

In-Sight[®] VC200 Vision Controller Reference Guide

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Open Source Libraries

The In-Sight® VC200 vision controller uses third-party open source software, whose licenses are described in the click-accept agreement that is part of the In-Sight VC Explorer software installation.

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Symbols

The following symbols indicate safety precautions and supplemental information.

 **WARNING:** This symbol indicates the presence of a hazard that could result in death, serious personal injury or electrical shock.

 **CAUTION:** This symbol indicates the presence of a hazard that could result in property damage.

 **Note:** Notes provide supplemental information about a subject.

 **Tip:** Tips provide helpful suggestions and shortcuts that may not otherwise be apparent.

Regulations/Conformity

Note: For the most up-to-date CE declaration and regulatory conformity information, please refer to the Cognex online support site: <http://www.cognex.com/Support>.

Safety and Regulatory	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
	Regulatory Model 1AAL
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.
KCC 	Regulatory Model 1AAL: MSIP-REM-CGX-1AAL
NRTL	TÜV SÜD AM SCC/NRTL OSHA Scheme for UL/CAN 61010-1.
CB	TÜV SÜD AM, IEC/EN 61010-1. CB report available upon request.
EU RoHS	Compliant to the latest applicable Directive.

China RoHS



Part Name 部件名称	Hazardous Substances 有害物质					
	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr (VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴二苯醚
Regulatory Model 1AAL	X	O	O	O	O	O
This table is prepared in accordance with the provisions of SJ/T 11364. 这个标签是根据SJ/T 11364 的规定准备的。 O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB / T26572 - 2011. 表示本部件所有均质材料中含有的有害物质低于GB / T26572 - 2011 的限量要求。 X: Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB / T26572 - 2011. 表示用于本部件的至少一种均质材料中所含的危害物质超过GB / T26572 - 2011 的限制要求。						

For European Community Users

Cognex complies with Directive 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE).

This product has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment, if not properly disposed.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems for product disposal. Those systems will reuse or recycle most of the materials of the product you are disposing in a sound way.



The crossed out wheeled bin symbol informs you that the product should not be disposed of along with municipal waste and invites you to use the appropriate separate take-back systems for product disposal.

If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You may also contact your supplier for more information on the environmental performance of this product.

Precautions

Observe these precautions when installing the vision controller to reduce the risk of injury or equipment damage:

- The vision controller is intended to be supplied by a NRTL listed power supply with a minimum output rated 24VDC, 3.5A and must be used with the Cognex-supplied 24VDC power connector. Any other voltage creates a risk of fire or shock and can damage the components. Applicable national and local wiring standards and rules must be followed. Wire and connections must be in accordance with these instructions, the National Electrical Code and applicable national and local wiring standards and rules.
- 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 current wiring or high-voltage power sources.
- Do not install Cognex products where they are directly exposed to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
- The In-Sight vision controller does not contain user-serviceable parts. Do not make electrical or mechanical modifications to In-Sight vision controller components. Unauthorized modifications may void your warranty.
- Changes or modifications not expressly approved by the party responsible for regulatory compliance could void the user's authority to operate the equipment.
- Service loops should be included with all cable connections.
- Cable shielding can be degraded or cables can be damaged or wear out more quickly if a service loop or bend radius is tighter than 10X the cable diameter. The bend radius must begin at least six inches from the connector.
- Remove power from the vision controller before connecting or disconnecting any cables or the I/O terminal blocks.
- The maximum torque that can be applied to the I/O terminal connectors is 0.25 Nm (2.2 in-lb). Applying torque above this limit can damage the connectors.
- Remove power from the vision controller before connecting or disconnecting the 24VDC power connector.
- The maximum torque that can be applied to the 24VDC power connector is 0.6 Nm (5.3 in-lb). Applying torque above this limit can damage the connector.
- This device is certified for office use only and if used at home, there can be frequency interference problems.
- This device should be used in accordance with the instructions in this manual.
- All specifications are for reference purpose only and may be changed without notice.

Introduction

The In-Sight® VC200 vision controller is a compact, network-ready vision controller that can be directly connected to In-Sight cameras or Cognex 3D displacement sensors. In-Sight cameras are light-weight "smart" cameras used for automated inspection, measurement and identification applications on the factory floor. Cognex 3D displacement sensors combine GigE Vision and laser-stripe illumination to generate information about three-dimensional objects that cannot easily be generated by cameras that acquire two-dimensional images.

The vision controller extends the capabilities of the connected devices by providing:

- Direct connection to a Gigabit Ethernet network.
- 8 inputs, optically isolated.
- 16 outputs, optically isolated.
- Support for current sinking (NPN) and current sourcing (PNP) devices.
- DIN-rail mountable.

Support

Several resources are available to assist you in using the vision controller with the connected Cognex device:

- The *ISC-7000 Series Camera Reference Guide*, included with In-Sight VC Explorer software.
- The *ISC-8000 Series Camera Reference Guide*, included with In-Sight VC Explorer software.
- The *DS900 Series and DS1000 Series Sensor Reference Guide*, included with In-Sight VC Explorer software.
- The *In-Sight® Multi-Camera User Guide*, included with In-Sight VC Explorer software.
- The *In-Sight® Profiler User Guide*, included with In-Sight VC Explorer software.
- In-Sight online support: <http://www.cognex.com/support/ISVC200>.

Standard Components

The vision controller is shipped with the components listed below.

Note:

- If any of the standard components appear to be missing or damaged, immediately contact your Cognex Authorized Service Provider (ASP) or Cognex Technical Support.



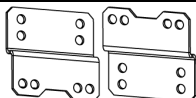
- The number and type of cameras or sensors included with the vision controller will vary based on the product kit.
- Cables are sold separately.

Component	
1	In-Sight VC200 Vision Controller
2	Terminal Block Kit: • INPUTS terminal blocks • OUTPUTS terminal blocks • 24VDC power connector
3	ISC-7000 Series Camera
4	ISC-8402 Series or ISC-8400 Series Camera
5	ISC-8405 Camera and Ferrite
6	DS900 Series Sensor
7	DS1000 Series Sensor

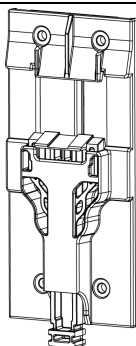
Accessories

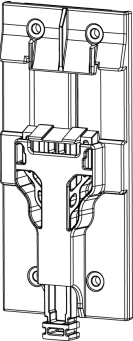
The following components can be purchased separately. For a complete list of options and accessories, contact your local Cognex sales representative.

Mounting Brackets



Description		Part Number
Brackets for wall-mounting the vision controller.		BKT-WALL-VC200-01



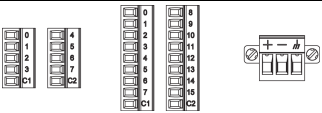
	
Description	Part Number
Bracket for mounting the vision controller to a 35 x 15mm DIN rail.	BKT-DIN-VC200-01
Note: The DIN rail mounting bracket accessory is not suitable for a 7.5mm profile DIN rail.	

Power Supply



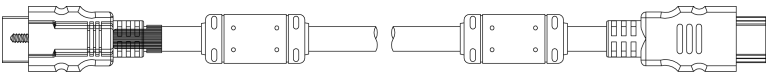
Description		Part Number
DIN rail power supply that converts AC mains power to 24VDC.		ACC-Quint-PS

Terminal Block Kit

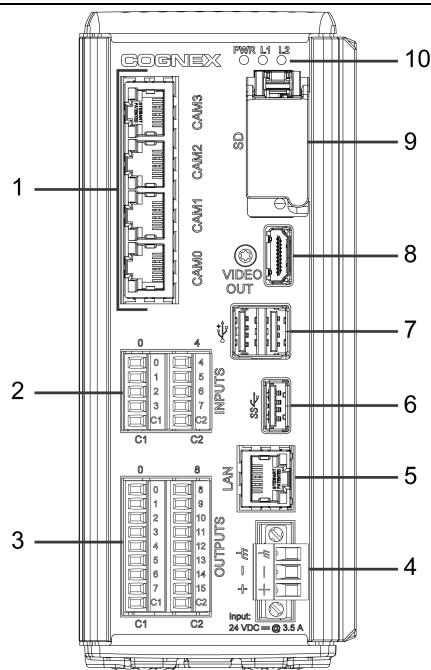
	
Description	Part Number
Terminal block kit includes replacement terminal blocks and connectors for the vision controller: • INPUTS terminal blocks • OUTPUTS terminal blocks • 24VDC power connector	820-10138-1R

HDMI Cable

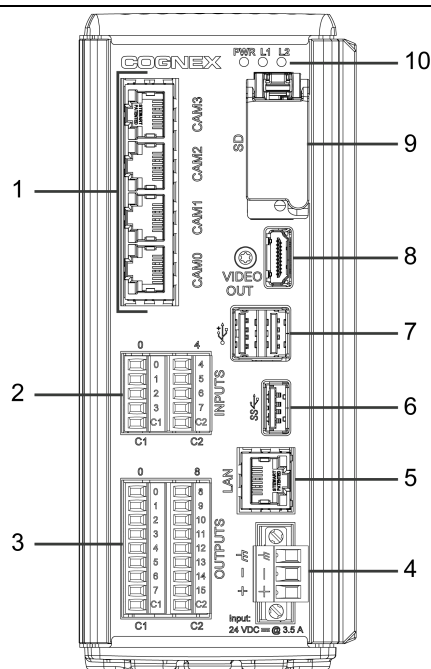
The shielded HDMI cable provides connection to a display device. The pin-outs for the cable are listed in the [HDMI Cable Specifications on page 36](#).

	
Length	Part Number
5m	CCB-HDMI-VC200-05

Connectors and Indicators



Connector/Indicator		Function
1	CAM Ports and LEDs	The four CAM ports (CAM 0 - CAM 3) are RJ-45 ports that provide Ethernet connectivity to In-Sight cameras, DS900 sensors and DS1000 sensors. These ports also provide power to Cognex industrial devices that support Power over Ethernet (PoE). The green LED is solid when the connected device is running at 1000 Mbps; the green LED is off when the connected device is running at 10/100 Mbps. The yellow LED blinks when network activity is detected. For more information, refer to CAM Ports on page 30. CAUTION: The vision controller's CAM ports provide Power over Ethernet (PoE) to supported Cognex devices; connecting other PoE devices to these ports could damage the vision controller or the PoE device.
2	INPUTS Terminal Block	The INPUTS terminal blocks provide access to a total of 8 inputs and 2 common connections. For more information, refer to INPUTS Terminal Block Assignments on page 33 .
3	OUTPUTS Terminal Block	The OUTPUTS terminal blocks provide access to a total of 16 outputs and 2 common connections. For more information, refer to OUTPUTS Terminal Block Assignments on page 34 .
4	24VDC Power Connector	The 24VDC power connector is used to connect an external power supply to the vision controller. For more information, refer to 24VDC Power Connector Terminal Assignments on page 35 .
5	LAN Port and LEDs	The LAN port is a 10/100/1000 RJ-45 Ethernet port that is used to connect the vision controller to an Ethernet network. The green LED is solid when connected to a 1000 Mbps network; the green LED is off when connected to a 10/100 Mbps network. The yellow LED blinks when network activity is detected. For more information, refer to LAN Port on page 30 .
6	USB 3.0 Port	The USB 3.0 port can be used to connect mouse, keyboard or mass storage device. For more information, refer to USB 3.0 Port on page 32 .
7	USB 2.0 Port	The two USB 2.0 ports can be used to connect mouse, keyboard or mass storage device. For more information, refer to USB 2.0 Ports on page 32 .



Connector/Indicator		Function
8	VIDEO OUT Port	The VIDEO OUT port is a locking HDMI port that provides connection to a display device. For more information, refer to VIDEO OUT Port on page 31 .
9	SD Card Slot	The SD card slot is used to save images, run time files and results.
10	LEDs	• PWR LED: The green PWR LED illuminates to indicate that the vision controller is powered on. • LED1: Green when active. User configurable. • LED2: Red when active. User configurable.

Installation

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

Note: Cables are sold separately.

CAUTION: All cable connectors are “keyed” to fit the connectors on the vision controller; do not force the connections or damage may occur.

Mount the Vision Controller

The vision controller provides mounting holes for attachment to either a bottom or backside mounting surface.

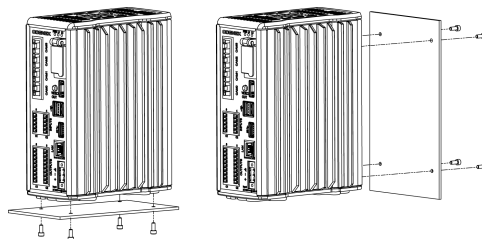
Note: The vision controller may be optionally mounted using the accessory wall mounting bracket (BKT-WALL-VC200-01) or to a 15mm DIN rail, using the accessory DIN rail mounting bracket (BKT-DIN-VC200-01). The DIN rail mounting bracket accessory is not suitable for a 7.5mm profile DIN rail. Please contact your Cognex sales representative for more information.

CAUTION:

- The vision controller must be mounted in a vertical orientation with the top of the controller up, and cannot be mounted in a horizontal orientation.
- To ensure sufficient ventilation, the vision controller must be mounted with sufficient clearance. If mounting to the bottom surface, 50mm of clearance is required above and on both sides of the vision controller. If mounting to the back surface or using the accessory wall mounting bracket or DIN rail mounting bracket, 24.5mm of clearance is required above, below and on both sides of the vision controller. If an adjacent device also produces heat, additional space or cooling is required if air space around the vision controller exceeds 45°C (113°F).
- Allow sufficient clearance and strain relief for wires and cables connected to the vision controller.

1. Drill the clearance holes for the mounting fasteners per the defined bolt pattern. The vision controller mounting hole screw thread is M4 x 0.7.
2. Align the holes on the mounting surface with the mounting holes on the vision controller.
3. Insert and tighten the mounting screws; the maximum torque is 2 Nm (18 in-lb).

CAUTION: The length of the screws used depends on the depth of the mounting surface; thread engagement of the screws must be 8mm - 10mm.



Install the Accessory Wall Mounting Brackets

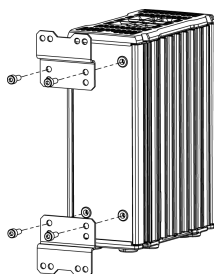
The accessory wall mounting bracket kit (BKT-WALL-VC200-01) includes two wall mounting brackets and M4 screws (quantity 4) to secure the controller to a mounting surface.

CAUTION:

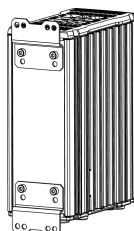
- The vision controller must be mounted in a vertical orientation with the top of the controller up, and cannot be mounted in a horizontal orientation.
- To ensure sufficient ventilation, the vision controller must be mounted with sufficient clearance. If mounting to the bottom surface, 50mm of clearance is required above and on both sides of the vision controller. If mounting to the back surface or using the accessory wall mounting bracket or DIN rail mounting bracket, 24.5mm of clearance is required above, below and on both sides of the vision controller. If an adjacent device also produces heat, additional space or cooling is required if air space around the vision controller exceeds 45°C (113°F).
- Allow sufficient clearance and strain relief for wires and cables connected to the vision controller.



1. Align the holes on the wall mounting brackets with the mounting holes on the vision controller. The vision controller mounting hole screw thread is M4 x 0.7.



2. Insert the M4 screws into the mounting holes and tighten the screws using a 3mm hex wrench; the maximum torque is 2 Nm (18 in-lb).



Install the Accessory DIN Rail Mounting Bracket

The accessory DIN rail mounting bracket kit (BKT-DIN-VC200-01) includes the DIN rail bracket and M4 screws (quantity 4) to secure the controller to a 35 x 15mm DIN rail.

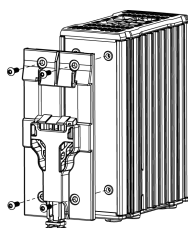
Note: The DIN rail mounting bracket accessory is not suitable for a 7.5mm profile DIN rail.

CAUTION:

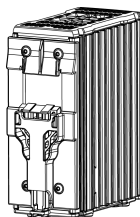
- The vision controller must be mounted in a vertical orientation with the top of the controller up, and cannot be mounted in a horizontal orientation.
- To ensure sufficient ventilation, the vision controller must be mounted with sufficient clearance. If mounting to the bottom surface, 50mm of clearance is required above and on both sides of the vision controller. If mounting to the back surface or using the accessory wall mounting bracket or DIN rail mounting bracket, 24.5mm of clearance is required above, below and on both sides of the vision controller. If an adjacent device also produces heat, additional space or cooling is required if air space around the vision controller exceeds 45°C (113°F).
- Allow sufficient clearance and strain relief for wires and cables connected to the vision controller.



1. Align the holes on the DIN rail mounting bracket with the mounting holes on the vision controller. The vision controller mounting hole screw thread is M4 x 0.7.



2. Insert the M4 screws into the mounting holes and tighten the screws using a 2.5mm hex wrench; the maximum torque is 2 Nm (18 in-lb).



Connect the ISC-7000 Series Camera

The camera's ENET connector provides an Ethernet connection. The ISC-7000 series camera's PWR connector supplies power to the camera and provides access to the camera's acquisition trigger and strobe output. Refer to the *ISC-7000 Series Camera Reference Guide* for complete camera installation steps and specifications.

CAUTION: Cognex recommends only cold-plugging the camera; turn the vision controller power off when connecting or disconnecting the camera.

1. Connect the Ethernet cable's M12 connector to the camera's ENET connector.
2. Connect the Ethernet cable's RJ-45 connector to one of the vision controller's CAM ports.

Note: If using a vision controller that supports a two camera configuration, connect the camera Ethernet cables to the vision controller's CAM 0 and CAM 1 ports.

3. Verify the camera's 24VDC power supply being is unplugged and not receiving power.
4. Optionally, connect the Breakout cable's I/O wires to an appropriate device (for example, a trigger sensor or strobe light).

Note: I/O wiring or adjustments to I/O devices should be performed when the camera is not receiving power.

5. Attach the Breakout cable's +24VDC (Red wire) and GND (Black wire) to the corresponding terminals on the power supply.

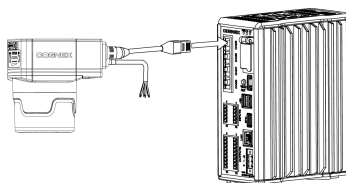
CAUTION:



- Use a UL or NRTL listed power supply with a 24VDC output rated for at least 2A continuous and a maximum short circuit current rating of less than 8A and a maximum power rating of less than 100VA and marked Class 2 or Limited Power Source (LPS).
- Never connect voltages other than 24VDC. Always observe the polarity shown.

Note: Unused wires can be clipped short or tied back using a tie made of non-conductive material. Keep all bare wires separated from the +24VDC wire.

6. Connect the Breakout cable's M12 connector to the camera's PWR connector.



Connect the ISC-8000 Series Camera

The ISC-8000 series camera's I/O connector provides connection to the camera's acquisition trigger and strobe output. The camera's ENET connector provides an Ethernet connection and Power over Ethernet (PoE) to the camera. Refer to the *ISC-8000 Series Camera Reference Guide* for complete camera installation steps and specifications.

CAUTION: Cognex recommends only cold-plugging the camera; turn the vision controller power off when connecting or disconnecting the camera.

1. Optionally, connect the Breakout cable's M8 connector to the camera's I/O connector.

CAUTION: A ferrite is included with the In-Sight 8405 camera standard components. To reduce emissions, the ferrite must be attached to the Breakout cable, adjacent to the strain relief on the cable.

2. Connect the Breakout cable's trigger and strobe wires to an appropriate device (for example, a trigger sensor or strobe light).

Note:

- I/O wiring or adjustments to I/O devices should be performed when the camera is not receiving power.
- The Ethernet cable should be unplugged or the PoE source powered down before making adjustments to the connections at the far end of the Breakout cable.
- Unused wires can be clipped short or tied back using a tie made of non-conductive material.

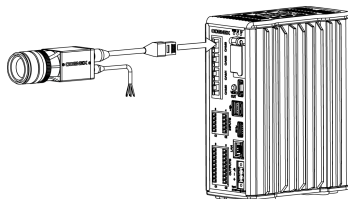
3. Connect one end of the Ethernet cable to the camera's ENET connector. If installing the In-Sight 8405 camera and using a compatible horizontal screw-locking Ethernet cable, use a screw driver to tighten the connector screws until snug, to secure it to the camera. The screws must be tight to ensure a reliable connection.

CAUTION:

- The Ethernet cable must be shielded. For the In-Sight 8405 camera, Cognex strongly recommends Cat 6 or Cat 7 Ethernet cables with S/STP shielding.
- The Ethernet cable shield must be grounded at the far end.
- The vision controller's CAM ports provide Power over Ethernet (PoE) to supported Cognex devices; connecting other PoE devices to these ports could damage the vision controller or the PoE device.

4. Connect the other end of the cable to one of the vision controller's CAM ports.

Note: If using a vision controller that supports a two camera configuration, connect the camera Ethernet cables to the vision controller's CAM 0 and CAM 1 ports.



Connect the DS900 Series Sensor

The DS900 series sensor's Ethernet connector provides an Ethernet connection and Power over Ethernet (PoE) to the sensor. The sensor's multifunction port provides access to I/O connections.

WARNING: The DS900 series sensors are designated as a Class 2M laser product. These laser products can be hazardous. Please refer to the *DS900 Series and DS1000 Series Sensor Reference Guide* for important instructions on their safe use.

CAUTION:



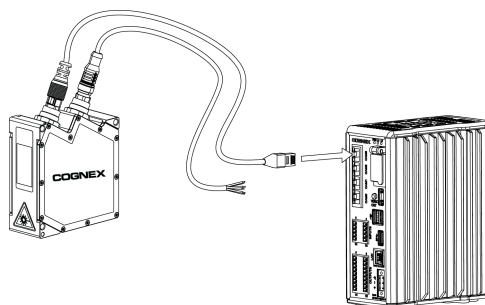
- Cognex recommends only cold-plugging the sensor; turn the vision controller power off when connecting or disconnecting the sensor.
- The vision controller's CAM ports provide Power over Ethernet (PoE) to supported Cognex devices; connecting other PoE devices to these ports could damage the vision controller or the PoE device.

1. Optionally, connect the terminated end of the Multifunction cable to the DS900 series sensor's Multifunction port. Connect the I/O wires to the applicable I/O device.

CAUTION: The Multifunction cable's PWR (Red) and GND (Blue) flying lead wires must not be connected to any external point or to each other.

2. Connect the Ethernet cable's M12 connector to the DS900 series sensor.
3. Connect the Ethernet cable's RJ-45 connector to one of the vision controller's CAM ports.

Note: Your specific configuration and firmware version may support between 1 and 4 sensors. Regardless of how many sensors your device supports or how many sensors you connect, you should always connect the first sensor to port 0, the second sensor to port 1, and so on.



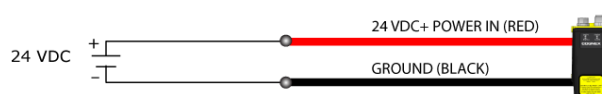
Connect the DS1000 Series Sensor

The sensor's 24VDC Power + I/O + Encoder connector provides access to power and I/O connections. The DS1000 series sensor's Ethernet connector provides an Ethernet connection.

WARNING: The DS1000 series sensors are designated as a Class 2M laser product. These laser products can be hazardous. Please refer to the *DS900 Series and DS1000 Series Sensor Reference Guide* for important instructions on their safe use.

CAUTION: Cognex recommends only cold-plugging the sensor; turn the vision controller power off when connecting or disconnecting the sensor.

1. Verify that the DS1000 power supply is unplugged and not receiving power.
2. Attach the Power and I/O Breakout cable's +24VDC (Red wire) and GND (Black wire) to the corresponding terminals on the power supply. Connect the cable or connector shield to earth ground.



CAUTION:



- Use a listed power supply with an output rated 24VDC, at least 500 mA, and marked Class 2, Limited Power Source (LPS). Any other voltage creates a risk of fire or shock and can damage the sensor.
- Never connect voltages other than 24VDC. Always observe the polarity shown.

Note:

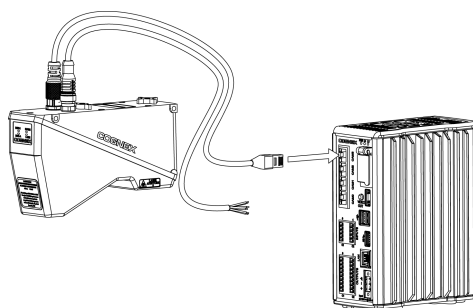


- Pins 1, 2, 3, and 4 may be used for an encoder connection. The configuration that you set for your sensor using the Cognex software determines how those lines are used.
- Cognex recommends unused encoder connections be tied to ground. If encoder signal inputs are left unconnected and your Cognex software is configured to use an encoder, the behavior of the encoder counter is undetermined.

3. Connect the Power and I/O cable's M12 connector to the DS1000 series sensor.
4. Connect the Ethernet cable's M12 connector to the DS1000 series sensor.
5. Connect the Ethernet cable's RJ-45 connector to one of the vision controller's CAM ports.



Note: Your specific configuration and firmware version may support between 1 and 4 sensors. Regardless of how many sensors your device supports or how many sensors you connect, you should always connect the first sensor to port 0, the second sensor to port 1, and so on.



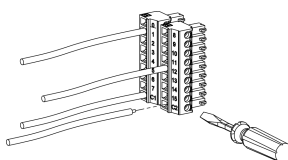
Connect the INPUTS and OUTPUTS Terminal Blocks

The vision controller is shipped with four terminal blocks for connecting inputs and outputs.

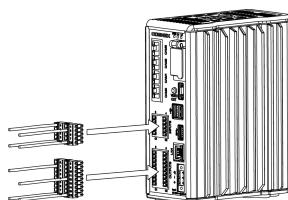
Note:

- It is recommended that all terminal blocks be installed to the vision controller, even if no devices are wired to the terminal block connectors. For ease of installation, the terminal block connectors on the vision controller are labeled to match the labels on the corresponding terminal blocks.
- i**
- If an input or output terminal row is not used, the COMMON connection for the terminal row should be connected to frame ground.
 - I/O wiring or adjustments to I/O devices should be performed when the vision controller is not receiving power.

1. Determine how I/O devices will be connected to the vision controller's INPUTS and OUTPUTS terminals. Refer to [Wire Inputs and Outputs on page 38](#) for common wiring configurations.
2. Use a screwdriver to loosen the wire retention screws on the terminal blocks.
3. Insert the input and output wires (16 - 26 AWG, solid or stranded wire) into the terminals. Refer to [INPUTS Terminal Block Assignments on page 33](#) and [OUTPUTS Terminal Block Assignments on page 34](#) for terminal block pin assignments.



4. Tighten the wire retention screws to secure the wire leads in the terminal block; the maximum torque is 0.25 Nm (2.2 in-lb).
5. Insert the terminal blocks into the corresponding INPUTS and OUTPUTS terminal block connectors on the vision controller, and push in until firmly seated.

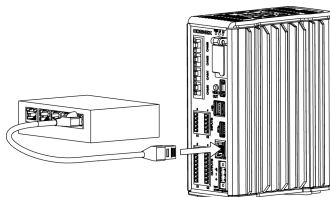


6. Connect the other end of the input and output wires to the applicable I/O device.

Connect to an Ethernet Network

Connect one end of the 10/100/1000 RJ-45 Ethernet cable into the vision controller's LAN port. Connect the other end of the cable to an Ethernet network adapter or switch, as applicable.

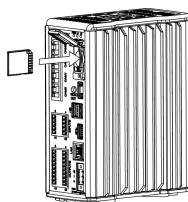
Note: To avoid electromagnetic interference, the Ethernet cable must be shielded. Cognex strongly recommends CAT5E Ethernet cables with S/STP shielding.



Install the SD Card (Optional)

Note: SD cards should be USH-I or USH-II and formatted with a FAT32 file system.

1. Lift the hinged door covering the SD card slot.
2. Insert the SD card into the SD card slot, ensuring the card is properly oriented.

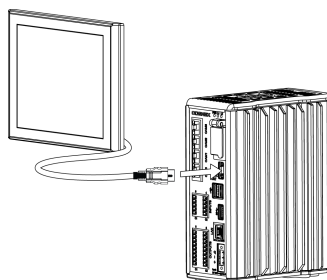


Connect to a Display (Optional)

CAUTION: If using the In-Sight Profiler integrated development environment (IDE), Cognex recommends only cold-plugging the HDMI cable and display; turn the vision controller power off when connecting or disconnecting the HDMI cable.

Note: To avoid electromagnetic interference, the HDMI cable must be shielded. A shielded Cognex accessory HDMI cable (CCB-HDMI-VC200-05) is available for purchase separately.

1. Connect a locking HDMI cable to the vision controller's VIDEO OUT port and tighten the thumb screw to secure it to the vision controller.
2. Connect the other end of the cable to the display.



Connect USB Devices (Optional)

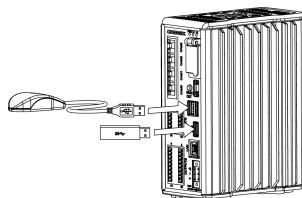
If connecting a USB mouse, keyboard or storage device to the vision controller, connect the USB device to one of the vision controller's USB ports.

CAUTION: Cognex recommends only cold-plugging USB devices; turn the vision controller power off when connecting or disconnecting USB devices.

Note:



- When using the vision controller in an electrically noisy environment, it is important to use USB devices that are rated for industrial use in the same environment. Most commercially available USB devices are rated for home use but are not designed for, or rated for, use in industrial environments. The use of peripherals not fully rated for the environment of use can result in impaired system immunity to nearby electrical noise.
- USB drives should be formatted with a FAT32 or NTFS file system.



Connect the 24VDC Power Supply

The vision controller is shipped with a 24VDC power connector.

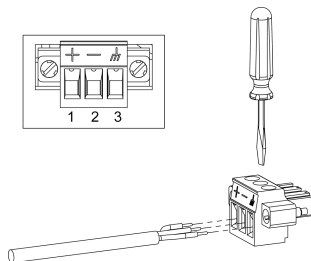
Note:



- A DIN rail-mountable power supply accessory is available. Please contact your Cognex sales representative for more information.
- If using a power supply with a ground terminal, the terminal must be connected to earth ground. If using a DIN rail-mounted power supply, the power supply must be mounted to an earth-grounded DIN rail. Wire and connections must be in accordance with these instructions, the National Electrical Code and applicable national and local wiring standards and rules.

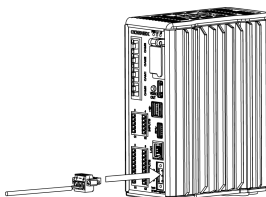
1. Verify that the 24VDC power supply being used is unplugged and not receiving power.
2. Use a screwdriver to loosen the wire retention screws on the 24VDC power connector.

3. Insert the power supply's +24VDC (Power) wire to Pin 1 and the -24VDC (Return) wire to Pin 2 on the power connector. Connect a frame ground wire from Pin 3 to frame ground. Recommended wiring is 14 - 18 AWG, solid or stranded wire. Refer to [24VDC Power Connector Terminal Assignments on page 35](#) for terminal pin assignments.



CAUTION: Do not connect AC power directly to the vision controller's power connector. Connecting AC power will damage the vision controller.

4. Tighten the wire retention screws to secure the wire leads in the terminals; the maximum torque is 0.6 Nm (5.3 in-lb).
5. Insert the power connector into the vision controller's 24VDC power port. Tighten the connector screws to secure it to the vision controller.



6. If a connected camera or sensor has a separate power supply, restore power to the camera or sensor's 24VDC power supply and turn it on if necessary.
7. Restore power to the vision controller's 24VDC power supply and turn it on if necessary.

Vision Controller Specifications

Specifications	Vision Controller
Supported Cognex Devices	- ISC-7000 series cameras. - ISC-8000 series cameras. - DS900 series and DS1000 series sensors.
Program Memory	8GB non-volatile flash memory. Unlimited storage via remote network device.
Image Processing Memory	2GB SDRAM.
SD Card Slot	1 SD card slot for saving images, run time files and results. SD cards should be UHS-I or UHS-II and formatted with a FAT32 file system.
Cooling System	Fanless Design.
Inputs	8 optically isolated discrete inputs.
Outputs	16 optically isolated discrete outputs. Note: When using the vision controller with In-Sight Profiler, output lines 14 and 15 are always reserved for the head synchronization of dual DS1000 series sensor configurations. This applies even for deployments that are not using a dual DS1000 series sensor configuration.
CAM Ports¹	4 RJ-45 dedicated Ethernet ports for connecting directly to supported Cognex devices, additionally supplying power to Cognex industrial cameras and sensors that support Power over Ethernet (PoE).
LAN Port²	1 RJ-45 Ethernet port, 10/100/1000 BaseT with auto MDIX. IEEE 802.3 TCP/IP Protocol. Dedicated port for connecting to wide area network.
USB Ports³	1 host USB 3.0 port (5 Gb/sec.) and 2 host USB 2.0 ports (480 Mb/sec.) ports for connecting mouse, keyboard or storage device. USB drives should be formatted with a FAT32 or NTFS file system.
Video Out Port	1 locking HDMI port that provides connection to a display device.
I/O Terminal Connectors	16 - 26 AWG, solid or stranded wire. Torque 0.25 Nm (2.2 in-lb).
24VDC Power Connector	14 - 18 AWG, solid or stranded wire. Torque 0.6 Nm (5.3 in-lb).
Status LEDs	PWR LED, LED 1, LED 2
Housing	Aluminum, steel sheet metal, injection-molded housing.
Mounting	Four bottom and four backside M4 x 0.7 threaded mounting holes. The vision controller may be optionally mounted using the accessory wall mounting bracket (BKT-WALL-VC200-01) or to a 35 x 15mm DIN rail, using the accessory DIN rail mounting bracket (BKT-DIN-VC200-01).
Dimensions	178.8mm (7.04in) x 142.1mm (5.59in) x 75.1mm (2.96in)
Weight	1.45 kg (3.2 lb)
Current	3.5A (maximum)
Voltage	24VDC $\pm$ 10%
Power Consumption	84W (maximum)

¹ To ensure reliable communication using 1000 BaseT operation, the Ethernet cable must not exceed 100 meters.

² To ensure reliable communication using 1000 BaseT operation, the Ethernet cable must not exceed 100 meters.

³ Maximum USB port speeds are listed. Actual speeds are dependent on the USB device, which are typically lower.

Specifications	Vision Controller
Operating Temperature¹	0°C to 45°C (32°F to 113°F)
Storage Temperature	-30°C to 80°C (-22°F to 176°F)
Humidity	10% - 85%, non-condensing (Operating and Storage)
Altitude	2,000m (6565ft)
Protection	IP30
Shock (Storage and Shipment)	30 G, per IEC 60068-2-7EA.
Vibration (Storage and Shipment)	2 G, 2 hrs/axis (10-500 Hz) per IEC 60068-2-6, FC.
Regulatory Compliance	CE, FCC, KCC, TÜV SÜD NRTL, EU RoHS

¹ To ensure sufficient ventilation, the vision controller must be mounted with sufficient clearance. If mounting to the bottom surface, 50mm of clearance is required above and on both sides of the vision controller. If mounting to the back surface or using the accessory wall mounting bracket or DIN rail mounting bracket, 24.5mm of clearance is required above, below and on both sides of the vision controller. If an adjacent device also produces heat, additional space or cooling is required if air space around the vision controller exceeds 45°C (113°F).

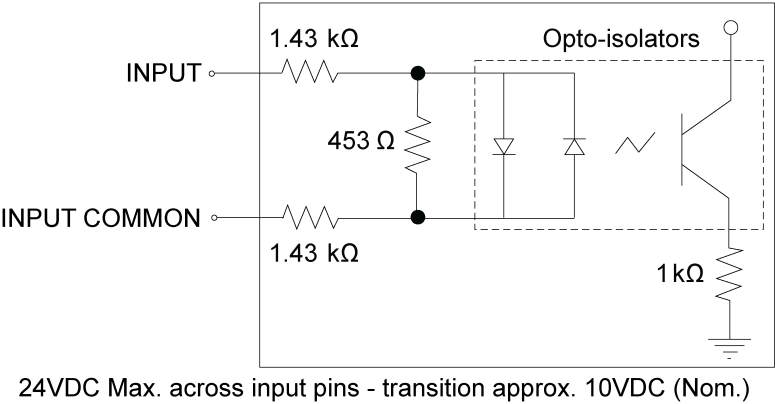
Inputs

The vision controller features eight independent inputs (INPUTS 0 - 7), which can be used to trigger vision controller events. The inputs are optically isolated and typically connected (directly or indirectly) to a PLC or photoelectric sensor. The vision controller will respond to an event when the voltage difference between the INPUT and INPUT COMMON exceeds 10VDC. Refer to [Wire Inputs and Outputs on page 38](#) for common wiring configurations.

Note:

- There are two input terminal rows. INPUTS 0 - 3 share the COMMON 1 connection and INPUTS 4 - 7 share the COMMON 2 connection. Therefore the input devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

Specification	Description
Input Voltage Limit	24VDC
Voltage	Input ON: >10VDC Input OFF: < 2VDC
Current	Input ON: > 6mA Input OFF: < 1.5mA Each line is optically isolated and polarity-independent.



Outputs

The vision controller features sixteen independent outputs (OUTPUTS 0 -15), which are optically isolated. Refer to [Wire Inputs and Outputs on page 38](#) for common wiring configurations.

- OUTPUTS 0 - 7 provide up to 50mA current (maximum). These outputs are typically connected (directly or indirectly) to an input, such as a trigger input or PLC input.
- OUTPUTS 8 - 15 provide up to 100mA of current (maximum). These outputs are typically connected (directly or indirectly) to a load, such as a relay, indicator light or reject mechanism.

Note:

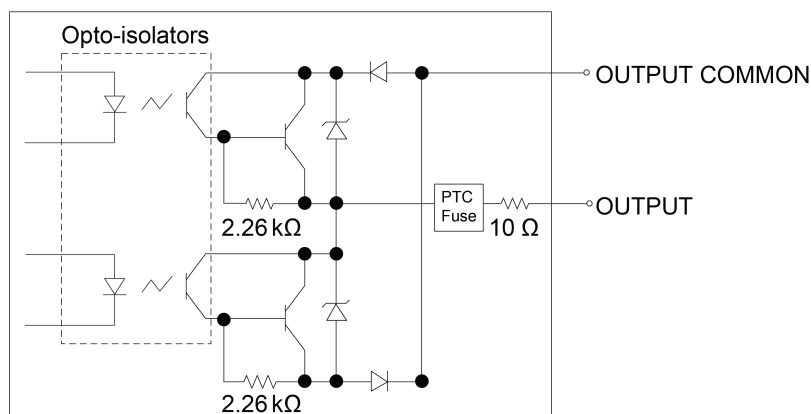
- When using the vision controller with In-Sight Profiler, output lines 14 and 15 are always reserved for the head synchronization of dual DS1000 series sensor configurations. This applies even for deployments that are not using a dual DS1000 series sensor configuration.
- There are two output terminal rows. OUTPUTS 0 - 7 share the COMMON 1 connection and OUTPUTS 8 - 15 share the COMMON 2 connection. Therefore the output devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

OUTPUTS 0 - 7 Specifications:

Specification	Description
Voltage	24VDC maximum between an output and output common.
Current	50mA maximum. Each line protected against over-current, short circuit and reverse polarity.
Maximum Voltage Drop	3VDC @ 50mA
Delay ¹	25µs (maximum due to opto-isolators turning ON)

OUTPUTS 8 - 15 Specifications:

Specification	Description
Voltage	24VDC maximum between an output and output common.
Current	100mA maximum. Each line protected against over-current, short circuit and reverse polarity.
Maximum Voltage Drop	3.5VDC @ 100mA
Delay ²	25µs (maximum due to opto-isolators turning ON)



¹ Delay when opto-isolators turn OFF depends on the load to which the output is connected. With a 1K load, the maximum delay will be 500 µs.

² Delay when opto-isolators turn OFF depends on the load to which the output is connected. With a 1K load, the maximum delay will be 500 µs.

Port and Terminal Block Specifications

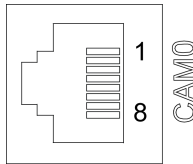
The following sections provide specifications for the vision controller's ports and terminal blocks.

CAM Ports

The four CAM ports (CAM 0 - CAM 3) are RJ-45 ports that provide Ethernet connectivity to In-Sight cameras, DS900 sensors and DS1000 sensors. These ports also provide power to Cognex industrial devices that support Power over Ethernet (PoE).



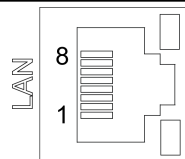
CAUTION: The vision controller's CAM ports provide Power over Ethernet (PoE) to supported Cognex devices; connecting other PoE devices to these ports could damage the vision controller or the PoE device.



Pin Number	Signal Name
1	TxRx A +
2	TxRx A -
3	TxRx B +
4	TxRx C +
5	TxRx C -
6	TxRx B -
7	TxRx D +
8	TxRx D -

LAN Port

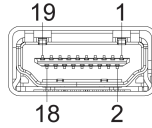
The LAN port is a 10/100/1000 RJ-45 Ethernet port that is used to connect the vision controller to an Ethernet network.



Pin Number	Signal Name
1	TxRx A +
2	TxRx A -
3	TxRx B +
4	TxRx C +
5	TxRx C -
6	TxRx B -
7	TxRx D +
8	TxRx D -

VIDEO OUT Port

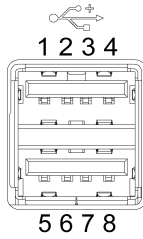
The VIDEO OUT port is a locking HDMI port that provides connection to a display device.



Pin Number	Signal Name
1	D2 +
2	D2 - Shield
3	D2 -
4	D1 +
5	D1 - Shield
6	D1 -
7	D0 +
8	D0 - Shield
9	D0 -
10	CLK +
11	CLK Shield
12	CLK -
13	CEC
14	RSVD
15	I2C_SCL
16	I2C_SDA
17	DDC_CEC GND
18	+5VDC
19	HOT_PLUG

USB 2.0 Ports

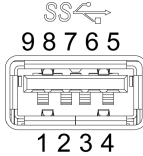
The two USB 2.0 ports can be used to connect mouse, keyboard or mass storage device.



Pin Number	Signal Name
1	VCC
2	D -
3	D +
4	GND
5	VCC
6	D -
7	D +
8	GND

USB 3.0 Port

The USB 3.0 port can be used to connect mouse, keyboard or mass storage device.

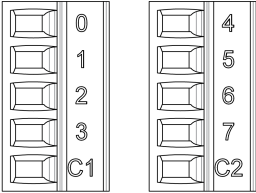


Pin Number	Signal Name
1	VBUS
2	D -
3	D +
4	GND
5	SSRx -
6	SSRx +
7	GND
8	SSTx -
9	SSTx +

INPUTS Terminal Block Assignments

The INPUTS terminal blocks provide access to a total of 8 inputs and 2 common connections. Recommended wiring is 16 - 26 AWG, solid or stranded wire.

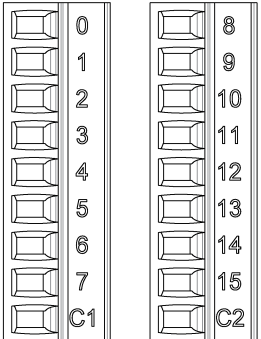
CAUTION: The maximum torque that can be applied to the I/O terminal connectors is 0.25 Nm (2.2 in-lb). Applying torque above this limit can damage the connectors.

	
Pin Label	Signal Name
0	INPUT 0
1	INPUT 1
2	INPUT 2
3	INPUT 3
C1	INPUT COMMON 1
4	INPUT 4
5	INPUT 5
6	INPUT 6
7	INPUT 7
C2	INPUT COMMON 2

OUTPUTS Terminal Block Assignments

The OUTPUTS terminal blocks provide access to a total of 16 outputs and 2 common connections. Recommended wiring is 16 - 26 AWG, solid or stranded wire.

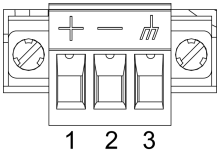
CAUTION: The maximum torque that can be applied to the I/O terminal connectors is 0.25 Nm (2.2 in-lb). Applying torque above this limit can damage the connectors.

		
Pin Label	Signal Name	
0	OUTPUT 0	
1	OUTPUT 1	
2	OUTPUT 2	
3	OUTPUT 3	
4	OUTPUT 4	
5	OUTPUT 5	
6	OUTPUT 6	
7	OUTPUT 7	
C1	OUTPUT COMMON 1	
8	OUTPUT 8	
9	OUTPUT 9	
10	OUTPUT 10	
11	OUTPUT 11	
12	OUTPUT 12	
13	OUTPUT 13	
14	OUTPUT 14	
15	OUTPUT 15	
C2	OUTPUT COMMON 2	

24VDC Power Connector Terminal Assignments

The 24VDC power connector is used to connect an external power supply to the vision controller. Recommended wiring is 14 - 18 AWG, solid or stranded wire.

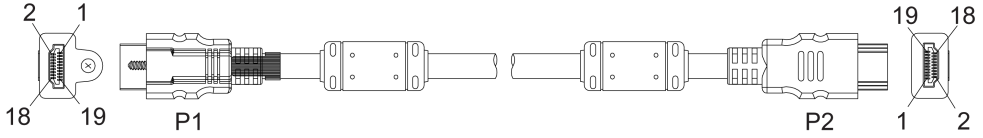
CAUTION: The maximum torque that can be applied to the 24VDC power connector is 0.6 Nm (5.3 in-lb). Applying torque above this limit can damage the connector.



Pin Number	Signal Name
1	+24VDC (POWER)
2	-24VDC (RETURN)
3	FRAME GROUND

HDMI Cable Specifications

The shielded HDMI cable provides connection to a display device.



P1 Pin Number	Signal	Wire Color	P2 Pin Number
1	D2 +	White	1
3	D2 -	Brown	3
2	D2 - Shield	Drain	2
4	D1 +	White	4
6	D1 -	Red	6
5	D1 - Shield	Drain	5
7	D0 +	White	7
9	D0 -	Green	9
8	D0 - Shield	Drain	8
10	CLK +	White	10
12	CLK -	Blue	12
11	CLK Shield	Drain	11
13	CEC	Red	13
15	I2C_SCL	White	15
16	I2C_SDA	Black	16
18	+5VDC	Violet	18
14	RSVD	White	14
19	HOT_PLUG	Orange	19
17	DDC_CEC GND	Drain	17
Shell	N/A	Drain	Shell

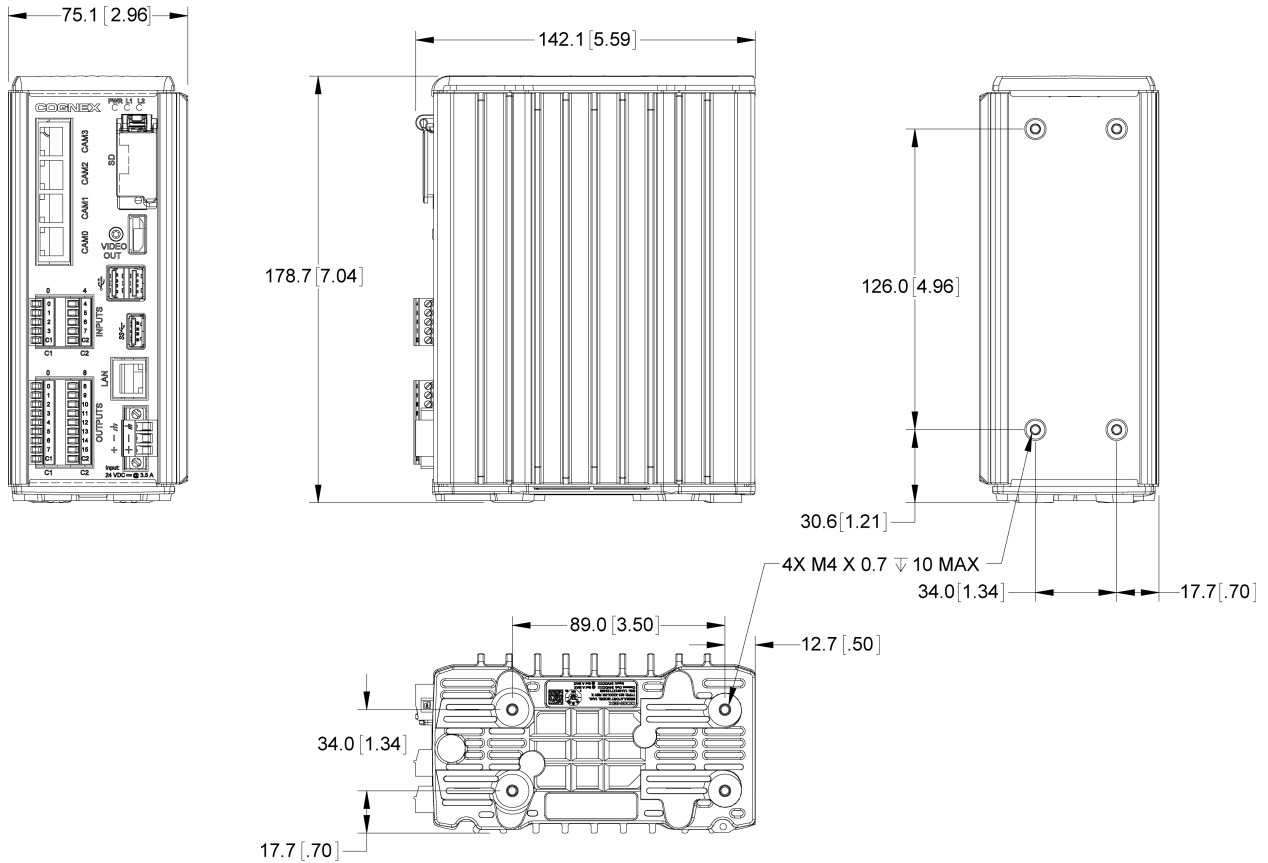
Note: Cables are sold separately.

Vision Controller Dimensions

Note:



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



Wire Inputs and Outputs

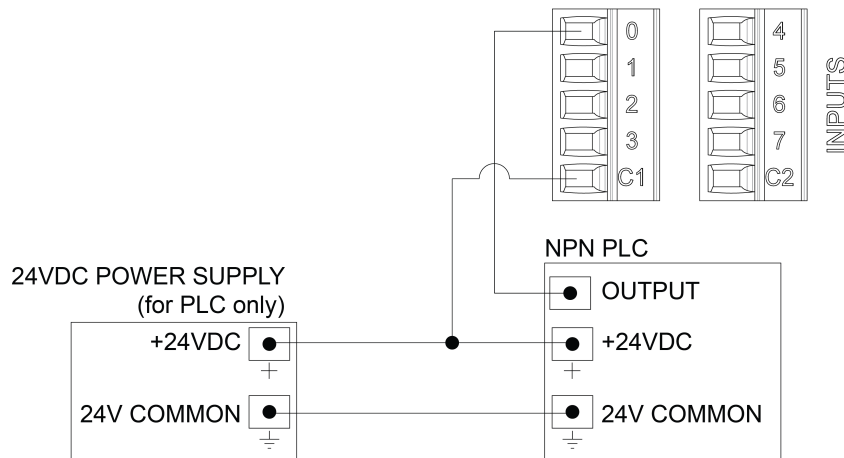
The following figures show basic wiring for some of the more common I/O configurations.

Input from PLC - Current Sinking

To configure the input as a sinking input, connect INPUT COMMON (for example, C1) to the high voltage reference (+24VDC) and connect one of the INPUTS on the same terminal row (for example, INPUT 0) to the OUTPUT of the photoelectric sensor or PLC. When the PLC output turns ON, the INPUT is pulled down to a low voltage level.

Note:

- There are two input terminal rows. INPUTS 0 - 3 share the COMMON 1 connection and INPUTS 4 - 7 share the COMMON 2 connection. Therefore the input devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

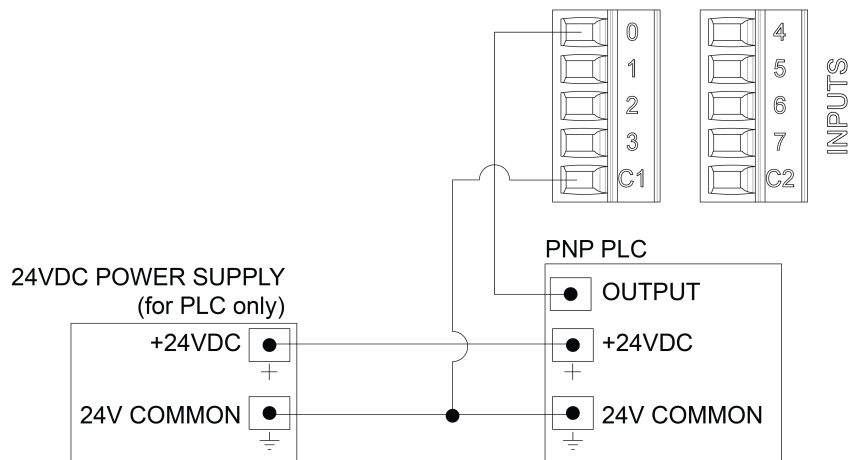


Input from PLC - Current Sourcing

To configure the input as sourcing input, connect INPUT COMMON (for example, C1) to the low voltage reference (24V COMMON) and one of the INPUTS on the same terminal row (for example, INPUT 0) to the OUTPUT of the photoelectric sensor or PLC. When the PLC output turns ON, the INPUT is pulled up to a positive voltage level.

Note:

- There are two input terminal rows. INPUTS 0 - 3 share the COMMON 1 connection and INPUTS 4 - 7 share the COMMON 2 connection. Therefore the input devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

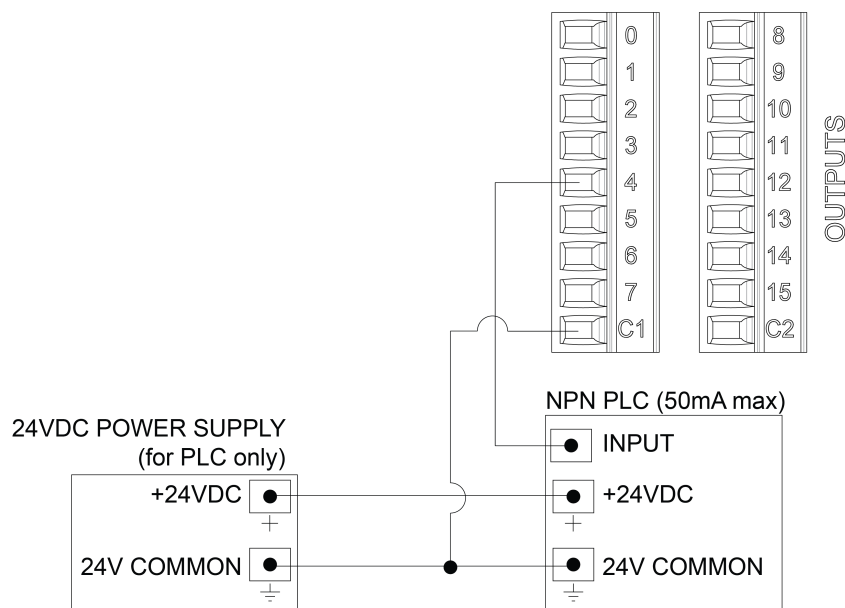


Output to PLC - Current Sinking

To configure the output as a sinking output, connect OUTPUT COMMON (for example, C1) to the low voltage reference (24V COMMON) and connect one of the OUTPUTS on the same terminal row (for example, OUTPUT 4) to the INPUT of the PLC. When the vision controller output turns ON, the PLC input is pulled down to a low voltage level.

Note:

- OUTPUTS 0 - 7 provide up to 50mA current (maximum).
- There are two output terminal rows. OUTPUTS 0 - 7 share the COMMON 1 connection and OUTPUTS 8 - 15 share the COMMON 2 connection. Therefore the output devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

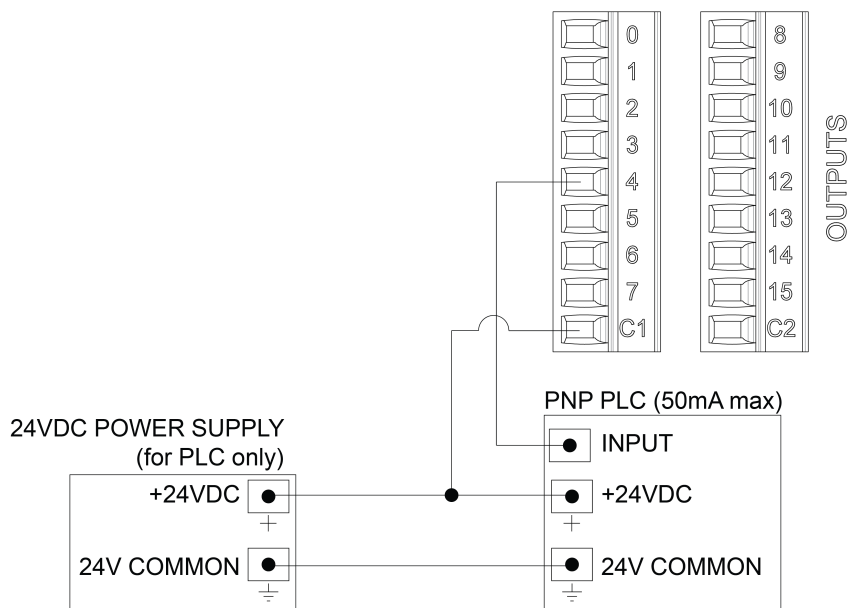


Output to PLC - Current Sourcing

To configure the output as a sourcing output, connect OUTPUT COMMON (for example, C1) to the high voltage reference (+24VDC) and connect one of the OUTPUTS on the same terminal row (for example, OUTPUT 4) to the INPUT of the PLC. When the vision controller output turns ON, the PLC input is pulled up to a high voltage level.

Note:

- OUTPUTS 0 - 7 provide up to 50mA current (maximum).
- There are two output terminal rows. OUTPUTS 0 - 7 share the COMMON 1 connection and OUTPUTS 8 - 15 share the COMMON 2 connection. Therefore the output devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

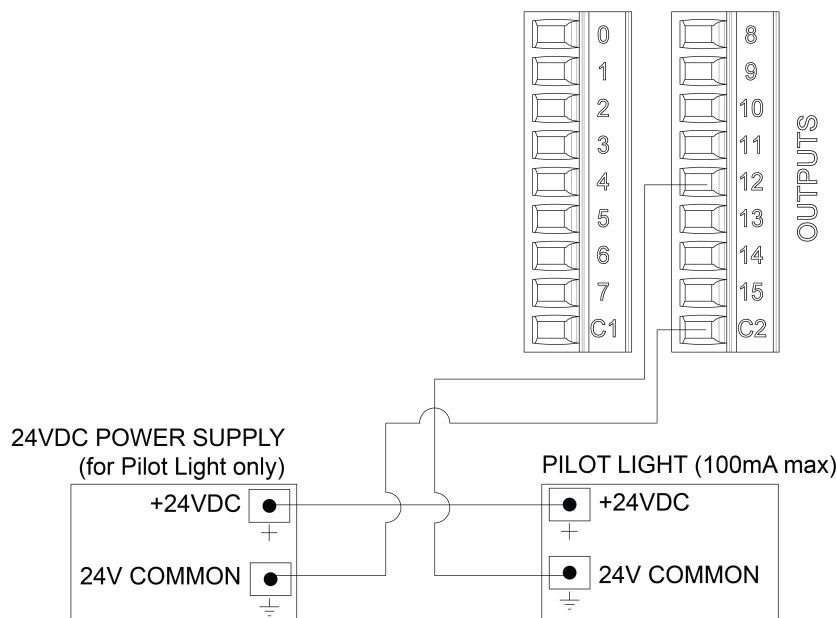


Output to Pilot Light - Current Sinking

To configure the output as a sinking output, connect OUTPUT COMMON (for example, C2) to the power supply's low voltage reference (24V COMMON) and connect one of the OUTPUTS on the same terminal row (for example, OUTPUT 12) to the pilot light's low voltage reference (24V COMMON).

Note:

- OUTPUTS 8 - 15 provide up to 100mA of current (maximum).
- There are two output terminal rows. OUTPUTS 0 - 7 share the COMMON 1 connection and OUTPUTS 8 - 15 share the COMMON 2 connection. Therefore the output devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

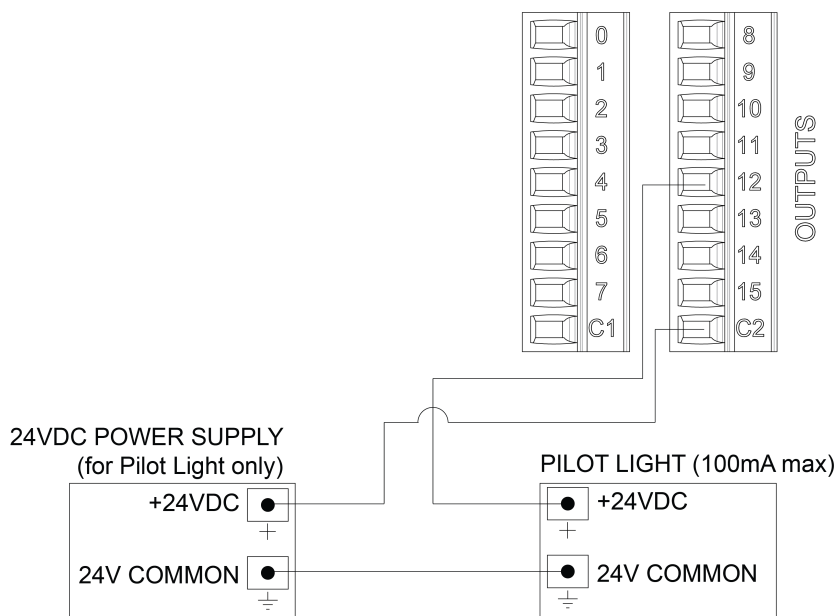


Output to Pilot Light - Current Sourcing

To configure the output as a sourcing output, connect OUTPUT COMMON (for example, C2) to the power supply's high voltage reference (+24VDC) and connect one of the OUTPUTS on the same terminal row (for example, OUTPUT 12) to the pilot light's high voltage reference (+24VDC).

Note:

- OUTPUTS 8 - 15 provide up to 100mA of current (maximum).
- There are two output terminal rows. OUTPUTS 0 - 7 share the COMMON 1 connection and OUTPUTS 8 - 15 share the COMMON 2 connection. Therefore the output devices for each terminal row must be the same; either current sinking or current sourcing.
- To maintain optical isolation of the I/O lines, the devices connected to these lines must not be connected to the same power supply as the vision controller. If they are connected to, or share a ground with, the same power supply, they may still function but will no longer be optically isolated.

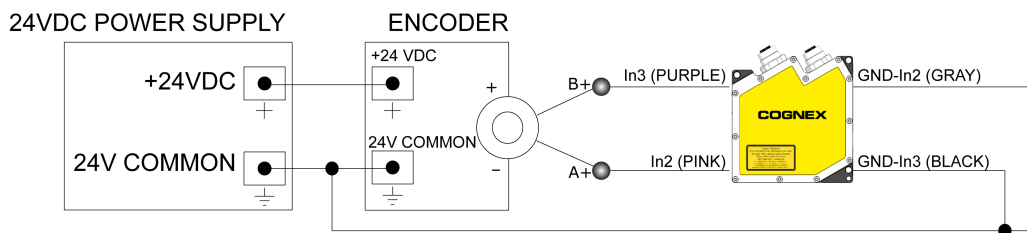


Connect a Single DS900 Sensor with Encoder

CAUTION: The Multifunction cable's PWR (Red) and GND (Blue) flying lead wires must not be connected to any external point or to each other. Unused wires can be clipped short or tied back using a tie made of non-conductive material.

Note:

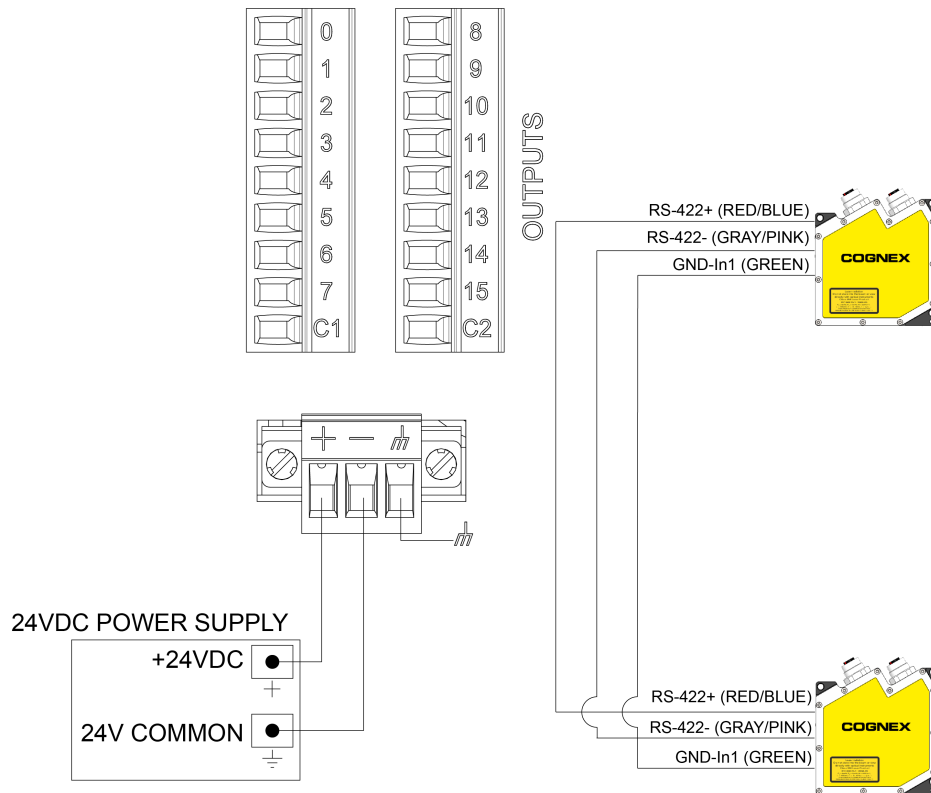
- For the Multifunction socket and pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.
- In the following example, the DS900 sensor is connected to a 24V encoder. The DS900 can also be connected to a 5V encoder. If using a 5V encoder, a separate 5V power supply must be connected to the encoder.
- On the Triggering tab in the In-Sight Profiler software, you must configure the Encoder property Signal Level based on the encoder's supply voltage:
 - TTL** for a 5V encoder (default).
 - 24V** for a 24V encoder.



Connect Two DS900 Sensors

CAUTION: The Multifunction cable's PWR (Red) and GND (Blue) flying lead wires must not be connected to any external point or to each other. Unused wires can be clipped short or tied back using a tie made of non-conductive material.

Note: For the Multifunction socket and pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.

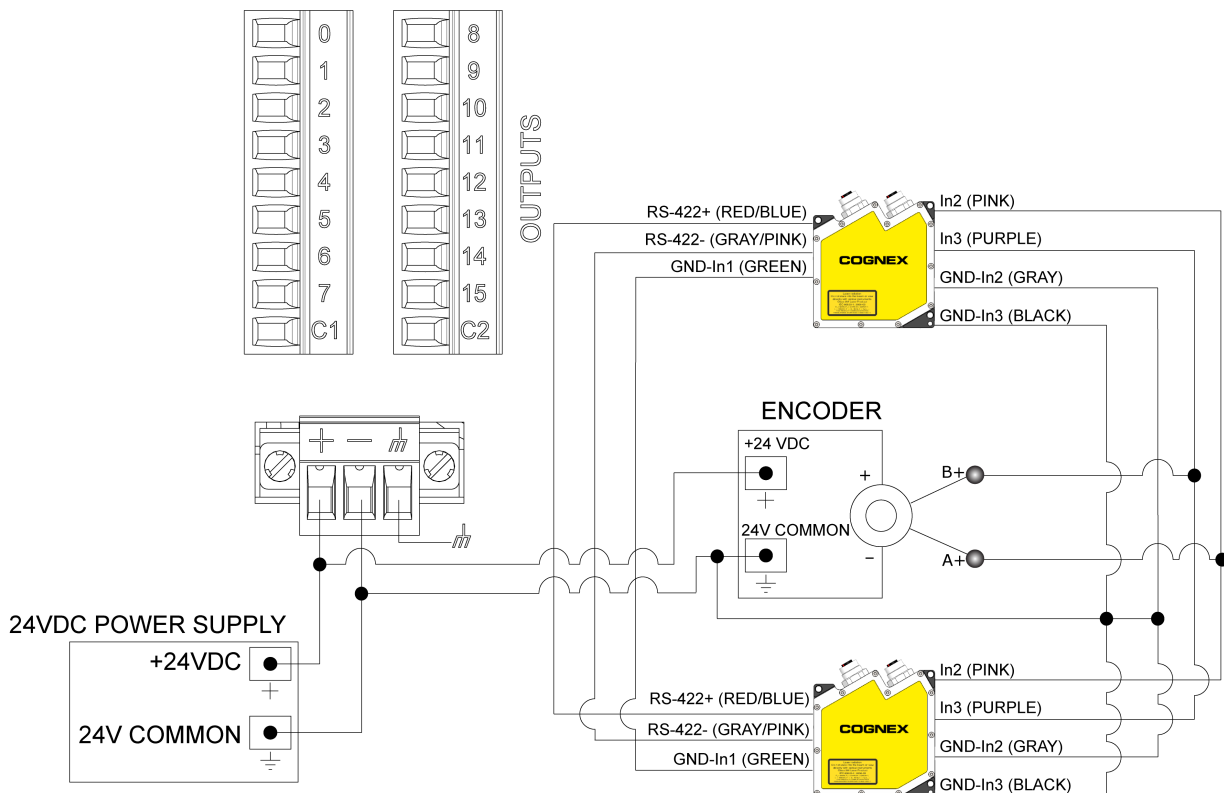


Connect Two DS900 Sensors with Encoder

CAUTION: The Multifunction cable's PWR (Red) and GND (Blue) flying lead wires must not be connected to any external point or to each other. Unused wires can be clipped short or tied back using a tie made of non-conductive material.

Note:

- For the Multifunction socket and pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.
- In the following example, the DS900 sensor is connected to a 24V encoder. The DS900 can also be connected to a 5V encoder. If using a 5V encoder, a separate 5V power supply must be connected to the encoder.
- On the Triggering tab in the In-Sight Profiler software, you must configure the Encoder property Signal Level based on the encoder's supply voltage:
 - TTL** for a 5V encoder (default).
 - 24V** for a 24V encoder.



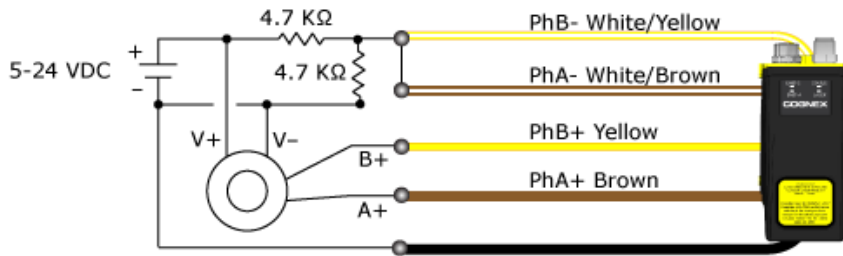
Connect a Single DS1000 Sensor with Single-Ended Encoder

Connect PhA+ and PhB+ to the encoder outputs. Derive PhA- and PhB- from the encoder voltage source and make them equal to 50% of the encoder reference voltage. For example, if the encoder is connected to 24V, set PhA- and PhB- to 12V.

Note:



- For the Power and I/O cable pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.
- The frequency of encoder pulses must not exceed 50 kHz.

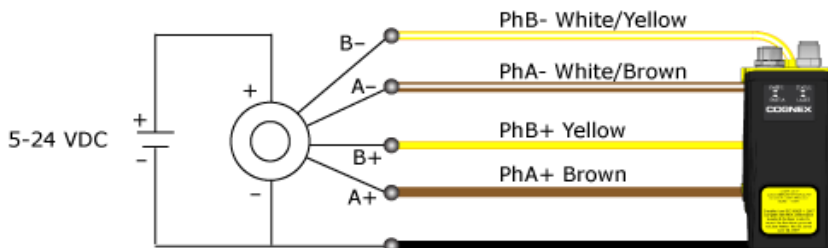


Connect a Single DS1000 Sensor with Differential Encoder

Note:

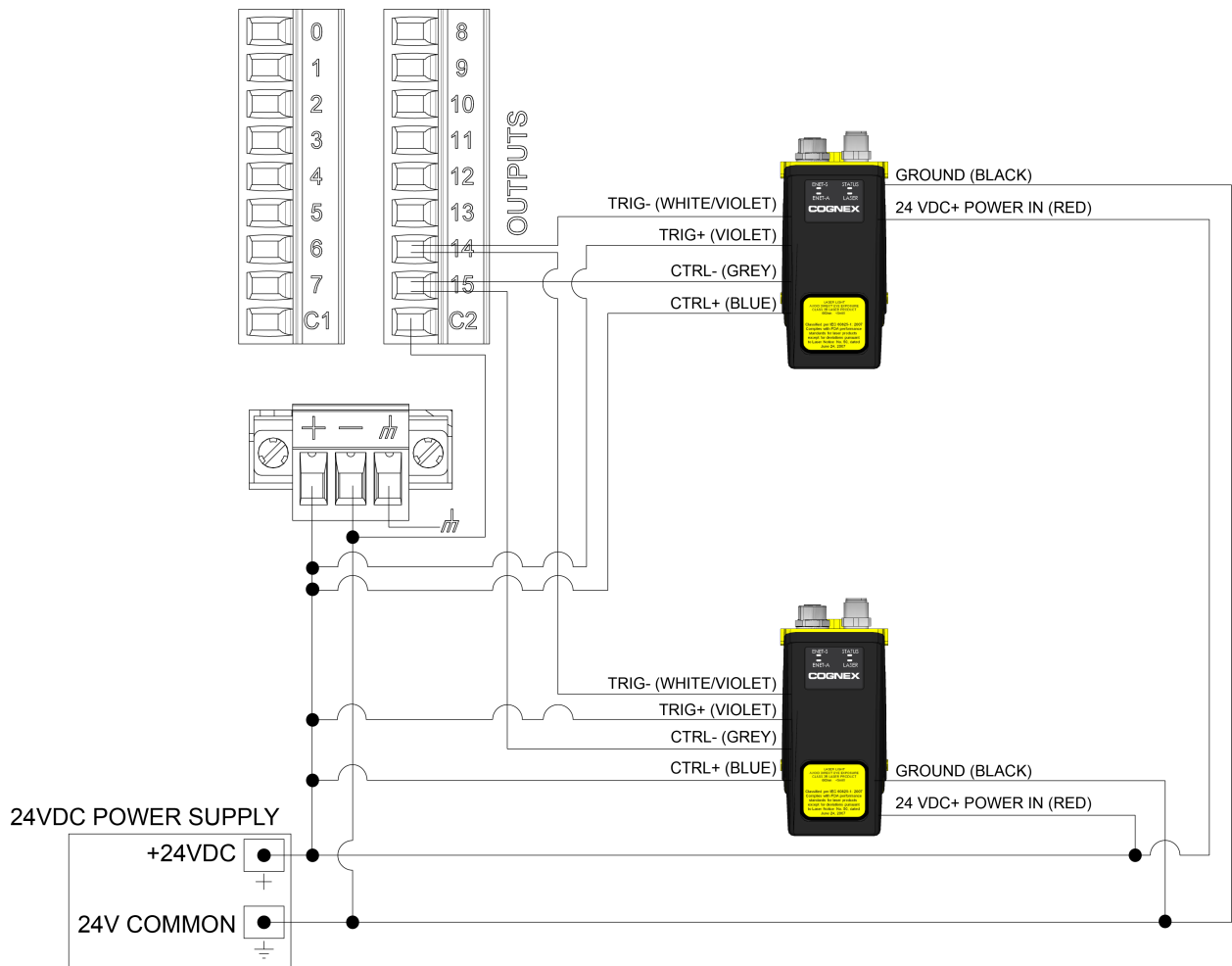


- For the Power and I/O cable pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.
- The frequency of encoder pulses must not exceed 50 kHz.



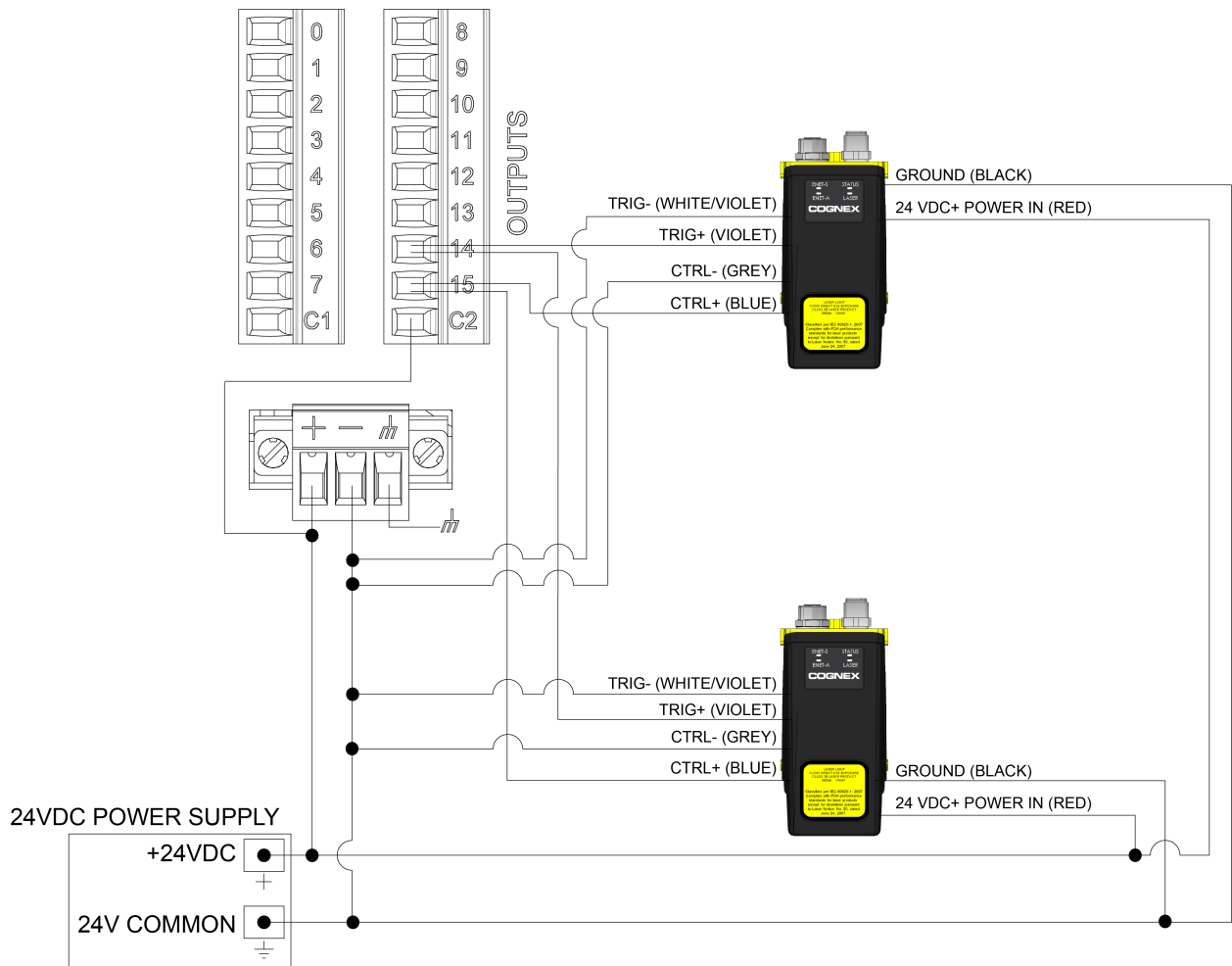
Connect Two DS1000 Sensors - Current Sinking

Note: For the Power and I/O cable pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.



Connect Two DS1000 Sensors - Current Sourcing

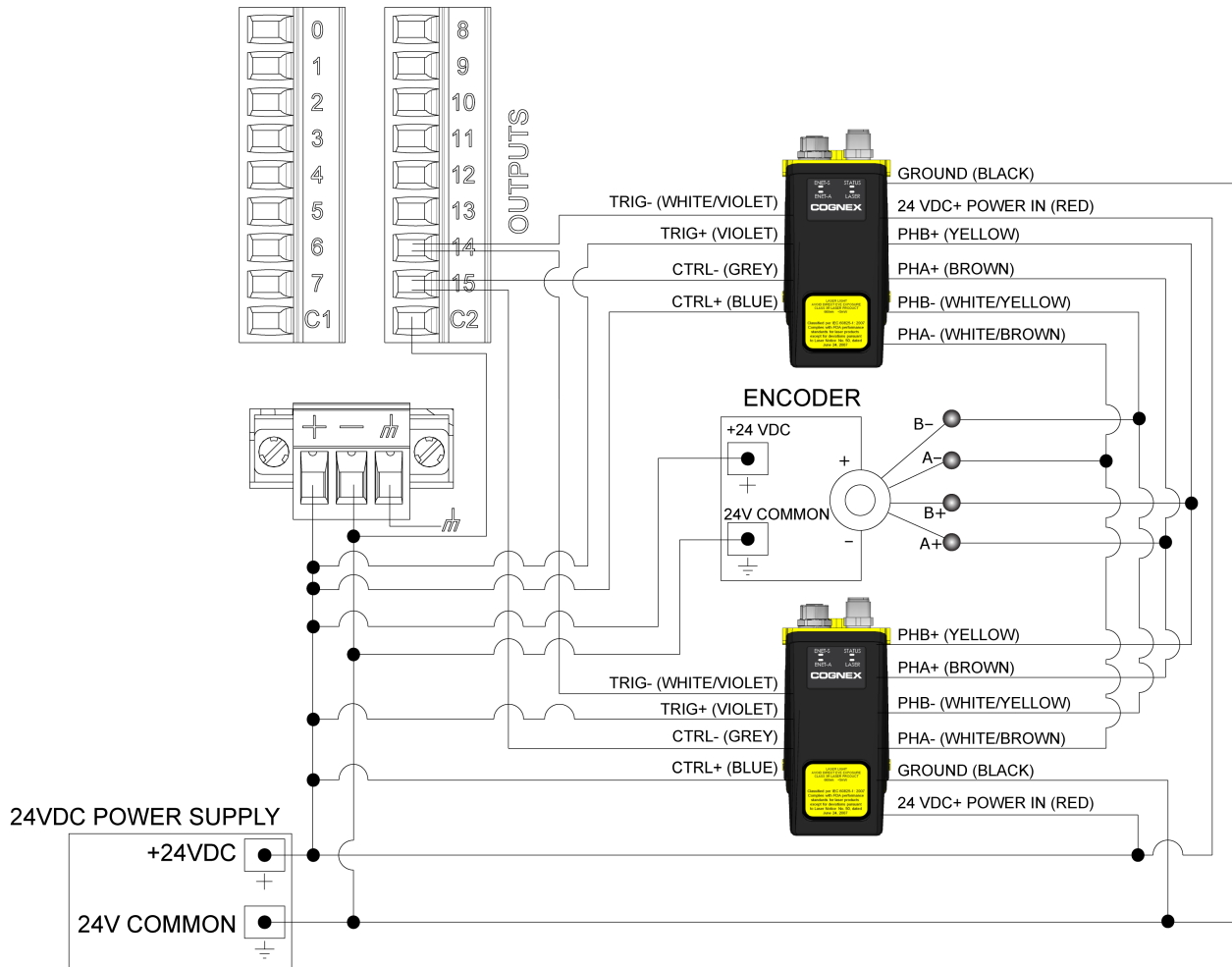
Note: For the Power and I/O cable pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.



Connect Two DS1000 Sensors with Encoder - Current Sinking

Note:

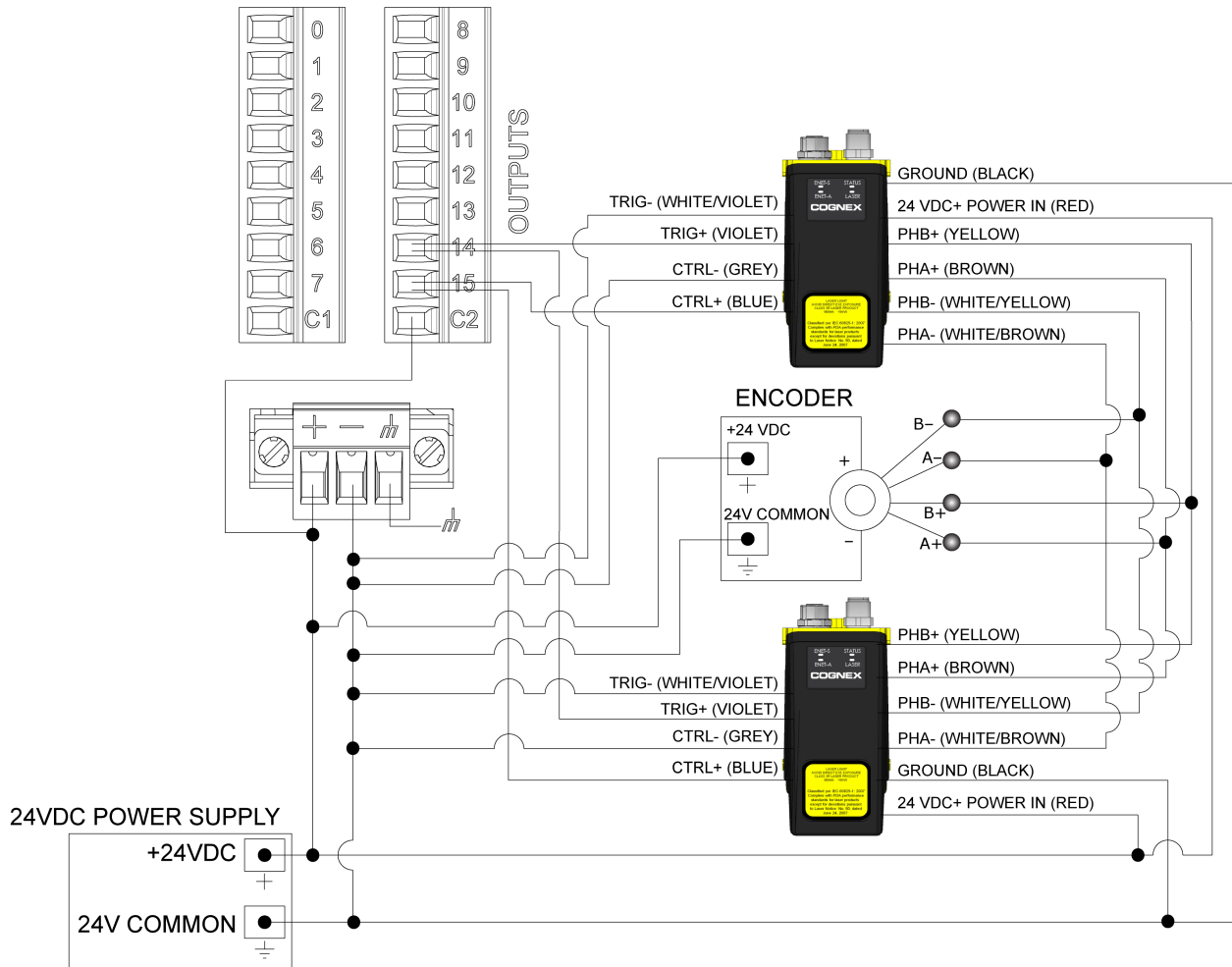

- For the Power and I/O cable pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.
- The frequency of encoder pulses must not exceed 50 kHz.



Connect Two DS1000 Sensors with Encoder - Current Sourcing

Note:


- For the Power and I/O cable pin assignments, refer to the *DS900 Series and DS1000 Series Sensor Reference Guide*.
- The frequency of encoder pulses must not exceed 50 kHz.



Cleaning/Maintenance

Cleaning the Vision Controller

Use a cleaning cloth or brush to remove dirt, dust and smudges from the vision controller. Keep all liquids away from the vision controller connectors and openings.



CAUTION: Cleaning chemicals should not be used on the vision controller.
