In-Sight®

COGNEX
Vision for Industry®

Installing In-Sight® 1720 Series Wafer Readers

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Cognex P/N 597-0047-01

The hardware and portions of the software described in this document may be covered by one or more of the following U.S. patents (other U.S. and foreign patents are pending):

In-Sight	Patents pending
Hardware	4,972,359; 5,526,050; 5,657,403; 5,793,899; 5,861,910
Vision Tools	5,495,537; 5,548,326; 5,583,954; 5,602,937; 5,640,200; 5,717,785; 5,742,037; 5,751,853; 5,768,443; 5,796,868; 5,818,443; 5,825,483; 5,825,913; 5,845,007; 5,859,466; 5,872,870; 5,909,504

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Regulations/Compliance

Declaration of Conformity	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this CE-marked Wafer Reader Machine Vision System Product	
Product Number	In-Sight 1721: P/N 800-5865-1; P/N 800-5865-1R (RoHS Compliant) In-Sight 1722: P/N 800-5865-2; P/N 800-5865-2R (RoHS Compliant)
Complies With	89/336/EEC Electromagnetic Compatibility Directive
Compliance Standards	EN 61000-6-4:2001 Class A EN 61000-3-2:2000 + A2:2005 EN 61000-3-3:1995 + A1:2001 EN 61000-6-2:2001
European Representative	Cognex France Immeuble le Patio 104 avenue Albert 1er 92563 Rueil Malmaison France
Safety	
c UL US	(UL 508:Standard for Industrial Control Equipment) CUL Certification marks are present on products
FCC	FCC Part 15, Class A
	IEC 60825-1/A2:2001 EN 60825-1/A1:2002 CAN/CSA-E60825-1:2003
Compliance	
SEMI	This equipment conforms with the applicable requirements of SEMI S2-0703a

Precautions

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

- The wafer reader is intended to be supplied by a Cognex power source (24V ±10%). Any other voltage creates a risk of fire or shock and can damage the In-Sight hardware.
- Do not install the wafer reader in locations that directly expose it to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
- To reduce the risk of damage or malfunction due to over-voltage, line noise, electrostatic discharge (ESD), power surges, or other irregularities in the power supply, route all cables and wires away from high-voltage power sources.
- Although the wafer reader is a Class 1 LED Product, it is not recommended to stare directly into the illumination LEDs when the wafer reader is receiving power. Note that the In-Sight 1722 wafer reader LEDs emit infrared light, therefore the illumination LED lights are not visible.
- Do not open the wafer reader. This device does not contain user-serviceable parts. Do not make electrical or mechanical modifications to the In-Sight hardware. The LED emitted light levels have not been tested when the wafer reader is open, therefore Class 1 LED Product certification is not guaranteed if the wafer reader is open. Unauthorized modifications violate your warranty.

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1 Introduction

In this Section…

1.1 In-Sight 1720 Series Wafer Reader Overview

The In-Sight® 1720 series of high performance vision sensors are image formation wafer readers for reading identification marks on silicon wafers. Featuring a vision processor, advanced lighting and optics, with built-in networking support and serial communications, the compact In-Sight 1720 series wafer readers can be utilized in virtually any back-end wafer fab process.

The In-Sight 1720 series wafer readers include the following models:

- In-Sight 1722: Infrared LED lighting, 1024 x 768 image resolution and variable working distance
- In-Sight 1721: Red LED lighting, 1024 x 768 image resolution and variable working distance

NOTE For information on the In-Sight 1700/1701 wafer reader installation and use, refer to the *In-Sight® 1700 Series Wafer Reader User Manual*.

The In-Sight wafer reader is configured remotely over a network using either the In-Sight software or a Microsoft® Internet Explorer® browser. This allows remote monitoring of the wafer reader's operation during runtime. The wafer reader may also be controlled remotely from users' custom application programs using In-Sight Native Mode commands to change settings and retrieve read results.

1.2 In-Sight Support

The following resources are available to assist you in using the In-Sight 1720 series wafer reader and graphical user interface:

- *In-Sight® Explorer Help*, an on-line HTML Help file provided on the In-Sight CD-ROM (for In-Sight software).
- The In-Sight Online Support and Learning Center: www.cognex.com/support/In-Sight.asp.

NOTE Only registered In-Sight users have access to the In-Sight Online Support and Learning Center website.

1.3 Initial Setup Checklist

- ☑ Install the In-Sight Software on a Windows PC
- ☑ Determine the Network Configuration
- ☑ Configure the PC's Network Settings (Non-DHCP)
- ☑ Verify Required Hardware Components
- ☑ Attach the Mirror for Horizontal Operation (Optional)
- ☑ Mount the Wafer Reader
- ☑ Connect the Network and Breakout Cables
- ☑ Add the Wafer Reader to the Network
- ☑ Log On to the Wafer Reader
- ☑ Acquire an Image
- ☑ Adjust the Focus
- ☑ Define Config Settings: OCR, Barcode or 2D Mark*
- ☑ Tune the Config*
- ☑ Configure the Input/Output*
- ☑ Test Network Settings (Optional)*
- ☑ Test Serial Settings (Optional)*

*Refer to the *In-Sight® Explorer Help* file for more information.

2 Set Up the PC

In this Section…

2.1 Install the In-Sight Software on a Windows PC

The In-Sight wafer reader may be configured, and its operation monitored, over an Ethernet network from a PC. A wafer reader, accessed from a networked PC, is configured using mouse and keyboard input.

There are two installation options available on the In-Sight CD-ROM: the .NET User Interface (standard interface) and the wafer reader Legacy Installation (Java Applet). The installation options refer to the graphical user interface of the wafer reader, but do not affect the programmatic (serial or TCP/IP) communication. The .NET user interface is a Microsoft Windows® .NET graphical user interface, while the legacy installation is a Java applet. The legacy installation should only be used for backward compatibility in a legacy situation, such as directly replacing an older, Java-based wafer reader or if your PC does not support Microsoft Windows .NET (for example, if the PC is running on a Windows NT operating system). The instructions in this manual pertain only to the .NET User Interface installation. For installation instructions and for more information regarding supported applet features, refer to the *In-Sight® 1700 Series Wafer Reader User Manual*, included with the legacy installation.

NOTE The wafer reader .NET user interface and the legacy Java applet can be installed on the same PC.

The standard interface is accessed from the In-Sight Explorer application. The Wafer ID View is the default view from In-Sight Explorer. In-Sight Explorer allows you to:

- Easily configure the IP address and other network settings.
- View all wafer readers on the network, including In-Sight 1700 and 1701 wafer readers running the Java applet.
- Manage job files between different wafer readers.
- Remotely configure or debug wafer readers from anywhere on the network.
- Upgrade firmware on multiple wafer readers simultaneously.
- Drag-and-drop job and image files from the local PC to any wafer reader on the network.
- Copy files from one wafer reader and paste it to another wafer reader.
- Perform file operations, including FTP operations, backup, restore and clone.
- Configure startup conditions such as the startup job and Online mode.
- Set access levels and user privileges.

In-Sight Explorer can connect to both In-Sight 1720 series wafer readers running the new .NET user interface and to legacy In-Sight 1700 and 1701 readers running the Java applet interface. If an In-Sight 1700 or 1701 wafer reader is double-clicked in the In-Sight Explorer Network pane, the Java applet Browser View will open within the In-Sight Explorer interface for the selected wafer reader.

If you plan to continue using Microsoft Internet Explorer, you can also launch the .NET user interface from Internet Explorer to configure and monitor Wafer ID applications on the wafer reader. For more information, refer to Section 4.2.2.

The following must be installed on the PC:

- Microsoft Windows® XP Professional (Service Pack 2 or higher) or Windows 2000 (Service Pack 4 or higher) for In-Sight software version 3.x.x and higher
- Microsoft .NET Framework 1.1 SP1 for In-Sight software 3.x.x and higher
- Network Interface Card (at least 100Mbps) for connecting to In-Sight wafer readers
- Internet Explorer 5.0.1 or higher

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

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

1. Shut down any applications on your PC.
2. Insert the In-Sight CD-ROM into your PC's CD-ROM drive. If Autoplay is enabled, the software should automatically launch the ISSetup.exe program.
3. Select the appropriate installation option; follow the setup dialogs as they appear on screen.
4. When the installation program is complete, remove the CD from the CD-ROM drive.

If the Install Program Does Not Start Automatically:

1. Click the Start menu, click Run, then click Browse.
2. In the browse window, select the PC's CD-ROM drive, then select the ISSetup.exe file.
3. Click Open, then click OK to begin the installation. The default installation directory is C:\Program Files\Cognex.
4. Select the appropriate installation option; follow the setup dialogs as they appear on screen.
5. 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 software installation by opening the Start menu and clicking *All Programs > Cognex > In-Sight > In-Sight Wafer ID 3.x.x > In-Sight Wafer ID 3.x.x.*
2. Verify the *In-Sight® Explorer Help* file installation by opening the Start menu and clicking *All Programs > Cognex > In-Sight > In-Sight Wafer ID 3.x.x > In-Sight Wafer ID 3.x.x Help*.

NOTE From the Wafer ID 3.x.x program group, select the 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.

2.2 Determine the Network Configuration

The In-Sight wafer reader is designed to operate as a host system on an Ethernet TCP/IP network. For the purposes of the instructions in this manual, an In-Sight network exists whenever one or more wafer readers can be accessed remotely from another host on the network.

The wafer reader may be used in several possible network configurations. For each configuration, the wafer reader is configured using either the In-Sight software or a Microsoft® Internet Explorer browser, which also provides the remote display for that wafer reader.

2.2.1 Standalone In-Sight Network Configurations

A standalone In-Sight network configuration includes a direct connection between a wafer reader and a PC equipped with a network card. In this configuration, the wafer reader and the PC are on a non-DHCP network. For information on configuring your PC's network settings on a non-DHCP network, refer to Section 2.3.

The In-Sight 1720 series wafer reader has an Autosense capability, allowing the wafer reader to connect directly to a PC using either a standard CAT5 network cable or a CAT5 crossover cable. In this configuration, neither the PC nor the wafer reader is connected to the larger, fab floor 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 wafer reader may not be established. It is recommended to use a hub or switch with a standard Ethernet cable to configure the In-Sight wafer reader or configure your PC to disable the Media Sense feature. See Microsoft Knowledge Base article 239924 for details on this process.

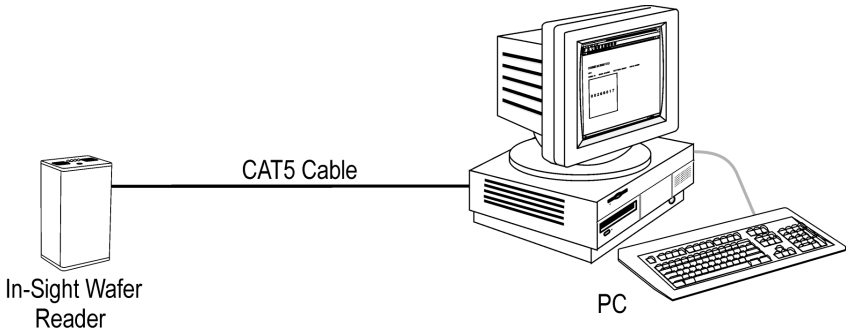


Figure 2-1: Standalone In-Sight Network

Configurations Using Switches/Routers

An In-Sight network may be extended to include multiple wafer readers by using an Ethernet switch or network router. 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.

To install multiple wafer readers on a standalone In-Sight network, use a switch/router between the wafer readers and the remote host. Make all connections via standard, straight-pinned CAT5 cables (Figure 2-2).

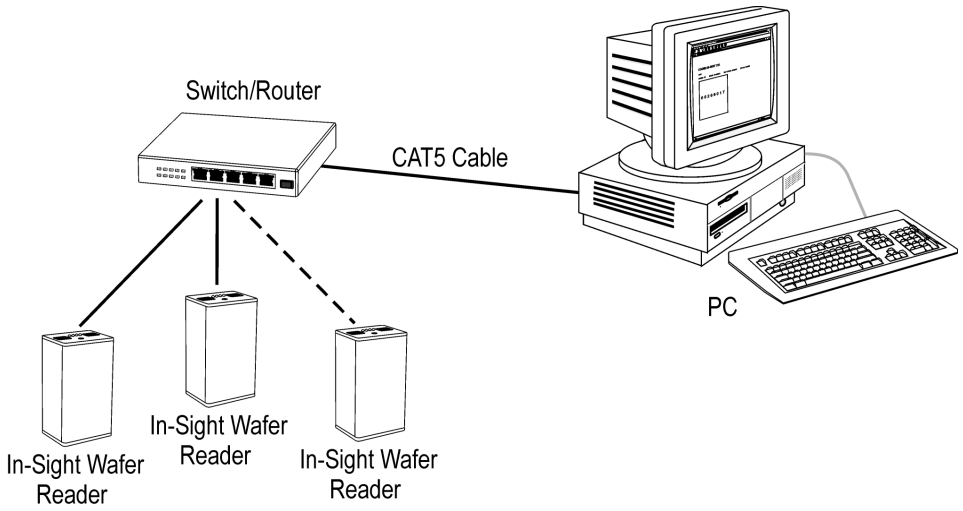


Figure 2-2: Standalone In-Sight Network with Ethernet Switch

2.2.2 Fab Floor In-Sight Network Configurations

To take full advantage of its networking capabilities, the wafer reader can operate as a host on the larger, fab floor network. The only physical difference between fab floor-networked wafer readers and a standalone wafer reader network is that the switch/router is connected directly to the network.

Groups of wafer readers connected to the fab floor network through a common switch/router are referred to as a local network. Figure 2-3 shows a local network that includes several wafer readers and a PC.

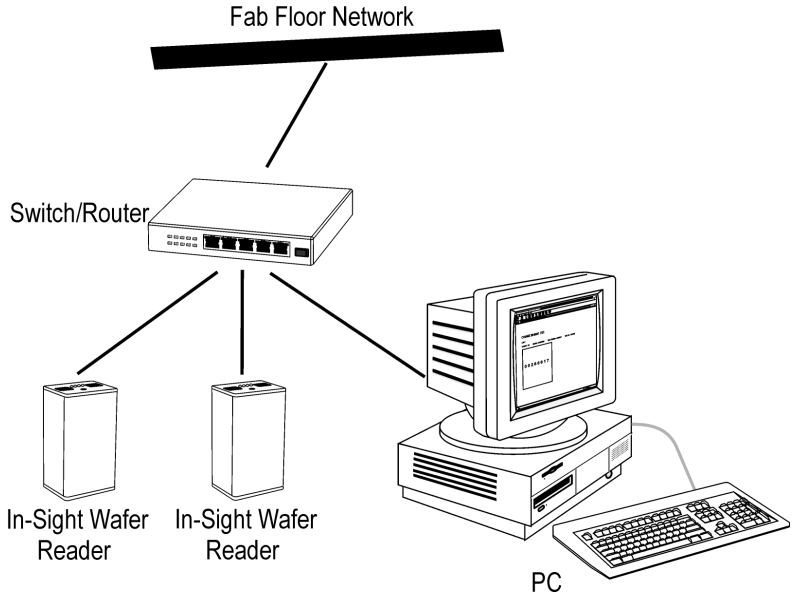


Figure 2-3: Local Network

2.3 Configure the PC's Network Settings (Non-DHCP)

This section provides information on how to configure Microsoft Windows network settings in order to connect to a wafer reader running In-Sight software on a non-DHCP network.

NOTE	The steps listed below and the example dialogs are specific to Windows XP Professional.

2.3.1 Configure the IP Address and Subnet Mask

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

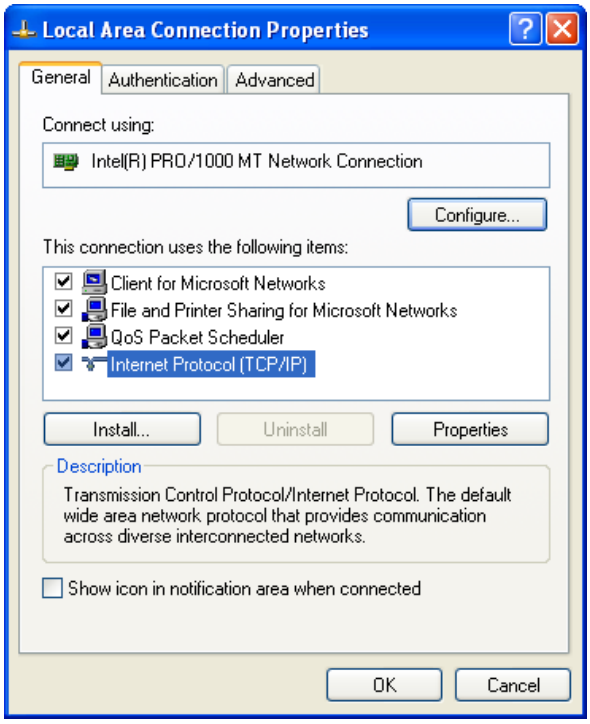


Figure 2-4: Local Area Connection Properties Dialog

7. For Non-DHCP networks, click the “Use the following IP address” radio button (Figure 2-5). The IP address, Subnet Mask, Default Gateway, Preferred DNS server and Alternate DNS server fields, which are grayed-out, become active.

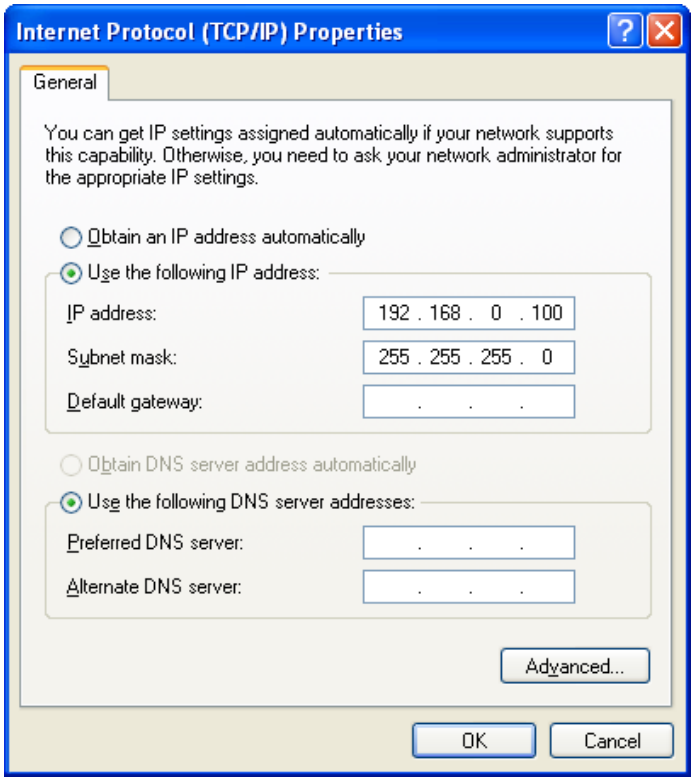


Figure 2-5: Select Network Protocol Dialog

a. Enter an appropriate IP address.

b. Enter an appropriate Subnet Mask. The Subnet Mask defines which portion of the wafer reader’s IP address refers to the network and which part refers to the host. The network portion 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.

NOTE	Consult your network administrator to determine the appropriate Subnet Mask, Preferred DNS server and Alternate DNS server.

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

3 Install the Wafer Reader

In this Section…

This section describes the connection of the wafer reader to its standard and optional components. For a complete list of options and accessories, contact your Cognex sales representative.

3.1 Verify Required Hardware Components

- In-Sight 1720 Series Wafer Reader
- 24VDC Power Supply and Adapter
- Network Cable
- Breakout Cable
- Mirror for Horizontal Operation (Optional)

3.2 Attach the Mirror for Horizontal Operation (Optional)

The optional horizontal mirror attachment (P/N 800-5796) allows the wafer reader to be installed in top or bottom-side reading applications where a low mounting profile is required.

NOTE For an increased working distance, mount the horizontal mirror in the recommended configuration.

To attach the mirror mount:

1. Align holes of the mirror attachment to holes on the front plate of the wafer reader.
2. Insert the two M3 X 14mm hex head screws (provided) through the mirror mount, into the front plate.
3. Tighten screws with a 2.5mm Allen wrench.

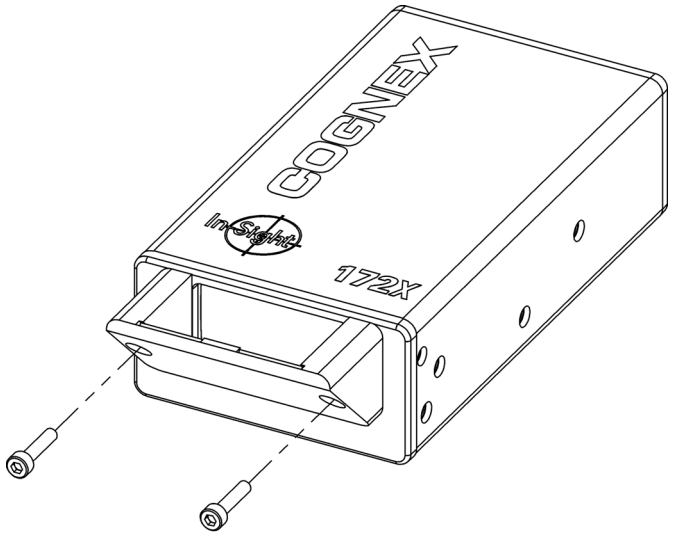


Figure 3-1: Recommended Mirror Mounting Configuration

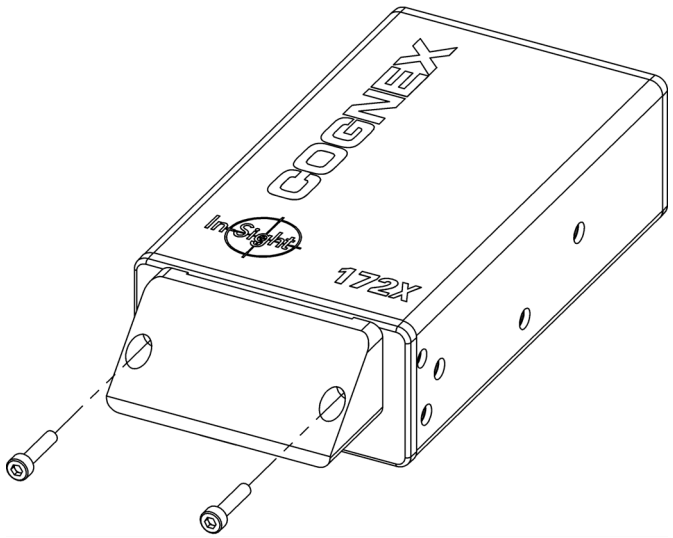


Figure 3-2: Optional Mirror Mounting Configuration

3.3 Mount the Wafer Reader

The working distance is adjustable, with a factory-set option of 50.0mm when vertically mounted. The useable working distance range is 1 to 80.0mm for the wafer reader in the vertical position.

NOTE The Image Orientation may need to be adjusted, depending on the configuration of the wafer reader and the mirror attachment installation. For more information, refer to the *In-Sight® Explorer Help* file.

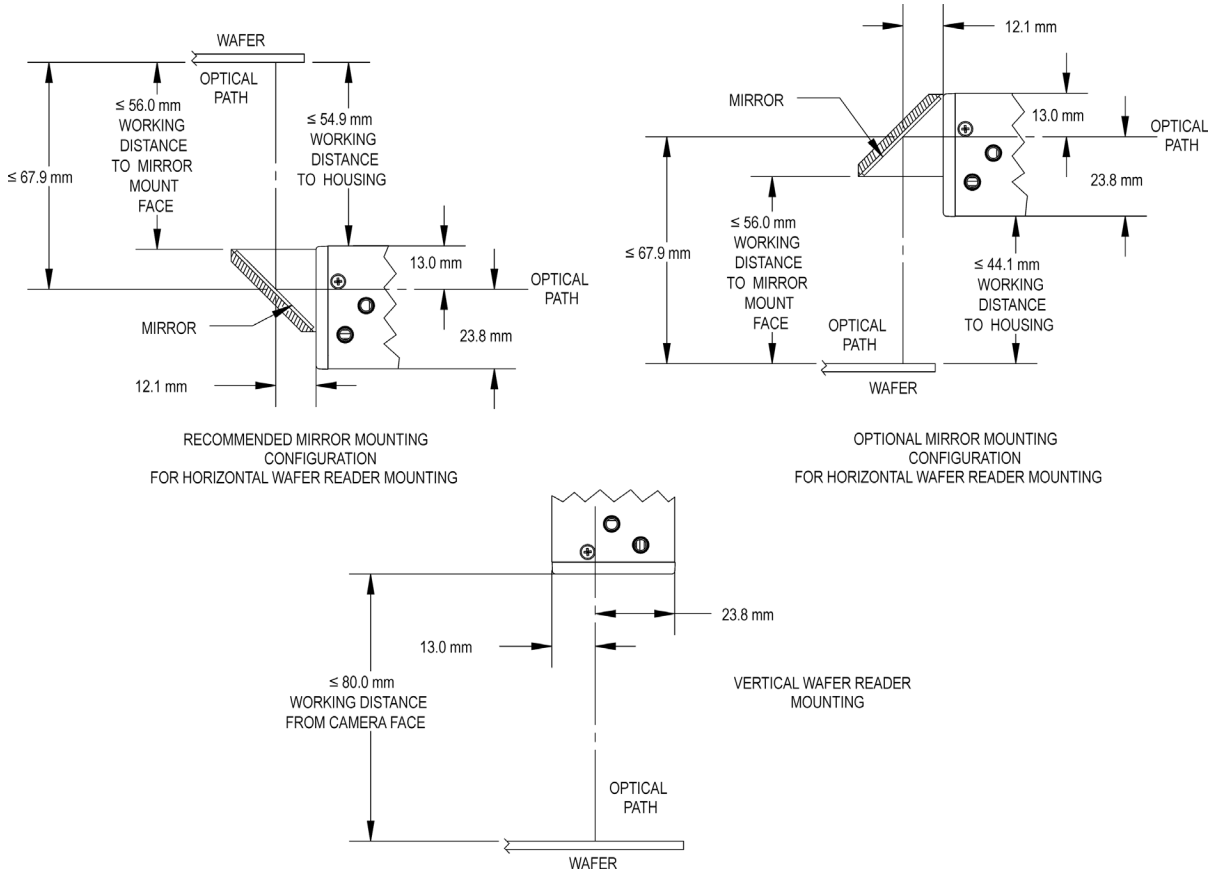


Figure 3-3: Working Distances in Vertical and Horizontal Mounting Configurations

NOTE The wafer reader can be mounted face-up or face-down in both horizontal mirror mounting configurations.

Table 3-1 shows examples of the wafer reader's vertical working distances and the corresponding horizontal working distances required at the same focal setting. For more information on adjusting the focus, refer to Section 4.4.

Table 3-1: Working Distances

Vertical Working Distance	Corresponding Horizontal Working Distance			
	Recommended Mirror Mounting		Optional Mirror Mounting	
	To Mirror Mount Face	To Housing	To Mirror Mount Face	To Housing
5.0mm	N/A	N/A	N/A	N/A
10.0mm	N/A	N/A	N/A	N/A
15.0mm	N/A	N/A	N/A	N/A
20.0mm	N/A	N/A	N/A	N/A
25.0mm	1.0mm	N/A	1mm	N/A
30.0mm	6.0mm	4.9mm	6.0mm	N/A
40.0mm	16.0mm	14.9mm	16.0mm	4.1mm
50.0mm*	26.0mm*	24.9mm*	26.0mm*	14.1mm*
60.0mm	36.0mm	34.9mm	36.0mm	24.1mm
70.0mm	46.0mm	44.9mm	46.0mm	34.1mm
80.0mm	56.0mm	54.9mm	56.0mm	44.1mm

* Indicates factory-set working distances

3.4 Connect the Network and Breakout Cables

The wafer reader has two RJ-45 connector ports: the Network Port and the Breakout Port (see Figure 3-4). The Network Port provides the Ethernet connection for network communications. The Breakout Port supplies connections for the 24VDC power source, I/O, acquisition trigger, and serial communications.

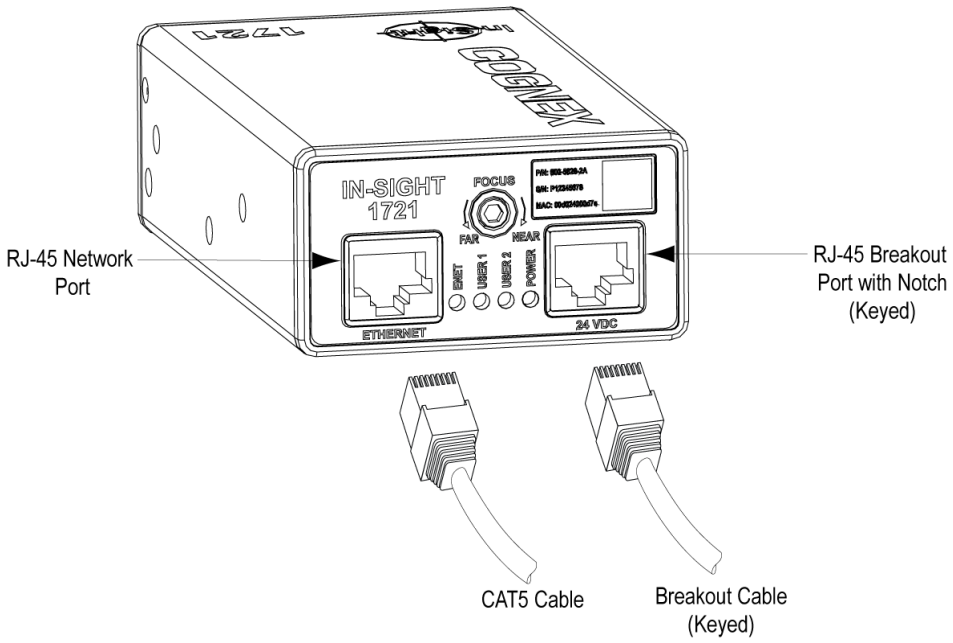


Figure 3-4: Location of RJ-45 Ports

3.4.1 Connect the Network Cable

- **If you are connecting to an Ethernet switch/router,** plug one of the RJ-45 connectors of a CAT5 straight-pinned cable or crossover cable into the Network Port (labeled Ethernet) and plug the other end into an available port on the switch/router.
- **If you are connecting directly to a wafer reader from a remote host,** plug one end of a CAT5 network cable or crossover cable into the wafer reader's Network Port (labeled Ethernet); plug the other end into the remote host's Ethernet port.

3.4.2 Connect the Breakout Cable

The breakout cable provides access to the wafer reader's power, serial communications, and I/O lines. The RJ-45 connector on this cable is "keyed" to the notch in the Breakout Port, and cannot be inadvertently plugged in to the Network Port. See Section 5.2.2: Breakout Port Pin Assignments on page 33 for the Breakout Cable's wiring details.

To connect the wafer reader using the optional 1350 Breakout Module, refer to Appendix B.

To Connect the Breakout Cable to the Wafer Reader:

1. Verify the 24VDC power supply being used is switched off.
2. Attach the Breakout Cable's power (white-green wire) and ground (brown wire) to the corresponding terminals on the power supply.
3. Connect the wires for the acquisition trigger, discrete outputs, and serial communications to their corresponding terminals on remote devices.
4. Plug the RJ-45 connector into the wafer reader's Breakout Port (labeled 24VDC).
5. Restore power to the 24V supply. The green power LED will indicate that the wafer reader is receiving power.

4 Configure the Wafer Reader

In this Section…

4.1 Add the Wafer Reader to the Network

The Wafer reader 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 wafer reader may not be established. It is recommended to use a hub or switch with a standard Ethernet cable to configure the In-Sight wafer reader 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 a wafer reader to a network depends on whether or not a ***Dynamic Host Configuration Protocol*** (DHCP) server is available. The DHCP server automatically assigns the wafer reader a network IP address and Subnet Mask.

NOTE When installing the wafer reader to an existing network, consult your network administrator to determine whether a DHCP server is available.

4.1.1 Install to a DHCP Network

The wafer reader 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 wafer reader, configure its settings, and add it to the network with the default Host Name. A Host Name is an “alias” for the wafer reader’s IP Address, and appears in any list of host names in the In-Sight interface.

NOTES

- After adding the wafer reader to a network with a DHCP server, disabling DHCP on the wafer reader and assigning it a static IP address is strongly recommended.
- If you originally connected your wafer reader directly to a PC (on a non-DHCP network), and want to add the wafer reader to a network with a DHCP server, use the In-Sight Connection Manager to modify the wafer reader’s network settings.

After adding the wafer reader to the network using DHCP, proceed to “Log On to the Wafer Reader” (page 24).

4.1.2 Install to a Non-DHCP Network

To install the wafer reader on a network that does not provide a DHCP server, use the In-Sight Connection Manager to configure the wafer reader's network settings.

1. Ensure that the wafer reader is connected to the network and has power.
2. Open the In-Sight Connection Manager from the In-Sight Wafer ID 3.x.x 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 4-1).
4. Click Next.

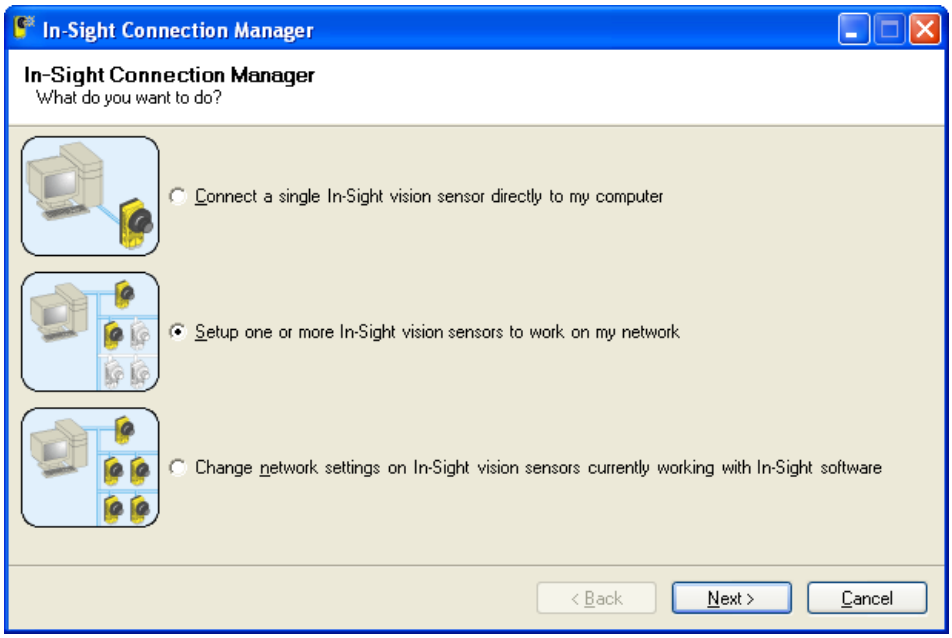


Figure 4-1: In-Sight Connection Manager

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

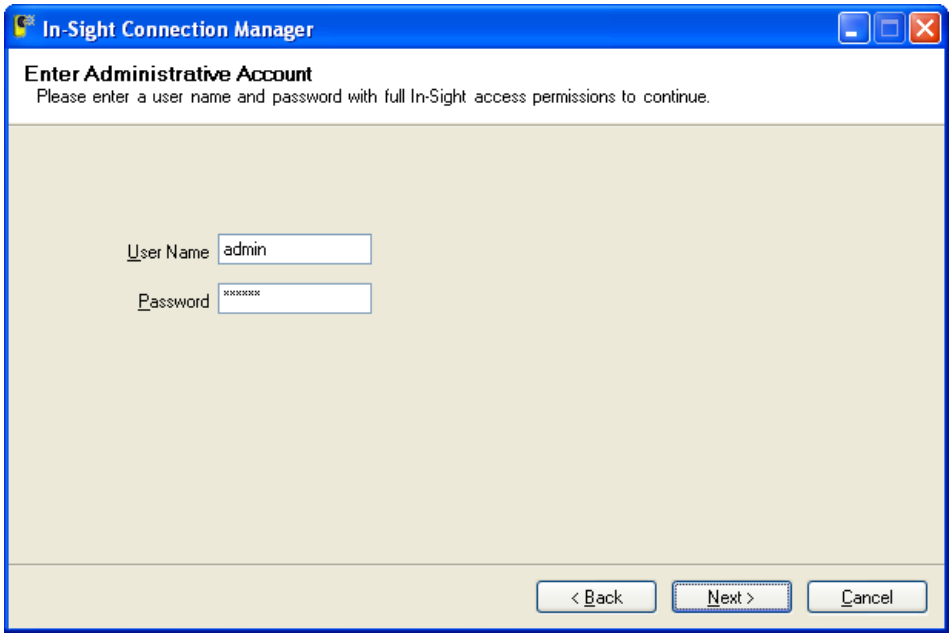


Figure 4-2: User Name and Password

7. In the left-hand text box, enter the MAC Address for the wafer reader you would like to configure, then click Add (Figure 4-3). Repeat these two steps for any additional wafer readers you would like to configure. Alternately, you can simply cycle power on any wafer readers you would like to configure, and the In-Sight Connection Manager will automatically add the corresponding MAC address to the list after they reboot.
8. Click Next.

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

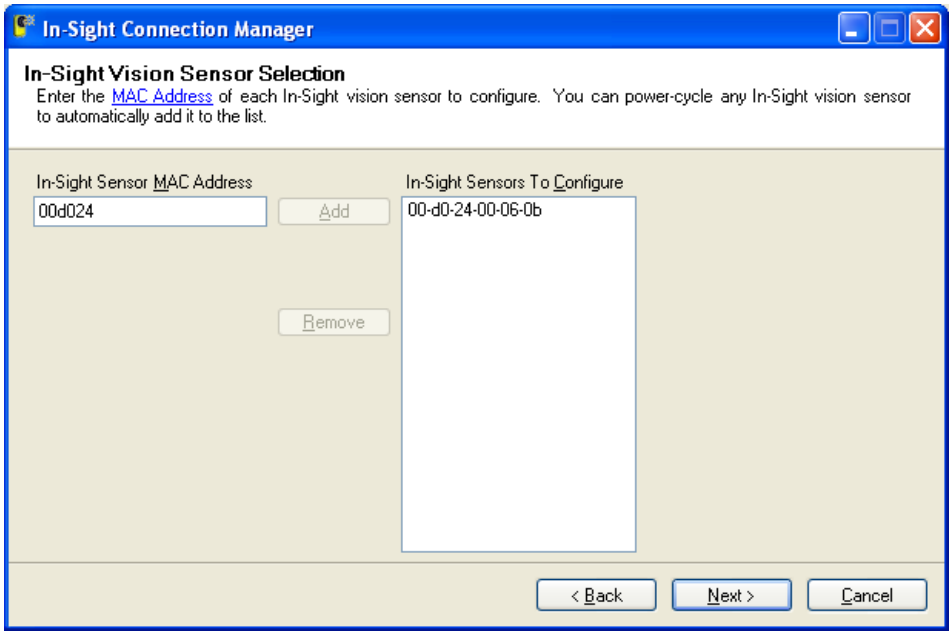


Figure 4-3: MAC Address

9. In the Set Network Configuration dialog (Figure 4-4), select the first option, “Use The Following Network Settings For All Sensors”.

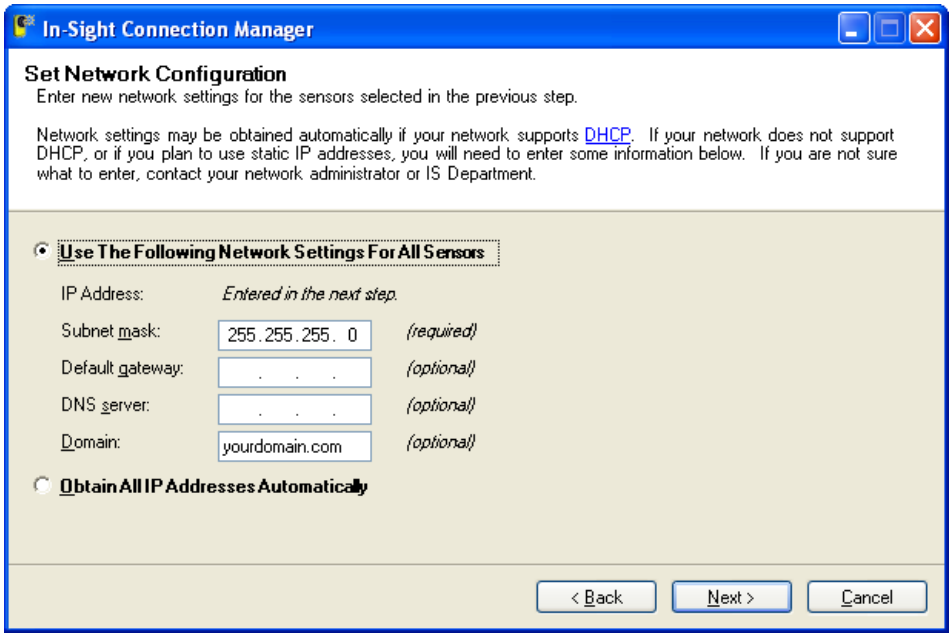


Figure 4-4: Set Network Configuration Dialog

10. Enter values for the Subnet mask; these settings will be applied to every wafer reader. The Subnet Mask defines which portion of the wafer reader’s IP address refers to the network and which part refers to the host. The network portion of the IP address is the same for all hosts on the same subnet, and the remainder is unique to each host. Consult your network administrator for more information.
11. Optionally, enter values for the Default gateway, DNS server and Domain; these settings will be applied to every wafer reader.
    - **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.
12. Click Next.

13. For each wafer reader in the table (Figure 4-5), enter a unique IP address in the New IP column. Optionally, you can type in meaningful names for each wafer reader under the New Name column.
14. Click Next.

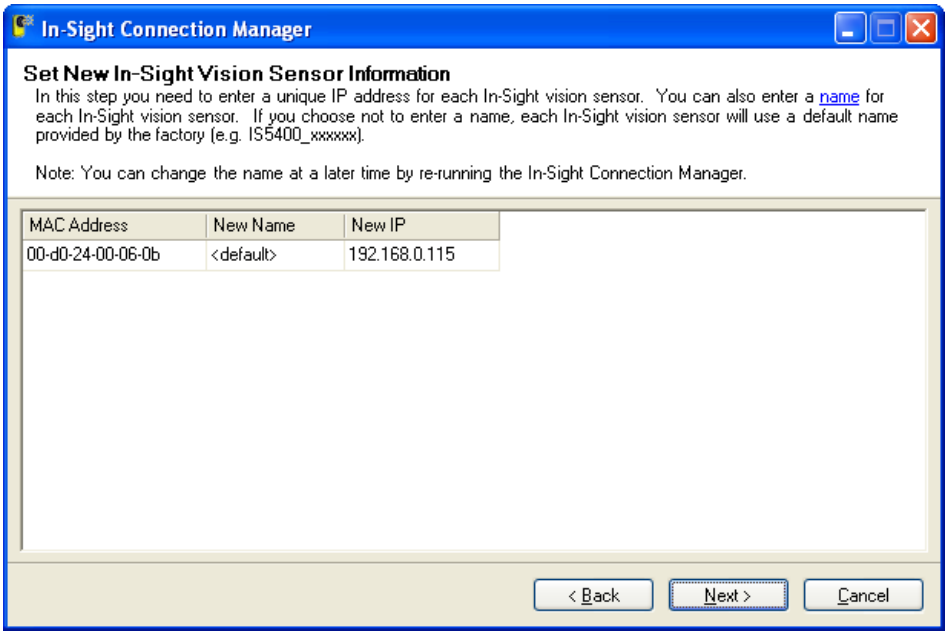


Figure 4-5: Enter IP Address

15. Click Configure (Figure 4-6).

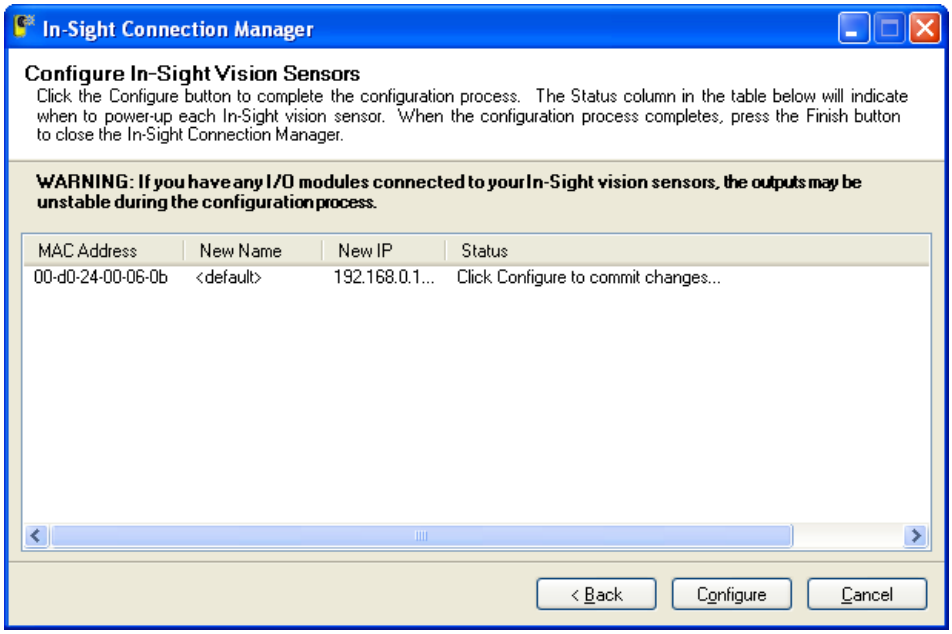


Figure 4-6: Configure In-Sight Vision Sensors

16. For every wafer reader 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.
17. Once all wafer readers have been configured, click Finish.

4.2 Log On to the Wafer Reader

After the wafer reader has been added to the network, log on to the wafer reader to verify the installation. To log on to a wafer reader, you must supply a valid User Name and Password.

NOTE If you are connecting to a newly installed wafer reader, leave the Password field blank. If you are connecting to a previously installed wafer reader, you may need to enter a password.

Every wafer reader is pre-configured with three User Names: admin, operator, and monitor; each of these accounts is configured with a blank password. Each User Name is assigned a specific Access level. The Access level controls how much interaction is allowed for the current user to prevent inadvertent or unauthorized changes to the configuration.

- **Admin Level** (Full): The user has complete, unrestricted access to the In-Sight wafer reader. Any job may be loaded, changed, and saved. All tab and menu selections are enabled.
- **Operator Level** (Protected): The user has limited access to the wafer reader. A user in Protected mode can toggle the wafer reader Online/Offline, access Live mode, Save & Load jobs (if permitted by their FTP Read/Write privileges), and Customize the appearance of the interface.
- **Monitor Level** (Locked): The most restrictive level of access available, a user in Locked mode can only monitor the operation of the current wafer reader.

NOTE For more information, refer to the User List topic in the *In-Sight® Explorer Help* file.

4.2.1 Log On Using In-Sight Explorer

NOTE Only one user at a time can be logged onto the wafer reader using the .NET user interface.

1. Open the In-Sight Explorer program. When In-Sight Explorer is launched, the admin user is logged on by default.
2. Double-click the wafer reader from the In-Sight Network tree. This sends the default User Name and Password to the wafer reader and displays its Wafer ID View.

4.2.2 Log On Using Microsoft Internet Explorer

As described in the Introduction, a Microsoft Internet Explorer browser can be used to configure and monitor Wafer ID applications on the wafer reader. When a connection to a wafer reader is made from a browser, the Wafer ID application automatically loads in the browser window.

NOTES

- In-Sight Explorer must be installed on the PC to access the wafer reader using Microsoft Internet Explorer.
- Only one user at a time can be logged onto the wafer reader using the .NET user interface.

To Open a Connection to the Wafer Reader from Internet Explorer:

1. Enter the IP address or host name of the wafer reader into the browser's Address Bar followed by "/WaferID.html" (for example, http://192.168.0.1/WaferID.html or http://is1721_00060b/WaferID.html). The HTTP logon dialog opens.

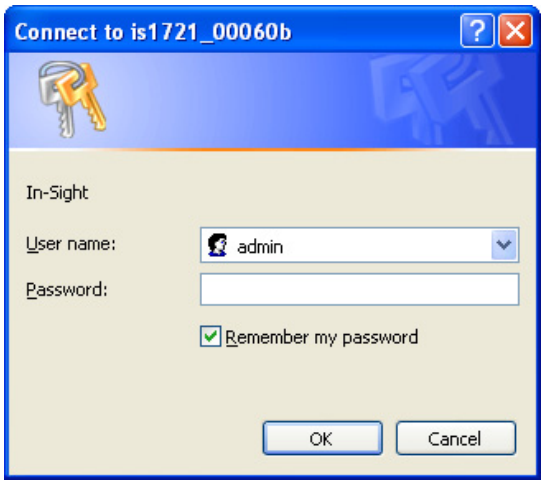


Figure 4-7: HTTP Logon Dialog

NOTE	Every wafer reader installed on the same subnet must have a unique IP address, which must be consistent with the addressing scheme in use on that network.

2. In the HTTP Logon dialog, enter the default User Name admin.

NOTE	If you are connecting to a newly installed wafer reader, leave the Password field blank. If you are connecting to a previously installed wafer reader, you may need to enter a password.

3. Click OK to log on to the wafer reader. The In-Sight Wafer ID application will begin loading automatically in the browser. Wait for the page to finish loading before making any further selections.

TIP	You can rename the "WaferID.html" file within the In-Sight Files pane to "index.html", allowing you to only enter the wafer reader's IP address or host name into the browser's Address Bar (for example, http://192.168.0.1 or http://is1721_00060b). If a legacy "index.html" file is already loaded on the wafer reader, make sure you don't accidentally overwrite this file.

To Suppress the HTTP Logon Dialog When Connecting to a Wafer Reader:

The user name and password can be specified as part of the address, allowing you to suppress the HTTP Logon dialog. The address must be typed using the following format into the browser's Address Box:

http://hostname/filename?isSL=username+password

NOTES

- "?isSL=username+password" is case sensitive; no spaces are allowed. If there is no password, leave it blank, without spaces. The "+" must be included, even if no password is entered.
- A filename must be specified.
- "hostname" can be either the Host Name or the IP address of the wafer reader.
- During a single HTTP session, do not connect to a wafer reader using both the HTTP Logon dialog and without.

Examples:

To log on as admin, with no password and open the WaferID.html file:

http://is1721_00060b/WaferID.html?isSL=admin+

To log on as admin, with the password Cognex and open the WaferID.html file:

http://192.168.0.1/WaferID.html?isSL=admin+Cognex

4.3 Acquire an Image

Once you've logged on to the wafer reader, you can verify the acquisition of live images.

1. Place a polished wafer below the wafer reader read window.
2. From the Run tab of the Wafer ID View, disable the Online checkbox.
3. From the Lighting tab, select Mode 1 from the Mode drop-down list.
4. Increase the Power setting until the image is saturated.
5. From the Setup tab, click the Live button to view an acquired image over the network.
6. Tilt the wafer reader until maximum image brightness is achieved. A horizontal bright strip should be displayed through the center of the live image.
7. Click the Manual button to exit Live mode.
8. From the Lighting tab, decrease the Power setting until the mark is visible in the field of view (FOV), making sure that the entire mark is visible in the image.

4.4 Adjust the Focus

The recommended working distance range is 1 to 80mm for the wafer reader in the vertical position. If using the horizontal mirror mount, the recommended working distance range is 1 to 56.0mm.

Once the working distance is established and an image is acquired, the focus can be adjusted using the focus adjustment screw (M3 hex screw), located in the center of the wafer reader's front face-plate (see Figure 4-8). To adjust the focus, use a 2.5mm Allen wrench. Turn the focus adjustment screw clock-wise if the wafer reader is moved closer to the wafer; turn the screw counter clock-wise if the wafer reader is moved farther away from the wafer.

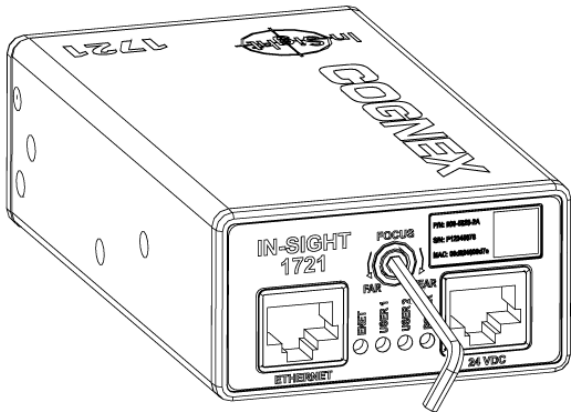


Figure 4-8: Location of Focus Adjustment Screw

4.4.1 Image Artifacts

Under certain conditions, horizontal lines may be observed in the image (Figure 4-9). These lines are artifacts of the wafer reader's optical design. They are most visible at a working distance of approximately 30.0mm, with a dark field image (most often observed when the lighting Mode is set to Mode 4 – Mode 9). In most cases, these lines will have no impact on reading performance. If desired, position the mark in an area of the field of view that is free of artifacts. To reduce the intensity of the lines, the lighting can be optimized using the automated tuning process.

Figure 4-9: Image Artifact Example

5 Specifications

In this Section…

5.1 General Specifications

The following sections list general specifications for the In-Sight 1720 series wafer readers.

Table 5-1: In-Sight 1720 Series Wafer Reader General Specifications

Specification		Description		
Configurations		Vertical mount w/ factory-set 50.0mm working distance.		
		In-Sight 1721: P/N 800-5865-1; P/N 800-5865-1R (RoHS Compliant) In-Sight 1722: P/N 800-5865-2; P/N 800-5865-2R (RoHS Compliant)		
		Optional Horizontal Mirror Mount (800-5796-1)		
Firmware		In-Sight version 2.90 and later.		
Reading Capability		Supported Wafer Marks		Standards
		OCR	SEMI font	SEMI M12, M13, M1.15
			IBM font	N/A
			Triple font	N/A
		2D	Data Matrix™ (ECC 200, 8 x 32)	SEMI T7 and M1.15
		Barcode	BC 412 and IBM 412	SEMI T1-95
Memory	**Job/Program**	32MB non-volatile flash memory; unlimited storage via remote network device.		
	Image/Processing	32MB SDRAM		
Image	**Sensor**	1/3-inch CCD		
	Optical Properties	6.0mm diagonal, 4.65 x 4.65µm sq. pixels		
	Resolution	1024 x 768		
	Electronic Shutter Speed	64µs to 33ms; up to 18 frames per second.		
	Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration.		
		256 gray levels (8 bits/pixel)		
		Gain controlled by software.		
Lighting/Optics		Working Distance: adjustable, w/ factory-set option of 50.0mm (Vertical).		
		Recommended working distance range: 1 to 80.0mm (Vertical); 1 to 56.0mm (Horizontal).		
		Illumination Area: 31.0mm (W) x 19.0mm (H) (nominal; depends on lighting Mode).		
		In-Sight 1721: Red LEDs, 630nm wavelength, with the ability to read bright field and dark field images. Variable exposure controlled through software. Maximum output power <40 microwatts. In-Sight 1722: Infrared LEDs, 880nm wavelength, with the ability to read bright field and dark field images. Variable exposure controlled through software. Maximum output power <60 microwatts.		
I/O	**Trigger**	1 opto-isolated, acquisition trigger input.		
		Remote software commands via Ethernet and RS-232.		
	Discrete Inputs	None built-in.		
		Unlimited inputs when using an Ethernet I/O system.		
	Discrete Outputs	None built-in.		
		Unlimited outputs when using an Ethernet I/O system.		
	Status LEDs	1 Network Traffic/Network Status, 2 User-Configurable, 1 Power		

Communications	**Network**	1 Ethernet port, 10/100 Base-T, TCP/IP protocol. Supports DHCP (factory default) or static IP address.
	Serial	1 RS-232C port (4800 to 115,200 baud rates).
	Protocols	In-Sight, Native Mode, Electroglas and LKx5.
Power		24 ±10% VDC; 140mA (illumination off) to 200mA (illumination on).
Mechanical	**Material**	Aluminum housing, black anodized with nickel-plated black end caps.
	Mounting	Eight 7.3mm deep M4 threaded mounting holes (four per side). Maximum torque 1.5 N-m (13.5 in-lb).
	Dimensions	125.8mm (4.95in) x 70.4mm (2.77in) x 36.9mm (1.45in) Horizontal configuration length: 151.2mm (5.95in)
	Weight	379.9 g (13.4 oz).
Environmental	**Temperature**	0 to 45°C (Operating), -10 to 65°C (Storage).
	Humidity	10 to 90%, non-condensing (Operating and Storage).
Certifications		CE, UL, CUL, FCC
		IEC 60825-1/A2:2001, EN 60825-1/A1:2002, CAN/CSA-E60825-1:2003 Class 1 LED Product
		This equipment conforms with the applicable requirements of SEMI S2-0703a

5.2 I/O Specifications

The wafer reader features one built-in acquisition trigger input and two user-configurable LED outputs for general-purpose use.

5.2.1 Wafer Reader Status LEDs

As shown in Figure 5-1, the wafer reader provides four status LEDs; two LEDs are user-configurable outputs. The function of each LED is listed in Table 5-2.

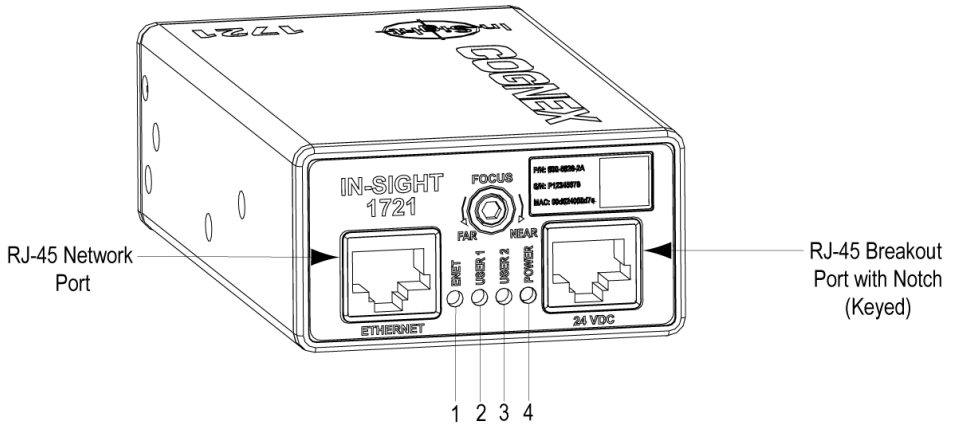


Figure 5-1: LED Outputs

Table 5-2: LED Function

LED Number	LED Color	LED Function	Description
1	Green	Network Traffic/ Network Status	Flashes when receiving data and when connected to the network.
2	Green	User-Configurable*	User-configurable using Discrete Output Line 4.
3	Red	User-Configurable*	User-configurable using Discrete Output Line 5.
4	Green	Power	On when power is connected.

*Although LED 2 and 3 are user-configurable using the Wafer ID Job View, it is not recommended.

5.2.2 Breakout Port Pin Assignments

Table 5-3 lists the pin assignment for each of the 8 signal lines of the Breakout Port (labeled "24VDC") according to each method of access.

Table 5-3: Breakout Port Pin Assignments

In-Sight Breakout Port Pin	Signal	Breakout Cable Wire Color	Breakout Module* Terminals
1	+24VDC	White/Green	6, 8, 10, 12, 14, 15, 16 (+24V)
2	Trigger +	Green	5 (TRG+)
3	Trigger –	White/Orange	4 (TRG-)
4	CTS	Blue	RS-232 serial (9-pin DSUB connector)
5	RTS	White/Blue	RS-232 serial (9-pin DSUB connector)
6	Serial Receive	Orange	RS-232 serial (9-pin DSUB connector)
7	Serial Transmit	White/Brown	RS-232 serial (9-pin DSUB connector)
8	Ground	Brown	1, 2, 3 (GND)

*Refer to the *In-Sight Breakout Module Installation and Reference* (P/N 597-0008-xx) for more detailed information.

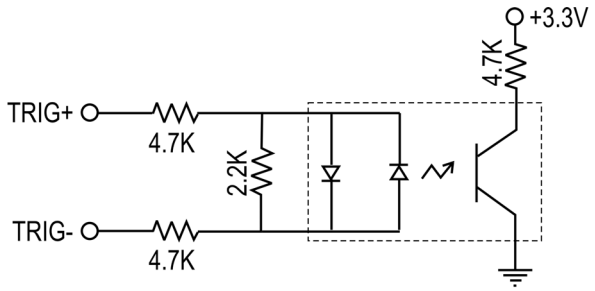
NOTE Unused bare wires can be clipped short or tied back using a tie made from non-conductive material. Keep all bare wires separated from the +24VDC (White/Green) wire.

5.2.3 Acquisition Trigger Input Specifications

Table 5-4: Acquisition Trigger Input Specifications

Specification	Description
Voltage	ON 20 to 28V (24V nominal)
	OFF 0 to 3V (12V nominal threshold)
Current	ON 2.0 to 2.9mA
	OFF <150μA
	Resistance ~10,000 Ohms
	For higher current add external resistor (for example, 2.2kΩ, 0.5W for 12mA) across inputs.
Delay	76 μSec latency between leading edge of trigger and start of acquisition. Input pulse should be minimum of 1ms wide.

The acquisition trigger input 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.



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

Figure 5-2: Acquisition Trigger Input Schematic

5.3 CAT5 Network Cable Specifications

Cognex-supplied, straight-pinned and crossover network patch cables meet CAT5/CAT5e specifications using 568-B standard wire pairing.

Table 5-5: CAT5/CAT5e Network Cable Wiring

Straight-Pinned		
Signal Name	**RJ-45 Connectors**	**Wire Color**
TPO+	1	White/Orange
TPO-	2	Orange
TPI+	3	White/Green
TRMA	4	Blue
TRMB	5	White/Blue
TPI-	6	Green
TRMC	7	White/Brown
TRMD	8	Brown

Table 5-6: CAT5/CAT5e Network Cable 568-B Wire Pairs

Pair #	Wire Pairs
1	4 — 5
2	1 — 2
3	3 — 6
4	7 — 8

5.4 Mechanical Specifications

The following sections present dimensional drawings for the In-Sight 1720 series wafer readers.

NOTE All dimensions are shown in millimeters [inches].

5.4.1 In-Sight 1720 Series Wafer Reader Dimensions

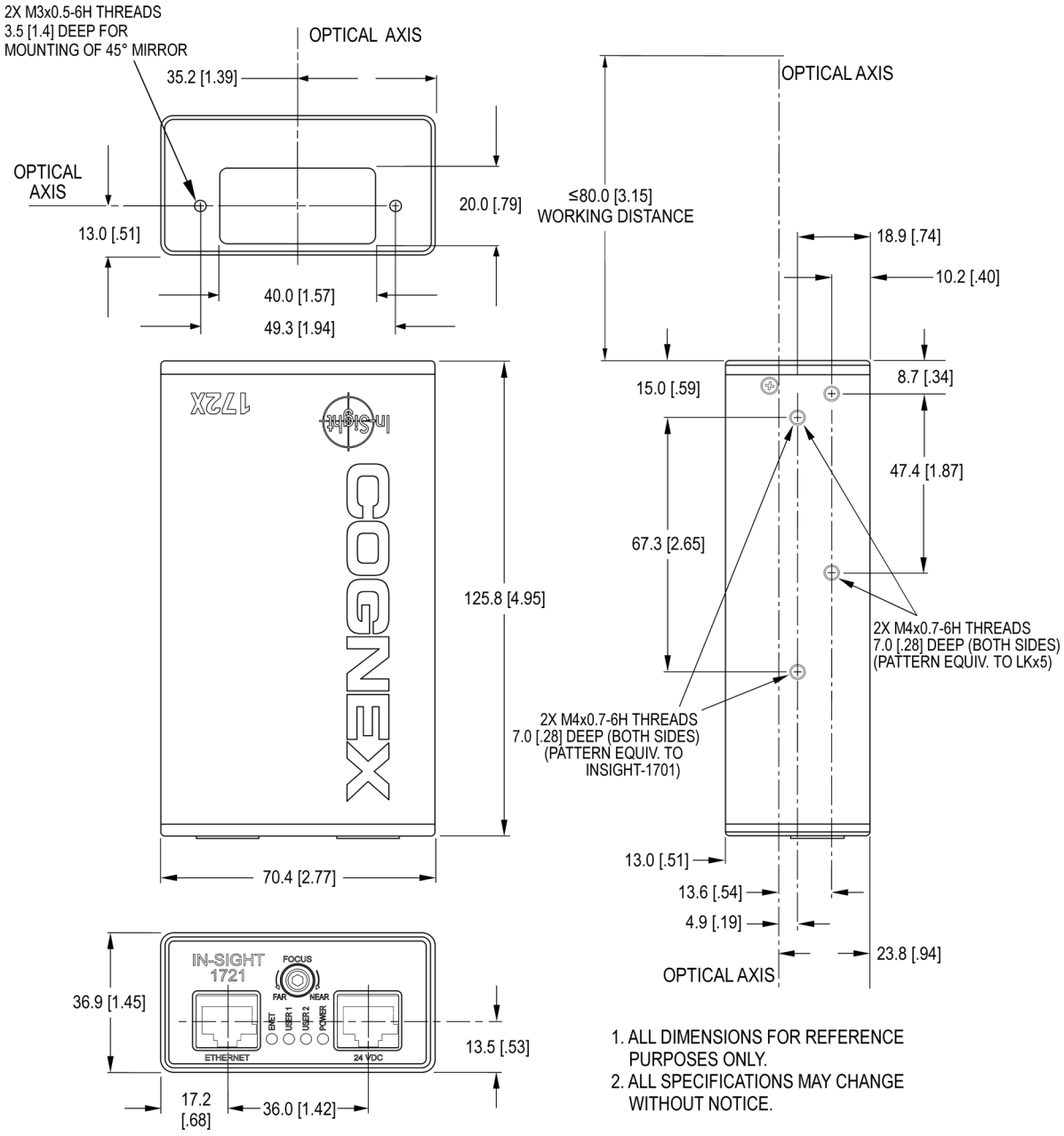


Figure 5-3: In-Sight 1720 Series Wafer Reader Dimensions

CAUTION	The wafer reader must be mounted from only one side. Mounting the wafer reader from both sides may damage optical components. The maximum torque is 1.5 N-m (13.5 in-lb).

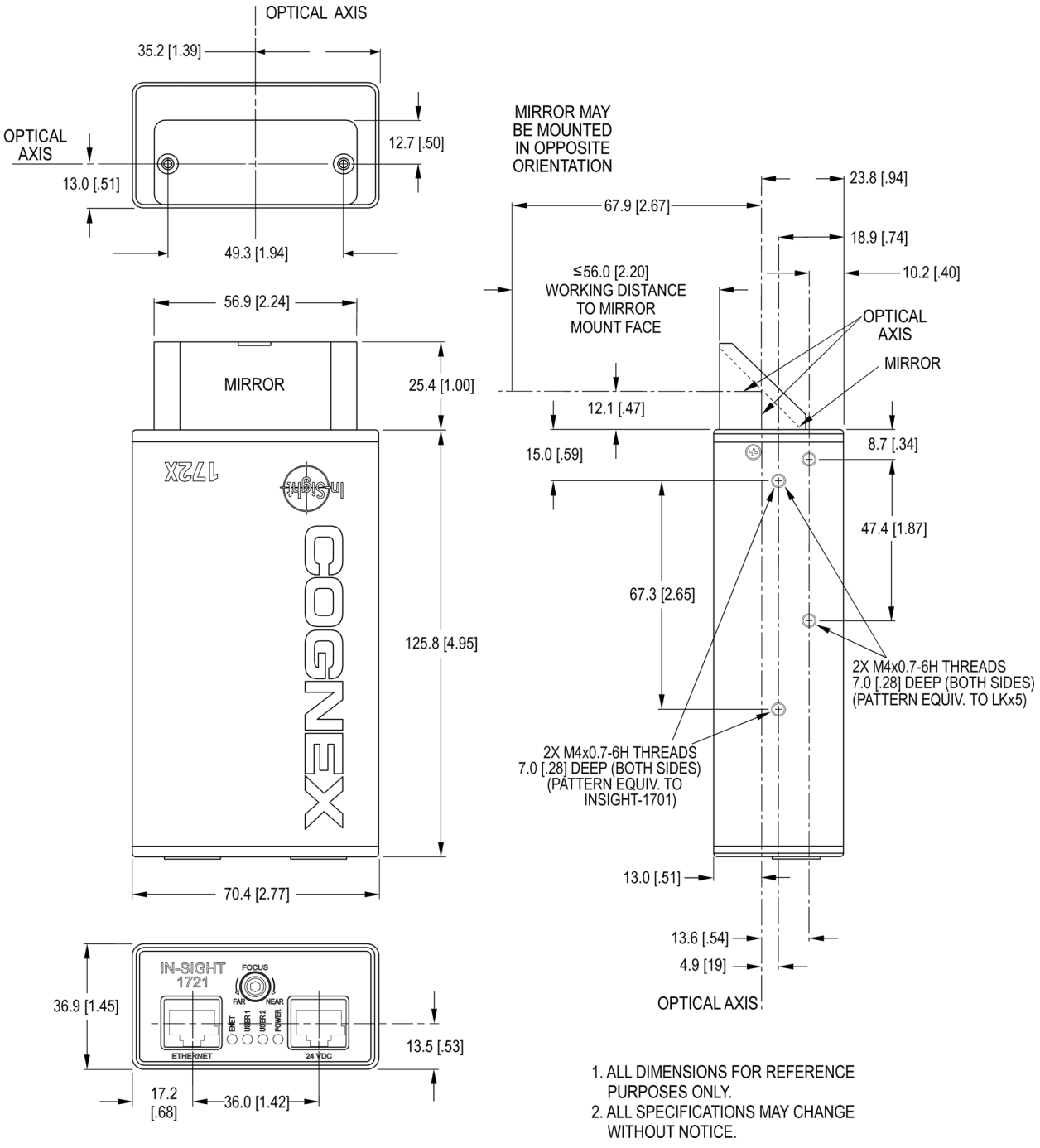


Figure 5-4: In-Sight 1720 Series Wafer Reader Dimensions with Horizontal Mirror Mount (Recommended Horizontal Configuration)

CAUTION	The wafer reader must be mounted from only one side. Mounting the wafer reader from both sides may damage optical components. The maximum torque is 1.5 N-m (13.5 in-lb).

Appendix A

A.1 Firmware Update Instructions

WARNINGS

- The firmware update process will erase all job and settings files from In-Sight non-volatile flash memory. In-Sight Explorer creates a backup of all job files and settings prior to the firmware update. These files are restored to the wafer reader automatically after the firmware update; however, you may wish to perform a manual backup operation on the wafer reader before starting the Firmware Update procedure.
- Do not power cycle the wafer reader while the firmware is being upgraded.
- If an error occurs during the firmware update process, power cycle the In-Sight wafer reader and restart the firmware update.
- You cannot update the firmware on a wafer reader that is currently Online. Take the wafer reader Offline before attempting to update the firmware.
- If a job containing a large number of functions is loaded when a firmware update is attempted, the update may be interrupted due to lack of empty flash memory. If this occurs: (1) ensure that the wafer reader is Offline, (2) click File > New Job and (3) try the update again.
- If the jobs on an In-Sight wafer reader consume a large portion of available flash memory, the firmware update may be interrupted due to lack of empty flash memory. If this occurs: (1) backup or delete the job files from the wafer reader, and (2) try the update again.
- If you receive an error ("Error 6029: Unable to establish native mode connection to <wafer reader>") while attempting the firmware update process, you may be logged on to the wafer reader without the appropriate privileges. Log off and then log on as a user with appropriate privileges and retry the firmware update procedure.

A.1.1 Updating the Firmware

1. Launch In-Sight Explorer.
2. Verify the following:
   - All target wafer readers are Offline
   - No other users are logged on to the target wafer readers
   - A new job is loaded on each target wafer reader (File > New Job)
3. On the System menu, click Update Firmware.
4. Highlight the In-Sight wafer reader(s) to be updated.
5. Click Update Firmware.
6. Verify that each wafer reader listed in the dialog is to receive new firmware.
7. Click OK.
8. Once all wafer readers have been updated and rebooted, click OK to close the Firmware Update dialog.

A.1.2 Copy the .JOB and .HTML Files

After the wafer reader's firmware has been updated, the WafID00.JOB and .HTML files included in the installation package must be copied to the wafer reader's flash memory. The required files can be copied into flash using a web browser or a command prompt. The files are copied to the wafer reader using an FTP session from a remote host on your network.

NOTE A WAFID00BC.job file is also included in the installation package. This job file is identical to the default WAFID00.JOB, except the default mark type is BC 412.

Using Microsoft Internet Explorer:

1. Open the web browser.
2. Type `ftp://`, followed by the wafer reader's IP address or Host Name, into the web browser's Address bar (for example, ftp://192.68.0.1 or ftp://is1721_00060b). A Log On As dialog appears.
3. Enter the In-Sight User Name. For example, the default In-Sight User Name is admin.
4. Enter the In-Sight Password. If the wafer reader has not been assigned a new User Name and Password, leave the Password field empty.
5. Click OK to log on to the In-Sight wafer reader's FTP file system. If the logon is successful, all of the files currently installed on the In-Sight wafer reader are displayed in the Internet Explorer window.
6. Open a separate Microsoft Windows Explorer window and navigate to the In-Sight Wafer ID 3.x.x directory. The default directory is: C:\Program Files\Cognex\In-Sight\In-Sight Wafer ID 3.x.x.
7. Copy and paste the WafID00.JOB and .HTML files located in the In-Sight Wafer ID 3.x.x directory to the In-Sight wafer reader's FTP file system. This will copy the WafID00.JOB and .HTML files to the In-Sight wafer reader.

Using a command prompt (in Microsoft Windows):

1. Open a command prompt.
2. From the root directory, change the directory to the Wafer ID 3.x.x directory (for example, `cd Program Files\Cognex\In-Sight\In-Sight Wafer ID 3.x.x`).
3. Open an FTP session by typing `ftp` followed by the wafer reader's IP address or Host Name (for example, `ftp 196.68.0.1` or `ftp is1721_00060b`).
4. When prompted for `User:`, enter the In-Sight User Name. For example, the default In-Sight User Name is admin.
5. If prompted, enter the In-Sight Password.
6. Type `mput WafID00.job` to copy the .job file to the In-Sight wafer reader.
7. When prompted, `mput WafID00.job?`, hit Enter to confirm.
8. Type `mput *.html` to copy the .html file to the In-Sight wafer reader.
9. When prompted, `mput *.html?`, hit Enter to confirm.
10. Type `quit` to exit the FTP session.
11. Close the command prompt.

Appendix B

B.1 Connecting the Breakout Module

The optional In-Sight Breakout Module (P/N 800-5743) is more convenient than using the standard Breakout Module cable to connect the wafer reader's power, serial communications, and I/O lines. For additional information on connecting a Breakout Module, refer to the *In-Sight Breakout Module Installation and Reference* manual (P/N 597-0008-xx).

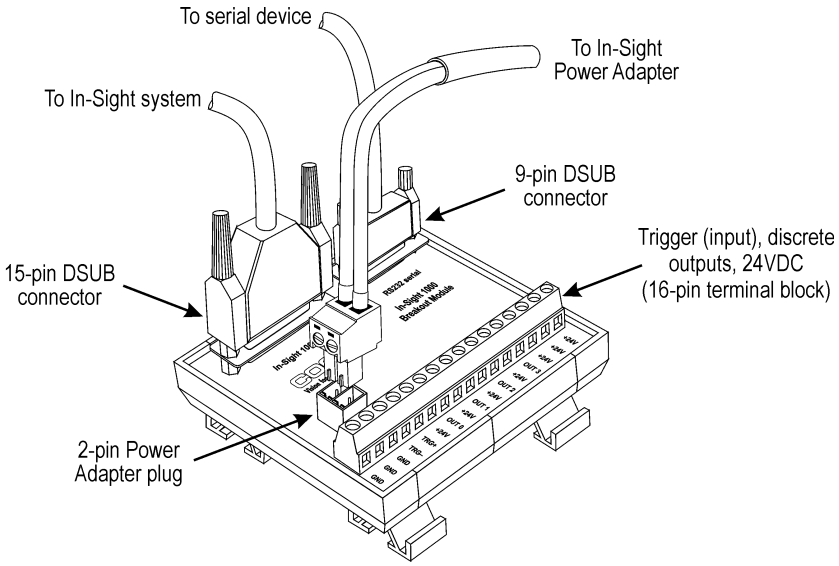


Figure B-1: Breakout Module Connections

To Connect the Breakout Module to the In-Sight Wafer Reader:

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 into their corresponding terminals on the Breakout Module.
3. Optionally, connect the 9-pin male DSUB connector of an RS-232 serial cable into the corresponding 9-pin female connector on the Breakout Module.
4. Plug the Breakout Module cable's 15-pin male DSUB connector into the corresponding female connector on the Breakout Module.
5. Plug the RJ-45 connector of the Breakout Module cable into the wafer reader's Breakout Port. The cable's connectors are "keyed" to the notch in the Breakout Port.
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 B-1).
7. Restore power to the 24VDC supply. The green power LED on the wafer reader and the orange +24V LED on the Breakout Module will indicate that the wafer reader and Breakout Module are receiving power.

Appendix C

C.1 Cleaning the Reader

To maintain optimal imaging and reading performance, keep the glass read window free of dust and fingerprints. To remove dust, use a pressurized air duster. If the window needs cleaning, use a lens cleaning cloth or a cleaner approved for use on coated optics. Do not spray water or cleaning fluids directly onto the glass window, which could allow moisture to enter the case.

Installing the In-Sight® 1720 Series Wafer Reader

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P/N 597-0047-01