
	Mounting	Four M4 threaded mounting holes on back of vision system.
	Dimensions	34.0mm (1.34in) x 136.0mm (5.35in) x 61.4mm (2.42in)
	Weight	295g (10.4 oz.)
Environmental	**Temperature**	Operating: 0°C to 55°C (32°F to 131°F) Storage: –30°C to 80°C (22°F to 176°F)
	Humidity	95%, non-condensing (Operating and Storage)
	Protection	IP67
	Shock	80 G shock per IEC 68-2-27.
	Vibration	10 G from 10-500 Hz per IEC 68-2-6.
Regulatory Compliance		CE, UL, CUL, FCC, RoHS

1. Maximum frames per second is job dependent and based on an 8ms exposure and a full image frame capture.
2. Expected variability in the physical position of the CCD, from vision system-to-vision system. This equates to ~ ±17 pixels on a 640 x 480 resolution CCD.

Table 3-4: Remote Head Camera Specifications

Specification		Remote Head Camera
Image	**Sensor**	1/3-inch CCD
	Sensor Properties	5.92mm diagonal, 7.4 x 7.4µm sq. pixels.
	Resolution (pixels)	640 x 480
	Electronic Shutter Speed	25µs to 1000ms (except value selected must be in increments of 50µs i.e., 25µs, 75µs, 125µs, etc.).
	Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration.
		256 grey levels (8 bits/pixel).
		Gain controlled by software.
		31 full frames per second.[1]
	Lens Type	CS-mount and C-mount (with 5mm extension, included).
	CCD Alignment Variability[2]	±0.254mm (0.01in), (both x and y) from lens C-mount axis to center of imager.
Mechanical	**Material/Finish**	Anodized, aluminum housing.
	Mounting	Three M3 threaded holes.
	Dimensions	32.0mm (1.26in) diameter, 50.6mm (1.99in) length
	Weight	68 g (2.4 oz.) without lens
Environmental	**Temperature**	Operating: 0°C to 45°C (32°F to 113°F) Storage: –30°C to 80°C (22°F to 176°F)
	Humidity	95% non-condensing (Operating and Storage).
	Protection	For environments where protection is required, use the optional protective Remote Head Camera Enclosure, Cognex P/N 800-5783-1.
	Shock	80 G Shock with 150 g or lighter lens per IEC 68-2-27. Remote head properly mounted using Cognex mounting bracket with vibration dampener tube.
	Vibration	10 G from 10-500Hz Vibration per IEC 68-2-6 with 150 g or lighter lens attached. Remote head properly mounted using Cognex mounting bracket with vibration damper tube.
Regulatory Compliance		CE, UL, CUL, FCC, RoHS

Table 3-5: Remote Head Camera Enclosure Specifications

Specification		Remote Head Camera Enclosure
Mechanical	**Material/Finish**	Anodized aluminum housing with glass window. Stainless steel housing with polycarbonate window (optional).
	Mounting	Three M3 threaded holes.
	Dimensions	Without remote head camera: 66.6mm (2.62in) high x 46.0mm (1.81in) diameter. Nominal height with remote head camera: 79.2mm (3.12 in) to 93.6mm (3.69 in).
	Weight	136.1 g (4.8 oz.), without remote head camera.
	Protection	IP67

3.1.4 In-Sight 5603 and 5600 Vision System Specifications

Table 3-6: 5603 and 5600 Vision System Specifications

Specification		In-Sight 5603	In-Sight 5600
Minimum Firmware Requirement		In-Sight version 3.4.0	
Memory	**Job/Program**	64MB non-volatile flash memory; unlimited storage via remote network device.	
	Image Processing	128MB	
Image	**Sensor**	1/1.8-inch CCD	1/3-inch CCD
	Sensor Properties	8.8mm diagonal, 4.4 x 4.4µm sq. pixels	5.92mm diagonal, 7.4 x 7.4µm sq. pixels
	Resolution (pixels)	1600 x 1200	640 x 480
	Electronic Shutter Speed	27µs to 1000ms	16µs to 1000ms
	Acquisition	Rapid reset, progressive scan, full-frame integration.	
		256 grey levels (8 bits/pixel)	
		Gain/Offset controlled by software.	
		14 full frames per second.[1]	60 full frames per second.[1]
	Lens Type	C-mount	
	CCD Alignment Variability[2]	±0.127mm (0.005in), (both x and y) from lens C-mount axis to center of imager.	
I/O	**Trigger**	1 opto-isolated, acquisition trigger input.	
		Remote software commands via Ethernet and RS-232C.	
	Discrete Inputs	None built-in. Additional inputs available using a compatible I/O module (see Table 1-3). Unlimited inputs when using an Ethernet I/O system.	
	Discrete Outputs	2 built-in, high-speed outputs. Additional outputs available using a compatible I/O module (see Table 1-3). Unlimited outputs when using an Ethernet I/O system.	
	Status LEDs	Power, Network Status, Network Traffic, 2 user configurable.	
Communications	**Network**	1 Ethernet port, 10/100 BaseT, TCP/IP protocol. Supports DHCP (factory default) or static IP address.	
	Serial	RS-232C when connected to an optional I/O module.	
Power		24VDC ±10%, 600mA maximum.	24VDC ±10%, 500mA maximum.
Mechanical	**Material**	Die-cast aluminum housing.	
	Finish	Painted/Powder coat (back plate).	
	Mounting	Eight M4 threaded mounting holes (four front and four back).	
	Dimensions	99.9mm (3.93in) x 124.1mm (4.88in) x 61.4mm (2.42in) with Lens Cover installed.	
		59.4mm (2.34in) x 124.1mm (4.88in) x 61.4mm (2.42in) without Lens Cover installed.	
	Weight	463 g (16.3 oz.) Lens cover installed, without lens.	409 g (14.4 oz.) Lens cover installed, without lens.

Table 3-6: 5603 and 5600 Vision System Specifications (Cont.)

Specification		In-Sight 5603	In-Sight 5600
Environmental	**Temperature**	Operating – non-circulating air[3]: 0°C to 45°C (32°F to 113°F) Operating – circulating air[4]: 0°C to 50°C (32°F to 122°F) Storage: –30°C to 80°C (22°F to 176°F)	
	Humidity	95%, non-condensing (Operating and Storage)	
	Protection	IP67 (with appropriate Lens Cover properly installed).	
	Shock	80 G Shock with 150 gram lens attached per IEC 68-2-27.	
	Vibration	10 G from 10-500 Hz with 150 gram lens per IEC 68-2-6.	
Regulatory Compliance		CE, UL, CUL, FCC, RoHS	

1. Maximum frames per second are job dependent and based on the minimum exposure for a full image frame capture.
2. Expected variability in the physical position of the CCD, from vision system-to-vision system. This equates to ~ ±17 pixels on a 640 x 480 resolution CCD and ~ ±29 pixels on a 1600 x 1200 resolution CCD.
3. The vision system should be mounted with sufficient clearance on all sides to allow air circulation around and through the cooling posts on the black heat sink. If the vision system is not mounted with sufficient clearance, a fan is recommended.
4. Additional cooling from a fan is required for operation above 40°C. For operation up to 50°C, there must be ≥4 CFM of air moving through the cooling posts on the black heat sink.

3.1.5 In-Sight 5604 Line Scan Vision System Specifications

Table 3-7: 5604 Vision System Specifications

Specification		In-Sight 5604
Minimum Firmware Requirement		In-Sight version 4.3.0
Memory	**Job/Program**	64MB non-volatile flash memory; unlimited storage via remote network device.
	Image Processing	128MB
Image	**Sensor**	1-inch CCD
	Sensor Properties	14.3 mm x 14µm active area, 14µm x 14µm sq. pixels.
	Resolution (pixels)	1024 x 1 (CCD); 1024 x 2048 (up to 2048 lines for full resolution image).
	Acquisition	Line Scan integration.
		256 grey levels (8 bits/pixel).
		Gain/Offset controlled by software.
		44K lines per second.[1]
	Lens Type	C-mount
	CCD Alignment Variability[2]	±0.127mm (0.005in), (both x and y) from lens C-mount axis to center of imager.
I/O	**Trigger**	1 opto-isolated, acquisition trigger input.
		Remote software commands via Ethernet and RS-232C.
	Discrete Inputs	None built-in. Additional inputs available using a compatible I/O module (see Table 1-3). Unlimited inputs when using an Ethernet I/O system.
	Discrete Outputs	2 built-in, high-speed outputs. Additional outputs available using a compatible I/O module (see Table 1-3). Unlimited outputs when using an Ethernet I/O system.
	Encoder Inputs	2 built-in, encoder inputs for use with a 24V signal.
	Status LEDs	Power, Network Status, Network Traffic, 2 user configurable.
Communications	**Network**	1 Ethernet port, 10/100 BaseT, TCP/IP protocol. Supports DHCP (factory default) or static IP address.
	Serial	RS-232C when connected to an optional CIO-MICRO OR CIO-MICRO-CC I/O module.
Power		24VDC ±10%, 350mA maximum.
Mechanical	**Material**	Die-cast aluminum housing.
	Finish	Painted/Powder coat (back plate).
	Mounting	Eight M4 threaded mounting holes (four front and four back).
	Dimensions	53.2mm (1.50in) x 124.1mm (4.88in) x 61.4mm (2.42in)
	Weight	454 g (16 oz.) protective lens cap installed, without lens.
Environmental	**Temperature**	Operating – non-circulating air[3]: 0°C to 45°C (32°F to 113°F) Operating – circulating air[4]: 0°C to 50°C (32°F to 122°F) Storage: –30°C to 80°C (22°F to 176°F)
	Humidity	95%, non-condensing (Operating and Storage)
	Protection	For environments where protection is required, use an optional protective enclosure.
	Shock	80 G Shock with 150 gram lens attached per IEC 68-2-27.
	Vibration	10 G from 10-500 Hz with 150 gram lens per IEC 68-2-6.

Table 3-7: 5604 Vision System Specifications (Cont.)

Specification	In-Sight 5604
Regulatory Compliance	CE, UL, CUL, FCC, RoHS

1. Maximum lines per second are based on the minimum exposure.
2. Expected variability in the physical position of the CCD, from vision system-to-vision system. This equates to ~ ±8 pixels on a 2024 x 1 resolution CCD.
3. The vision system should be mounted with sufficient clearance on all sides to allow air circulation around and through the cooling posts on the black heat sink. If the vision system is not mounted with sufficient clearance, a fan is recommended.
4. Additional cooling from a fan is required for operation above 40°C. For operation up to 50°C, there must be ≥4 CFM of air moving through the cooling posts on the black heat sink.

3.2 I/O Specifications

Cable and connector specifications and connection examples for the Acquisition Trigger input, encoder inputs (In-Sight 5604 only) and the high-speed outputs are provided in the following sections.

3.2.1 Acquisition Trigger Input

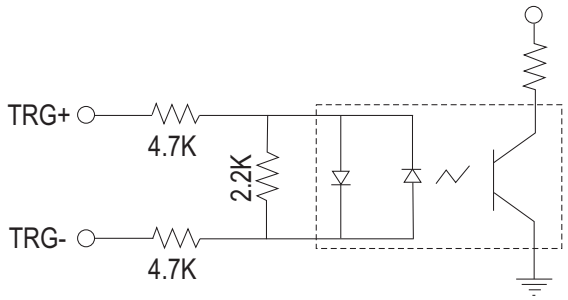
Table 3-8: Acquisition Trigger Input Specifications

Specification		Description
Voltage		ON: 20 to 28V (24V nominal) OFF: 0 to 3V (12V nominal threshold)
Current		ON: 2.0 to 2.9mA OFF: <150µA Resistance: ~10,000 Ohms
Delay	In-Sight 5100, In-Sight 5100C, In-Sight 5400C, In-Sight 5400CS, In-Sight 5400, In-Sight 5400S, In-Sight 5400R, In-Sight 5600	62µs maximum latency between leading edge of trigger and start of acquisition. Input pulse should be a minimum of 1 ms wide.
	In-Sight 5403, In-Sight 5403S, In-Sight 5603	66µs maximum latency between leading edge of trigger and start of acquisition. Input pulse should be a minimum of 1 ms wide.
	In-Sight 5401	76µs maximum latency between leading edge of trigger and start of acquisition. Input pulse should be a minimum of 1 ms wide.
	In-Sight 5604	1 line (approximately equivalent to 23µs, based on a 1.4µs Exposure) is the maximum latency between leading edge of trigger and start of acquisition. Input pulse should be a minimum of 5µs wide.

The acquisition trigger input on the vision system is opto-isolated. To trigger from an NPN (pull-down) type photoelectric sensor or PLC output, connect pin 2 (TRG+) to +24V and connect pin 3 (TRG–) to the output of the photoelectric sensor. When the output turns ON, it pulls TRG– down to 0V, turning the opto-coupler ON.

To trigger from a PNP (pull-up) photoelectric sensor or PLC output, connect pin 2 (TRG+) to the output of the photoelectric sensor and connect pin 3 (TRG–) to 0V. When the output turns ON, it pulls TRG+ up to 24V, turning the opto-coupler ON.

Note:	When using the vision system with the Breakout cable, the polarity of the input trigger (pins 2 and 3) is not critical. However, when using the optional Breakout or I/O modules, the polarity of the TRG+ and TRG– terminals should be observed.



28V Max. Across input pins - Transition approx. 12V (Min).

Figure 3-1: Acquisition Trigger Input Schematic

3.2.2 Encoder Inputs (In-Sight 5604 only)

Pins 6 and 7 of the Breakout cable (see Table 3-11 on page 32 for cable pin-outs) can be used for communication between the In-Sight 5604 line scan vision system and a single or quadrature encoder. The signal from the encoder must be 24V (other input specifications are listed in Table 3-9)

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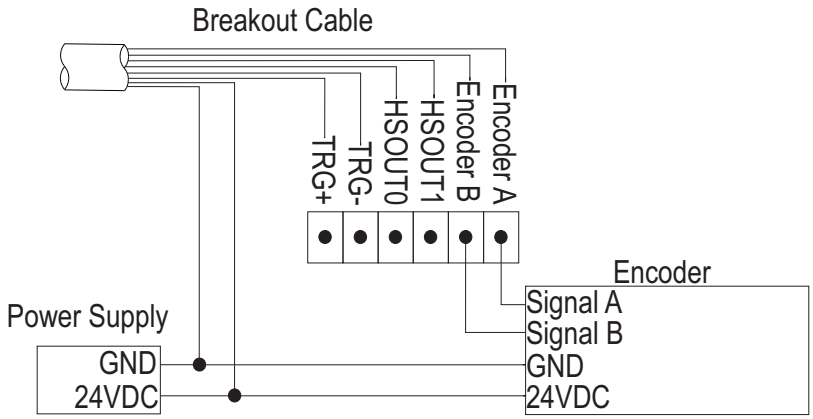


Figure 3-2: Connect the Encoder

Table 3-9: Encoder Input Specifications (In-Sight 5604 only)

Specification	Description
Voltage	ON: 20 to 28V (24V nominal) OFF: 0 to 3V (9.6V nominal threshold)
Current	ON: 84 to 118µA OFF: <11µA Resistance: ~233,000 Ohms

3.2.3 High-Speed Outputs

In-Sight 5000 series vision systems feature two built-in, high-speed outputs.

Table 3-10: High-Speed Output Specifications

Specification		Description
Voltage		28V maximum through external load.
Current	All In-Sight 5000 series (except In-Sight 5600 series)	200mA maximum sink current.
		OFF state leakage current 200µA maximum.
		External load resistance 140 Ohms to 10K Ohms.
		Each line rated at a maximum 200mA, protected against over-current, short circuit and transients from switching inductive loads. High current inductive loads require external protection diode.
	In-Sight 5600 series	100mA maximum sink current.
		OFF state leakage current 200µA maximum.
		External load resistance 280 Ohms to 10K Ohms.
		Each line rated at a maximum 100mA, protected against over-current, short circuit and transients from switching inductive loads. High current inductive loads require external protection diode.

Both of the high-speed outputs are NPN (pull-down) lines. The external load should be connected between the output and the positive supply voltage (<28V). The outputs pull down to <0.1V when ON (<1.25V for In-Sight 5604 only), which causes current to flow through the load. When the outputs are OFF, no current flows through the load.

Example 1

To connect the high-speed outputs to a relay, LED or similar load, connect the negative side of the load to the output and the positive side to +24V. When the output switches on, the negative side of the load is pulled down to 0V, and 24V appears across the load. Use a protection diode for a large inductive load, with the anode connected to the output and the cathode connected to +24V.

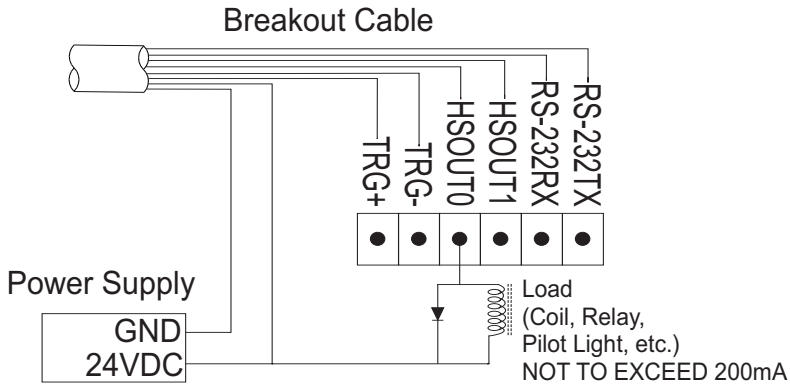


Figure 3-3: High-Speed Output Connection Example 1

Example 2

To connect to an NPN-compatible PLC input, connect Output 0 or Output 1 directly to the PLC input. When enabled, the output pulls down the PLC input to 0V.

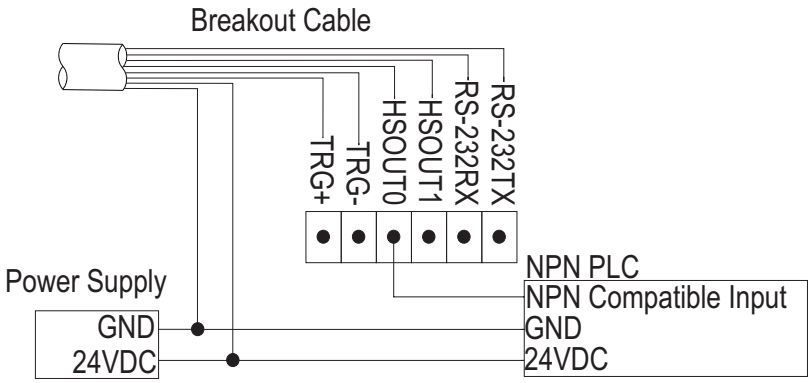


Figure 3-4: High-Speed Output Connection Example 2

Example 3

High-Speed outputs can also be used with a PNP-compatible PLC input if a pull-up resistor (for example, 2.2k 0.5W) is connected from the output to +24V. In this case, the resistor supplies 24V to the PLC input. The output will pull the voltage down to 0V, turning off the PLC input. This creates an inversion, with the PLC input ON when the In-Sight output is OFF, and vice-versa. Use an external NPN to PNP converter when this inversion is not desired.

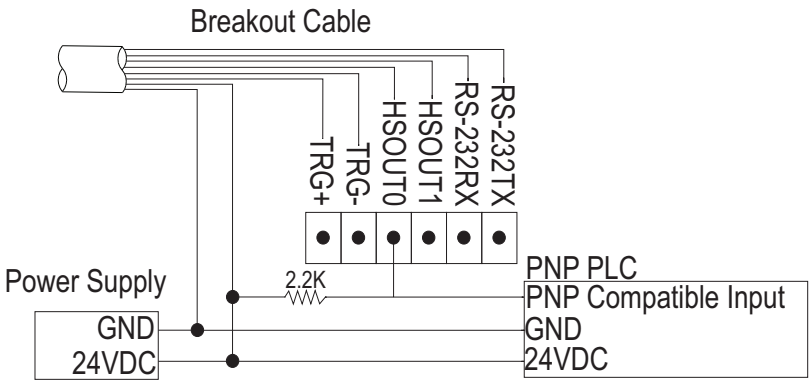
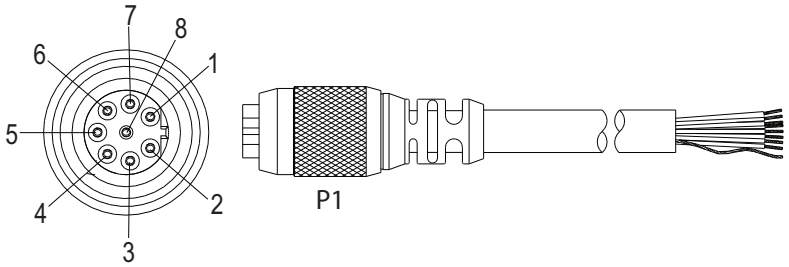


Figure 3-5: High-Speed Output Connection Example 3

3.2.4 24VDC Breakout Cable

The 24VDC Breakout connector provides access to power, serial communications, trigger and high-speed outputs. The Breakout cable is not terminated. When using the In-Sight 5604, refer to Table 3-9 for encoder input specifications.

Table 3-11: 24VDC Breakout Cable Pin-Out



Pin#	Signal Name	Wire Color
1	Power, +24 VDC	White/Green
2	Trigger +	Green
3	Trigger -	White/Orange
4	High-Speed Out 0	Blue
5	High-Speed Out 1	White/Blue
6	RS-232 Receive (RxD)[1] (In-Sight 5604 Only: Encoder B)	Orange
7	RS-232 Transmit (TxD)[1] (In-Sight 5604 Only: Encoder A)	White/Brown
8	Ground	Brown

1. If hardware handshaking is required, an I/O module must be used.

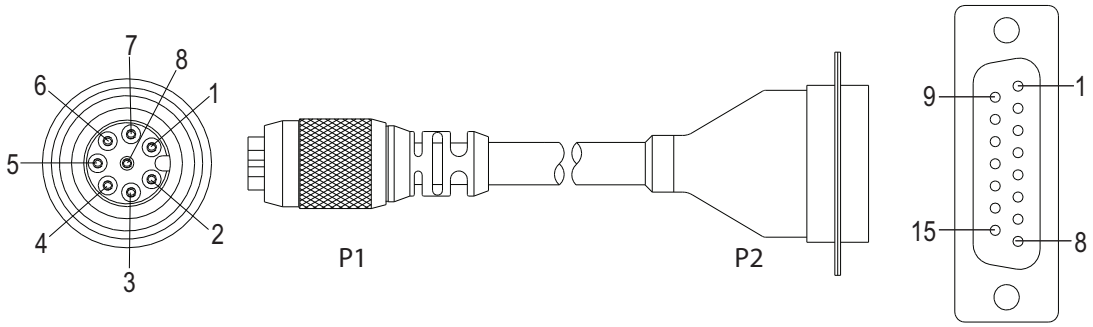
Notes:

- Cables are sold separately.
- Unused bare wires can be clipped short or tied back using a tie made from non-conductive material. Keep all bare wires separated from the +24VDC (White/Green) wire.
- The housing of the vision system is internally connected to the system ground wire (pin 8 of the Breakout cable). Therefore, if the mounting surface of the vision system is at a non-zero ground potential, it is strongly recommended that the vision system be mounted on an isolated or non-conductive mount.

3.2.5 I/O Module Cable

The I/O Module cable is used with the optional I/O module and 1350 Breakout Module (Table 1-3 specifies which I/O modules are compatible with your In-Sight 5000 series vision system). The I/O Module cable connects the vision system directly to the applicable I/O module via the DB15 connector. When the I/O module or 1350 Breakout Module is used, all power and communication lines used by the vision system are connected using the I/O Module cable.

Table 3-12: I/O Module Cable Pin-Out



P1 Pin#	Signal Name	P2 Pin#
1	Power, +24 VDC	1
2	Trigger +	2
3	Trigger -	3
4	High-Speed Out 0	4
5	High-Speed Out 1	5
6	RS-232 Receive (RxD) (In-Sight 5604 Only: Encoder B)	6
7	RS-232 Transmit (TxD) (In-Sight 5604 Only: Encoder A)	7
8	Ground	8

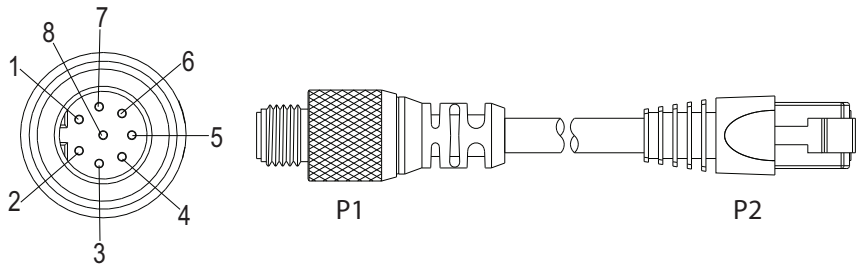
Notes:

- Cables are sold separately.
- Refer to your specific I/O module installation manual for more connection information.

3.2.6 Ethernet Cable

The Ethernet cable is used to connect the vision system to other network devices. The Ethernet cable can be connected to a single device or provide connections to multiple devices via a network switch or router.

Table 3-13: Ethernet Cable Pin-Out



Signal Name	P1 Pin#	P2 Pin#	Wire Color
TPO+	6	1	White/Orange
TPO-	4	2	Orange
TPI+	5	3	White/Green
TRMA	7	4	Blue
TRMB	1	5	White/Blue
TPI-	8	6	Green
TRMC	2	7	White/Brown
TRMD	3	8	Brown

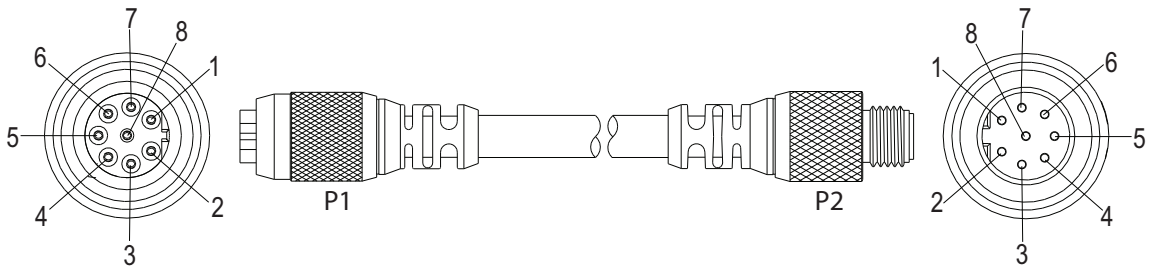
Notes:

- Cables are sold separately.
- The wiring for this cable follows standard industrial Ethernet M12 specifications. This varies from the 568B standard.

3.2.7 Camera Cable

The Camera cable connects the remote head camera to the 5400R vision system. The Camera cable provides power and communications to the camera.

Table 3-14: Camera Cable Pin-out



P1 Pin#	Signal Name	P2 Pin#
1	CTRL+	1
2	CTRL-	2
3	DAT+	3
4	+17V	4
5	-10V	5
6	DAT-	6
7	+6V	7
8	GND	8

Note: Cables are sold separately.

3.3 In-Sight Dimensional Drawings

3.3.1 5100, 5100C, 5400, 5401, 5400C and 5403 Vision System Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

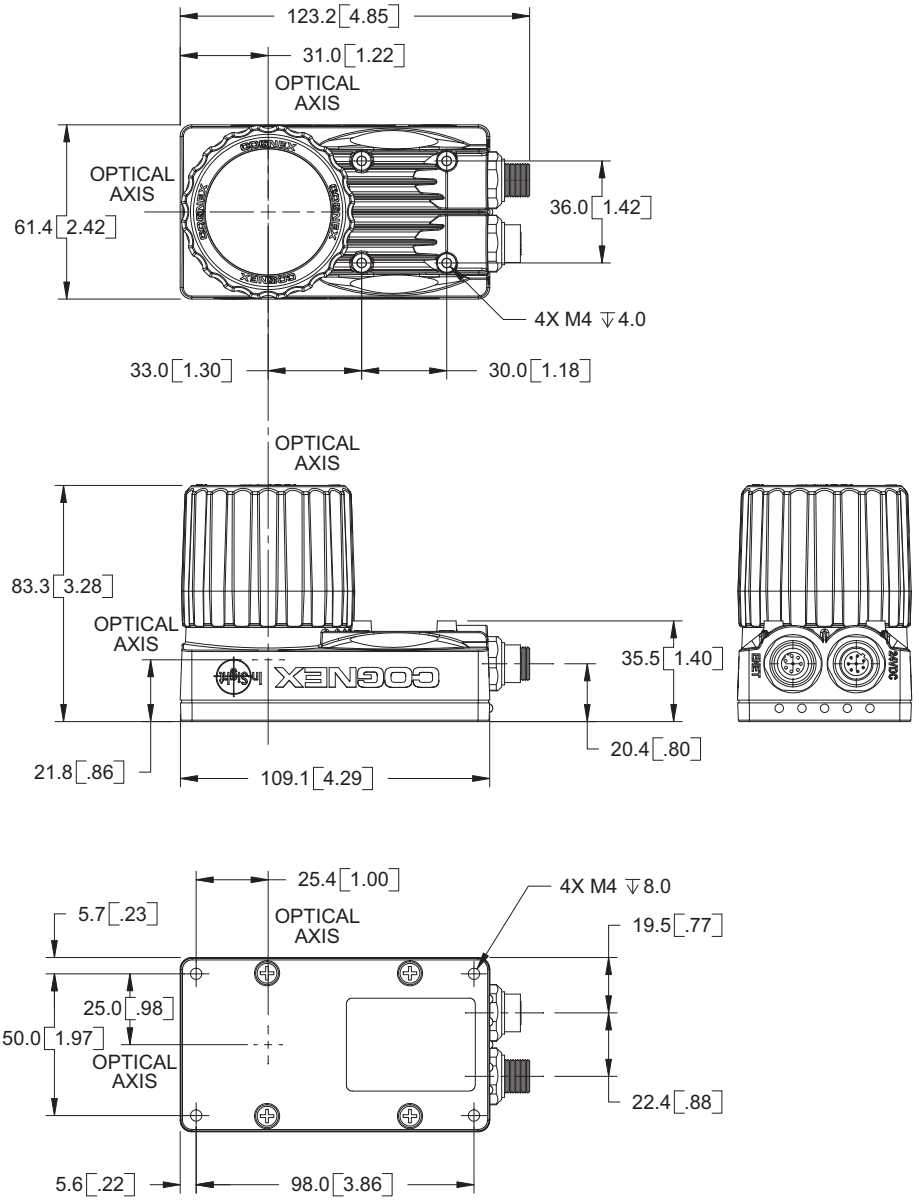


Figure 3-6: Standard Vision System Dimensions (With Lens Cover)

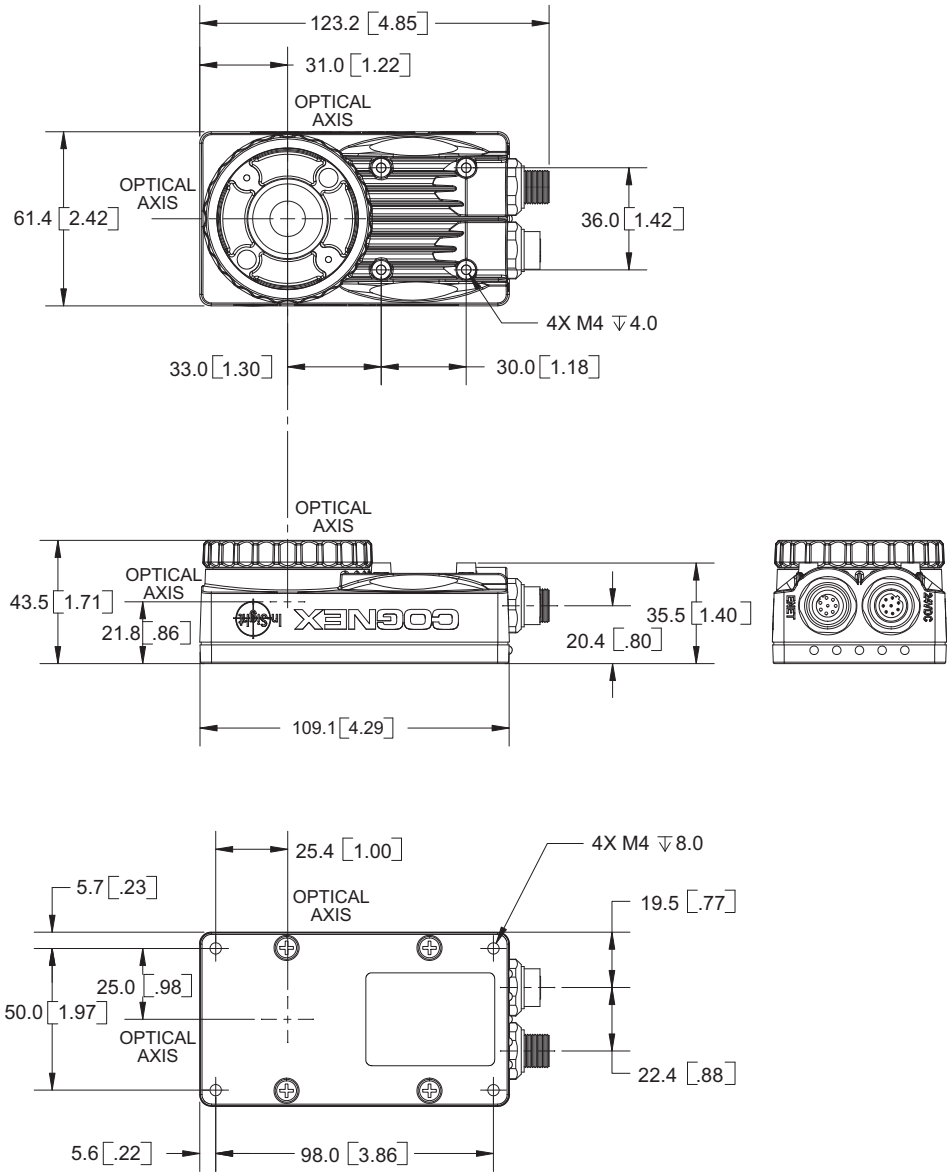


Figure 3-7: Standard Vision System Dimensions (Without Lens Cover)

3.3.2 5403S, 5400CS and 5400S Vision System Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

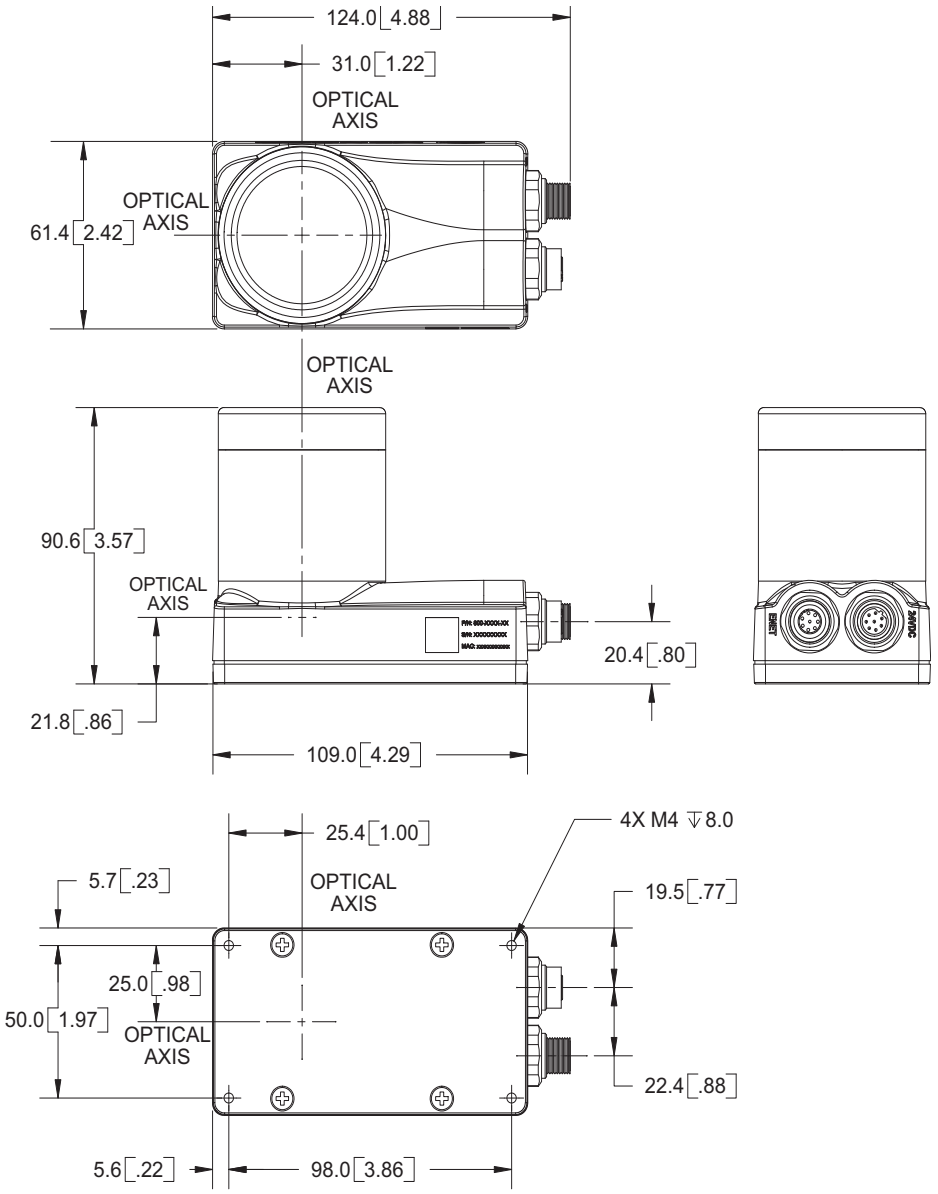


Figure 3-8: Stainless Steel Vision System Dimensions (With Lens Cover)

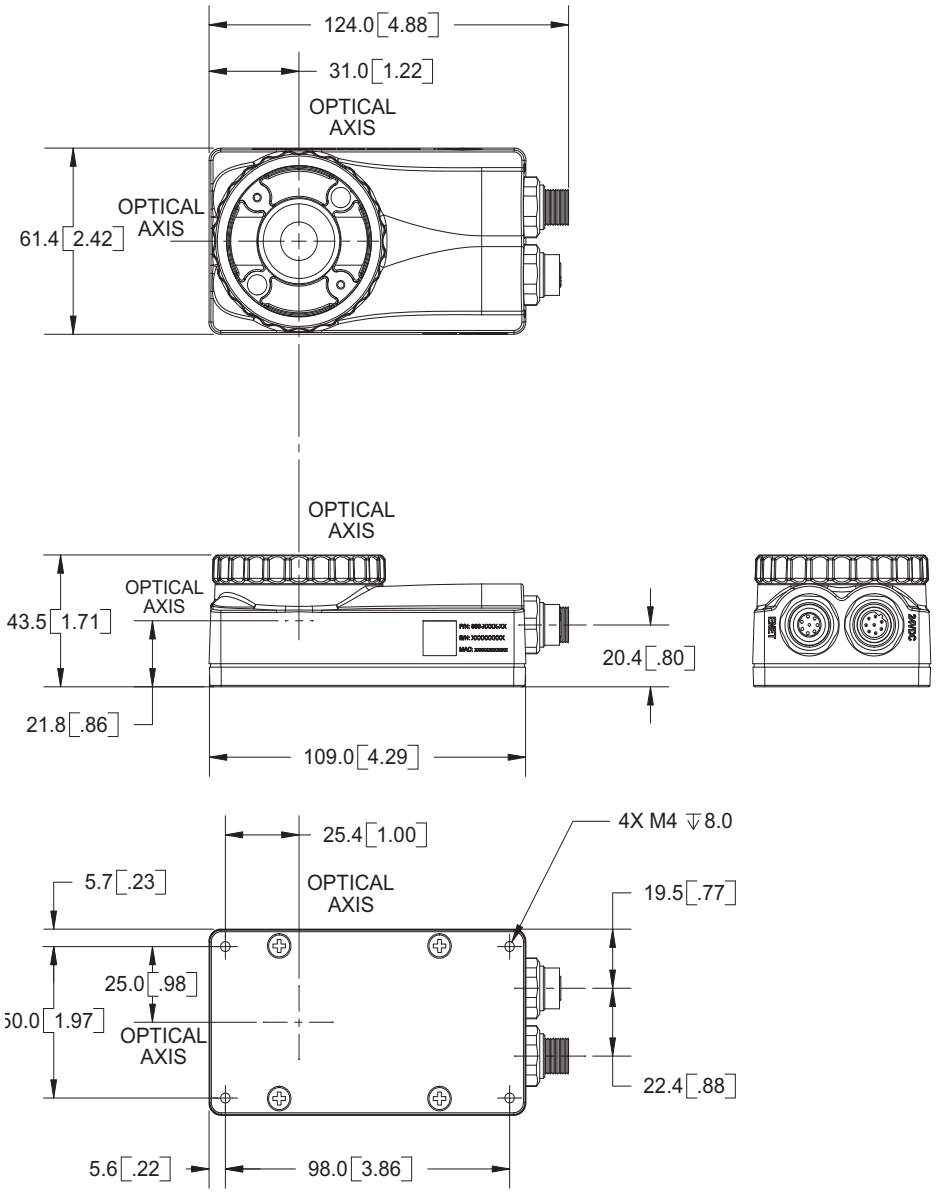


Figure 3-9: Stainless Steel Vision System Dimensions (Without Lens Cover)

3.3.3 5400R Vision System Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

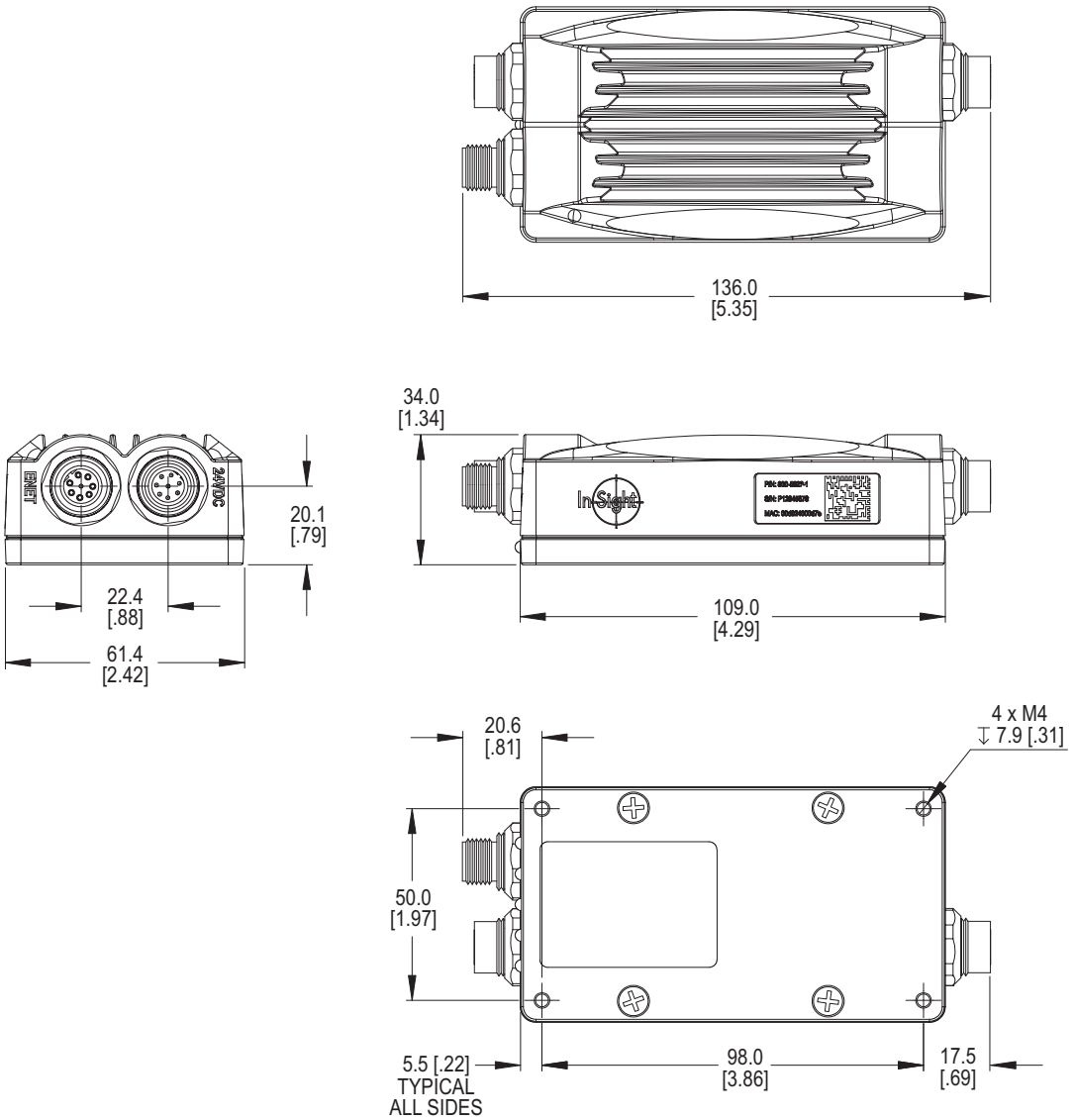


Figure 3-10: 5400R Vision System Dimensions

3.3.4 Remote Head Camera Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

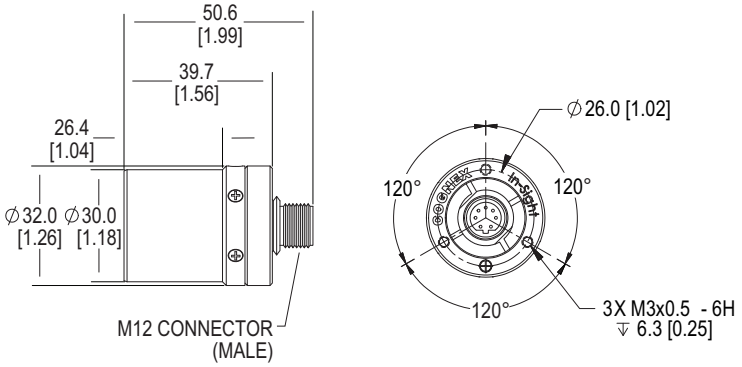


Figure 3-11: Remote Head Camera Dimensions

3.3.5 Remote Head Camera Enclosure Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

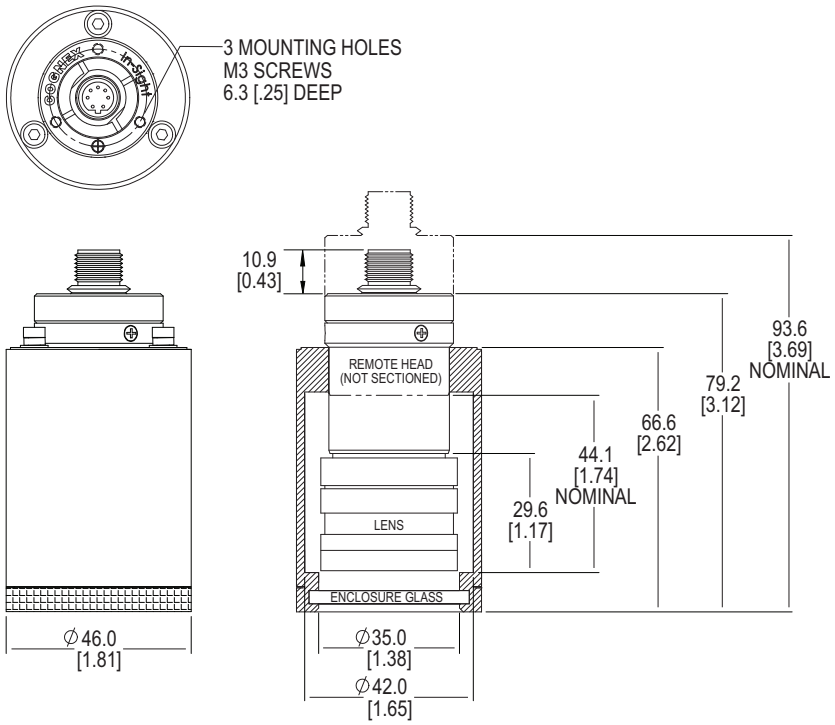


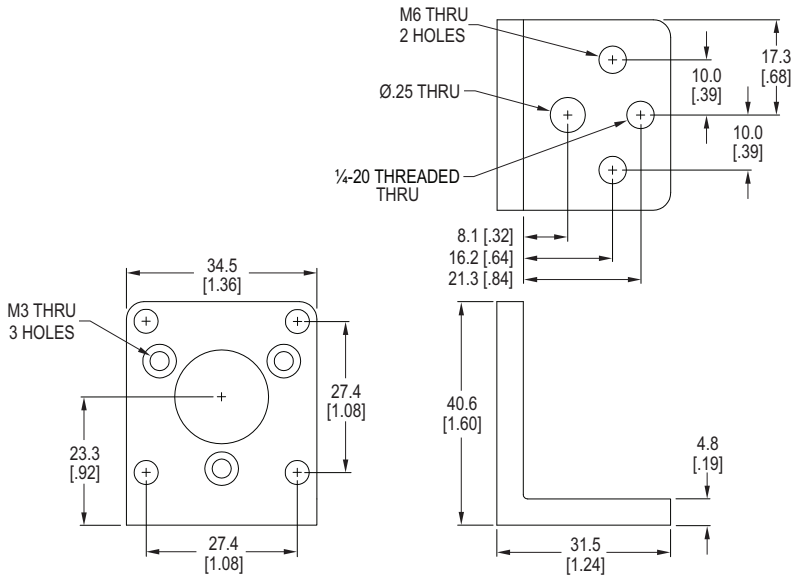
Figure 3-12: Remote Head Camera Enclosure Dimensions

3.3.6 Remote Head Camera Mount Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

The remote head mounting bracket dimensions are illustrated below. Refer to Appendix A for installation instructions.

MOUNTING BRACKET



MOUNTING BRACKET WITH REMOTE HEAD AND VIBRATION DAMPENER

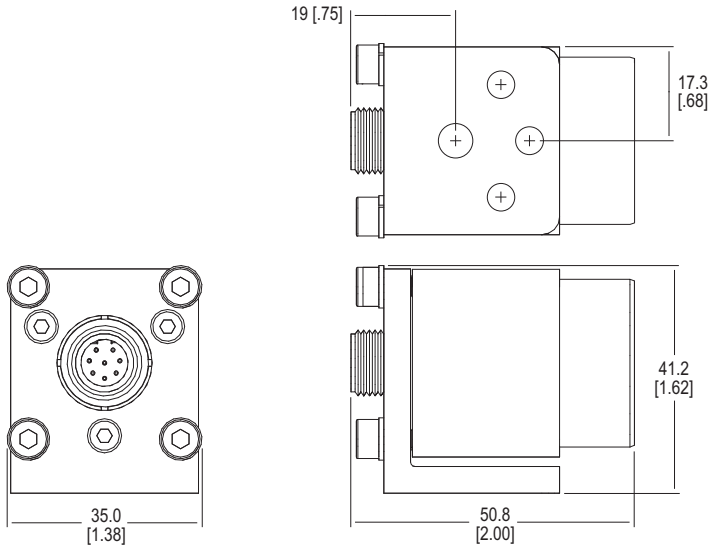


Figure 3-13: Remote Head Camera Mount Dimensions

3.3.7 5600 and 5603 Vision System Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

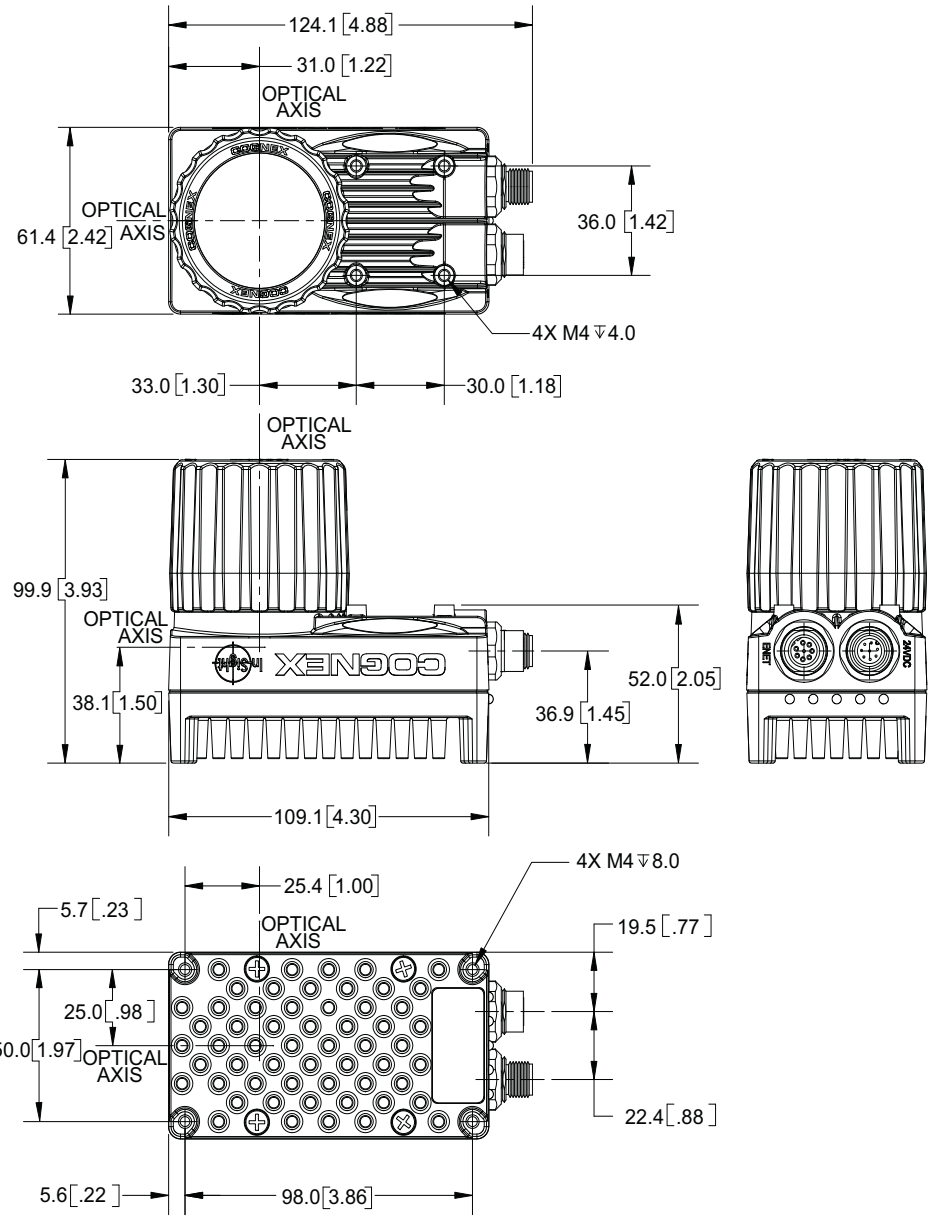


Figure 3-14: 5600 and 5603 Vision System Dimensions (With Lens Cover)

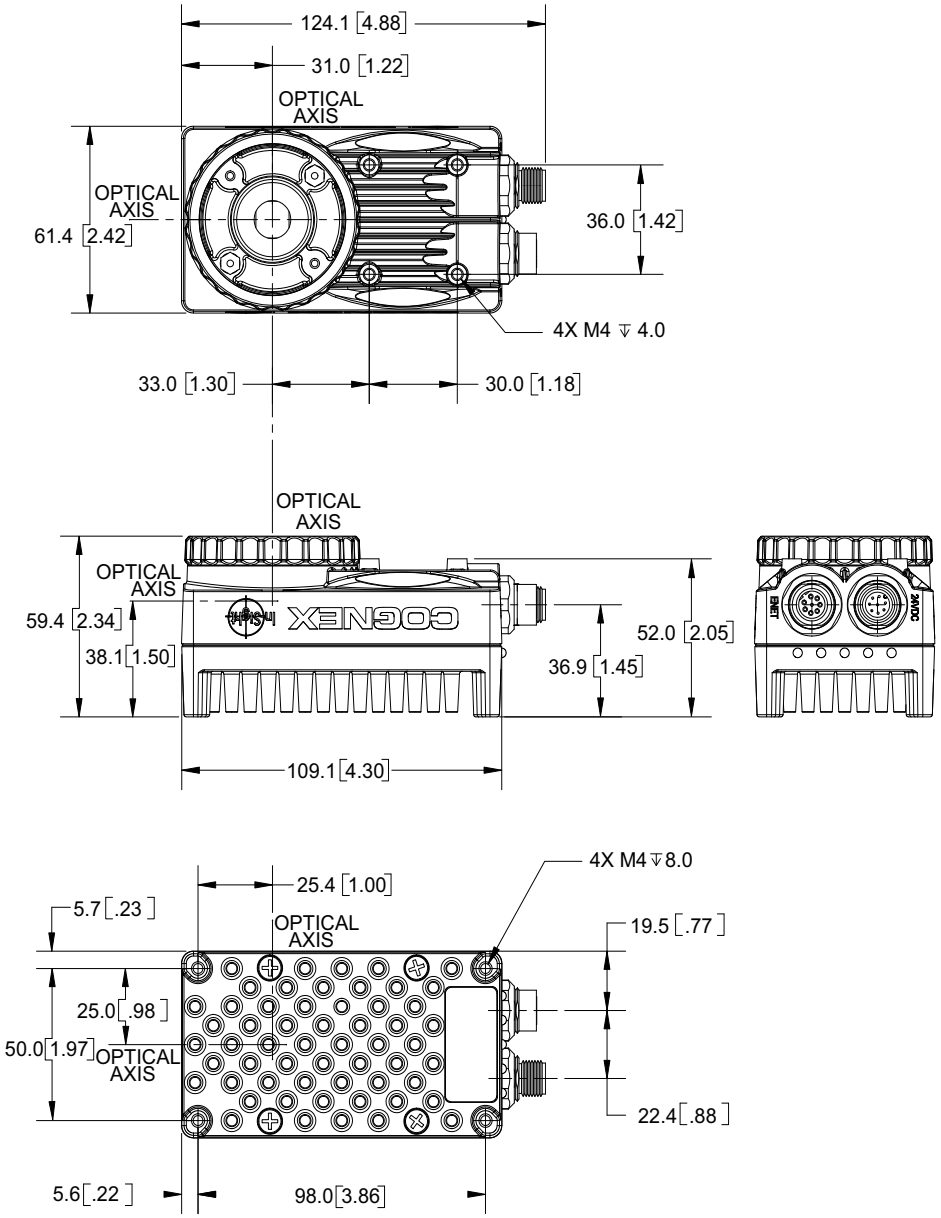


Figure 3-15: 5600 and 5603 Vision System Dimensions (Without Lens Cover)

3.3.8 5604 Vision System Dimensions

Notes:	• All dimensions are in millimeters [inches] and are for reference purposes only. • All specifications may be changed without notice.

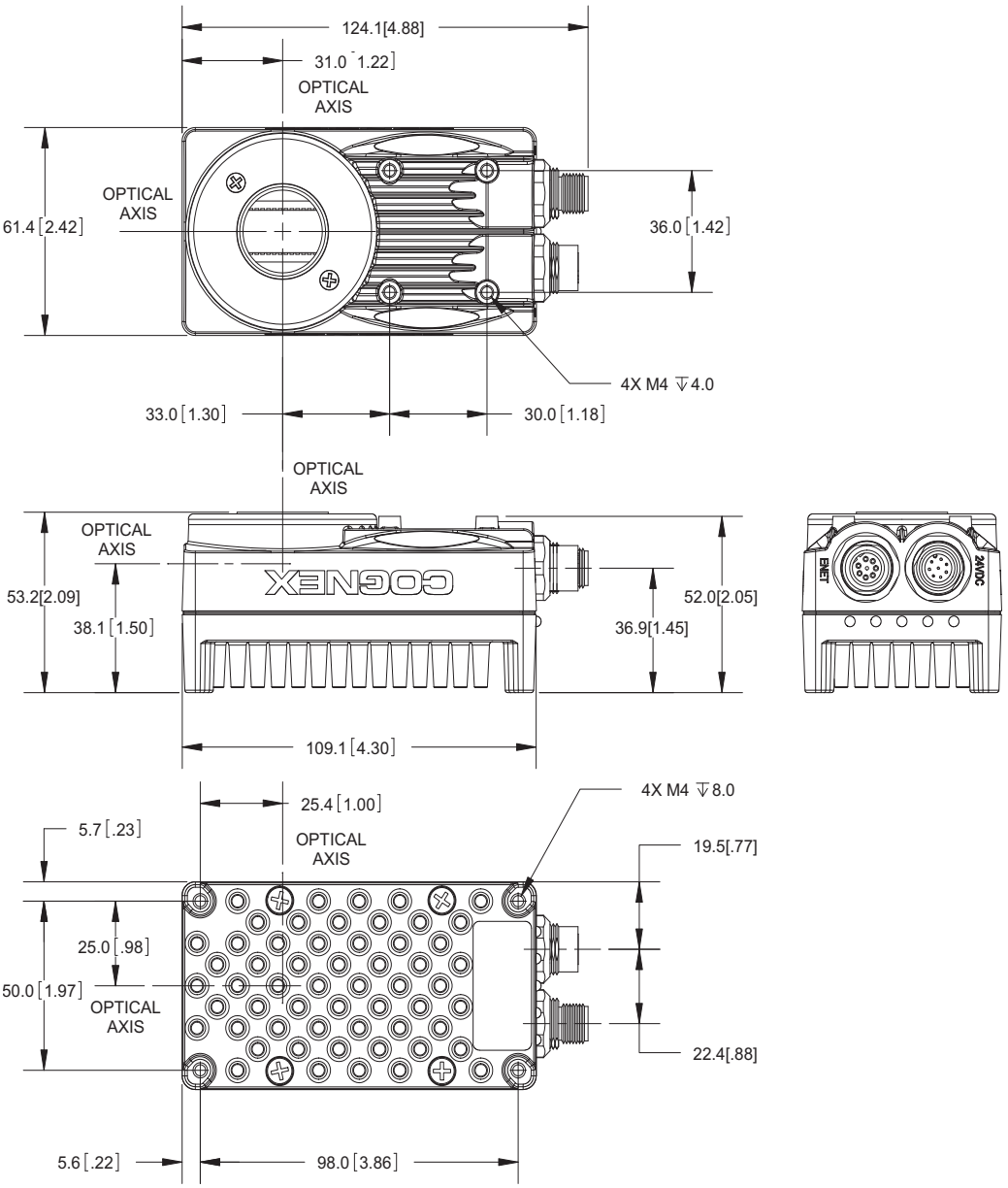


Figure 3-16: 5604 Vision System Dimensions

Appendix A

A.1 Installing the Remote Head Camera

The remote head accessory kit includes the hardware required to secure the remote head camera to a mounting surface. The Lens Tube (item 6) is included with the kit, but is not required for all applications. The Lens Tube is highly recommended for environments where vibration may be present.

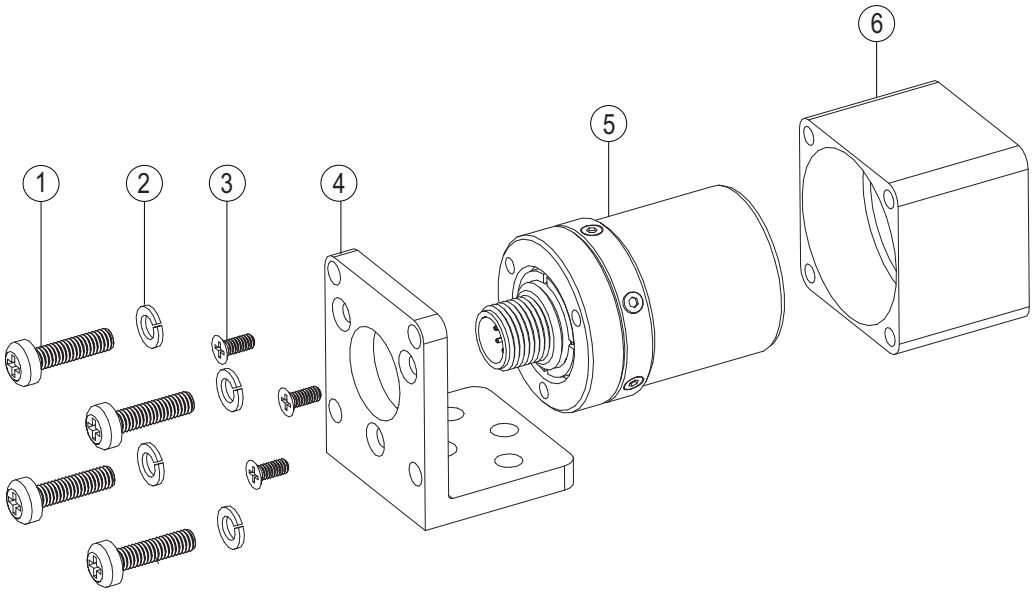


Figure A-1: Remote Head Camera Installation Diagram

1. Attach the remote head camera bracket (item 4) to the mounting surface (refer to Figure 3-12 on page 42).
2. Attach the remote head camera (item 5) to the remote head camera bracket using three M3 x 8mm Phillips head screws (item 3).
3. If required, slide the Lens Tube (item 6) over the remote head camera (item 5) and secure to the remote head camera bracket (item 4), using four M4 x 18mm cap screws (item 1) and lock washers (item 2).
4. Connect the Camera cable to the remote head camera.

Appendix B

B.1 Cleaning/Maintenance

B.1.1 Cleaning the Vision System

To clean the outside of the vision system, use a small amount of mild detergent cleaner or isopropyl alcohol on a cleaning cloth. Do not pour the cleaner directly onto the vision system.

Note:	Do not attempt to clean In-Sight products with harsh or corrosive solvents, including Lye, methyl ethyl ketone (MEK) or gasoline.

B.1.2 Cleaning the CCD Window

To remove dust from the outside of the CCD window, use a pressurized air duster. The air must be free of oil, moisture or other contaminants that could remain on the glass and possibly degrade the image. Do not touch the glass window. If oil/smudges still remain, clean the window with a cotton bud using alcohol (ethyl, methyl or isopropyl). Do not pour the alcohol directly on the window.

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