



COGNEX
Vision for Industry®

Installing The In-Sight® 3400 Vision Sensor



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Complies With

89/336/EEC Electromagnetic Compatibility Directive

Compliance Standards

EN 55011 Class A
EN 61000-3-2
EN 61000-3-3
EN 61000-6-2
(EN 6100-4-2/-3/-4/-5/-6/-8/-11)

Certificate Number

CE-058

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Safety



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FCC Part 15, Class A

Precautions

Observe these precautions when installing the In-Sight 3400 sensor to reduce the risk of injury or equipment damage:

- Do not connect the In-Sight 3400 sensor to a power source other than 24VDC. Any other voltage creates a risk of fire or shock and can damage In-Sight components. Always observe the proper polarity.
- Do not connect or disconnect In-Sight components to any equipment while connected to a power source. Installing or removing “live” equipment can damage In-Sight 3400 components.
- Do not connect any camera other than the In-Sight cameras specified in this document; this may damage the remote head camera, the In-Sight sensor, or both.
- Do not install the In-Sight 3400 sensor where it is directly exposed to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
- Do not route In-Sight cables and wires near high-voltage power sources. Route cables and wires away from high-voltage power sources to reduce the risk of damage or malfunction.
- Do not open the In-Sight 3400 sensor 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.

Precautions

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1 Introduction



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1.1 In-Sight 3400 Vision Sensor Overview

The In-Sight® 3400 sensor is a compact, network-ready machine vision sensor for automated inspection, measurement, identification, alignment and robot guidance applications on the factory floor. The In-Sight 3400 sensor provides an intuitive spreadsheet interface for configuring and monitoring any In-Sight sensor without using a PC. Use the In-Sight 3400 sensor to configure other sensors on a factory network, or remotely from another part of the factory or enterprise network. The spreadsheet also allows local or remote monitoring of the In-Sight sensor's operation during runtime without using a PC.

This manual describes how to install the In-Sight 3400 sensor.

1.2 In-Sight Support

Other resources with information about the In-Sight 3400 sensor and its spreadsheet interface include:

- *Getting Started with In-Sight*, Cognex P/N 590-6368 (English), 590-6368F (French), 590-6368J (Japanese), or 590-6368G (German)
- *In-Sight® Explorer Help*, an on-line HTML Help file provided on the In-Sight CD-ROM (for In-Sight Explorer software).
- *In-Sight® Guide & Reference*, an on-line HTML Help file provided on the In-Sight CD-ROM (for In-Sight PC Host software version 2.51 through version 2.80).
- In-Sight computer-based tutorials provided on CD-ROM with In-Sight starter accessories kits.
- The In-Sight Online Support and Learning Center:
www.cognex.com/support/In-Sight.asp.

1.3 In-Sight 3400 Components

The In-Sight 3400 sensor is shipped with the components shown in Figure 1-1. Component part numbers and descriptions are listed in Table 1-1.

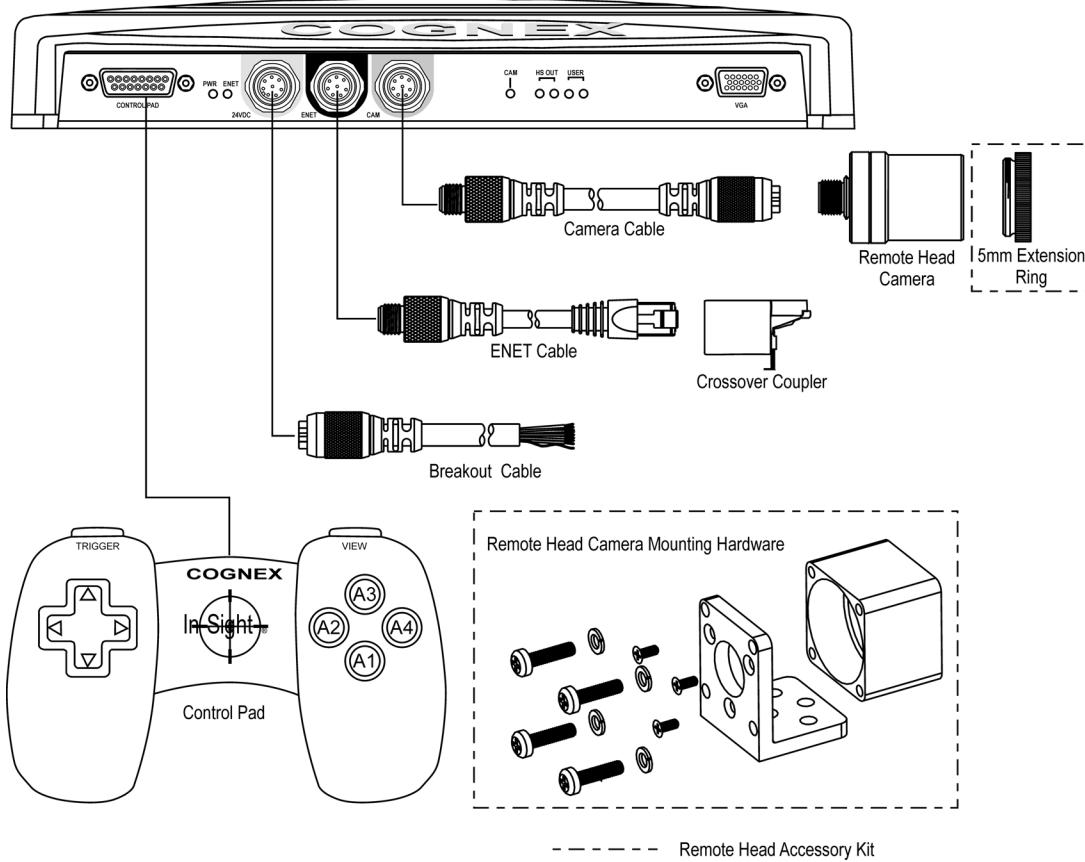


Figure 1-1: Standard In-Sight 3400 Components

Table 1-1: In-Sight 3400 Standard Component Descriptions

COMPONENT	DESCRIPTION
Sensor (P/N 800-5809-1)	Provides image display, vision processing, serial and Ethernet connectivity and discrete I/O.
Remote Head Camera (P/N 800-5808-1)	Acquires and sends images to the In-Sight 3400 sensor.
Camera Cable 2M (P/N 185-0085) 5M (P/N 185-0086) 10M (P/N 185-0087) 15M (P/N 185-0088)	Connects the In-Sight 3400 remote head camera to the sensor. This cable can be identified by its M12 connectors at both ends.
Breakout Cable¹ 2M (P/N 185-0095) 5M (P/N 185-0096) 10M (P/N 185-0093) 15M (P/N 185-0094)	Connects the In-Sight 3400 sensor to an external power supply, an acquisition trigger source, output devices and a remote serial device. This cable can be identified by its M12 connector on one end, and eight wires on the other. When an I/O Expansion Module or Breakout Module is used, the I/O Cable supplied with the module replaces the Breakout Cable.
Network Cable¹ 5M (P/N 185-0084) 10M (P/N 185-0092) 15M (P/N 185-0097) 30M (P/N 185-0089)	Connects the In-Sight 3400 sensor to the factory network. This cable is a CAT5/5e standard, straight-pinned Ethernet cable, and can be identified by its M12 connector on one end and standard RJ-45 connector on the other.
Crossover Coupler (P/N 185-0080)	Attaches to the RJ-45 connector of the network cable to provide crossover CAT5/5e cable functionality when connecting the In-Sight 3400 sensor directly to a PC or other In-Sight sensor.
Control Pad (P/N 800-5746-1)	Used to navigate and configure the In-Sight spreadsheet user interface. Attaches to the In-Sight 3400 sensor via DB15 male connector.
Remote Head Accessory Kit (P/N 800-5813-1)	Includes remote head camera mounting hardware and a 5mm extension ring (for use with C-mount lenses).

- When you receive a Breakout cable or Network cable from Cognex, the cable bag is labeled with a CCB-84909-xxxx-xx product number and a Cognex 185-xxxx part number. The cable is tagged with an 84909-xxxx cable number.

1.4 In-Sight 3400 Sensor Configurations

The In-Sight 3400 sensor can operate as a standalone sensor, or as a host sensor on a factory network. For the purposes of the instructions in this manual, a network is an In-Sight 3400 sensor connected over Ethernet to at least one other In-Sight sensor or PC running In-Sight software.

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

Introduction

Several basic In-Sight 3400 configurations are described in the following sections.

1.4.1 Standalone (No Network) Configuration

A standalone In-Sight 3400 configuration does not include a connection to any other network device or In-Sight sensor. Figure 1-2 shows the standalone configuration.

The standalone configuration requires a local VGA display to configure applications and monitor the In-Sight 3400 sensor's runtime operation. In this configuration, the jobs that can be stored are limited to the amount of local storage available on the In-Sight 3400 sensor. A remote serial device must be used for storing image files or for additional job storage.

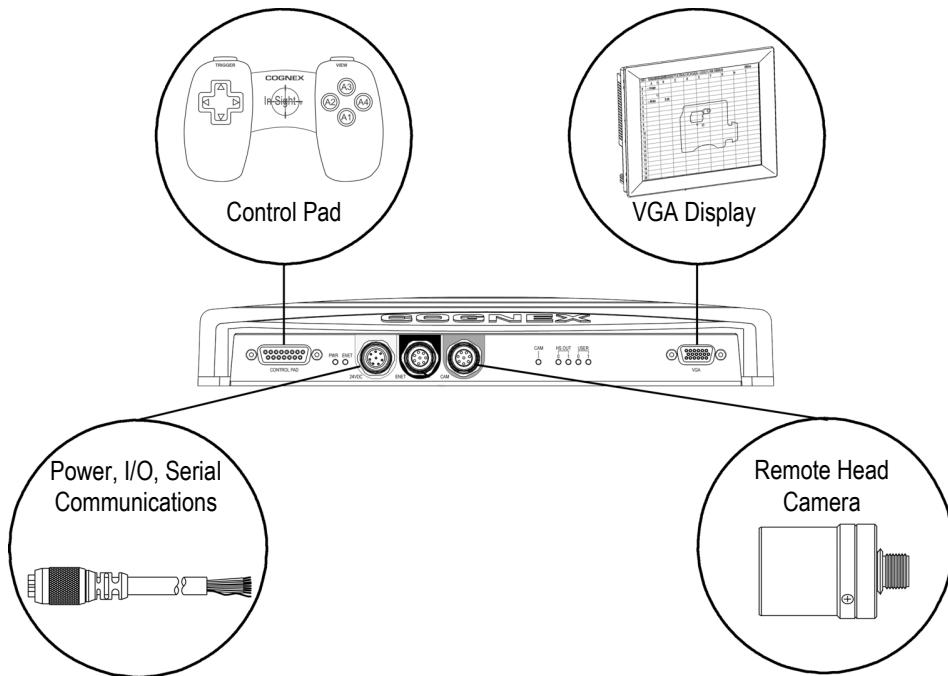


Figure 1-2: In-Sight 3400 Standalone Configuration

Configurations Using Switches/Routers

An In-Sight network may be extended to include more than two In-Sight sensors 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 1-3 includes an In-Sight 3400 sensor, two In-Sight 5000 series sensors and a PC running In-Sight Explorer, connected by a switch/router. In this configuration, any In-Sight sensor on the network can be configured using either the In-Sight 3400 GUI or the In-Sight Explorer software. In-Sight Explorer also provides additional job storage, and image and data archiving, for all three In-Sight sensors 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 sensors.

NOTE In this configuration, the Network cable connecting the In-Sight 3400 sensor to the switch/router **does not** use the Crossover Coupler.

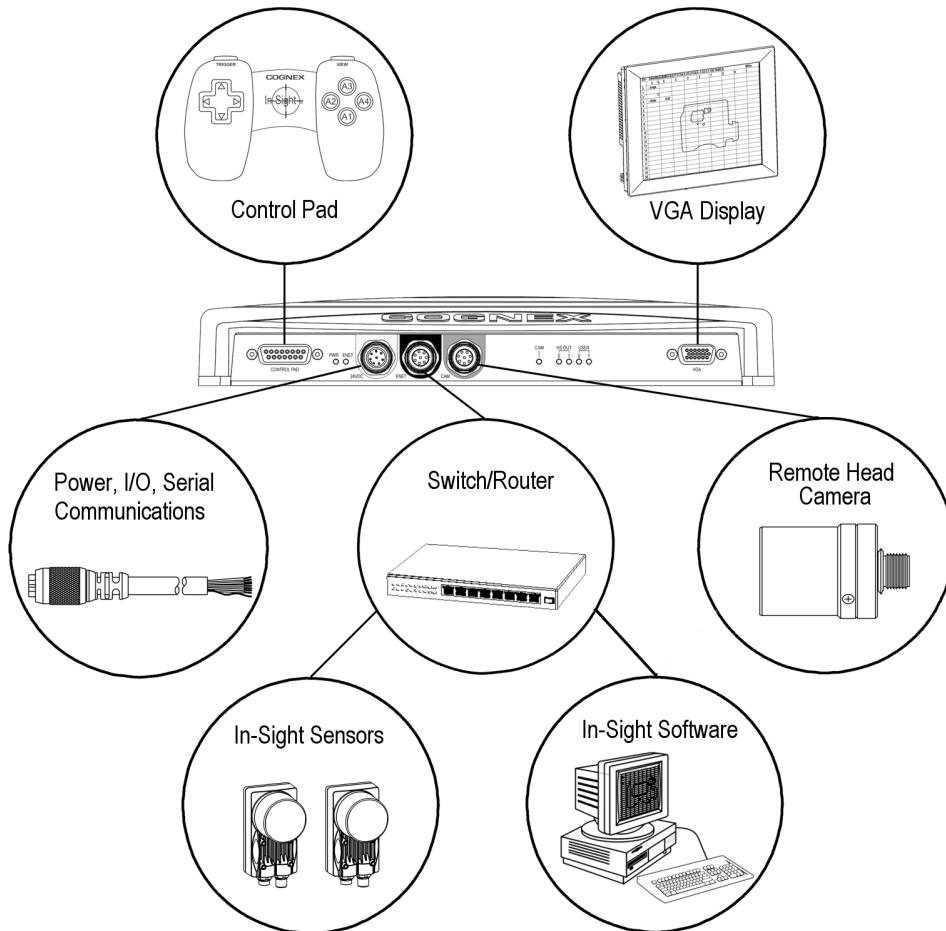


Figure 1-3: Standalone In-Sight Network with Switch/Router

1.4.2 Adding an In-Sight Network to a 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, an In-Sight 3400 sensor located on each In-Sight network provides local job configuration and image display for all In-Sight sensors, without a PC.

As in the example in the previous section, the In-Sight network shown below includes an In-Sight 3400 sensor, two In-Sight 5000 series sensors 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.

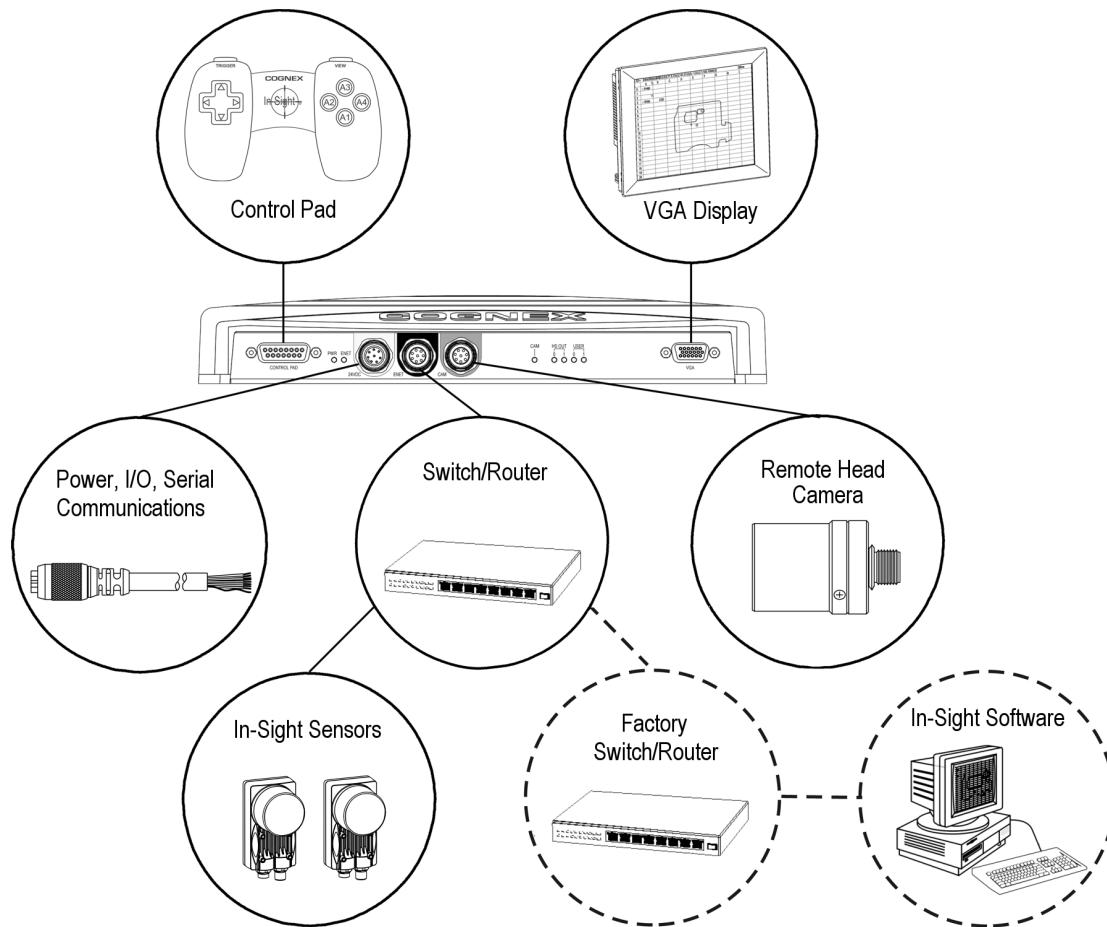


Figure 1-4: In-Sight Network on the Factory Network

2 In-Sight 3400 Installation



In This Section...

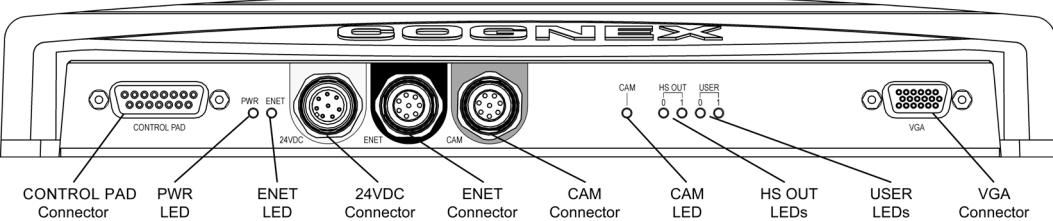
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2.1 Connecting the In-Sight 3400 Vision Sensor

This section describes the connection of the In-Sight 3400 to its standard components and optional I/O modules. For a complete list of options and accessories, contact your Cognex sales representative.

In-Sight 3400 Installation

Table 2-1: In-Sight 3400 Vision Sensor Connections and Indicators



CONNECTOR/ INDICATOR	FUNCTION
CONTROL PAD Connector	Connects the In-Sight Control Pad, which is used to navigate the spreadsheet user interface. The Control Pad is not required when the In-Sight 3400 sensor is accessed remotely from a PC running In-Sight software.
PWR LED	This PWR LED indicates the power status of the In-Sight 3400 sensor. The LED is red when the sensor is receiving power during initialization, momentarily switches from green to orange during the LED start-up test, and then switches back to green after initialization is completed. If initialization fails, the LED remains red. The LED blinks red if the power supply is overloaded, causing the power to cycle. If the sensor is rebooting, the PWR LED is orange.
ENET LED	The ENET LED is orange during the LED start-up test, momentarily switches to green when a network connection is established, and then blinks green and orange when network traffic is detected. If a network connection cannot be established, the LED is not lit.
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. Alternatively, this connector is used to attach the I/O Cable to an optional In-Sight I/O Expansion Module, which adds general-purpose discrete I/O and light control functionality. Refer to Table 4-7 and Table 4-8, pages 45 and 46.
ENET Connector	Connects the In-Sight sensor to a network. The ENET connector provides the Ethernet connection to external network devices. Refer to Table 4-9, page 47.
CAM Connector	The CAM connector attaches the remote head camera to the In-Sight 3400 sensor. Refer to Table 4-10, page 48.
CAM LED	The CAM LED indicates the status of the remote head camera. The LED is orange during the LED start-up test and then switches to green when the camera is connected to the sensor and the synchronization signal is established. The LED is orange when the camera is acquiring an image and blinks red if the camera loses sync. If the camera does not sync-lock during initialization, the LED is solid red.
HSOUT 0/1 LEDs	These LEDs indicate the status of the two High-Speed outputs. The applicable LED is green when active.
USER 0/1 LEDs	The User 0 LED lights green; User 1 lights red when triggered by a user-definable event. Refer to the “WriteDiscrete” topic in the <i>In-Sight® Explorer Help</i> file for information on configuring the behavior of User 0/1 LEDs.
VGA Connector	Connects a standard VGA or flat panel display. A display is not needed when configuring or monitoring an In-Sight 3400 sensor from a remote PC location. Refer to Table 4-11, page 49.

2.1.1 Connecting the In-Sight 3400 Components

Perform the following steps when connecting the In-Sight 3400 sensor standard components:

1. Attach the Control Pad to the In-Sight sensor's **CONTROL PAD** connector (Figure 2-1).

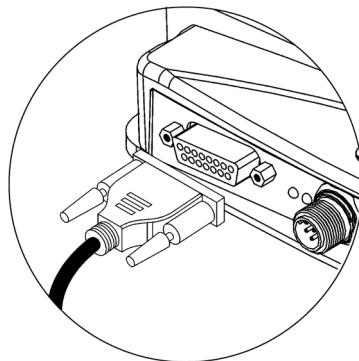


Figure 2-1: Control Pad Connection

2. Attach the video cable of a VGA monitor or flat-panel display to the In-Sight sensor's **VGA** connector (Figure 2-2).

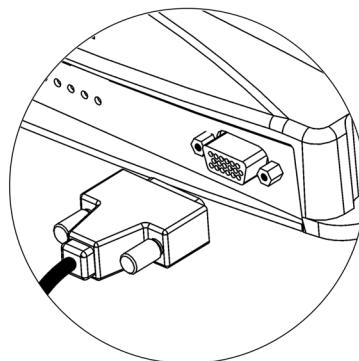


Figure 2-2: VGA Connection

3. Attach a CS-Mount or C-Mount (with 5mm extension ring) lens to the In-Sight 3400 remote head camera. Installing a lens allows you to see the In-Sight 3400 sensor 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 3400 Installation

4. Attach the female M12 connector of the camera cable to the remote head camera's male M12 connector. Attach the male M12 camera cable connector to the In-Sight sensor's **CAM** connector (Figure 2-3).

CAUTION Remove power from the In-Sight 3400 sensor before connecting or disconnecting the remote head camera. "Hot plugging" the remote head camera can damage the In-Sight sensor and/or remote head camera.

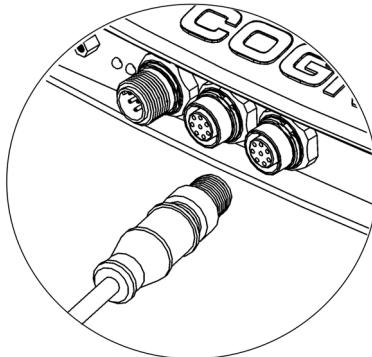


Figure 2-3: CAM Connection

5. Verify that the 24VDC supply is not receiving power, and then connect the power supply to the 2-pin terminal plug on the Breakout Cable. Attach the Breakout Cable to the **24VDC** connector on the sensor (Figure 2-4).

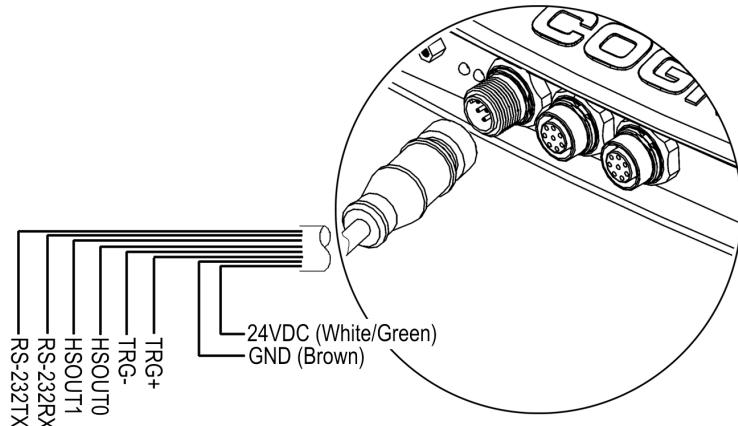


Figure 2-4: Power Connections

CAUTION Never connect voltages other than 24VDC. Always observe the polarity shown.

2.1.2 Verifying the Standard Connections

Follow these steps to verify that the standard components have been properly connected:

1. Switch on the VGA display.
2. Apply power to the In-Sight 3400 sensor (see section 2.1). The **PWR** LED is red during initialization, momentarily turns from green to orange during the LED start-up test, and turns green when the sensor is ready for use.
 - If the PWR LED does not illuminate, verify the polarity of the connections to the power supply.
 - If the PWR LED remains red and does not turn green, review the Safe Mode initialization procedures (page 77).
3. The monitor should now display the In-Sight start screen, followed by a blank spreadsheet. The **CAM** LED will be green if the remote head camera is properly connected.
 - If nothing appears on the display, verify that the monitor is on and that the cable is properly connected.
 - If the spreadsheet is displayed over a grayscale grid pattern, the CAM LED will be red, indicating that no synchronization signal could be established. Remove power from the sensor, reconnect the camera cable to the remote head and the sensor, and then restore power to the sensor.
4. Press the A3 button on the Control Pad (see page 35) to display the System menu. If the menu does not appear, check the Control Pad connection.
5. Select Live from the System menu and press the A1 button to display a live image. Adjust the camera and lens until the image is focused.
 - If the image is completely black, verify that there is sufficient light and adjust the lens aperture.
 - If the image is completely gray or white, or blurry, adjust the lens focus, aperture and camera working distance until a clear image display is achieved.

To stop the live video test, press any button on the Control Pad.

2.2 Connecting the Model 1350 Breakout Module

The optional In-Sight Breakout Module (P/N 800-5743) is a convenient way to connect the In-Sight 3400 sensor's power, serial communications, and I/O lines.

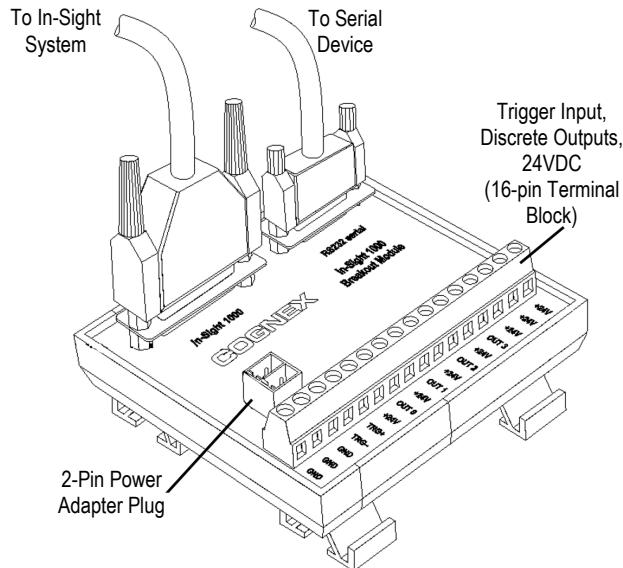


Figure 2-5: Breakout Module Connections

To Connect the Model 1350 Breakout Module to the In-Sight 3400 Sensor:

1. Verify the 24VDC power supply being used is switched off.
2. Optionally, connect the power and ground wires for the acquisition trigger input and the discrete outputs to their corresponding terminals on the Breakout Module.
3. Optionally, connect the DB9 male connector of an RS-232 serial cable to the corresponding DB9 female connector on the Breakout Module.
4. Plug the DB15 male connector of the Breakout Module cable into the corresponding female connector on the Breakout Module.
5. Plug the M12 connector of the Breakout Module cable into the In-Sight 3400 sensor's 24VDC connector.
6. Plug the wire leads from a 24VDC supply for the +24V power and ground into the 2-pin terminal plug on the Breakout Module. Alternatively, remove the terminal plug and insert the 2-pin terminal plug attached to the In-Sight power adapter into the keyed power adapter port on the Breakout Module (Figure 2-5).
7. Restore power to the 24V supply. The green PWR LED on the In-Sight 3400 sensor and the orange +24V LED on the Breakout Module will indicate that the In-Sight 3400 sensor and Breakout Module are receiving power.

2.3 Connecting the Model 1460 I/O Expansion Module

Like the 1350 Breakout Module and the Model 1450 I/O Expansion Module, the optional Model 1460 I/O Expansion Module (P/N 800-5815), shown in Figure 2-6, provides convenient access to an In-Sight 3400 sensor's power, serial communications and discrete I/O lines. In addition to the two discrete outputs, acquisition trigger and serial transmit/receive that are standard on In-Sight 3400 sensors, the Model 1460 I/O Expansion module provides the following:

- 8 discrete outputs
- 8 discrete inputs
- RS-232 hardware handshaking
- Light Control
- Plug-in connections for I/O opto-isolator modules

To Connect the Model 1460 I/O Expansion Module to the In-Sight Sensor:

1. Verify the 24VDC power supply being used is switched off.
2. Connect the power and ground wires from remote I/O devices to terminals on the 1460 I/O Expansion Module (Figure 2-6).

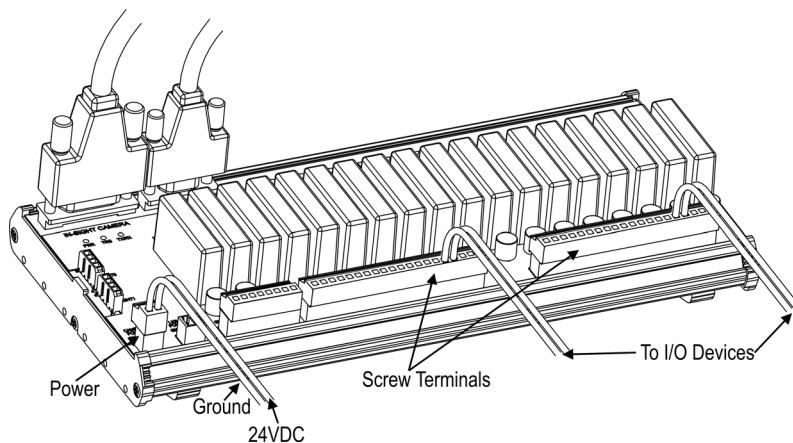


Figure 2-6: Connecting I/O Wires

- a. Use a Flat-head screwdriver to loosen the screw terminals.
- b. Insert the wire leads from remote I/O devices into the appropriate positions on the terminal block.

NOTE	The 1460 I/O Expansion Module outputs labeled HSOUT 0 and HSOUT 1 correspond to the In-Sight 3400 sensor's built-in outputs. These signals pass through the micro-controller on the 1460 I/O Expansion Module without processing. In contrast, the general-purpose outputs labeled OUT 0 through OUT 7 are lower speed because the micro-controller processes these signals before they are transmitted to remote devices.
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- c. Tighten the screw terminals with the screwdriver to secure the wire leads in the terminal.
3. Optionally, connect the DB9 male connector of an RS-232 serial cable to the corresponding DB9 female connector on the Expansion Module (Figure 2-7).
4. Plug the I/O Module Cable's DB15 male connector into the corresponding female connector on the Expansion Module.

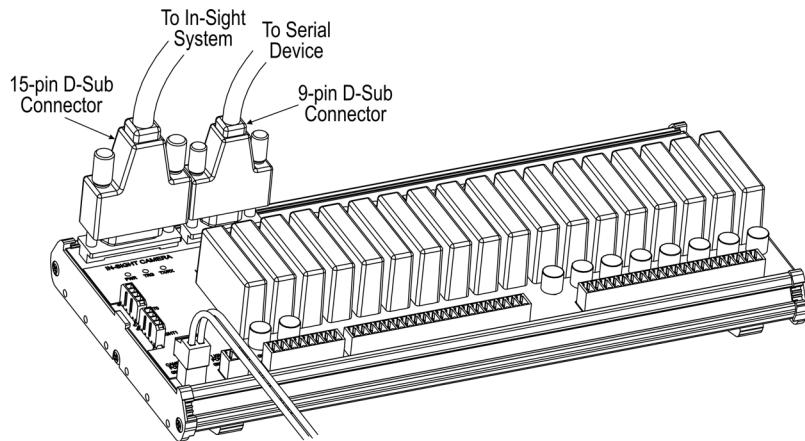


Figure 2-7: Connecting the I/O Cable and Serial Cable

5. Plug the M12 connector of the I/O Module Cable into the In-Sight 3400 sensor's 24VDC connector (Figure 2-8).

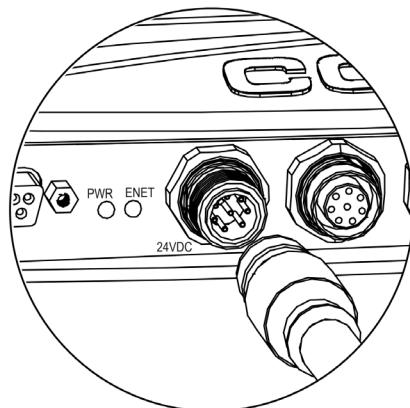


Figure 2-8: Connecting the Expansion Module to In-Sight

6. Plug wire leads from a 24VDC supply for the +24V power and ground into the 2-pin terminal plug labeled "Camera Power" on the Expansion Module (Figure 2-9).
7. Restore power to the 24V supply. The green PWR LED on the In-Sight 3400 sensor and the +24V LED on the Expansion Module will indicate that the sensor is receiving power.

CAUTION Never connect the 1460 I/O Expansion Module to a power source other than 24VDC. Any other voltage creates a risk of fire or shock and can damage the hardware. Do not connect the 24VDC source to any terminals other than the 2-pin 24VDC power connector.

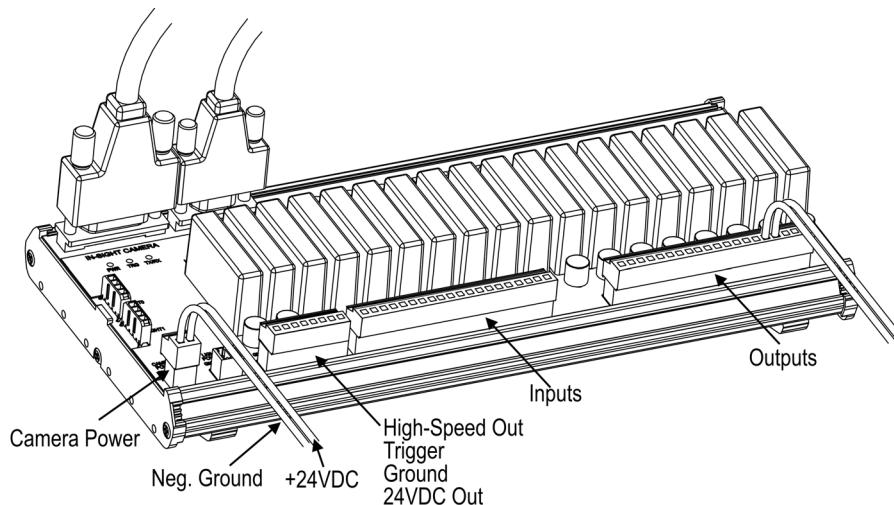


Figure 2-9: Connecting +24VDC and Ground Wires

2.4 Connecting the Model 1450 I/O Expansion Module

Like the 1350 Breakout Module and the Model 1460 I/O Expansion Module, the optional Model 1450 I/O Expansion Module provides convenient access to the In-Sight 3400 sensor's power, serial communications, and discrete I/O lines. In addition to the two discrete outputs, acquisition trigger, and serial transmit/receive that are standard on the In-Sight 3400 sensor, the model 1450 I/O Expansion module provides the following:

- 8 discrete outputs
- 8 discrete inputs
- RS-232 hardware handshaking

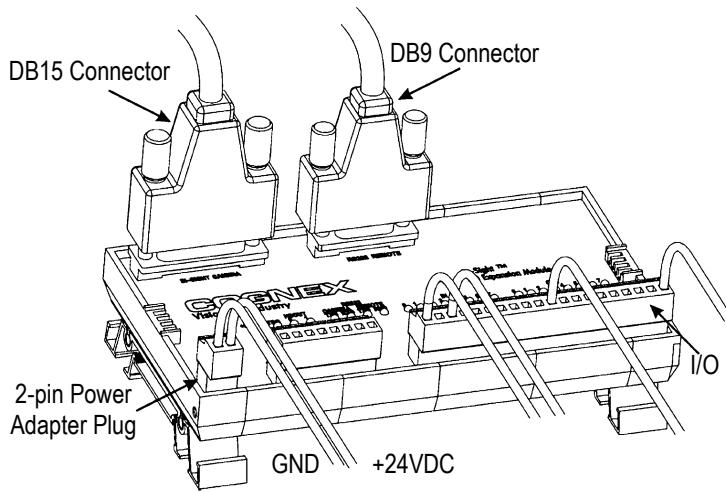


Figure 2-10: Model 1450 I/O Expansion Module Connections

To Connect the Model 1450 I/O Expansion Module to the In-Sight 3400 Sensor:

1. Verify the 24VDC power supply being used is switched off.
2. Optionally, connect the power and ground wires for the acquisition trigger input, discrete outputs and discrete inputs to their corresponding terminals on the Model 1450 I/O Expansion Module.

NOTE The 1450 I/O Expansion Module outputs labeled HSOUT 0 and HSOUT 1 are high-speed outputs direct from the In-Sight 3400 sensor and pass through the Expansion Module. The outputs labeled OUT 0 through OUT 7 are lower speed because their signals are processed by the Expansion Module processor before being sent to remote devices.

3. Optionally, connect the DB9 male connector of an RS-232 serial cable to the corresponding DB9 female connector on the Model I/O 1450 Expansion Module.
4. Plug the I/O Module Cable's DB15 male connector into the corresponding female connector on the Expansion Module.
5. Plug the M12 connector of the Model 1450 I/O Module Cable into the In-Sight 3400 sensor's 24VDC connector.
6. Plug wire leads from a 24VDC supply for the +24V power and ground into the 2-pin terminal plug labeled "Power Input" on the Expansion Module. Alternatively, remove the terminal plug and insert the 2-pin terminal plug attached to the In-Sight power adapter into the keyed power adapter port on the Expansion Module (Figure 2-10).
7. Restore power to the 24V supply. The green PWR LED on the In-Sight 3400 sensor and the +24V LED on the Expansion Module will indicate that the In-Sight 3400 sensor is receiving power.

CAUTION Never connect the 1450 I/O Expansion Module to a power source other than 24VDC. Any other voltage creates a risk of fire or shock and can damage the hardware. Do not connect the 24VDC source to any terminals other than the 2-pin 24VDC power connector.

2.5 Adding the Sensor to a Network Using the In-Sight 3400 GUI

The In-Sight 3400 sensor is ready to be installed as a network host once it has power and is physically connected to the network.

NOTE If the Microsoft "Media Sense" feature, which automatically detects whether or not your network interface is linked to a network, is enabled when running Microsoft Windows 2000 or XP, communication with an In-Sight sensor may not be established. It is recommended to use a hub or switch with a standard Ethernet cable to configure the In-Sight sensor or configure your PC to disable the Media Sense feature. See Microsoft Knowledge Base article 239924 for details on this process.

As previously described, there are many possible In-Sight network configurations. The specific procedure for adding an In-Sight 3400 sensor to a network depends on whether or not a Dynamic Host Configuration Protocol (DHCP) server is available. The DHCP server automatically assigns the In-Sight 3400 sensor a network IP address and Subnet Mask.

NOTE When installing the In-Sight 3400 sensor to an existing network, consult your network administrator to determine whether a DHCP server is available.

2.5.1 Installing to a DHCP Network

The In-Sight 3400 sensor is pre-configured for an existing network with a DHCP server. After connecting the Network cable and supplying power, the DHCP server will automatically detect the In-Sight 3400 sensor, configure its settings, and add it to the network.

NOTE After adding an In-Sight 3400 sensor to a network with a DHCP server, disabling DHCP on the sensor and assigning it a static IP address is strongly recommended. For more information, refer to the Network Settings topic in the *In-Sight® Explorer Help* file.

For an In-Sight 3400 sensor connected to a network with a DHCP server, a user can configure only the Host Name, Host Table, FTP, Time and Advanced settings. A Host Name is an "alias" for the In-Sight 3400 sensor's IP Address, and appears in any list of host names in the In-Sight interface. If you do not enter a new Host Name, the In-Sight 3400 sensor will appear on the network with the default Host Name. Refer to the *In-Sight® Explorer Help* file for information concerning other settings.

After adding the In-Sight 3400 sensor to the network using DHCP, proceed to "Verifying the In-Sight 3400 Sensor Network Connection" (page 22).

2.5.2 Installing to a Non-DHCP Network

To install an In-Sight 3400 sensor on a standalone In-Sight network or factory network without a DHCP server, the sensor's network settings must be configured manually using the In-Sight Control Pad and a VGA display.

Alternately, the In-Sight 3400 sensor may also be configured remotely using a PC running the In-Sight Explorer software program or another In-Sight 3400 sensor already installed on the network. Refer to Section 2.6 for details on adding the sensor to a network using In-Sight Explorer.

Configuring Network Settings Using the In-Sight 3400 GUI

1. Supply power to the In-Sight 3400 sensor and its local display.
2. From the In-Sight spreadsheet, open the System menu and select Settings (Figure 2-11).

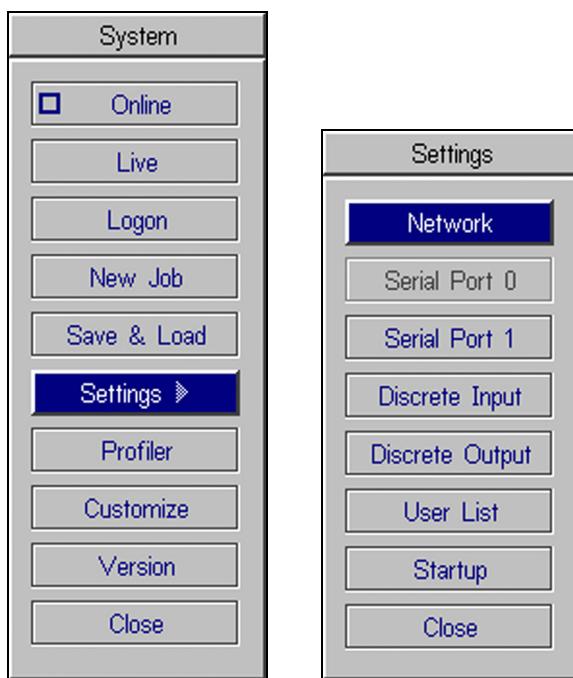


Figure 2-11: System and Settings Menus

3. Select Network to open the Network dialog (Figure 2-12).

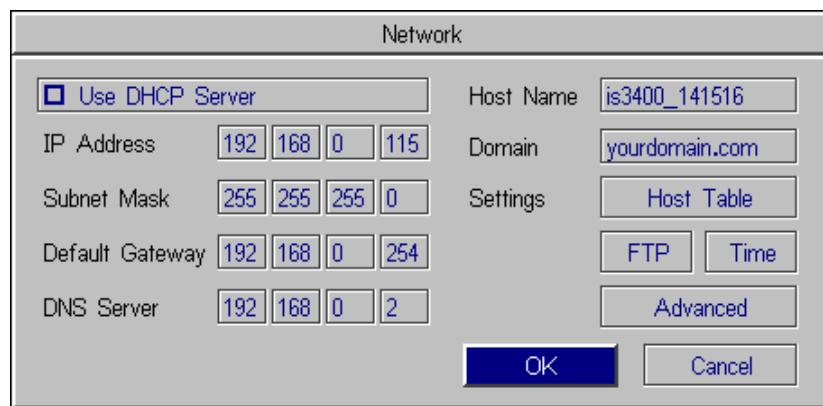


Figure 2-12: Network Dialog

4. Verify that the Use DHCP Server checkbox is disabled.

Each of the Network dialog settings is explained in the following section. For more information, refer to the *In-Sight® Explorer Help* file.

Use DHCP Server

The Use DHCP Server checkbox determines whether the In-Sight 3400 sensor uses DHCP on start up or if the values in the Network dialog will configure TCP/IP.

NOTE This box should be checked only if a DHCP server is running on the local network. If a DHCP server does not respond within 60 seconds after startup, the sensor will boot without network support enabled.

If the network has a DHCP server and the Use DHCP Server check box is enabled, the DHCP server will automatically configure the In-Sight 3400 sensor's network settings on startup. Optionally, a new Host Name may be assigned.

When the Use DHCP Server checkbox is disabled, all Network dialog settings are enabled and must be configured manually.

IP Address

The IP Address assigns a unique identifier for each In-Sight sensor on the network, which must be consistent with the IP address-numbering scheme of the local network.

NOTE The IP Address setting is grayed out when the Use DHCP Server checkbox is enabled.

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Unlike the factory-set MAC address, the IP address is assigned automatically by a DHCP server or can be manually assigned by the user (also referred to as a static IP address). The following IP addressing schemes are recommended:

Table 2-2: IP Address Schemes

ADDRESSING SCHEME	DESCRIPTION
10.0.0.0/8	The 10.0.0.0/8 private network is a class A network ID that allows valid IP addresses from 10.0.0.1 to 10.255.255.254. The 10.0.0.0/8 private network has 24 host bits, which can be used for any subnetting scheme within the private organization. The default Subnet Mask is 255.0.0.0.
172.16.0.0/12	The 172.16.0.0/12 private network can be interpreted either as a block of 16 class B network IDs or as a 20-bit assignable address space (20 host bits) which can be used for any subnetting scheme within the private organization. The 172.16.0.0/12 private network allows valid IP addresses from 172.16.0.1 to 172.31.255.254. The default Subnet Mask is 255.255.240.0.
192.168.0.0/16	The 192.168.0.0/16 private network can be interpreted either as a block of 256 class C network IDs or as a 16-bit assignable address space (16 host bits), which can be used for any subnetting scheme within the private organization. The 192.168.0.0/16 private network allows valid IP addresses from 192.168.0.1 to 192.168.255.254. The default Subnet Mask is 255.255.0.0

Subnet Mask

The Subnet Mask defines which part of the In-Sight 3400 sensor's IP address refers to the network and which part refers to the host.

NOTE When DHCP is enabled, this field is grayed out and displays the value assigned by the DHCP server.

The network part of the IP address is the same for all hosts on the same subnet, and the remainder is unique to each host. As shown in Table 2-3, a Subnet Mask of 255.255.255.0 (a class C mask) identifies 24 bits for the network portion and 8 bits for the host portion.

Table 2-3: Subnet Mask Formats

MASK	CLASS	DESCRIPTION
255.0.0.0	A	8 network/24 host
255.255.0.0	B	16 network/16 host
255.255.255.0	C	24 network/8 host

Most users will not need to change the default Subnet Mask setting of 255.255.255.0.

Default Gateway

The Default Gateway specifies the IP address of the gateway host, if available on the network.

NOTE The Default Gateway setting will be grayed out when the Use DHCP Server checkbox is enabled. The value shown is the gateway assigned by the DHCP server.

The gateway host is responsible for sending and receiving data between hosts on different networks, routing data packets from a sensor on the local subnet to a sensor on another subnet.

For example, if an In-Sight 3400 sensor will need to communicate with a remote host on a different subnet, enter the address of the gateway sensor in the Default Gateway field. However, if the sensor will need to communicate only with sensors on the local subnet, do not enter an address for the Default Gateway (leave the field all zeros).

DNS Server

The Domain Name Server (DNS) specifies the IP address of the host on the network providing DNS resolution, if available.

NOTE The DNS Server setting will be grayed out when the Use DHCP Server checkbox is enabled. The value shown is the DNS Server assigned by the DHCP server.

A Domain name (e.g., `yourdomain.com`) is an alias for a network (e.g., `192.168.0.0`). A DNS Server maintains the data cross-referencing host to IP addresses. The DNS Server setting determines which host is contacted (by IP address) by translating a given Host Name into its corresponding IP address.

Host Name

The Host Name assigns a name, or “alias”, for the In-Sight 3400 sensor, as it will appear when browsing the network.

Each In-Sight 3400 sensor has its host name set automatically the first time it boots. The format is `“is3400_xxxxxx”`, where “`xxxxxx`” consists of the last 6 characters of the In-Sight 3400 sensor’s unique MAC address. For example, an In-Sight 3400 sensor with the MAC Address `00-d0-24-14-15-16` will be assigned the host name, `“is3400_141516”`.

NOTE The Host Name setting is not automatically assigned by the DHCP server (if used) or referenced through the DNS server. If the Use DHCP Server checkbox is enabled and the DHCP server supplies the Host Name, it is ignored in favor of the default host name or the name entered by the user.

Domain

The Domain specifies the In-Sight 3400 sensor’s Fully Qualified Domain Name (FQDN) for the network on which it is installed.

NOTE When the Use DHCP Server check box is enabled, this field is grayed out and displays the value assigned by the DHCP server.

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An In-Sight 3400 sensor must have a FQDN to be accessible from a remote host that is not part of the local network. The Domain setting sets the string that is appended to the host name to make a FQDN.

For example, setting Domain to **yourdomain.com** yields the following results:

- If a host name is **sensor1**, the FQDN for lookup is **sensor1.yourdomain.com**.
- If a host name is **sensor1.yourdomain.com**. (note the period at the end), the FQDN for lookup is still **sensor1.yourdomain.com**.

Appending the period to the end of the host name prevents redundancy in appending the Domain name to the FQDN. For example, if the period were omitted, **sensor1.yourdomain.com** would become **sensor1.yourdomain.com.yourdomain.com**.

FTP Settings and Host Table

The FTP button opens the FTP Settings dialog to configure the File Transfer Protocol (FTP). The Host Table button opens the Host Table dialog to specify a local mapping of host names to IP addresses. Neither FTP Settings nor Host Table settings are required for installing the In-Sight 3400 sensor to a network.

Advanced Settings

The Advanced button opens the Advanced dialog to configure the sensor's DHCP Timeout. The DHCP Timeout specifies the time an In-Sight sensor will wait for a DHCP server to respond with an available IP address, when the sensor is configured for DHCP. If a DHCP server does not provide the sensor with an IP address within the specified timeout period, network communication on the sensor will be suspended. The sensor will not attempt to connect to the network again until power is cycled on the sensor.

2.5.3 Verifying the In-Sight 3400 Sensor Network Connection

Perform the following steps to verify the In-Sight 3400 sensor network configuration using the In-Sight 3400 GUI:

1. Supply power to the In-Sight 3400 sensor and its local display. If the In-Sight 3400 sensor is connected to the network, the startup screen will show the MAC Address, Host Name, Domain Name, IP Address, Subnet Mask, Gateway and DNS Server. If the In-Sight 3400 sensor is not connected to the network, this information will not appear.

2. From the spreadsheet, open the System menu and click Logon to open the Logon dialog (Figure 2-13).

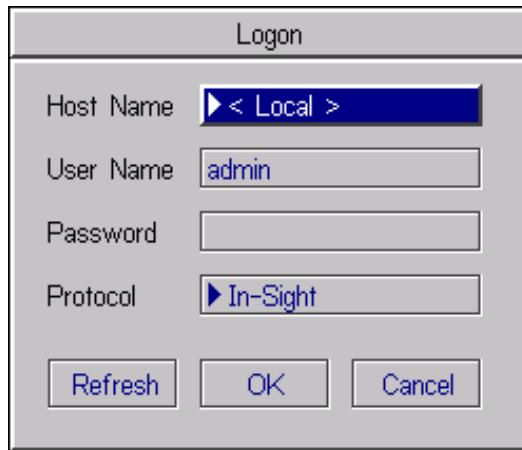


Figure 2-13: Logon Dialog

3. Select the Host Name field to open the drop-down list. If the In-Sight 3400 sensor is connected to the network, the Host Name list will contain the names of PCs running In-Sight Explorer software and other In-Sight sensors on the local network. If an expected Host Name does not appear, click the Refresh button.
4. Select a name, and then click OK. A message will appear while the In-Sight 3400 GUI logs on to the In-Sight sensor you selected. The spreadsheet for that sensor will appear. The Host Name of the sensor you are logged on to is displayed in the lower-left corner of the spreadsheet.

NOTE To log on to a sensor, you must supply a valid User Name and password. New In-Sight sensors are shipped with a User List containing three standard accounts: admin, monitor and operator; each of these accounts is configured with a blank password.

5. Open the System menu and select Live to view an acquired image. If the image appears, the In-Sight 3400 sensor has a fully functional network connection.

NOTE If the In-Sight 3400 sensor does not have a fully functional network connection, verify the In-Sight network settings. In the In-Sight Network dialog, verify that the IP Address and Subnet Mask are valid.

This completes the basic installation procedure for adding an In-Sight 3400 sensor onto a network using the In-Sight 3400 GUI. For information on using your In-Sight 3400 sensor, refer to the *In-Sight® Explorer Help* file included on your In-Sight CD-ROM.

2.6 Installing the In-Sight Software on a Windows PC

The In-Sight 3400 sensor may be configured, and its operation monitored over an Ethernet network from a PC. An In-Sight 3400 sensor accessed from a networked PC is configured using mouse and keyboard input. The following must be installed on the PC:

- Microsoft® Windows® XP or 2000 (Service Pack 4 or later) for In-Sight Explorer version 3.1.0 and higher.
- Microsoft Windows XP Professional, 2000, NT 4.0 (Service Pack 4 or later), ME or 98SE for In-Sight Explorer version 2.51 through 2.80.
- Microsoft .NET Framework 1.1 SP1 for In-Sight Explorer version 3.1.0 and higher.
- Network Interface Card (at least 100Mbps) for connecting to In-Sight sensors.
- Internet Explorer 4.0 or higher, to display the *In-Sight® Explorer Help*.

NOTE In-Sight software can be used only on a local subnet that includes a networked In-Sight sensor.

Perform the following Steps to Install the In-Sight Software:

1. Shut down any applications on your PC.
2. Insert the In-Sight installation CD-ROM into your PC's CD-ROM drive. The install program should start automatically; follow the setup dialogs as they appear on screen.
3. When the installation program is complete, remove the CD from the CD-ROM drive.

Verify the In-Sight Software Installation:

1. Verify the In-Sight Explorer software installation by opening the Start menu and clicking *All Programs > Cognex > In-Sight > In-Sight Explorer > In-Sight Explorer*.
2. Verify the *In-Sight® Explorer Help* file installation by opening the Start menu and clicking *All Programs > Cognex > In-Sight > In-Sight Explorer > In-Sight Explorer Help*.

NOTE From the Cognex program group, select In-Sight Release Notes for current information about In-Sight software, including new features, fixes and known issues. Registered In-Sight users can download updated versions of In-Sight documentation at: www.cognex.com/support/In-Sight.asp.

2.7 Adding the Sensor to a Network Using In-Sight Explorer

The In-Sight 3400 sensor is ready to be installed as a network host once it has power and is physically connected to the network.

NOTE If the Microsoft "Media Sense" feature, which automatically detects whether or not your network interface is linked to a network, is enabled when running Microsoft Windows 2000 or XP, communication with an In-Sight sensor may not be established. It is recommended to use a hub or switch with a standard Ethernet cable to configure the In-Sight sensor or configure your PC to disable the Media Sense feature. See Microsoft Knowledge Base article 239924 for details on this process.

As previously described, there are many possible In-Sight network configurations. The specific procedure for adding an In-Sight 3400 sensor to a network depends on whether or not a Dynamic Host Configuration Protocol (DHCP) server is available. The DHCP server automatically assigns the In-Sight 3400 sensor a network IP address and Subnet Mask.

NOTE When installing the In-Sight 3400 sensor to an existing network, consult your network administrator to determine whether a DHCP server is available.

Refer to Appendix C for details on adding the sensor to a network using In-Sight PC Host.

2.7.1 Installing to a DHCP Network

The In-Sight 3400 sensor is pre-configured for an existing network that uses a DHCP server. After connecting the network cable and supplying power, the DHCP server will automatically detect the In-Sight 3400 sensor, configure its settings, and add it to the network. If your network does not use a DHCP server, use the In-Sight Connection Manager to establish communication with your In-Sight 3400 sensor. The In-Sight Connection Manager is a utility that allows you to quickly set up new In-Sight sensors.

NOTE After adding an In-Sight 3400 sensor to a network with a DHCP server, disabling DHCP on the sensor and assigning it a static IP address is strongly recommended. For more information, refer to the Network Settings topic in the *In-Sight® Explorer Help* file.

For an In-Sight 3400 sensor connected to a network with a DHCP server, a user can configure only the Host Name, DHCP Timeout and EIP I/O Watchdog Timeout Action settings. A Host Name is an "alias" for the In-Sight 3400 sensor's IP Address, and appears in any list of host names in the In-Sight interface. If you do not enter a new Host Name, the In-Sight 3400 sensor will appear on the network with the default Host Name. For more information on assigning a Host Name, proceed to "Modifying the In-Sight 3400 Sensor Network Settings" on page 32.

After adding the In-Sight 3400 sensor to the network using DHCP, proceed to "Logging On to the In-Sight 3400 Sensor" (page 31).

2.7.2 Installing to a Non-DHCP Network

To install an In-Sight 3400 sensor on a network that does not provide a DHCP server, use the In-Sight Connection Manager to configure the In-Sight 3400 sensor's network settings. This installation may also require changes to network settings in Microsoft Windows (see Appendix A, page 55).

1. Ensure that the sensor is connected to the network and has power.
2. Open the In-Sight Connection Manager from the Cognex Program group on the Start Menu.
3. Select the second option, "Setup one or more In-Sight vision sensors to work on my network" (Figure 2-14). Click Next.

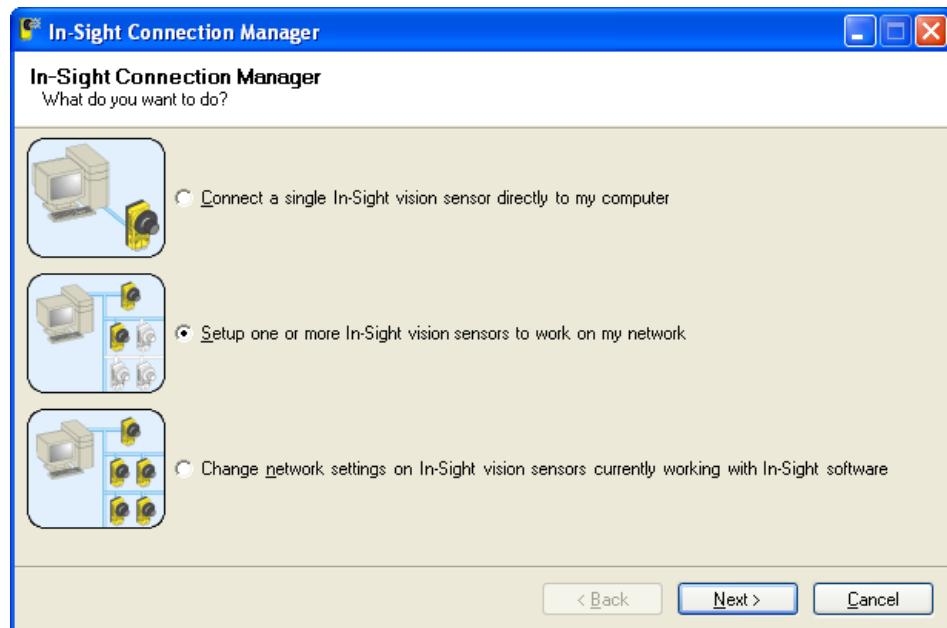


Figure 2-14: In-Sight Connection Manager

4. You may need to supply administrative credentials (User Name and Password) for at least one In-Sight sensor on your network in order to proceed (Figure 2-15). Click Next.

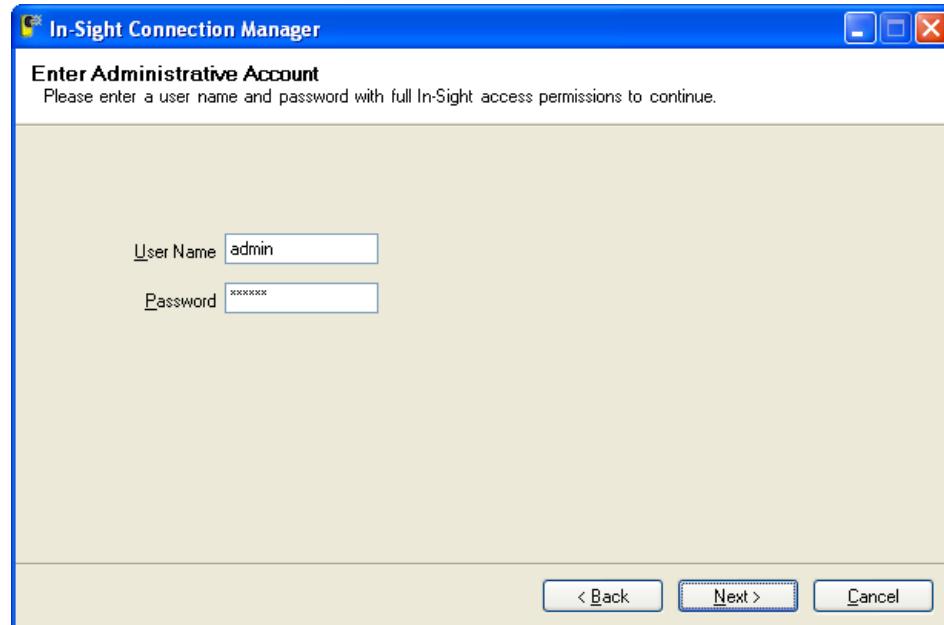


Figure 2-15: User Name and Password

In-Sight 3400 Installation

5. In the left-hand text box, enter the MAC Address for the In-Sight sensor you would like to configure, then click Add (Figure 2-16). Repeat these two steps for any additional sensors you would like to configure. Alternately, you can simply cycle power on any In-Sight sensors you would like to configure, and the In-Sight Connection Manager will automatically add the corresponding MAC address to the list after they reboot. Click Next.

NOTE The MAC address is located on the serial number label affixed to the In-Sight 3400 sensor. This identifier is factory-assigned, unique for every In-Sight sensor and cannot be changed or deleted.

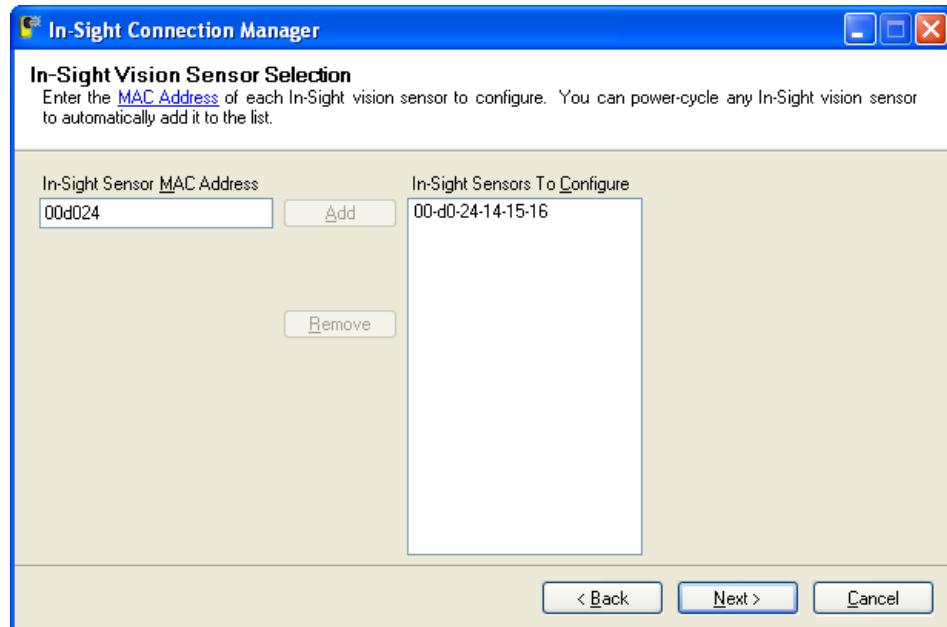


Figure 2-16: MAC Address

6. In the Set Network Configuration dialog (Figure 2-17), select the first option, “Use The Following Network Settings For All Sensors”.

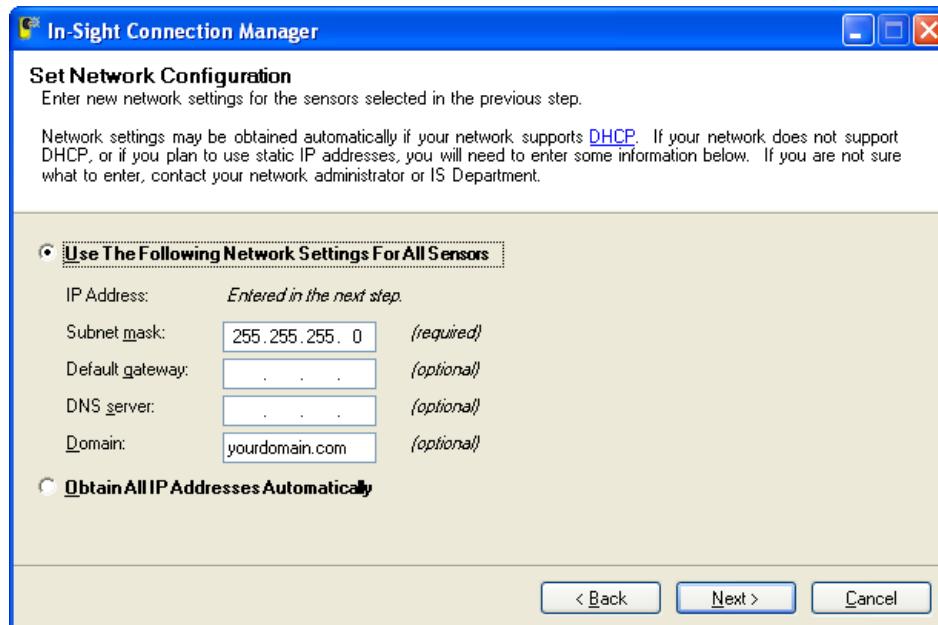


Figure 2-17: Set Network Configuration Dialog

7. Enter values for the **Subnet mask**; these settings will be applied to every sensor. The Subnet Mask specifies which parts of the In-Sight 3400 sensor's IP Address are the same for all hosts on the local network and which are unique to each host. See Table 2-3 or consult your network administrator for more information.
8. Optionally, enter values for the Default gateway, DNS server and Domain; these settings will be applied to every sensor.
 - **Default Gateway:** Specifies the IP address of the gateway host, if available on the network. The gateway host is responsible for sending and receiving data between hosts on different networks.
 - **DNS Server:** Specifies the IP address of the host on the network providing DNS resolution, if available.
 - **Domain:** Specifies the network Domain for the host network.
9. Click Next.

In-Sight 3400 Installation

10. For each sensor in the table (Figure 2-18), enter a unique IP address in the New IP column. Optionally, you can type in meaningful names for each sensor under the New Name column.
11. Click Next.

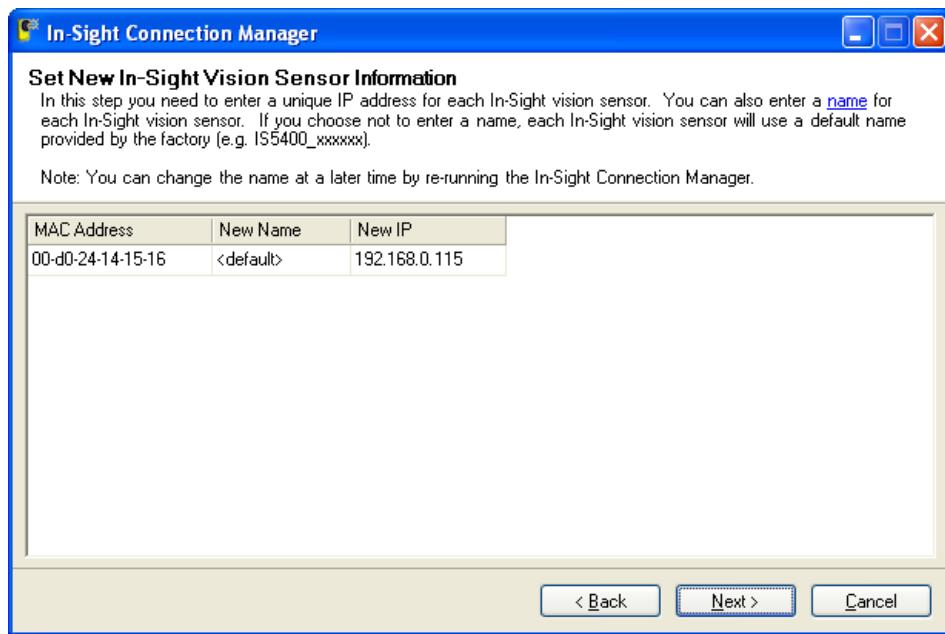


Figure 2-18: Enter IP Address

12. Click Configure.

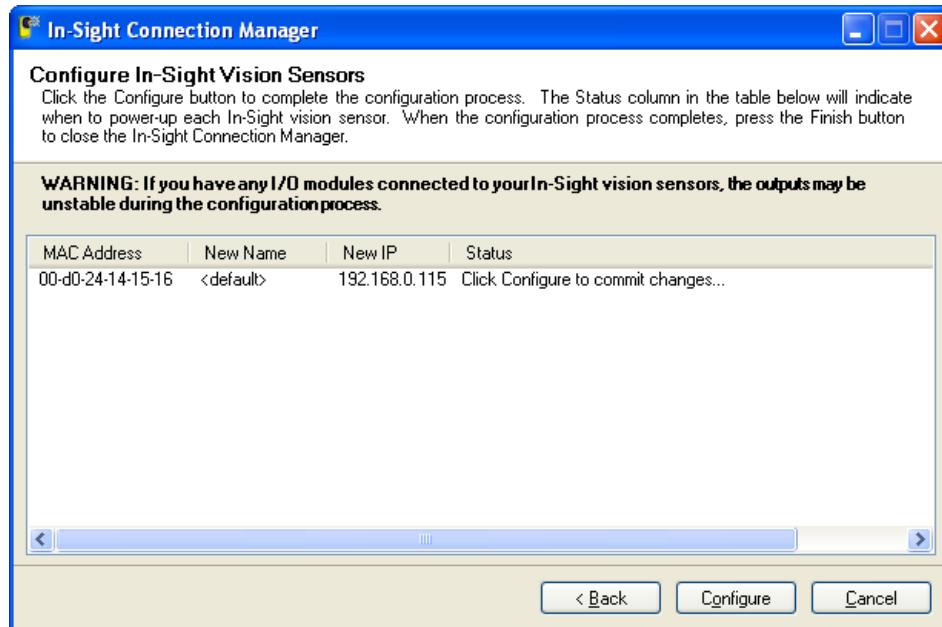


Figure 2-15: Configure In-Sight Vision Sensors

13. For every sensor in the table, disconnect the power for five seconds and reconnect it. The status text will change once the new network settings have been confirmed.
14. Once all sensors have been configured, click Finish.

2.7.3 Logging On to the In-Sight 3400 Sensor

After the In-Sight 3400 sensor has been added to the network, log on to the sensor to verify the installation and to configure additional network settings. To log on to a sensor, you must supply a valid User Name and Password. New In-Sight sensors are shipped with a User List containing three standard accounts: admin, monitor and operator; each of these accounts is configured with a blank password. Refer to Appendix C for details on logging on to your sensor using In-Sight PC Host.

1. Attach a lens to the In-Sight 3400 sensor to verify the acquisition of live video images. The exact focal length needed depends on the working distance and the field of view required in your machine vision application. For now, any compatible lens may be used.
2. Open the In-Sight Explorer program. When In-Sight Explorer is launched, the admin user is logged on by default.
3. Double-click the In-Sight sensor from the In-Sight Network tree. This will send the default User Name and Password to the sensor and display its Job View.
4. Open the Image menu and select Live Mode to view an acquired image over the network. If the image appears, the In-Sight 3400 sensor has a fully functional network connection.

2.7.4 Modifying the In-Sight 3400 Sensor Network Settings

You may need to change the In-Sight 3400 sensor's network settings when installing to a non-DHCP network where a Default Gateway, DNS Server and Domain name are used, or when moving the In-Sight 3400 sensor from one network to another. Refer to Appendix C for details on changing the In-Sight 3400 sensor's network settings using In-Sight PC Host.

1. Open the In-Sight Explorer program.
2. Log on to the In-Sight 3400 sensor.
3. On the Sensor menu, click Network Settings to open the Network Settings dialog (Figure 2-19).

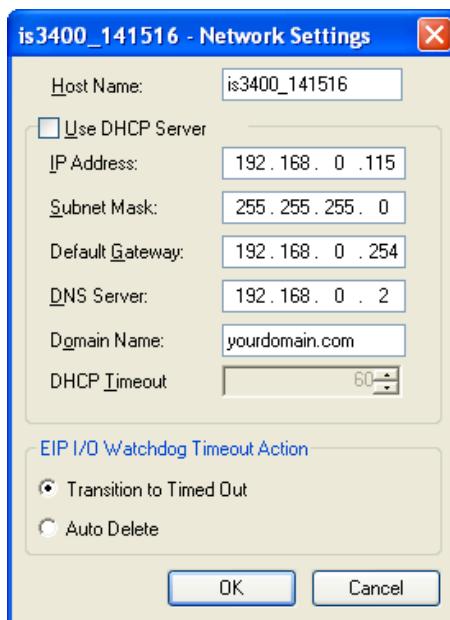


Figure 2-19: Network Settings Dialog

The following network settings can be changed using the Network Dialog:

- **Host Name:** Defines the name of the In-Sight sensor, as it will appear in the In-Sight Network. If the local system is a networked PC running the In-Sight Explorer software, the Host Name will automatically be inherited from the Computer Name defined in the Windows operating system. Each In-Sight sensor has its host name set automatically the first time it boots. For example, an In-Sight 3400 sensor's host name is "is3400_xxxxxx". For every sensor, "xxxxxx" is given by the last 6 characters of the sensor's unique MAC Address. For example, an In-Sight 3400 sensor with the MAC Address 00-d0-24-14-15-16 will be assigned the host name, "is3400_141516".
- **IP Address:** Assigns a unique identifier for each In-Sight sensor on the network, which must be consistent with the IP address-numbering scheme of the local network.
- **Subnet Mask:** Defines which part of the IP address refers to the network and which part refers to the host. The network part of the IP address is the same for all hosts on the same subnet, and the remainder is unique to each host.

- **Default Gateway:** Specifies the IP address of the gateway host, if available on the network. The gateway host is responsible for sending and receiving data between hosts on different networks.
- **DNS Server:** Specifies the IP address of the host on the network providing DNS resolution, if available.
- **Domain Name:** Specifies the network Domain for the host network.
- **DHCP Timeout:** Specifies the time an In-Sight sensor will wait for a DHCP server to respond with an available IP address, when the sensor is configured for DHCP. If the sensor times out, network communication will be suspended. The sensor will not attempt to connect to the network again until power is cycled on the sensor.
- **EIP I/O Watchdog Timeout Action:** Specifies the In-Sight Ethernet/IP implicit connection timeout behavior.

This completes the basic installation procedure for adding an In-Sight 3400 sensor onto a network using In-Sight Explorer. For information on using your In-Sight 3400 sensor, refer to the *In-Sight® Explorer Help* file.

In-Sight 3400 Installation

3 Using the Control Pad



In This Section...

3.1	Direction Buttons	35
3.2	Action Buttons.....	36

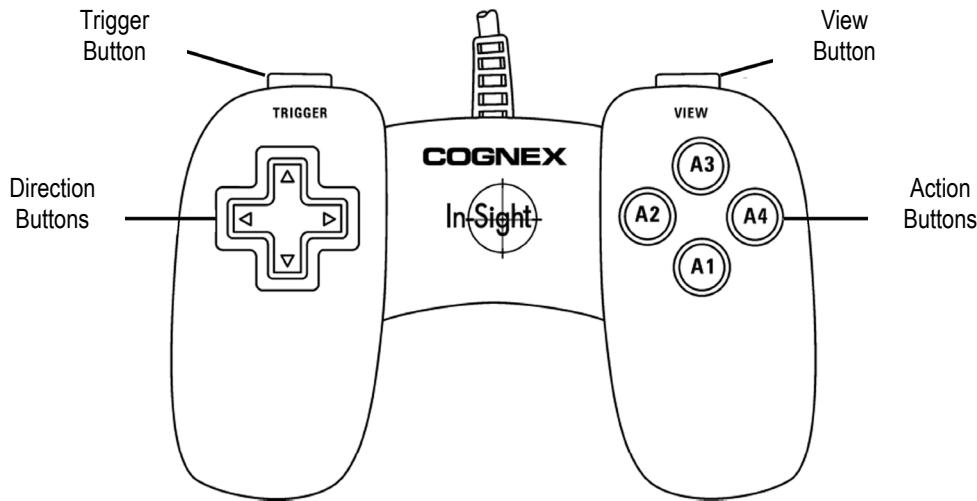


Figure 3-1: Control Pad

3.1 Direction Buttons

The direction buttons are used in many common operations, including interface navigation, manipulating regions of interest, incrementing/decrementing numeric values and selecting ranges of cells. The exact behavior of the direction buttons is context-sensitive.

The up direction moves the on-screen highlight up, decreases the size of a region and increments numeric values. In the spreadsheet, pressing this button while holding the A4 button selects an entire column of cells.

The down direction moves the highlight down, increases the size of a region and decrements numeric values.

The left direction moves the highlight left, decreases the width of a region, rotates a region counter-clockwise, curves a region up and selects a digit to increment in a numeric value. In the spreadsheet, pressing while holding the A4 button selects an entire row of cells.

The right direction moves the highlight right, increases the width of a region, rotates a region clockwise, curves a region down and selects a digit to increment in a numeric value.

3.1.1 Trigger Button

This button manually triggers an image acquisition and updates the spreadsheet.

3.1.2 View Button

This button switches the display between the default view and the Custom view of the current spreadsheet.

3.2 Action Buttons

The four action buttons are used to open menus, enter formula data, and manipulate interactive graphics.

Press and release A1 to select a highlighted item and perform an action or confirm a change. Press and hold down A1 to open the Enter menu. Pressing A1 is similar to pressing ENTER on a computer keyboard.

In a property sheet, press A2 to access Interactive Graphics mode. In the Formula Editor, press A2 to access editing shortcuts, including backspace. In Numeric Edit mode, press A2 to zero numbers.

In the spreadsheet, press A3 to open the System menu. In all other contexts, press A3 to cancel changes and escape to the previous menu or dialog. Pressing A3 is equivalent to pressing ESC on a computer keyboard.

Press A4 to open the Edit menu in the spreadsheet and in property sheets. In Numeric Edit mode, press A4 to maximize numbers.

4 Specifications



In This Section...

4.1	General Specifications	37
4.2	Detailed I/O Specifications.....	40
4.3	Dimensional Drawings	50

4.1 General Specifications

The following sections list general specifications for the In-Sight 3400 sensor and remote head camera, and the remote head camera enclosure.

4.1.1 In-Sight 3400 Sensor Specifications

Table 4-1: In-Sight 3400 Sensor, General Specifications

SPECIFICATION		DESCRIPTION
Firmware		In-Sight version 3.1.0 and later.
Memory	Job/ Program ¹	32MB non-volatile flash memory. Unlimited storage via remote network device.
	Image/ Processing	64MB SDRAM. Only 48MB available for Imaging/Processing.
I/O	Trigger	1 opto-isolated, acquisition trigger input.
		Remote software commands via Ethernet and RS-232.
	Inputs	Eight discrete inputs, using optional I/O Expansion Module.
	Outputs	2 built-in, high-speed outputs.
		Eight additional discrete outputs, using optional I/O Expansion Module.
	Status LEDs	7 total: power, network, camera, high-speed outputs (2) and user-defined (2).
Communications	Network	1 Ethernet port, 10/100 Base-T, TCP/IP protocol. 100 Base T is recommended. Supports DHCP (factory default) or static IP address.
	Serial	RS-232C port (4800 to 115,200 baud rates).
Power	24VDC ±10%, isolated, 500mA.	
Mechanical	Material	Painted, cast aluminum housing.
	Mounting	Four 6.86mm (.27") thru-holes.
	Dimensions	Width: 293.1mm (11.54"), Depth: 142.5mm (5.61"), Height: 45.5mm (1.79").
	Weight	1094g (2 lb., 7 oz.).
Environmental	Temperature	0° to 60°C (Operating), -40° to 85°C (Storage).
	Humidity	95%, non-condensing (Operating and Storage).
	Protection	IP52.
	Shock	30G Shock per IEC 68-2-27.
	Vibration	2G from 10-2000Hz Vibration per IEC 68-2-6.
Certifications	CE, FCC, UL, CUL.	

1. In-Sight 3400 sensors with P/N 800-5809-1 Rev. F and higher have 32MB of non-volatile flash memory. All prior In-Sight 3400 sensors have 16MB of non-volatile flash memory. To locate the Part Number, refer to the Part Number label on the front panel of your sensor. In-Sight 3400 sensors with 16MB of non-volatile flash memory are compatible with In-Sight firmware version 2.51 and higher.

4.1.2 In-Sight 3400 Remote Head Camera Specifications

Table 4-2: In-Sight 3400 Remote Head Camera, General Specifications

SPECIFICATION		DESCRIPTION
Image	Sensor	1/3-inch CCD
	Optical Properties	6mm 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 50ms i.e., 25ms, 75ms, 125ms, etc.)
	Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration. 256 gray levels (8 bits/sec). Gain controlled by software. Up to 38 frames per second.
	Lens Type	CS-mount and C-mount (with 5mm extension, included).
	Image Repeatability ¹	±0.01in (0.254mm), (both x and y) from lens C-mount axis to center of imager.
	Material	Anodized, cast aluminum housing.
	Mounting	Three M3 threaded holes.
Mechanical	Dimensions	32mm (1.26") diameter, 50mm (1.97") length.
	Weight	68g (2.4 oz.) without lens.
	Temperature	0° to 50°C (Operating), -30° to 80°C (Storage).
	Humidity	95%, non-condensing (Operating and Storage).
	Protection	IP20 (NEMA 1) Only remote head without lens or enclosure.
Environmental	Shock	80G Shock with 150 gram or lighter lens per IEC 68-2-27. Remote head properly mounted using Cognex mounting bracket with vibration damper tube.
	Vibration	10G from 10-500Hz Vibration per IEC 68-2-6 with 150 gram or lighter lens attached. Remote head properly mounted using Cognex mounting bracket with vibration damper tube.
Certifications	CE, FCC, UL, CUL.	

1. Expected repeatability between cameras. This equates to ~ ±34 pixels on a 640 x 480 resolution camera.

4.1.3 Remote Head Camera Enclosure Specifications

Table 4-3: Remote Head Camera Enclosure Specifications

PARAMETER	SPECIFICATION
Mechanical	Material Black anodized aluminum housing with glass window. Stainless steel housing with polycarbonate window (optional).
	Mounting Three M3 threaded holes.
Dimensions	Without camera: 65.8 mm (2.59 in) high x 46.0 mm (1.81) diameter. Nominal height with camera: 79.2 mm (3.12 in) to 93.6 mm (3.69 in).
Weight	136.1 g (4.8 oz), without camera.
Protection	IP67 (NEMA 5).

4.2 Detailed I/O Specifications

Cable and connector specifications and connection examples for the Acquisition Trigger input and the high-speed outputs are provided in the following sections.

4.2.1 Acquisition Trigger Input

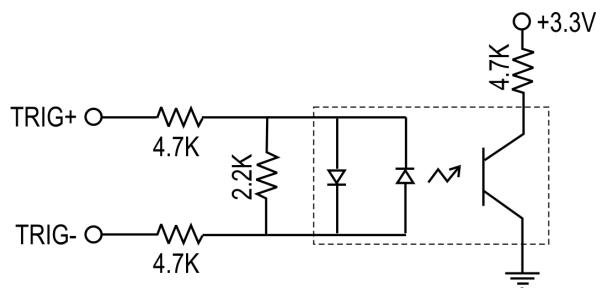
Table 4-4: Acquisition Trigger Input Specifications

SPECIFICATION	DESCRIPTION
Voltage	ON 20 to 28V (24V nominal)
	OFF 0 to 3V (12V nominal threshold)
Current	ON 1.8 to 2.7mA
	OFF <150µA
	Resistance ~10,000 Ohms
Delay	62µSec nominal latency between leading edge of trigger and start of acquisition. Input pulse should be minimum of 1ms wide.

The acquisition trigger input on the In-Sight 3400 sensor is opto-isolated. To trigger from an NPN (pull-down) type photo-detector or PLC output, connect pin 2 (TRG+) to +24V and connect pin 3 (TRG-) to the output of the detector. When the output turns ON, it pulls TRG- down to 0V, turning the opto-coupler ON.

To trigger from a PNP (pull-up) photo-detector or PLC output, connect pin 2 (TRG+) to the output of the detector 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 In-Sight 3400 sensor 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 Expansion Modules, the polarity of the TRG+ and TRG- terminals should be observed.



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

Figure 4-1: Acquisition Trigger Input Schematic

4.2.2 High-Speed Outputs

In-Sight 3400 sensors feature two built-in, high-speed outputs.

Table 4-5: High-Speed Output Specifications Table

SPECIFICATION	DESCRIPTION
Voltage	28V maximum through external load.
Current	200mA maximum sink current.
	OFF state leakage current 200µA maximum.
	External load resistance 120 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.

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 0V when ON, 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.

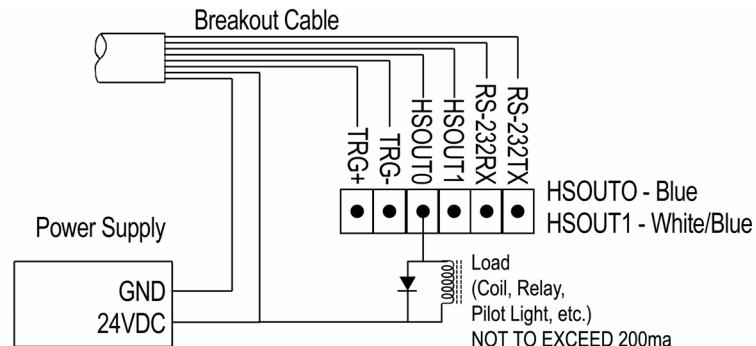


Figure 4-2: High-Speed Output Connection Example 1

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 the PLC input down to 0V.

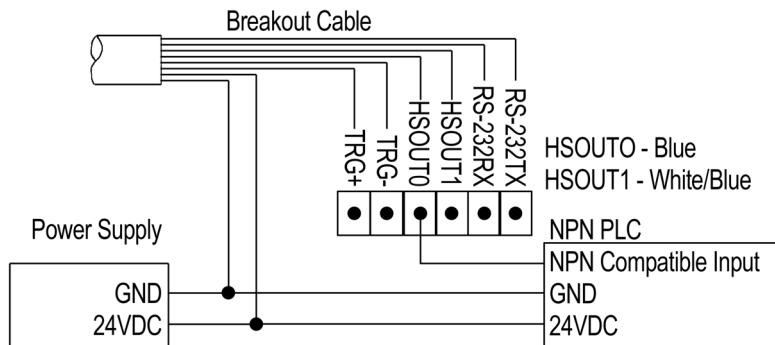


Figure 4-3: High-Speed Output Connection Example 2

Example 3

High-Speed outputs can also be used with a PNP-compatible PLC input if a pull-up resistor (for example, 2.2k Ohm 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.

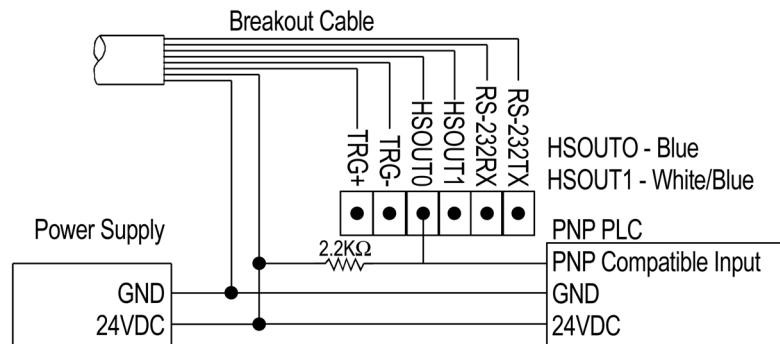


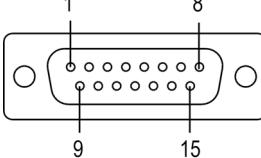
Figure 4-4: High-Speed Output Connection Example 3

The **HSOUT** status LEDs on the In-Sight 3400 sensor indicate the state of the outputs. The LEDs will illuminate when the outputs are actively pulled low (NPN type output).

4.2.3 Control Pad and Connector Specifications

The In-Sight 3400 sensor can be configured locally using an In-Sight Control Pad connected to the sensor. Table 4-6 provides pin numbers and assignments for the CONTROL PAD port.

Table 4-6: Control Pad Port Pin Numbers and Assignments

					
PIN#	SIGNAL NAME	PIN#	SIGNAL NAME	PIN#	SIGNAL NAME
1	Power, +5 VDC	6	Analog 1 (cursor)	1 1	Analog 2 (cursor)
2	Button 1	7	Button 2	1 2	Ground
3	Analog 0 (cursor)	8	Not connected	1 3	Analog 3 (cursor)
4	Ground	9	Power, +5 VDC	1 4	Button 4
5	Ground	1 0	Button 3	1 5	Not connected

4.2.4 24VDC Breakout Connector and Cable Specifications

The 24VDC Breakout connector provides access to power, serial communications, trigger and high-speed outputs. The Breakout cable is not terminated (Table 4-7).

Table 4-7: 24VDC Breakout Connector 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) *	Orange
7	RS-232 Transmit (TxD) *	White/Brown
8	Ground	Brown

* If hardware handshaking is required, an I/O Expansion Module must be used.

4.2.5 I/O Module Cable

The I/O Module cable (Table 4-8) is included with the 1350 I/O Breakout Module, optional 1460 I/O Expansion Module and the optional 1450 I/O Expansion Module. The I/O Module cable connects the In-Sight 3400 sensor directly to the applicable I/O Expansion module via the DB15 connector. When the 1350 Breakout Module, 1460 I/O Expansion Module or 1450 I/O Expansion Module is used, all power and communication lines used by the In-Sight 3400 sensor are connected via the I/O Module cable.

The I/O Module cable is available in 5M (PN 185-0099) and 10M (PN 185-0090) lengths.

NOTE Refer to the 1460 I/O Expansion Module, 1450 I/O Expansion Module or 1350 Breakout Module Installation Manual for more connection information.

Table 4-8: 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)	6
7	RS-232 Transmit (TxD)	7
8	Ground	8

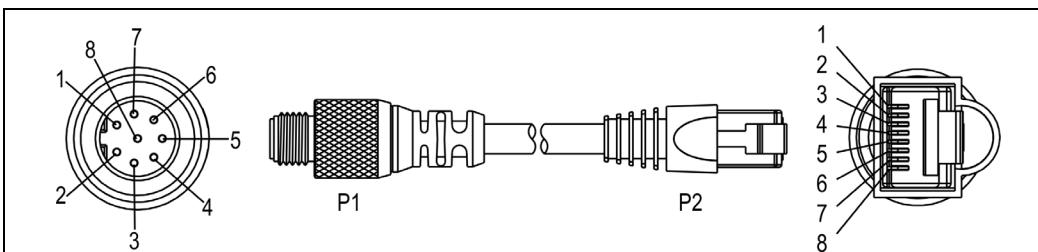
4.2.6 Network Cable Specifications

The Network cable is used to connect the In-Sight 3400 sensor to other network sensors. The Network cable provides network connections to multiple sensors via a network switch or router, or a single sensor using the Crossover Coupler.

The Crossover Coupler is used with the Network cable for applications requiring a Crossover Cable. The pin-out for the Crossover Coupler matches that of a standard CAT5/e Crossover cable.

NOTE The wiring for this cable follows standard industrial Ethernet M12 specifications. This varies from the 568B standard.

Table 4-9: Network Cable Pin-Out



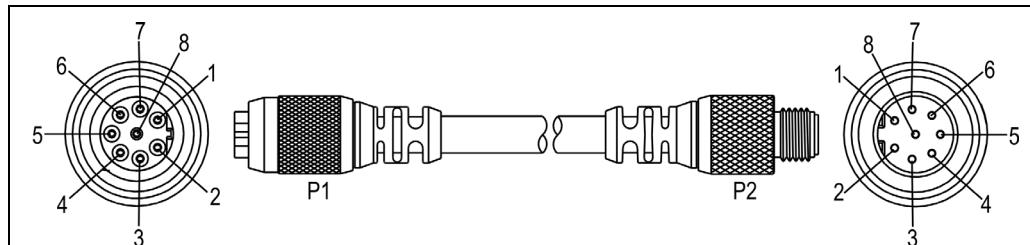
SIGNAL NAME	P1 PIN#	P2 PIN#	WIRE COLOR	CROSSOVER COUPLER FEMALE CONNECTOR	CROSSOVER COUPLER MALE CONNECTOR
TPO+	6	1	White/Orange	1	3
TPO-	4	2	Orange	2	6
TPI+	5	3	White/Green	3	1
TRMA	7	4	Blue	4	5
TRMB	1	5	White/Blue	5	4
TPI-	8	6	Green	6	2
TRMC	2	7	White/Brown	7	8
TRMD	3	8	Brown	8	7

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4.2.7 Camera Cable Specifications

The Camera cable connects the In-Sight 3400 remote head camera to the sensor. The Camera cable provides power and communications to the camera.

Table 4-10: Camera Cable Pin-Out

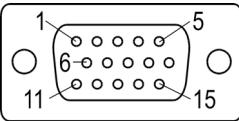


P1 PIN#	SIGNAL NAME	P2 PIN#
1	CTRL+	1
2	CTRL-	2
3	DAT+	3
4	+17V	4
5	-10V	5
6	DAT-	6
7	+6V	7
8	GND	8

4.2.8 VGA Connector Specifications

The VGA connector located on the In-Sight 3400 sensor is a standard, analog VGA, DB15 connector. This connection may be used to connect any standard VGA monitor.

Table 4-11: VGA Connector Pin-Out

		
PIN#	NAME	DESCRIPTION
1	RED	Red Video (75 Ohm, 0.7 V p-p)
2	GREEN	Green Video (75 Ohm, 0.7 V p-p)
3	BLUE	Blue Video (75 Ohm, 0.7 V p-p)
4	ID2	Monitor ID Bit 2
5	GND	Ground
6	RGND	Red Ground
7	GGND	Green Ground
8	BGND	Blue Ground
9	KEY	Key (No pin)
10	SGND	Sync Ground
11	ID0	Monitor ID Bit 0
12	ID1 or SDA	Monitor ID Bit 1
13	H SYNC or CSYNC	Horizontal Sync (or Composite Sync)
14	V SYNC	Vertical Sync
15	ID3 or SCL	Monitor ID Bit 3

4.3 Dimensional Drawings

Dimensional drawings for the In-Sight 3400 sensor components are provided in the following sections:

4.3.1 Sensor Dimensions

The In-Sight 3400 sensor dimensions are illustrated in Figure 4-5. Dimensions are in millimeters (inches).

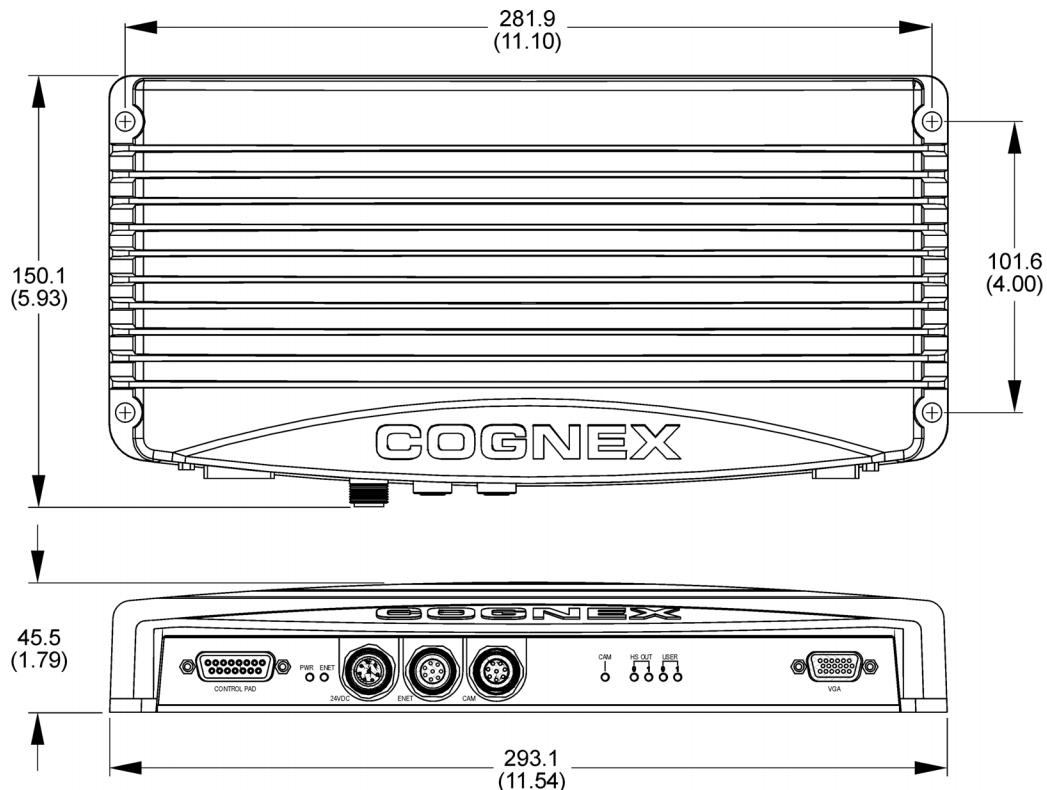


Figure 4-5: In-Sight 3400 Sensor Dimensions

4.3.2 Remote Head Camera Dimensions

The In-Sight 3400 remote head camera dimensions are illustrated in Figure 4-6. Dimensions are in millimeters (inches).

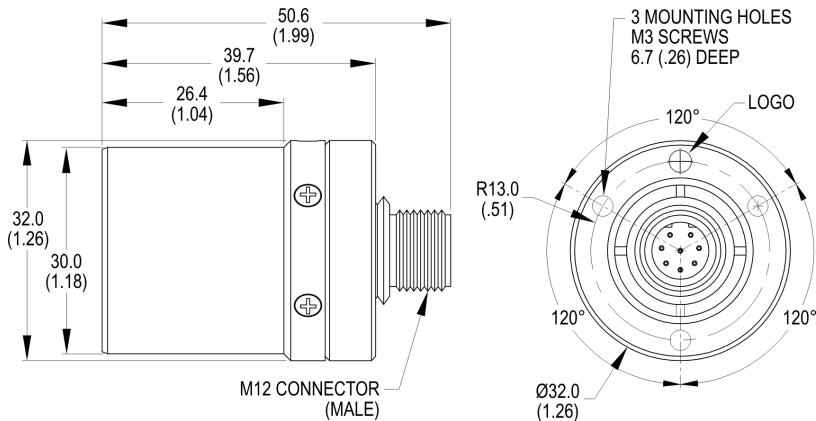


Figure 4-6: Remote Head Camera Dimensions

Specifications

4.3.3 Remote Head Camera Enclosure Dimensions

The remote head camera enclosure dimensions are illustrated in Figure 4-7. Dimensions are in millimeters (inches).

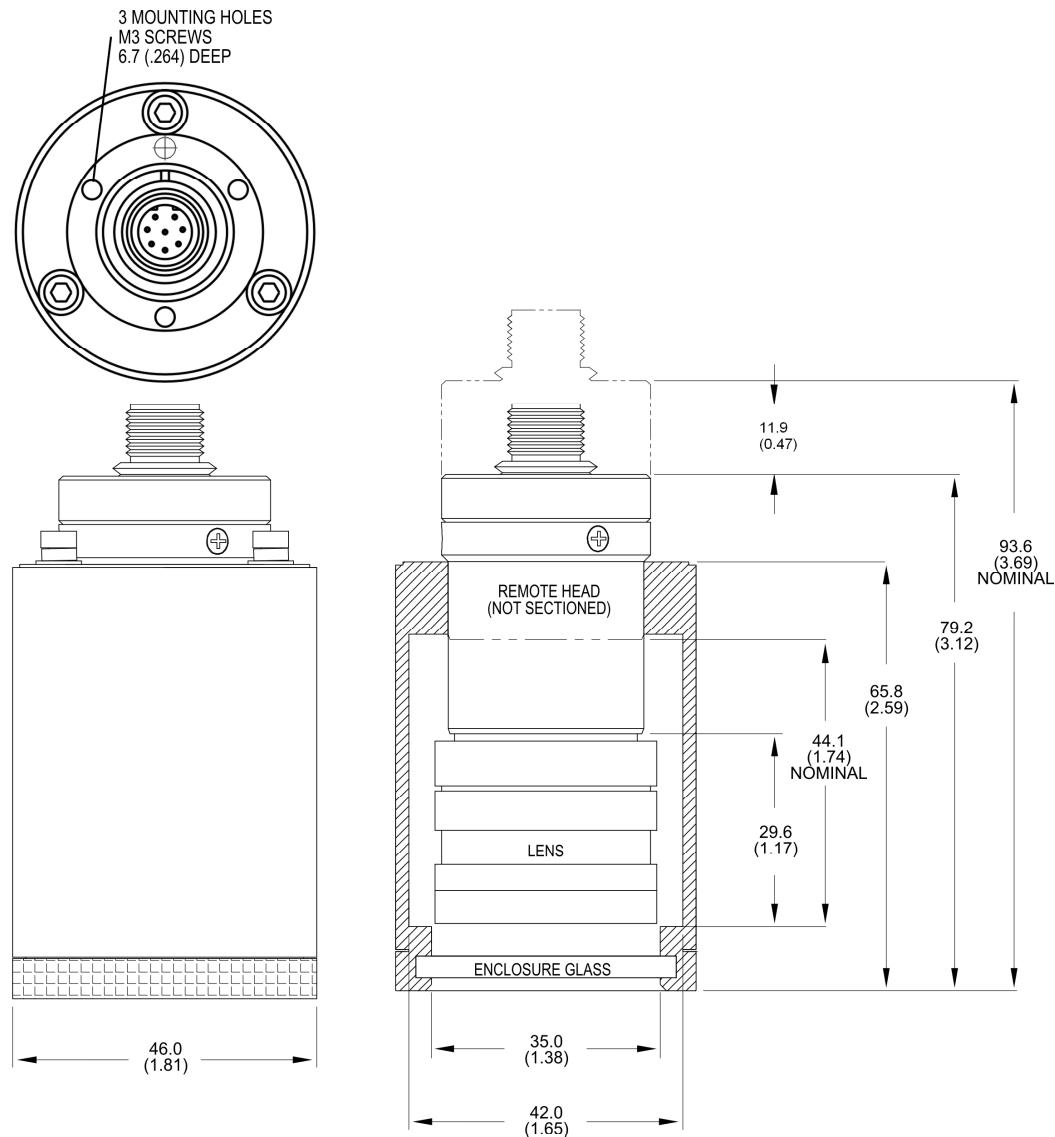


Figure 4-7: Remote Head Camera Enclosure Dimensions

4.3.4 Remote Head Camera Mount Dimensions

The remote head camera mounting bracket dimensions are illustrated in Figure 4-8. Dimensions are in millimeters (inches). Refer to Appendix D for installation instructions.

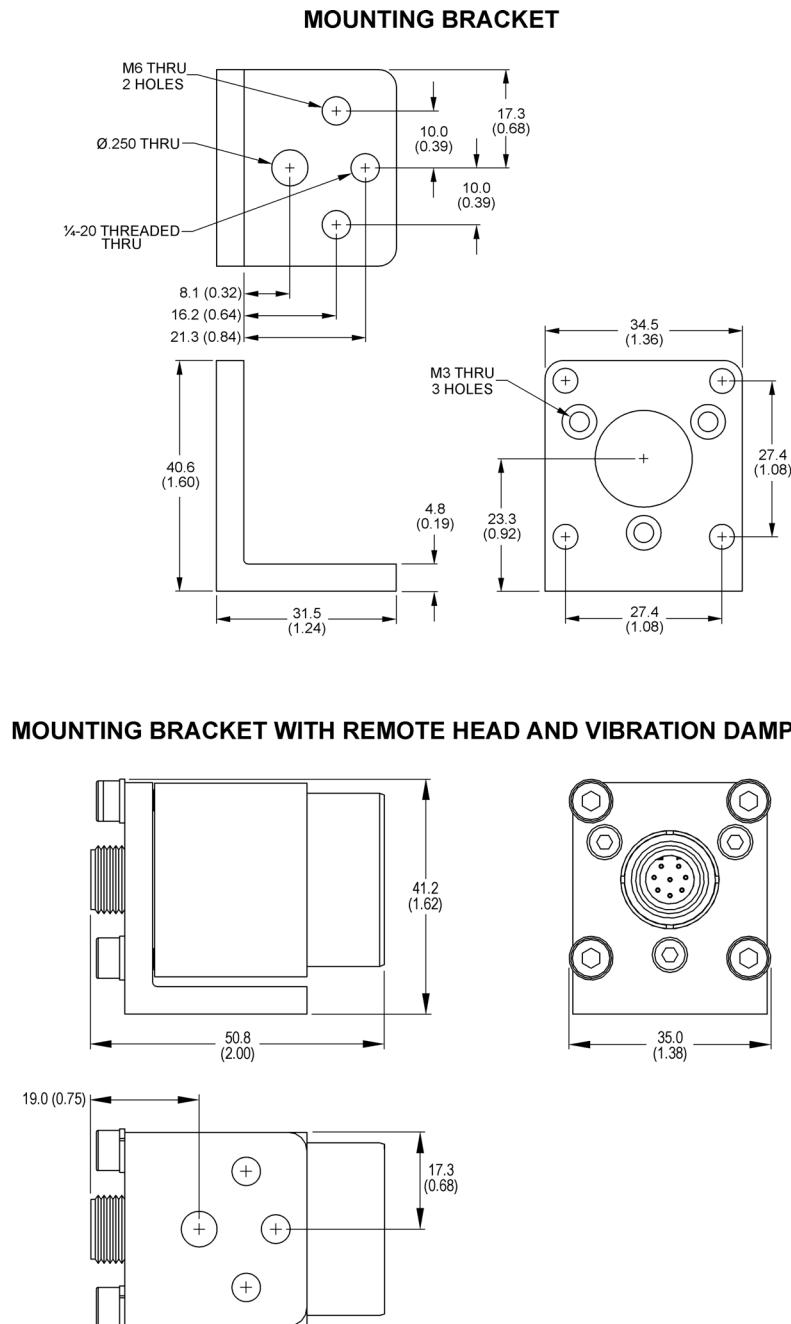


Figure 4-8: Remote Head Camera Mount Dimensions

Specifications

4.3.5 Control Pad Dimensions

The In-Sight Control Pad dimensions are illustrated in Figure 4-9. Dimensions are in millimeters (inches).

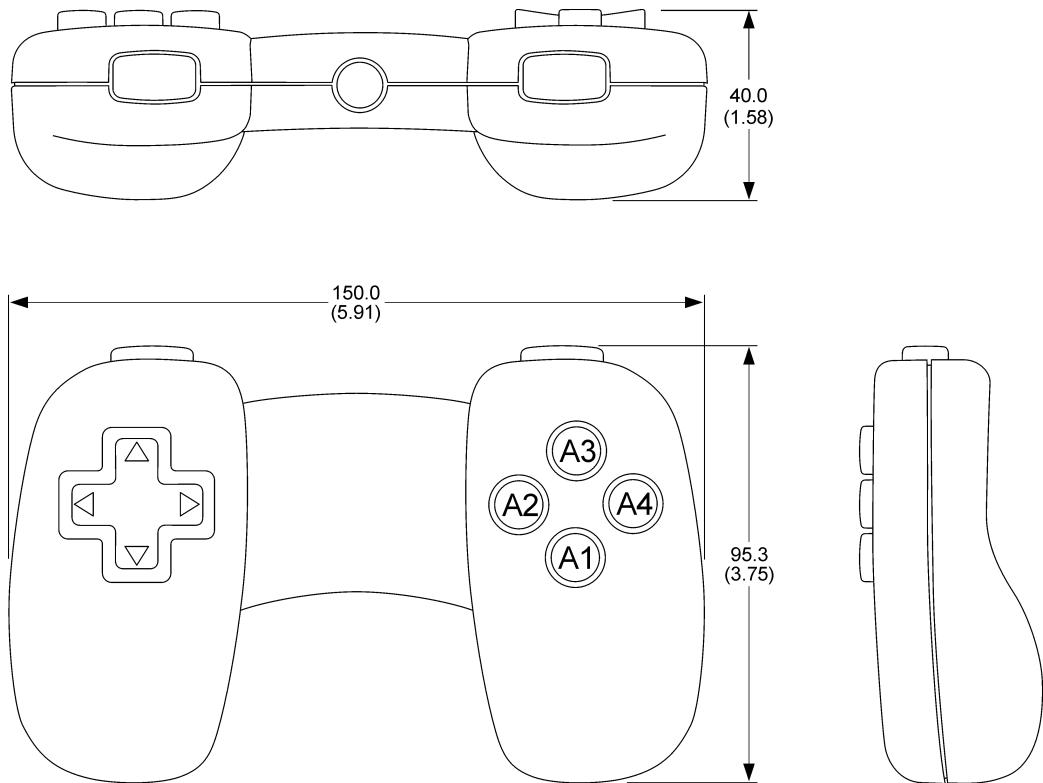


Figure 4-9: Control Pad Dimensions

Appendix A



A.1 Configuring Microsoft Windows Network Settings

This section provides information on how to configure Microsoft Windows network settings in order to connect to an In-Sight 3400 sensor running In-Sight Explorer on a non-DHCP network. The steps listed below and the example dialogs are specific to Windows XP Professional.

A.1.1 Configuring the IP Address and Subnet Mask

1. Click Start, then click on the Control Panel shortcut to open the Control Panel icon group.
2. Click the Network and Internet Connections icon to open the Network and Internet Connections Dialog.
3. Click the Network Connections icon to open the Network Connections Dialog.
4. Right-click the Local Area Connections icon and click Properties to open the Local Area Connections dialog.
5. Highlight Internet Protocol (TCP/IP) in the General tab and click Properties to open the Internet Protocol (TCP/IP) Properties dialog (Figure A-1).

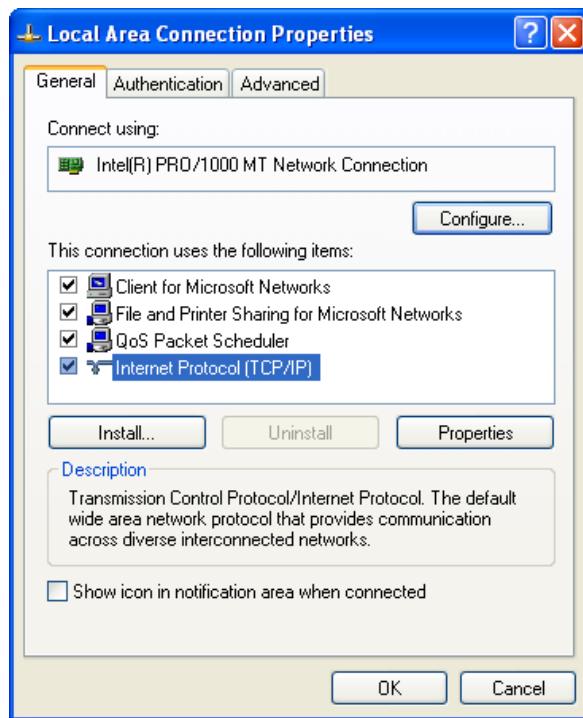


Figure A-1: Local Area Connection Properties Dialog

Configuring Microsoft Windows Network Settings

6. Click the “Use the following IP address” radio button (Figure A-2). The IP address, Subnet Mask, Default Gateway, Preferred DNS server and Alternate DNS server fields, which are grayed-out, become active.

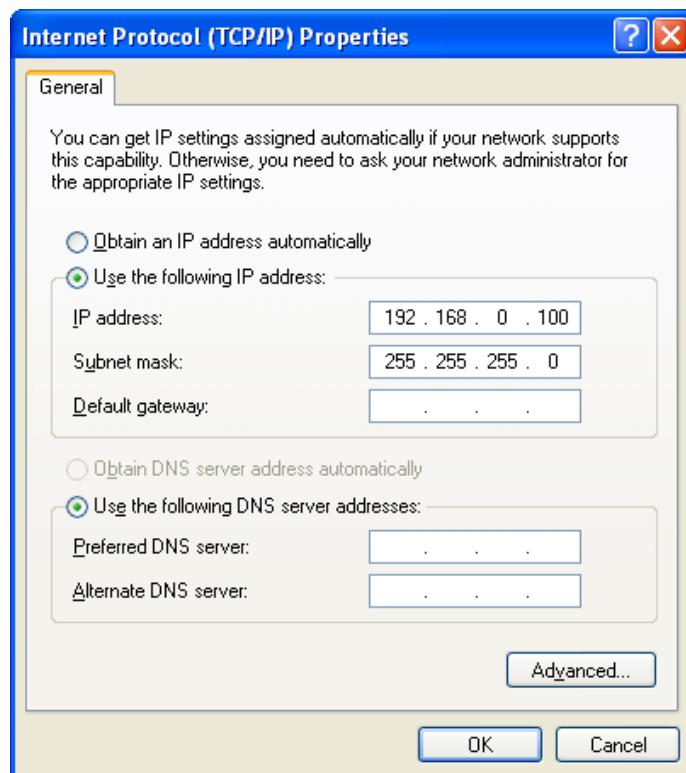


Figure A-2: Select Network Protocol Dialog

7. Enter an appropriate IP address.
8. Enter an appropriate Subnet Mask. The Subnet Mask defines which part of the sensor's IP address refers to the network and which part refers to the host. The network part of the IP address is the same for all hosts on the same subnet, and the remainder is unique to each host. The default Subnet Mask setting of 255.255.255.0 is usually appropriate. See Table 2-3 or consult your network administrator for more information.

NOTE Consult your network administrator to determine your Preferred DNS server and Alternate DNS server.

9. Click OK.
10. Click Close, then restart Windows if prompted to do so.

Appendix B



B.1 Configuring the In-Sight Sensor's I/O Settings Using In-Sight Explorer

Before an I/O Expansion Module can be used, the In-Sight sensor's settings must be configured to recognize the availability of the additional inputs and outputs, as well as the added serial hardware handshaking capability. The I/O Expansion Module may be configured using In-Sight Explorer. Refer to Appendix C for details on configuring the In-Sight sensor's I/O settings using In-Sight PC Host.

B.1.1 Configuring the I/O Expansion Module

1. Physically connect the I/O Expansion Module to the In-Sight sensor, as described in the applicable I/O Expansion Module Installation manual.
2. Open the In-Sight Explorer program and log on to the sensor.
3. From the Sensor menu, select the Discrete I/O Settings submenu. Select the Output Settings option (Figure B-1).

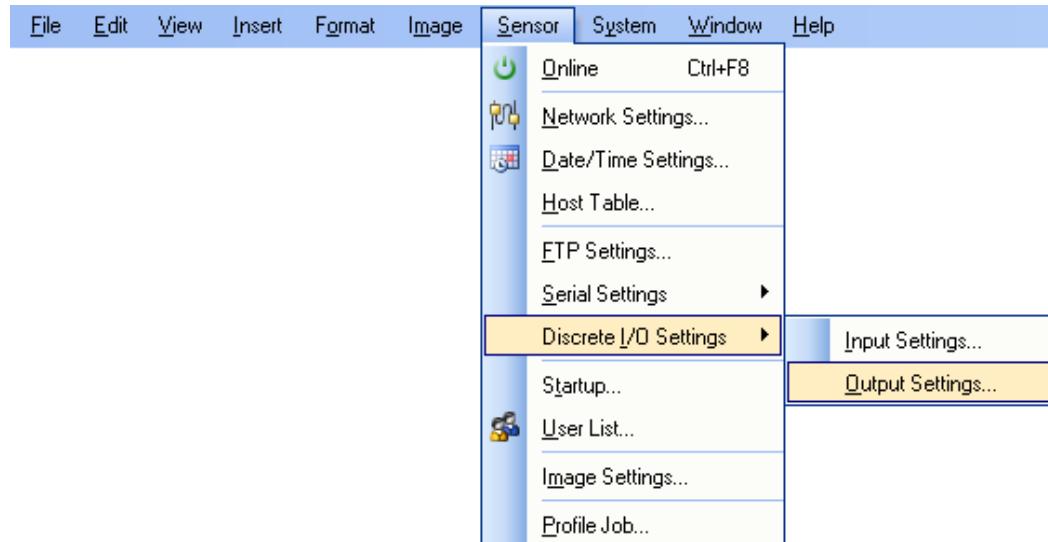


Figure B-1: Accessing the Discrete Output Settings

Configuring the In-Sight Sensor's I/O Settings Using In-Sight Explorer

4. Open the Output Module drop-down list at the bottom left of the window (Figure B-2) and select I/O Expansion Module. The Discrete Output window will automatically reconfigure to correspond to the I/O Expansion Module.
5. Configure the Line Name, Type and Details as required.

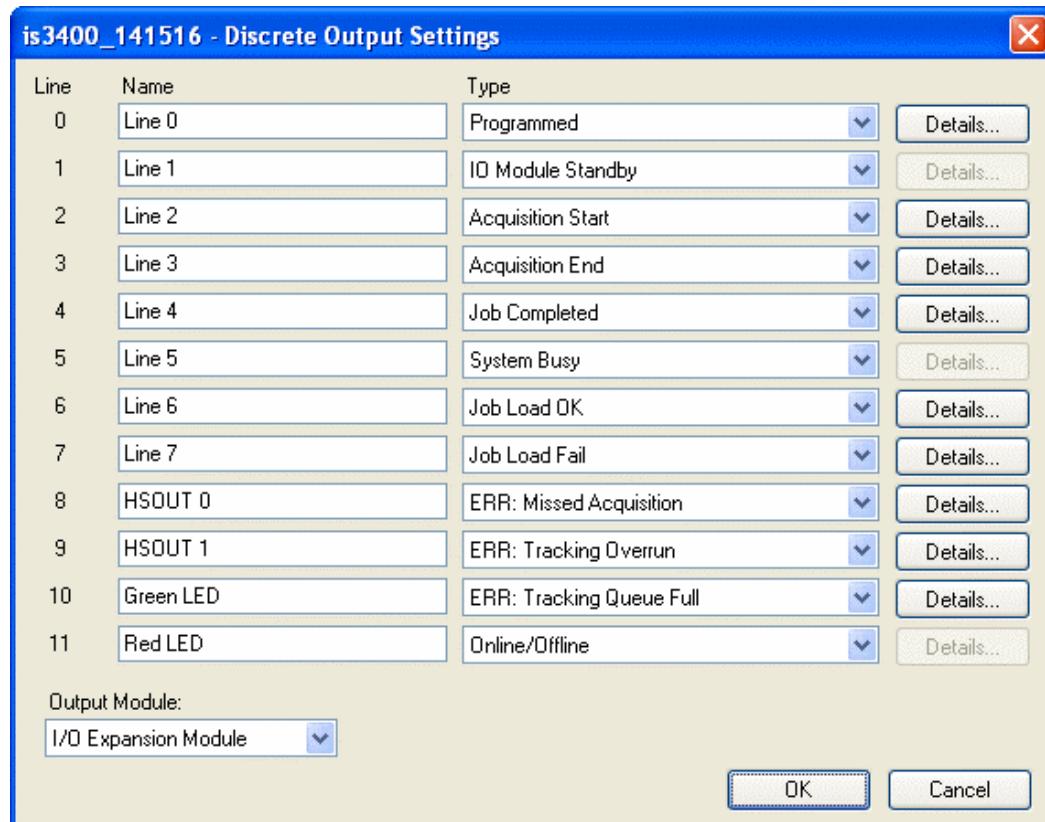


Figure B-2: Discrete Output Settings Dialog

NOTE When an existing .JOB file containing a WriteDiscrete function is loaded on an In-Sight sensor to which the I/O Expansion Module has just been added, the Start Bit and Number of Bits parameters in WriteDiscrete must be changed to reflect the new configuration of the I/O lines. For example, the physical output lines 0 and 1 become lines 8 and 9 (HSOUT 0 and HSOUT 1) when the I/O Expansion Module is enabled.

6. Click OK to save the new settings to the sensor's flash RAM.

NOTE An error message will appear if the I/O Expansion Module is not attached to the In-Sight sensor, and the Discrete Output dialog will return to its default configuration. Verify that the I/O Expansion Module is connected, then repeat steps 1 - 6 as described above.

The sensor can also be configured to use the I/O Expansion Module by opening the Discrete Input dialog and following steps 4 - 6, as described above.

Once the I/O Expansion Module is selected in either the Discrete Input or Discrete Output dialogs, it is automatically enabled for both inputs and outputs, and hardware handshaking may be used in serial communications.

B.1.2 Enabling Hardware Handshaking

1. Physically connect the I/O Expansion Module to the In-Sight sensor, as described in the applicable I/O Expansion Module Installation manual.
2. Open the In-Sight Explorer program and log on to the sensor.
3. From the Sensor menu (Figure B-3), select the Serial Settings submenu. Select Port 1.

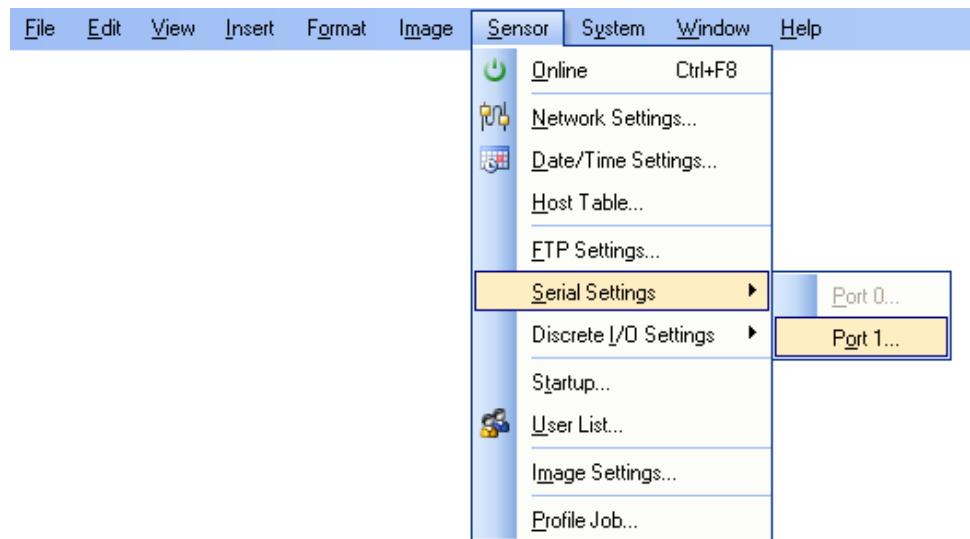


Figure B-3: Accessing the Serial Port Settings

Configuring the In-Sight Sensor's I/O Settings Using In-Sight Explorer

4. Select Hardware from the Handshake drop-down list (Figure B-4).

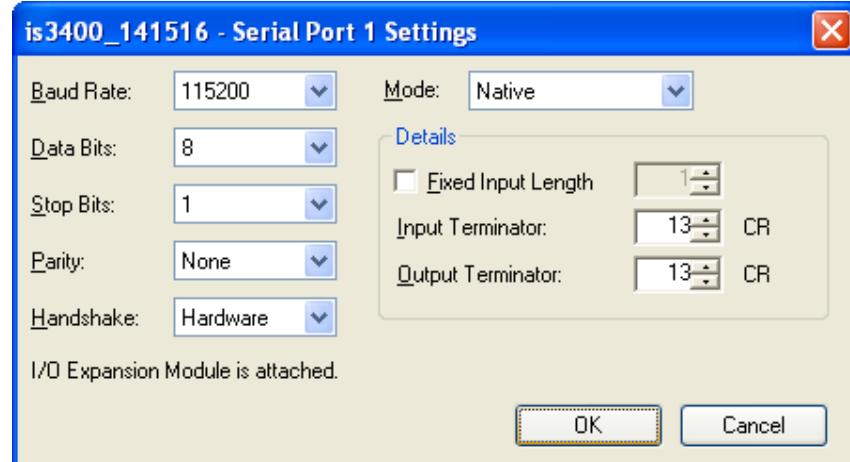


Figure B-4: Serial Port Settings Dialog

Refer to the *In-Sight® Explorer Help* file for details on using the Discrete and Serial Input/Output functions in the In-Sight spreadsheet.

Appendix C



C.1 Configuring the In-Sight Sensor Using In-Sight PC Host

C.1.1 Adding the In-Sight 3400 Sensor to a Network

The In-Sight 3400 sensor is ready to be installed as a network host once it has power and is physically connected to the network.

NOTE If the Microsoft "Media Sense" feature, which automatically detects whether or not your network interface is linked to a network, is enabled when running Microsoft Windows 2000 or XP, communication with an In-Sight sensor may not be established. It is recommended to use a hub or switch with a standard Ethernet cable to configure the In-Sight sensor or configure your PC to disable the Media Sense feature. See Microsoft Knowledge Base article 239924 for details on this process.

As previously described, there are many possible In-Sight network configurations. The specific procedure for adding an In-Sight 3400 sensor to a network depends on whether or not a Dynamic Host Configuration Protocol (DHCP) server is available. The DHCP server can automatically assign the In-Sight 3400 sensor a network IP address and Subnet Mask.

NOTE When installing the In-Sight 3400 sensor to an existing network, consult your network administrator to determine whether a DHCP server is available.

Installing to a DHCP Network

The In-Sight 3400 sensor is factory-configured for installation on an existing network with a DHCP server. To add an In-Sight 3400 sensor to a network using a DHCP server requires only connecting the sensor to the network and supplying power; no manual configuration of the network settings is required.

NOTE After adding an In-Sight 3400 sensor to a network with a DHCP server, disabling DHCP on the sensor and assigning a static IP address is strongly recommended.

For an In-Sight 3400 sensor connected to a network with a DHCP server, a user can configure only the Host Name, Host Table, FTP, Time and Advanced settings. A Host Name is an "alias" for the In-Sight 3400 sensor's IP Address, and appears in any list of host names in the In-Sight interface. If you do not enter a new Host Name, the In-Sight 3400 sensor will appear on the network with the default Host Name. For more information on assigning a Host Name, proceed to "Modifying the In-Sight 3400 Sensor's Network Settings" on page 66.

After adding the In-Sight 3400 sensor to the network using DHCP, proceed to "Logging On to the In-Sight 3400 Sensor" on page 65.

Installing to a Non-DHCP Network

To install an In-Sight 3400 sensor on a network that does not provide a DHCP server, use another In-Sight 3400 sensor or In-Sight PC Host to manually configure the In-Sight 3400 sensor's network settings. This installation may also require changes to network settings in Microsoft Windows (see Appendix A page 55).

1. Ensure that the sensor is connected to the network and has power.
2. Open the In-Sight PC Host program.
3. From the In-Sight spreadsheet, open the System menu (Figure C-1).
4. Select Logon to open the Logon dialog.



Figure C-1: System Menu

5. Click the Host Name drop-down list to view the names of all In-Sight host sensors on the local network, in alphabetical order by host name (Figure C-2).



Figure C-2: Logon Dialog

6. Select <New> from the list to open the New Host Configuration dialog (Figure C-3).

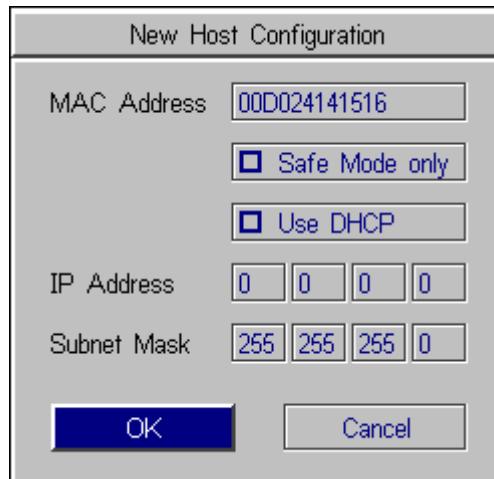


Figure C-3: New Host Configuration

7. Enter the last six characters of the In-Sight 3400 sensor's 12-character MAC address, without spaces or dashes. Do not delete or change the first six characters that are already entered.

NOTE The MAC address is located on the serial number label affixed to the In-Sight 3400 sensor. This identifier is factory-assigned, unique for every In-Sight sensor, and cannot be changed or deleted.

Configuring the In-Sight Sensor Using In-Sight PC Host

8. Verify that the Use DHCP Server checkbox is disabled.
9. Enter a valid IP address for the In-Sight 3400 sensor. Every In-Sight sensor must be assigned a unique IP address consistent with the addressing scheme in use on the network.
10. Enter a Subnet Mask for the local network. The Subnet Mask specifies which parts of the In-Sight 3400 sensor's IP address are the same for all hosts on the local network, and which are unique to each host. See Table 2-3 or consult your network administrator for more information.

NOTE When the Safe Mode only checkbox is disabled (the default setting), the IP Address and Subnet Mask entered overwrite the target In-Sight 3400 sensor's Network settings. If the checkbox is enabled, the Use DHCP, IP Address, and Subnet Mask fields will be grayed out, and the target sensor's network settings will be preserved.

11. Click OK. The message box shown in Figure C-4 appears.

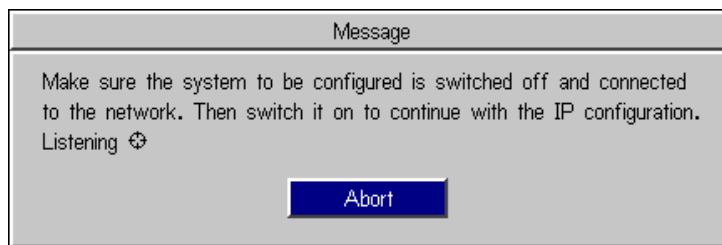


Figure C-4: IP Configuration Message Box

12. Cycle power on the In-Sight 3400 sensor by removing, then applying, power to the sensor's 24VDC port. The message in Figure C-5 appears when the In-Sight 3400 sensor is located on the network.

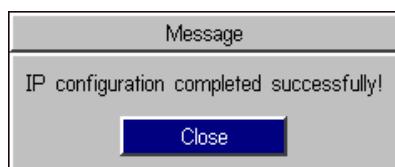


Figure C-5: IP Configuration Successful Message Box

If the message in step 12 does not appear within one minute of cycling power, click Abort. The Logon dialog will reappear. Verify that the IP Address is valid and the Subnet Mask is appropriate for the local network. Make corrections as necessary, and retry steps 1 through 12. Contact your network administrator if problems persist.

C.1.2 Logging On to the In-Sight 3400 Sensor

After the In-Sight 3400 sensor has been added to the network, log on to the sensor to verify the installation and to configure additional network settings. To log on to a sensor, you must supply a valid User Name and Password. New In-Sight sensors are shipped with a User List containing three standard accounts: admin, monitor and operator; each of these accounts is configured with a blank password.

1. Attach a lens to the In-Sight 3400 sensor to verify the acquisition of live video images. The exact focal length needed depends on the working distance and the field of view required in your machine vision application. For now, any compatible lens may be used.
2. Open the In-Sight PC Host program.
3. From the In-Sight spreadsheet, open the System menu (Figure C-6).



Figure C-6: System Menu

Configuring the In-Sight Sensor Using In-Sight PC Host

4. Select Logon to open the Logon dialog (Figure C-7).



Figure C-7: Logon Dialog

5. Click the Host Name drop-down list to view the names of all In-Sight host sensors on the local network, in alphabetical order by host name. If an In-Sight sensor was only recently connected to the network, its Host Name may not appear in this list. Press the Refresh button to update the list.

NOTE The Refresh button must be pressed after any changes have been made to the sensor's IP Address from the Network dialog.

6. Select a Host Name.
7. The default User Name is admin. The default password for the admin user is blank. For now, leave the User Name and Password fields configured with the default settings.
8. From the Protocol drop-down list, select In-Sight.
9. Click the OK button to log on to the selected target In-Sight sensor. A message box appears while the logon is in progress.

C.1.3 Modifying the In-Sight 3400 Sensor's Network Settings

You may need to change the In-Sight 3400 sensor's network settings when installing it to a non-DHCP network where a Default Gateway, DNS Server, and Domain name are used, or when moving the In-Sight 3400 sensor from one network to another.

1. Open the In-Sight PC Host program and log on to the sensor.

2. From the In-Sight spreadsheet, open the System menu (Figure C-8).



Figure C-8: System Menu

3. Select Settings to open the Settings menu (Figure C-9).



Figure C-9: Settings Menu

Configuring the In-Sight Sensor Using In-Sight PC Host

4. From the System Menu, select Network to open the Network dialog (Figure C-10).

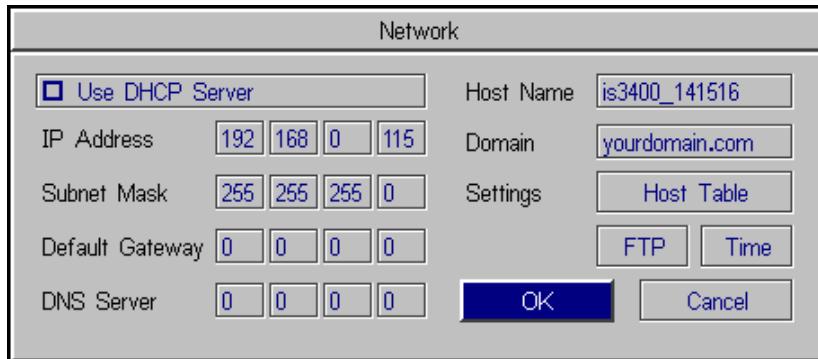


Figure C-10: Network Dialog

The following network settings can be changed using the Network dialog:

- **IP Address:** Assigns a unique identifier for each In-Sight sensor on the network, which must be consistent with the IP address-numbering scheme of the local network.
- **Subnet Mask:** Specifies which parts of the In-Sight 3400 sensor's IP address are the same for all hosts on the local network, and which are unique to each host.
- **Default Gateway:** Specifies the IP address of the gateway host, if available on the network. The gateway host is responsible for sending and receiving data between hosts on different networks.
- **DNS Server:** Specifies the IP address of the host on the network providing DNS resolution, if available.
- **Host Name:** Opens the text entry dialog for entering the Host Name for the In-Sight sensor, as it will appear when browsing the network. If the local system is a networked PC running In-Sight PC Host software, the Host Name will automatically be inherited from the Computer Name defined in the Windows operating system. Each In-Sight sensor has its host name set automatically the first time it boots. For example, an In-Sight 3400 sensor's host name is "is3400_xxxxxx". For every sensor, "xxxxxx" is given by the last 6 characters of the sensor's unique MAC Address. For example, an In-Sight 3400 sensor with the MAC Address 00-d0-24-14-15-16 will be assigned the host name, "is3400_141516".
- **Domain:** Specifies the network Domain for the host network.
- **Host Table:** Specifies a local mapping of host names to IP addresses.
- **FTP:** Configures the File Transfer Protocol (FTP).
- **Advanced:** Opens the Advanced dialog to configure the sensor's DHCP Timeout. The DHCP Timeout specifies the time an In-Sight sensor will wait for a DHCP server to respond with an available IP address, when the sensor is configured for DHCP. If a DHCP server does not provide the sensor with an IP address within the specified timeout period, network communication on the sensor will be suspended. The sensor will not attempt to connect to the network again until power is cycled on the sensor.

C.1.4 Configuring the In-Sight Sensor's I/O Settings

Before an I/O Expansion Module can be used, the In-Sight sensor's settings must be configured to recognize the availability of the additional inputs and outputs, as well as the added serial hardware handshake capability. The I/O Expansion Module may be configured using In-Sight PC Host.

Configuring the I/O Expansion Module

1. Physically connect the I/O Expansion Module to the In-Sight sensor as described in the applicable I/O Expansion Module Installation and Reference manual.
2. Open the In-Sight PC Host program and log on to the sensor.
3. Open the System menu (Figure C-11).



Figure C-11: System Menu

Configuring the In-Sight Sensor Using In-Sight PC Host

4. Select Settings to open the Settings menu (Figure C-12).

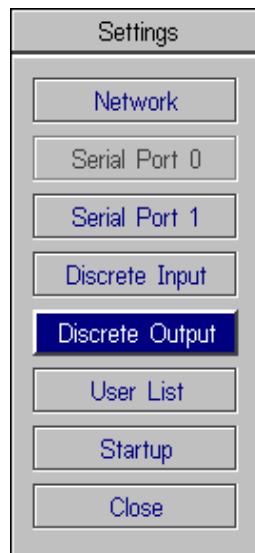


Figure C-12: Settings Menu

5. Select Discrete Output to open the Discrete Output dialog (Figure C-13).

Discrete Output				
Line	Name	State	Type	
0	Job Complete	0	► Job Completed	Details
1	Pass / Fail	1	► Programmed	Details
2	Line 2	0	► Programmed	Details
3	Line 3	0	► Programmed	Details
4	Green LED	0	► Programmed	Details
5	Red LED	0	► Programmed	Details
6	Line 6	0	► Programmed	Details
7	Line 7	0	► Programmed	Details
8	Line 8	0	► Programmed	Details
9	Line 9	0	► Programmed	Details
10	Line 10	0	► Programmed	Details
11	Line 11	0	► Programmed	Details

Figure C-13: Discrete Output Dialog, Default Settings

6. Open the drop-down list to the left of the OK button and select I/O Expansion Module. The Discrete Output dialog will automatically reconfigure to correspond to the I/O Expansion Module, as shown in Figure C-14.
7. Configure the Line Name, Type and Details as required.

NOTE When an existing .JOB file containing a WriteDiscrete function is loaded on an In-Sight sensor to which the I/O Expansion Module has just been added, the Start Bit and Number of Bits parameters in WriteDiscrete must be changed to reflect the new configuration of the I/O lines. For example, the physical output lines 0 and 1 become lines 8 and 9 (HSOUT 0 and HSOUT 1) when the I/O Expansion Module is enabled.

Discrete Output				
Line	Name	State	Type	
0	Line 0	0	► Programmed	Details
1	Line 1	0	► Programmed	Details
2	Line 2	0	► Programmed	Details
3	Line 3	0	► Programmed	Details
4	Line 4	0	► Programmed	Details
5	Line 5	0	► Programmed	Details
6	Line 6	0	► Programmed	Details
7	Line 7	0	► Programmed	Details
8	HSOUT 0	0	► Programmed	Details
9	HSOUT 1	0	► Programmed	Details
10	Green LED	0	► Programmed	Details
11	Red LED	0	► Programmed	Details

► I/O Expansion Module **OK** **Cancel**

Figure C-14: Discrete Output Dialog, I/O Expansion Configuration

8. Select OK to save the new settings to the sensor's flash RAM.

NOTE An error message will appear if the I/O Expansion Module is not attached to the In-Sight sensor, and the Discrete Output dialog will return to its default configuration. Verify that the I/O Expansion Module is connected, then repeat steps 1 - 8 as described above.

The sensor can also be configured to use the I/O Expansion Module by opening the Discrete Input dialog and following steps 6 - 8, as described above.

Configuring the In-Sight Sensor Using In-Sight PC Host

Once the I/O Expansion Module is selected in either the Discrete Input or Discrete Output dialogs, it is automatically enabled for both inputs and outputs, and hardware handshaking may be used in serial communications.

Enabling Hardware Handshaking

1. Open the In-Sight PC Host program and log on to the sensor.
2. Physically connect the I/O Expansion Module to the In-Sight sensor, as described in the applicable I/O Expansion Module Installation and Reference manual.
3. Open the System menu (Figure C-15).



Figure C-15: System Menu

4. Select Settings to open the Settings menu (Figure C-16).

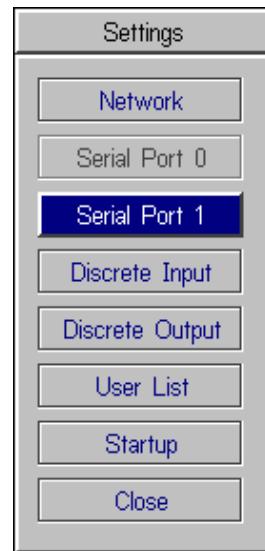


Figure C-16: Settings Menu

5. Select Serial Port 1 to open the Serial Port 1 dialog (Figure C-17).

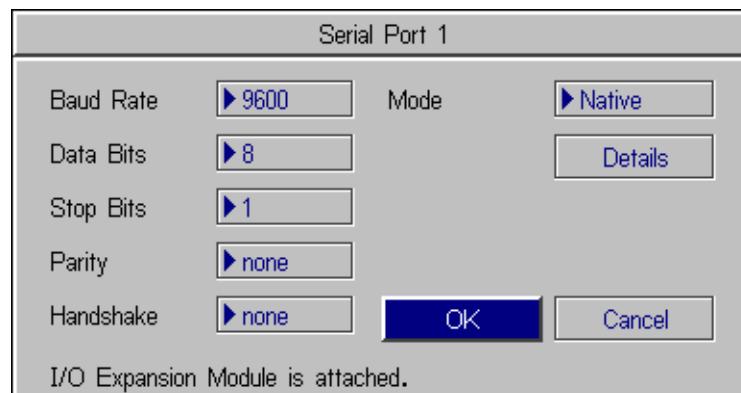


Figure C-17: Serial Port Dialog

Configuring the In-Sight Sensor Using In-Sight PC Host

6. Select Hardware from the Handshake drop-down list (Figure C-18).

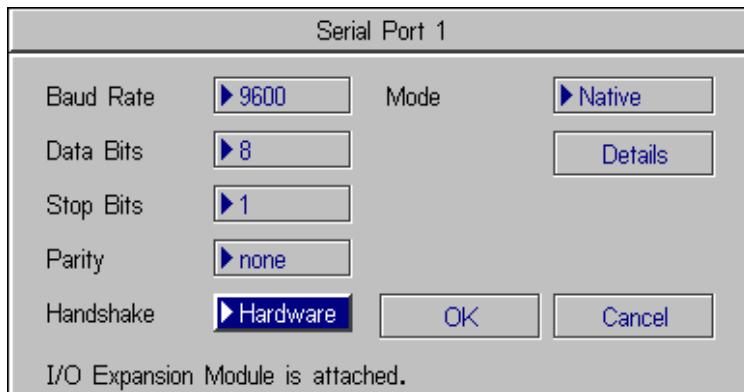


Figure C-18: Serial Port Dialog, Hardware Handshaking Enabled

Appendix D



D.1 Installing the Remote Head Camera Mount

The remote head camera mount 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.

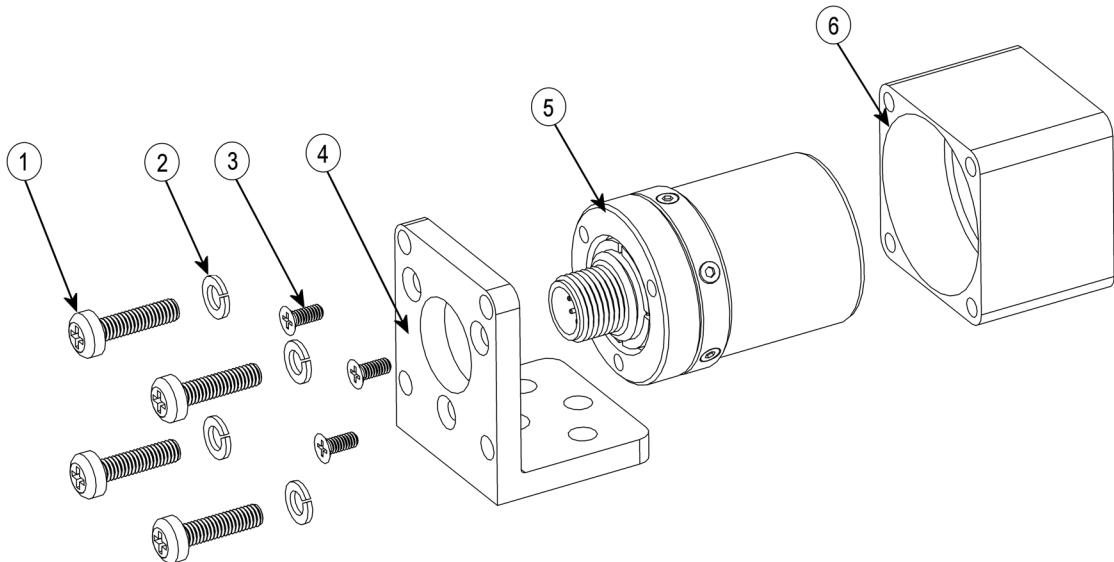


Figure D-1: Remote Head Camera Installation Diagram

1. Attach the remote head camera bracket (item 4) to the mounting surface (reference Figure 4-8).
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.

Installing the Remote Head Camera Mount

Appendix E



E.1 System Recovery Using Safe Mode

When power is first applied to the In-Sight 3400 sensor, the PWR LED will be red while the sensor initializes. When initialization is complete, the LED will momentarily change from green to orange during the LED start-up test, and then switch back to green. However, initialization failure may be caused by corrupted job files, settings, or incorrect configurations. If the In-Sight 3400 sensor does not properly initialize—in other words, the PWR LED remains red and never changes to green—the Safe Mode startup procedure may be used to re-initialize the In-Sight 3400 sensor.

To initialize the In-Sight 3400 sensor in Safe Mode:

1. Verify that the sensor is connected to a suitable power source, and that the In-Sight Control Pad is properly connected.
2. Immediately after power is applied to the sensor, repeatedly press the VIEW button on the Control Pad.
3. The initialization sequence will be interrupted by the following message:

Press the A4 button to enter SAFE mode, or press the A2 button to Cancel.

- If the A2 button is pressed, the sensor will continue with the initialization, using the previously configured settings, including the selected Startup job. If the sensor still fails to initialize, the Startup job may be corrupted or incorrectly configured. Repeat this procedure and select A4 to enter Safe Mode.
- If the A4 button is pressed, the sensor will enter Safe Mode. In Safe Mode, the 3400 sensor settings will reset to their defaults. Before reconfiguring the sensor settings and specifying any Startup job, cycle power to the sensor and verify normal initialization. After a normal initialization, the In-Sight 3400 sensor may be re-configured and the Startup job may be selected.

If the In-Sight 3400 sensor still does not initialize properly, or fails again after re-configuring the sensor, login to the **In-Sight Online Support & Learning Center** to access online support resources:

www.cognex.com/support/In-Sight.asp.

If you are unable to find the answer to your In-Sight question online, call the In-Sight Technical Support number for your region.

United States:	+1-508-650-4100
Japan:	+81-3-5977-5410
France:	+33 (0)1 4777 1550
United Kingdom:	+44 (0)1908 206000
Germany:	+49 (0) 7 21 / 66 39 - 0
Italy:	+39 (0)267471200



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