

COGNEX

In-Sight[®] 1720 Series Wafer Reader

Installation Manual

IN-SIGHT
Vision Systems

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Regulations/Conformity

NOTE For the most up-to-date regulations and conformity information, please refer to the In-Sight online support site: <http://www.cognex.com/Support/InSight>.

Declaration of Conformity	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this  -marked Wafer Reader Machine Vision System Product	
Product Type	P/N 800-5865-3R
Complies With	89/336/EEC Electromagnetic Compatibility Directive
Compliance Standards	EN 55022:2006 +A1:2007 Class B EN 61000-3-2:2006 EN 61000-3-3:1995 +A1:2001 +A2:2005 EN 61000-6-2:2005
European Representative	COGNEX INTERNATIONAL Immeuble "Le Patio" 104 Avenue Albert 1er 92563 Rueil Malmaison Cedex - France
Safety and Regulatory	
	UL and CUL Certification marks are present on products.
FCC Class B ¹	FCC Part 15, Class B This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
	IEC 60825-1/A2:2001 EN 60825-1/A1:2002 CAN/CSA-E60825-1:2003
SEMI	This equipment conforms with the applicable requirements of SEMI S2-0703a
RoHS	RoHS 6 Compliant

1. Using a shielded Ethernet cable. Use of an unshielded Ethernet cable may result in Class A radiated emission levels.

Regulations/Conformity

Declaration of Conformity	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
Declares this -marked Wafer Reader Machine Vision System Product	
Product Type	P/N 800-5865-1 P/N 800-5865-1R P/N 800-5865-2 P/N 800-5865-2R
Complies With	2004/108/EC Electromagnetic Compatibility Directive
Compliance Standards	EN 55011:2007 Class A EN 61000-3-2:2006 EN 61000-3-3:1995 + A1:2001 + A2:2005 EN 61000-6-2:2005
European Representative	COGNEX INTERNATIONAL Immeuble "Le Patio" 104 Avenue Albert 1er 92563 Rueil Malmaison Cedex - France
Safety and Regulatory	
	UL and CUL Certification marks are present on products.
FCC	FCC Part 15, Class A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
	IEC 60825-1/A2:2001 EN 60825-1/A1:2002 CAN/CSA-E60825-1:2003
SEMI	This equipment conforms with the applicable requirements of SEMI S2-0703a
RoHS	RoHS 6 Compliant (product numbers/types appended by an "R" suffix indicate RoHS compliance).

Precautions

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

- In-Sight 1720 series wafer readers are intended to be supplied by a Listed, Direct Plug-In Power Unit with a minimum output rated 24 VDC, 500mA and marked Class 2, Limited Power Source (LPS). Any other voltage creates a risk of fire or shock and can damage the In-Sight components.
- Do not install 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.
- The housing of the wafer reader is internally connected to the system ground wire (pin 8 of the Breakout cable). Therefore, if the mounting surface of the wafer reader is at a non-zero ground potential, it is strongly recommended that the wafer reader be mounted on an isolated or non-conductive mount.
- Do not expose the CCD to laser light; CCDs can be damaged by direct, or reflected, laser light. If your application requires the use of laser light that may strike the CCD, a lens filter at the corresponding laser's wavelength is recommended. Contact your local integrator or application engineer for suggestions.
- 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.
- When connecting the 1720 series wafer reader to the CIO-1400 I/O module, never connect wire leads from remote devices to the HS OUT 0 or HS OUT 1 terminals on the I/O module; doing so can damage the 1720 series hardware.
- Cable shielding can be degraded or cables can be damaged or wear out more quickly if a bend radius or service loop is tighter than 10X the cable diameter.
- Service loops should be included with all cable connections.

Precautions

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1 Introduction

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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 1720: Red LED lighting, 752 x 480 image resolution and variable working distance
- In-Sight 1721: Red LED lighting, 1024 x 768 image resolution and variable working distance
- In-Sight 1722: Infrared LED lighting, 1024 x 768 image resolution and variable working distance

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:

- *Cognex Wafer ID Help*, an online HTML Help file provided on the In-Sight CD-ROM (for In-Sight software).
- The In-Sight online support:
<http://www.cognex.com/Support/InSight>.

1.3 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 In-Sight software.

1.3.1 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.

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

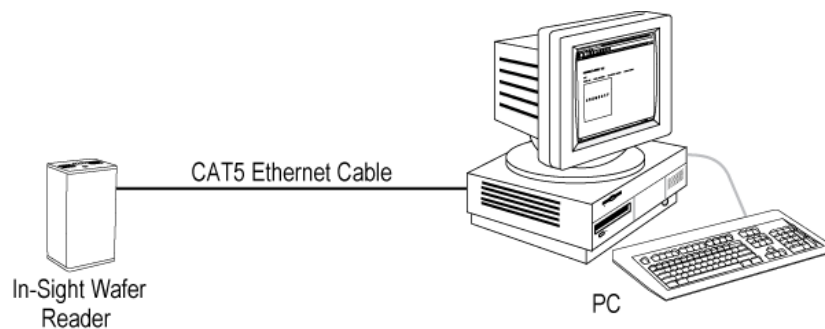


Figure 1-1: Standalone In-Sight Network

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 Ethernet cables (Figure 1-2).

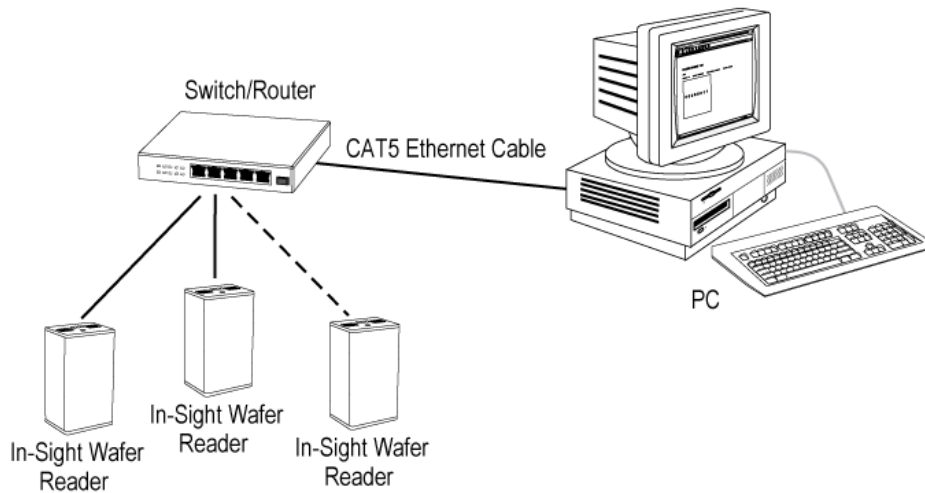


Figure 1-2: Standalone In-Sight Network with Switch/Router

1.3.2 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 1-3 shows a local network that includes several wafer readers and a PC.

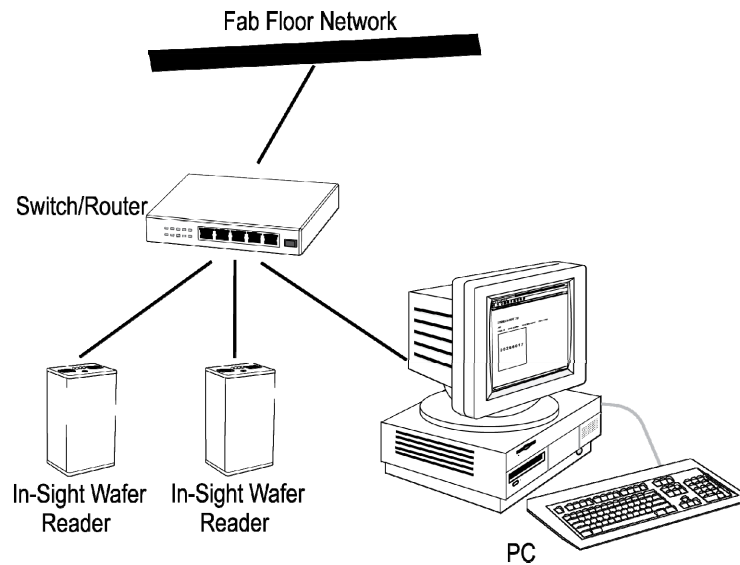


Figure 1-3: Local Network

2 Install the Wafer Reader

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2.3	Mount the Wafer Reader	7
2.4	Connect the Ethernet and Breakout Cables	9
2.5	Adjust the Focus	10

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.

2.1 Verify Hardware Components

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

NOTE	The power supply, cables and mirror are sold separately.
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2.2 Attach the Mirror for Horizontal Operation (Optional)

The optional horizontal mirror attachment (P/N 800-5796-1; P/N 800-5796-1R) 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 (see Figure 2-1).

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 hex wrench.

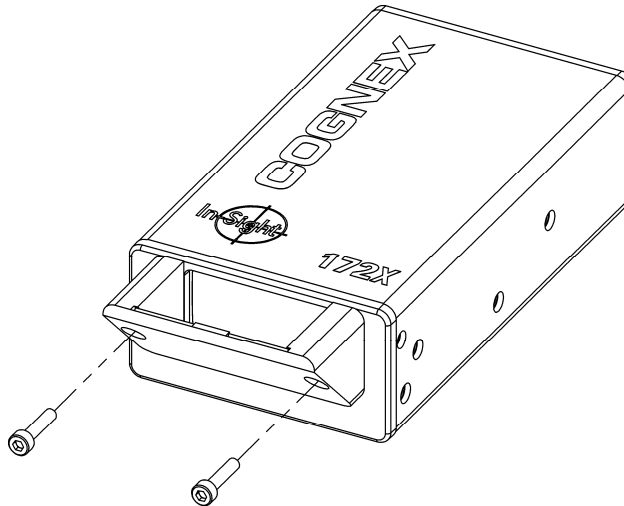


Figure 2-1: Recommended Mirror Mounting Configuration

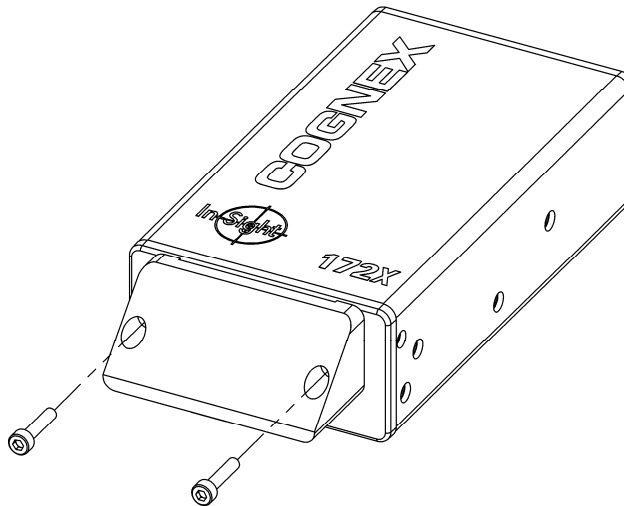


Figure 2-2: Optional Mirror Mounting Configuration

2.3 Mount the Wafer Reader

The wafer reader is shipped with a factory-set working distance of 50.0mm. If using the horizontal mirror mount, the recommended working distance range is 1.0mm to 56.0mm. The recommended working distance range is 1.0mm 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 *Cognex Wafer ID Help* file.

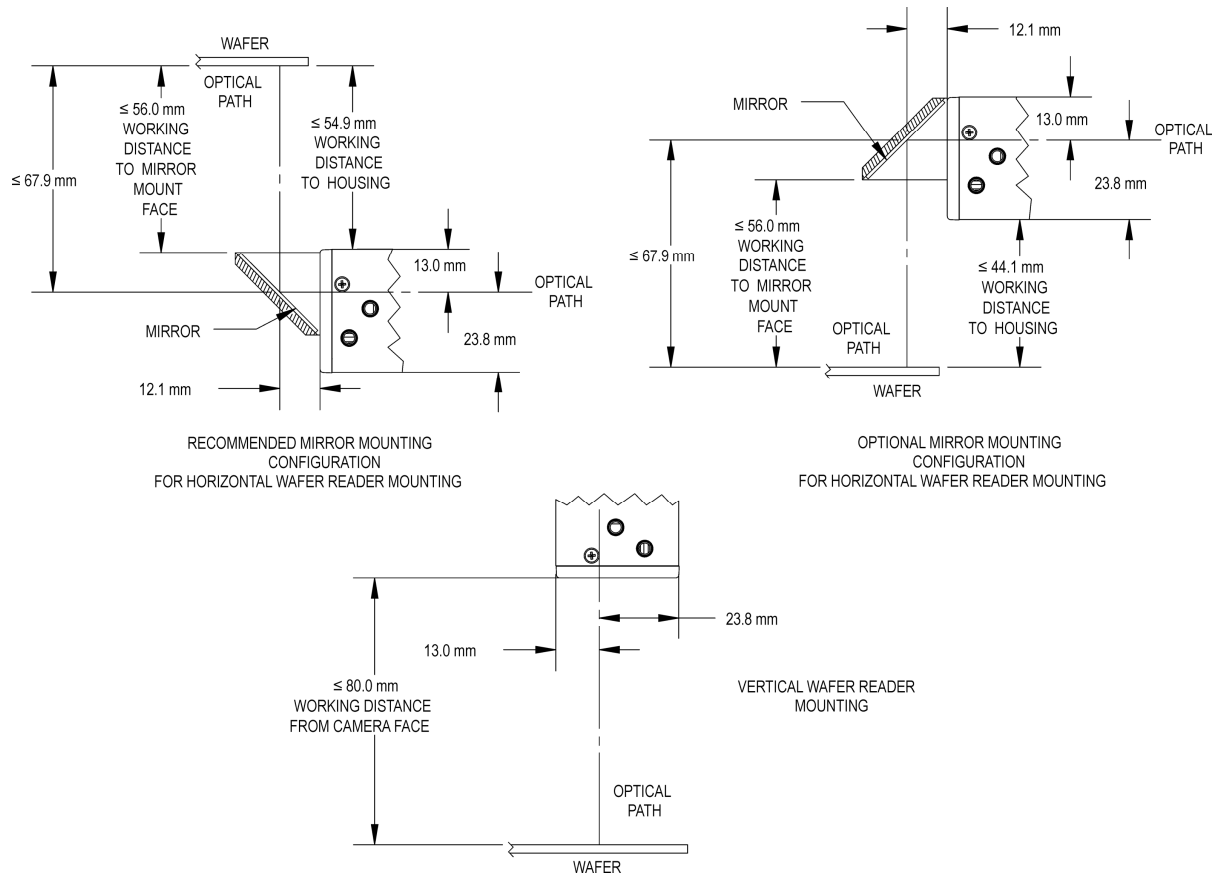


Figure 2-3: Working Distances in Vertical and Horizontal Mounting Configurations

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

Install the Wafer Reader

Table 2-1 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 2.5.

Table 2-1: 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

2.4 Connect the Ethernet and Breakout Cables

NOTES

- Cables are sold separately.
- All cable connectors are “keyed” to fit the connectors on the wafer reader; do not force the connections or damage may occur.
- To connect the wafer reader using the optional CIO-1400 I/O module, refer to Appendix A.

The wafer reader has two RJ-45 connector ports: the ETHERNET port and the 24 VDC port (see Figure 2-4). The ETHERNET port provides the Ethernet connection for network communications. The 24 VDC port supplies connections for the 24 VDC power source, acquisition trigger, and serial communications.

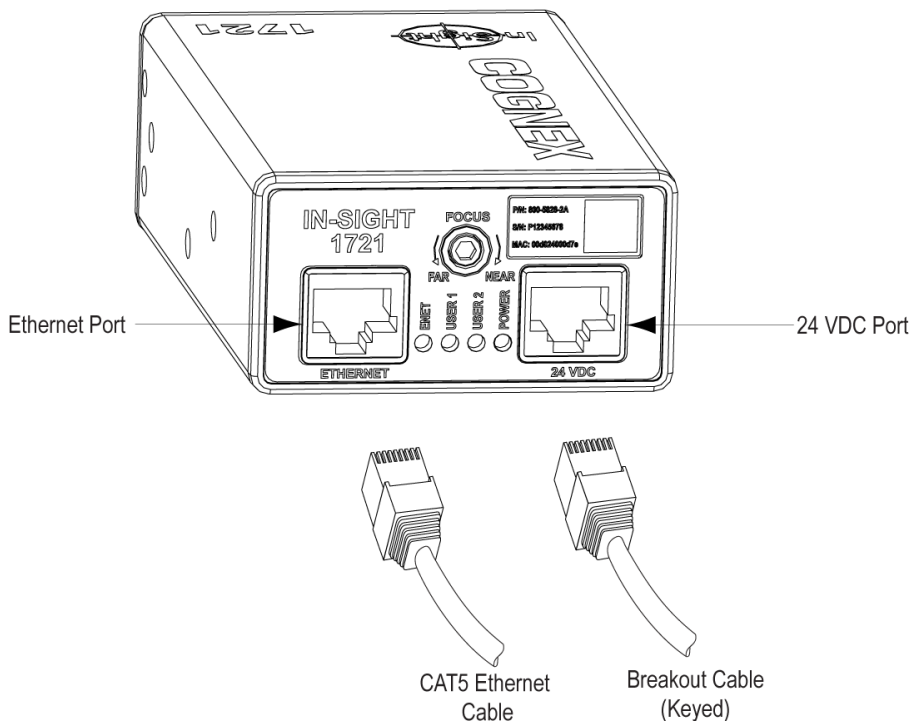


Figure 2-4: Location of the ETHERNET and 24 VDC Ports

2.4.1 Connect the Ethernet Cable

- **If you are connecting to an Ethernet switch/router**, plug one of the RJ-45 connectors of a CAT5 Ethernet cable or crossover cable into the ETHERNET port 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 Ethernet cable or crossover cable into the wafer reader's ETHERNET port; plug the other end into the remote host's Ethernet port.

2.4.2 Connect the Breakout Cable

1. Verify the 24 VDC power supply being used is unplugged and not receiving power.
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 and serial communications to their corresponding terminals on remote devices.
4. Plug the RJ-45 connector into the wafer reader's 24 VDC port.
5. Restore power to the 24 VDC power supply, and turn it on if necessary. The green power LED will indicate the wafer reader is receiving power.

NOTES

- Unused bare wires can be clipped short or tied back using a tie made from non-conductive material. Keep all bare wires separated from the +24 VDC (White/Green) wire.
- See Section 3.2.3: Breakout Cable Specifications on page 19 for the Breakout cable's wiring details.

2.5 Adjust the Focus

The wafer reader is shipped with a factory-set working distance of 50.0mm. The focus has been calibrated to accommodate this working distance. If mounting the wafer reader at a working distance other than 50.0mm, the focus will need to be adjusted.

To Adjust the Focus:

1. Acquire an image.
2. Remove the label covering the focus adjustment screw (M3 hex screw) located by the wafer reader's ETHERNET port and 24 VDC port (see Figure 2-5).
3. Using a 2.5mm hex 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.

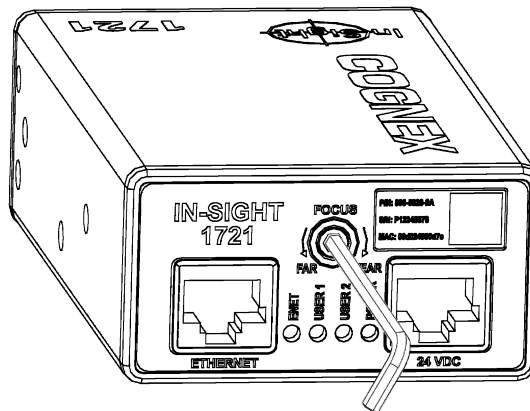


Figure 2-5: Location of Focus Adjustment Screw

2.5.1 Image Artifacts

Under certain conditions, horizontal lines may be observed in the image (Figure 2-6). 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. 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 setup tuning process.



Figure 2-6: Image Artifact Example

3 Specifications

In this Section...

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3.1 General Specifications

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

Specifications

Table 3-1: In-Sight 1720 Wafer Reader General Specifications

Specification		Description	
Configurations		Vertical mount w/ factory-set 50.0mm working distance.	
		In-Sight 1720: P/N 800-5865-3R	
		Optional Horizontal Mirror Mount: P/N 800-5796-1; P/N 800-5796-1R	
Firmware		Minimum: 3.4.1 PR1 and later. Recommended: 4.2.1 and later.	
Reading Capability	Supported Wafer Marks		Standards
	OCR	SEMI font	SEMI M12, M13, M1.15
		IBM font	N/A
		Triple font	N/A
		OCR-A font	N/A
		Chartered Semiconductor font	N/A
	2D	Data Matrix™ (ECC 200)	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 CMOS	
	Sensor Properties	5.35mm diagonal, 6.0 x 6.0µm sq. pixels	
	Resolution	752 x 480	
	Electronic Shutter Speed	100µs to 127ms	
	Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration.	
		256 gray levels (8 bits/pixel)	
		Gain controlled by software.	
		41 frames per second. ¹	
Lighting/Optics		Working Distance: adjustable, with factory-set option of 50.0mm (Vertical).	
		Recommended working distance range: 1 to 80.0mm (Vertical); 1 to 56.0mm (Horizontal).	
		Illumination Area: 29.0mm (W) x 19.0mm (H) (nominal; depends on lighting Mode).	
		Red LEDs, 633nm wavelength, with the ability to read bright field and dark field images.	
		Variable exposure controlled through software. Maximum output power <80 microwatts.	
I/O	Trigger	1 opto-isolated, acquisition trigger input.	
		Remote software commands via Ethernet and RS-232.	
	Discrete Inputs	None. (Eight additional inputs available when using the optional CIO-1400 I/O Module.)	
	Discrete Outputs	None. (Six additional outputs available when using the optional CIO-1400 I/O Module.)	
	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 (1200 to 115,200 baud rates).
	Protocols	In-Sight, Native Mode, LKx5, Electroglas, TEL and TSK.
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	381.0 g (13.4381 oz).
Environmental	Temperature	0 to 45°C (Operating), -10 to 65°C (Storage).
	Humidity	10 to 90%, non-condensing (Operating and Storage).
Regulatory Compliance		CE, UL, CUL, FCC, RoHS
		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.

1. Maximum frames per second are job dependent and based on a 8ms exposure and a full image frame capture.

Specifications

Table 3-2: In-Sight 1721 & 1722 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: P/N 800-5796-1; P/N 800-5796-1R		
Firmware	In-Sight 1721: Minimum: 3.4.1 PR1 and later. Recommended: 4.2.1 and later. In-Sight 1722: Minimum: 3.4.1 PR1 and later. Recommended: 4.2.1 and later.		
Reading Capability	Supported Wafer Marks		Standards
	OCR	SEMI font	SEMI M12, M13, M1.15
		IBM font	N/A
		Triple font	N/A
		OCR-A font	N/A
		Chartered Semiconductor font	N/A
	2D	Data Matrix™ (ECC 200)	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	
	Sensor Properties	5.952mm diagonal, 4.65 x 4.65µm sq. pixels	
	Resolution	1024 x 768	
	Electronic Shutter Speed	100µs to 127ms	
	Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration.	
		256 gray levels (8 bits/pixel)	
		Gain controlled by software.	
		17 frames per second. ¹	
Lighting/Optics	Working Distance: adjustable, with 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, 626nm 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. (Eight additional inputs available when using the optional CIO-1400 I/O Module.)	
	Discrete Outputs	None. (Six additional outputs available when using the optional CIO-1400 I/O Module.)	
	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 (1200 to 115,200 baud rates).
	Protocols	In-Sight, Native Mode, LKx5, Electroglas, TEL and TSK.
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).
Regulatory Compliance		CE, UL, CUL, FCC, RoHS (part numbers with an "R" suffix are RoHS compliant)
		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.

1. Maximum frames per second are job dependent and based on a 8ms exposure and a full image frame capture.

3.2 I/O Specifications

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

3.2.1 Acquisition Trigger Input Specifications

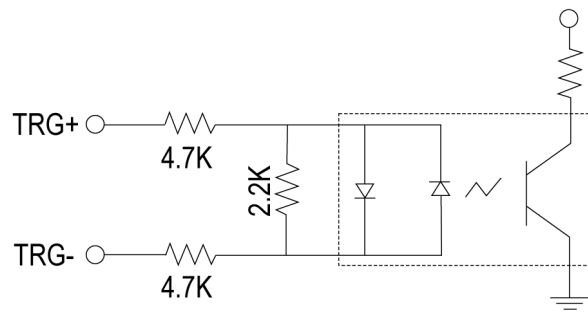
Table 3-3: Acquisition Trigger Input Specifications

Specification	Description
Voltage	ON 20 to 28V (24V nominal)
	OFF 0 to 3V (8V nominal threshold)
Current	ON 2.0 to 2.8mA
	OFF <250 μ A
	Resistance ~10,000 Ohms
	For higher current add external resistor (for example, 2.2k Ω , 0.5W for 12mA) across inputs.
Delay	76 μ Sec latency between leading edge of trigger and start of acquisition. Input pulse should be a minimum of 1ms wide.

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

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

NOTE When using the wafer reader with the Breakout cable, the polarity of the input trigger (pins 2 and 3) is not critical. However, when using the optional I/O module, the polarity of the TRG+ and TRG- terminals should be observed.



28V Max. Across input pins - Transition approx. 8V (Nom).

Figure 3-1: Acquisition Trigger Input Schematic

3.2.2 Wafer Reader Status LEDs

As shown in Figure 3-2, the wafer reader provides four status LEDs; two LEDs are user-configurable outputs. The function of each LED is listed in Table 3-4.

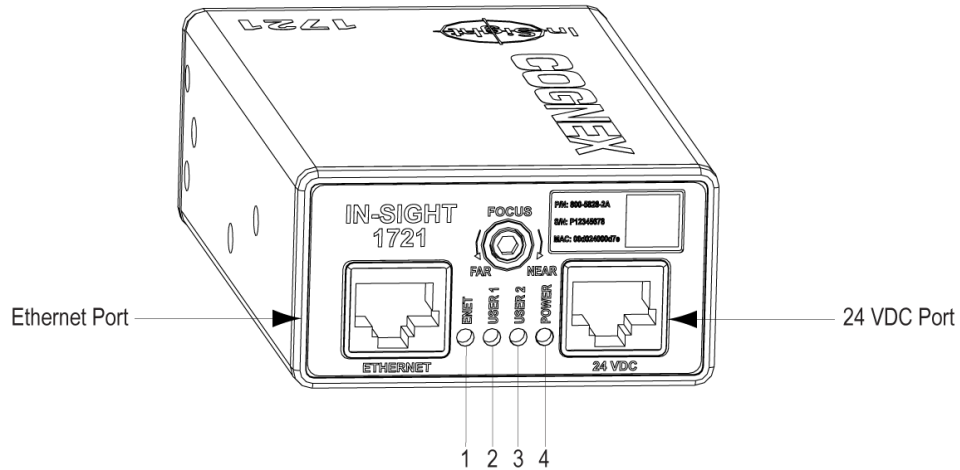


Figure 3-2: LED Outputs

Table 3-4: 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.

3.2.3 Ethernet Cable Specifications

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

Table 3-5: CAT5/CAT5e Ethernet 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 3-6: CAT5/CAT5e Ethernet Cable 568-B Wire Pairs

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

NOTES

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

3.2.4 Breakout Cable Specifications

The Breakout cable provides access to power, serial communication and trigger.

Table 3-7: 24 VDC Port Pin Assignments

Pin #	Signal	Breakout Cable Wire Color
1	+24 VDC	White/Green
2	Trigger +	Green
3	Trigger –	White/Orange
4	CTS	Blue
5	RTS	White/Blue
6	Serial Receive	Orange
7	Serial Transmit	White/Brown
8	Ground	Brown

NOTES

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

3.3 In-Sight Wafer Reader Dimensional Drawings

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

NOTE All dimensions are shown in millimeters [inches].

3.3.1 In-Sight 1720 Series Wafer Reader Dimensions

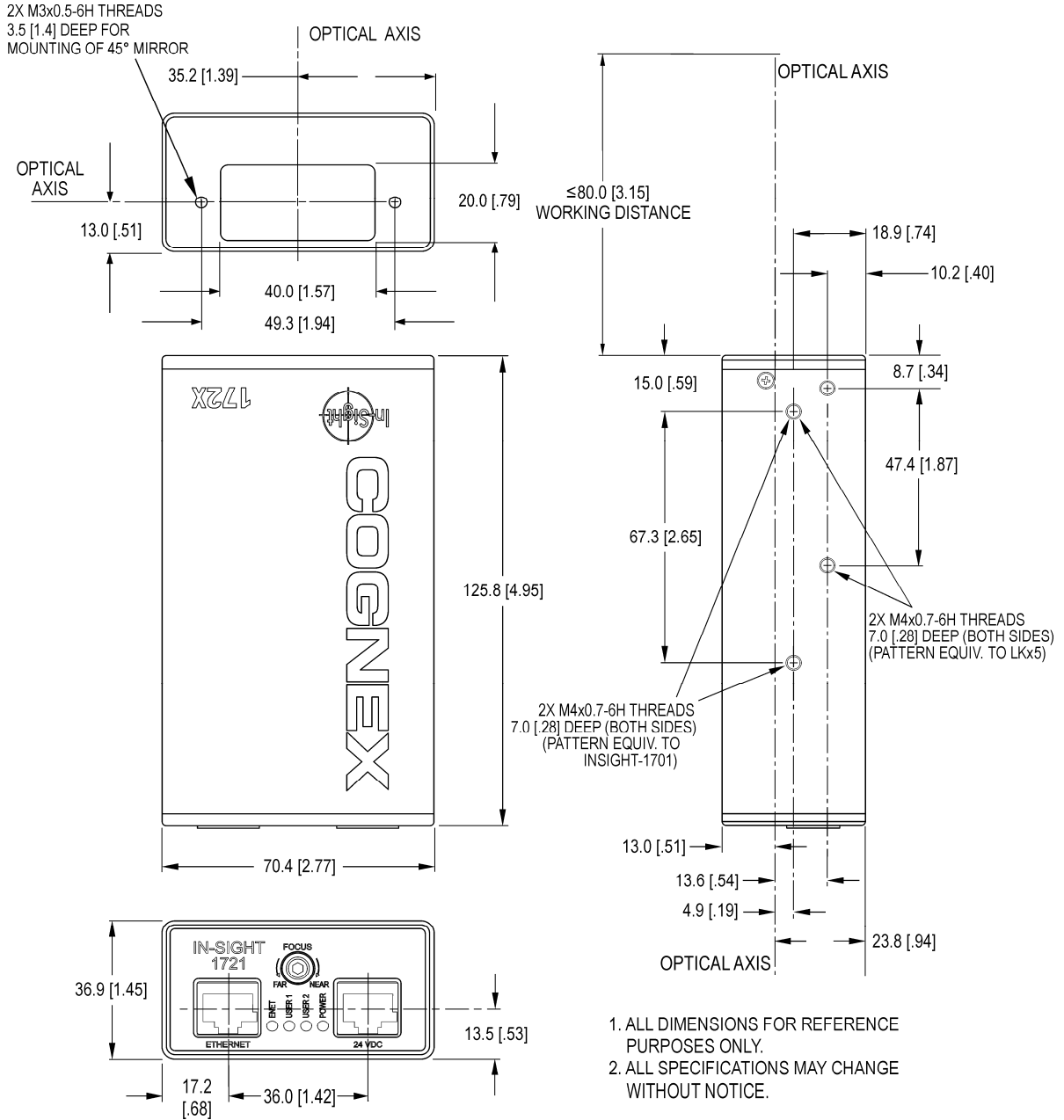


Figure 3-3: In-Sight 1720 Series Wafer Reader Dimensions

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).

Specifications

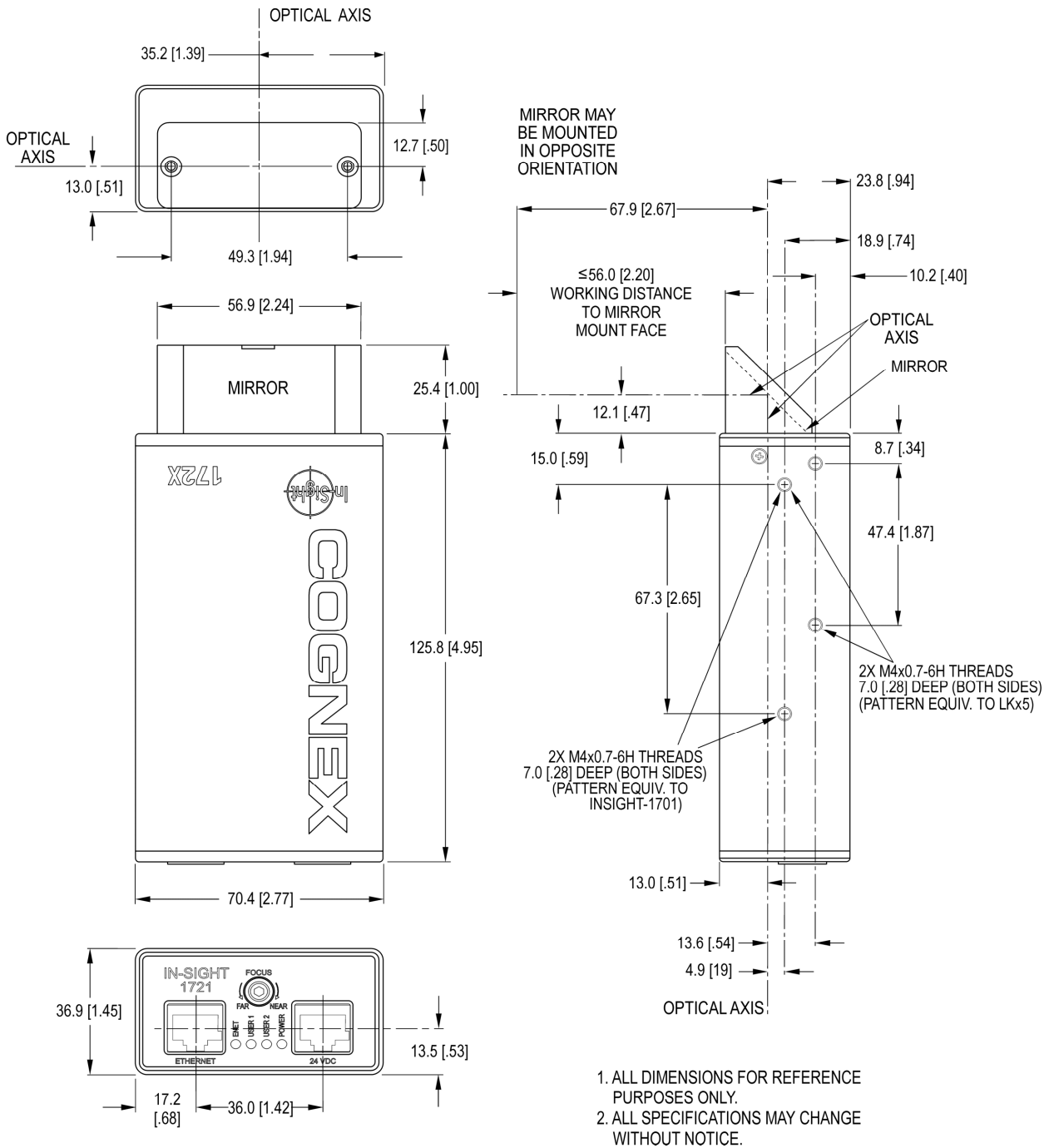


Figure 3-4: In-Sight 1720 Series Wafer Reader Dimensions with Horizontal Mirror Mount (Recommended Horizontal Configuration)

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 Connecting the I/O Module

The optional In-Sight CIO-1400 I/O module is more convenient than using the standard Breakout cable to connect the wafer reader's power, serial communications, and I/O lines. For additional information on connecting the I/O module, refer to the *In-Sight® 1400 I/O Expansion Module Installation and Reference* manual (P/N 597-0104-xx).

CAUTION

- Never connect the I/O module to a power source other than 24 VDC. Any other voltage creates a risk of fire or shock and can damage the hardware. Do not connect the 24 VDC power source to any terminals other than the 24 VDC + and – power connectors.
- When connecting the 1720 series wafer reader to the CIO-1400 I/O module, never connect wire leads from remote devices to the HS OUT 0 or HS OUT 1 terminals on the I/O module; doing so can damage the 1720 series hardware.

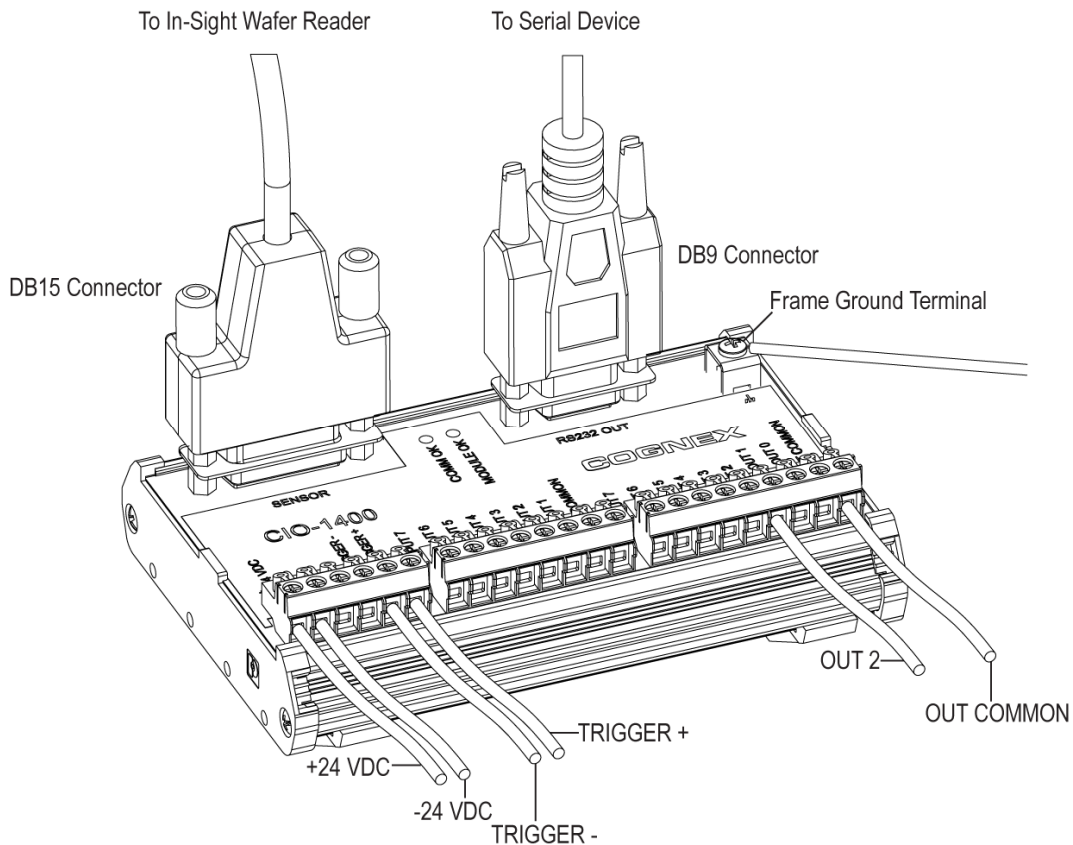


Figure A-1: I/O Module Connections

Connecting the I/O Module

1. Verify that the 24 VDC power supply being used is unplugged and not receiving power.
2. Use a screwdriver to loosen the power terminals (labeled 24 VDC + and –).
3. Insert the 24 VDC + and – wires (14 - 26 AWG solid or stranded wire) from the power supply into the 24 VDC + and – terminals on the I/O module.
4. Tighten the screw terminals with the screwdriver to secure the wire leads in the terminal block; the maximum torque is 0.4 Nm (3.54 in-lb).
5. Connect a frame ground to the I/O module's Frame Ground terminal.
6. Connect the other end of the frame ground wire to frame ground.
7. Optionally, insert the signal and ground wire leads (14 - 26 AWG solid or stranded wire) from remote I/O devices into the appropriate positions on the terminal block. Tighten the screw terminals with the screwdriver to secure the wire leads in the terminal block; the maximum torque is 0.4 Nm (3.54 in-lb).

NOTE	The default Wafer ID job file (WafID00.job) must be modified to support discrete inputs and outputs. Contact your Cognex sales representative for more information.
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8. Optionally, plug an RS-232 serial cable (DB9 connector) into the I/O module's RS232 OUT port.
9. Connect the I/O Module cable's RJ-45 connector to the wafer reader's 24 VDC port. The cable's connectors are "keyed" to the notch in the 24 VDC port.
10. Plug the I/O Module cable's DB15 connector into the I/O module's SENSOR port.
11. Restore power to the I/O module's 24 VDC power supply and turn it on if necessary. The green power LED on the wafer reader and the orange MODULE OK LED on the I/O Module will indicate that the wafer reader and I/O Module are receiving power.

Appendix B

B.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.



P/N 597-0047-05