

I/O Expansion Module

Installation & Reference



Overview

The In-Sight™ vision sensor supports up to ten discrete inputs and ten discrete outputs. Two inputs and two outputs are built-in to the In-Sight processor. The remaining eight inputs and outputs require the optional I/O Expansion Module.

This document describes the I/O Expansion Module, including the following topics:

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Product Contents:

The I/O Expansion Module kit (Cognex P/N CIO-2350-00) includes the following components:

- I/O Expansion Module (P/N 800-5712-2)
- 2.1 m (7.0 ft) I/O Expansion Module Cable (P/N 300-0274-7)

NOTE: The In-Sight processor supplies power to the I/O Expansion Module; no external power supply is necessary.

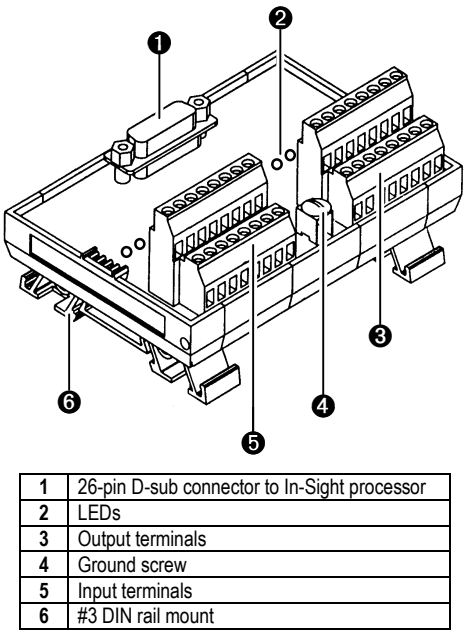


Figure 1 – I/O Expansion Module Overview

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Installation

This section describes how to connect the I/O Expansion Module to the In-Sight processor and how to connect input and output lines to the I/O Expansion Module.

Step 1 – Connect the Cables

1. Remove power from the In-Sight processor.
2. Plug one end of the provided cable into the I/O Expansion Module's 26-pin connector, and the other into the 26-pin connector on the In-Sight processor labeled **EXTERNAL I/O**.

CAUTION! The I/O Expansion Module must have the same ground potential as the In-Sight processor's chassis. Any difference in potential can damage the equipment. If you connect a ground wire to the I/O module's ground screw, then that ground must have the same potential as that of the In-Sight processor.

3. On the I/O Expansion Module, connect input lines to the input terminals and output lines to the output terminals. For both input and output signals, connect the “source” side of the signal to a positive number terminal and the “sink” side to a negative-numbered terminal. Tighten the set screws.

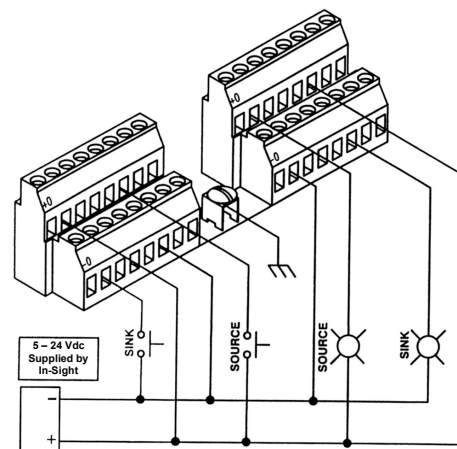


Figure 2 – Wiring Diagram

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Step 2 – Configure the Input Lines in the User Interface

1. Power up the In-Sight processor.
2. Using the control pad, highlight any empty cell in the spreadsheet and press the **A3** button to open the **System** menu.
3. Highlight Settings and press the **A1** button to open the **Settings** menu.
4. To configure a discrete input line, highlight **Discrete Input** and press **A1** to open the **Discrete Input** dialog. Configure the selected input lines as needed and press **OK** to close the **Discrete Input** dialog.

A screenshot of the "Discrete Input" dialog box. It contains a table with columns: Line, Name, State, Type, and Signal. The table lists 10 lines (0-9). Line 0 has State 1 and Type "User data". Lines 1-9 have State 0 and various types like "Event Trigger", "Job ID Number", "Job Load Switch", "Online/Offline", "Acquisition Trigger", "Tracking Pulse", and "User data". Each line has a corresponding "Signal" button. At the bottom are "OK" and "Cancel" buttons.

Line	Name	State	Type	Signal
0	Line 0	1	User data	
1	Line 1	0	Event Trigger	Rising Edge
2	Line 2	0	Job ID Number	
3	Line 3	0	Job Load Switch	Rising Edge
4	Line 4	0	Online/Offline	
5	Line 5	0	Acquisition Trigger	Rising Edge
6	Line 6	0	Tracking Pulse	Rising Edge
7	Line 7	0	Event Trigger	Falling Edge
8	Line 8	0	User data	
9	Line 9	0	User data	

Figure 3 – Discrete Input Dialog

You read a discrete input values in the spreadsheet using the **Read Discrete** function.

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Step 3 – Configure the Output Lines

1. Open the **Settings** menu as in Step 5, but this time highlight **Discrete Output** to open the **Discrete Output** dialog.
2. Configure the selected output line as needed and press **OK** to close the **Discrete Output** dialog.

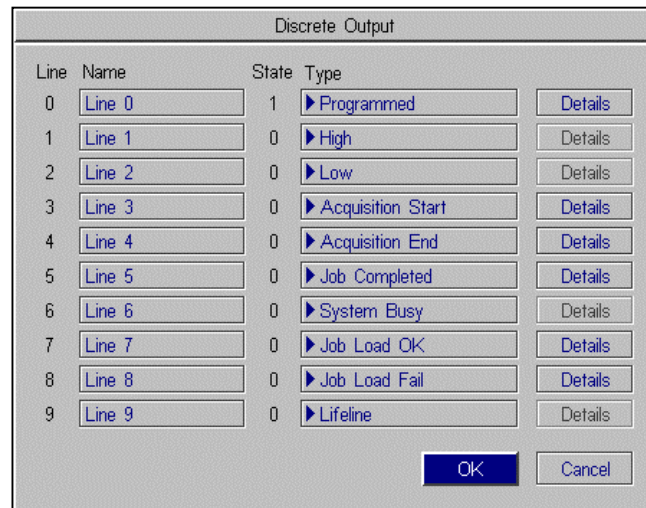


Figure 4 – Discrete Output Dialog

You write values from the worksheet to the discrete output through the **WriteDiscrete** function.

NOTE: In-Sight retains the settings in the **Discrete Input** and **Discrete Output** dialogs until you change them. These settings are system-wide, and apply to all saved jobs.

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Connector Pin Assignments

The following table lists the signal assignments for each pin on the I/O Expansion Module's connector:

Pin #	Assignment	Pin #	Assignment
1	Input 0	14	Output 5
2	Input 1	15	Output 6
3	Input 2	16	Output 7
4	Input 3	17	Power, +5v DC, fused at 0.5 A
5	Input 4	18	Power, +5v DC, fused at 0.5 A
6	Input 5	19	Ground
7	Input 6	20	Ground
8	Input 7	21	Ground
9	Output 0	22	Ground
10	Output 1	23	Ground
11	Output 2	24	Ground
12	Output 3	25	Not connected
13	Output 4	26	Not connected



Figure 5 –Connector Pin Numbering

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Terminal Block Pin Assignments

The table below lists the signal assignments for both the Input and Output terminal blocks on the I/O Expansion Module.

Pin #	Assign ment		Pin #	Assign ment	
	INPUTS (LED Anode)	OUTPUTS (Collector)		INPUTS (LED Cathode)	OUTPUTS (Emitter)
1	IN 0+	OUT 0+	9	IN 0 -	OUT 0-
2	IN 1+	OUT 1+	10	IN 1 -	OUT 1-
3	IN 2+	OUT 2+	11	IN 2 -	OUT 2-
4	IN 3+	OUT 3+	12	IN 3 -	OUT 3-
5	IN 4+	OUT 4+	13	IN 4 -	OUT 4-
6	IN 5+	OUT 5+	14	IN 5 -	OUT 5-
7	IN 6+	OUT 6+	15	IN 6 -	OUT 6-
8	IN 7+	OUT 7+	16	IN 7 -	OUT 7-

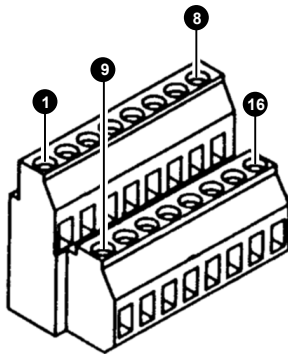


Figure 6 – Terminal Block Pin Numbering

NOTE: The pin numbering for both input and output terminal blocks is identical.

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Schematics

The following schematics apply only to the external discrete inputs and outputs on the I/O Expansion Module. For information on the built in discrete inputs and outputs on the In-Sight processor, see the *Installing In-Sight* guide.

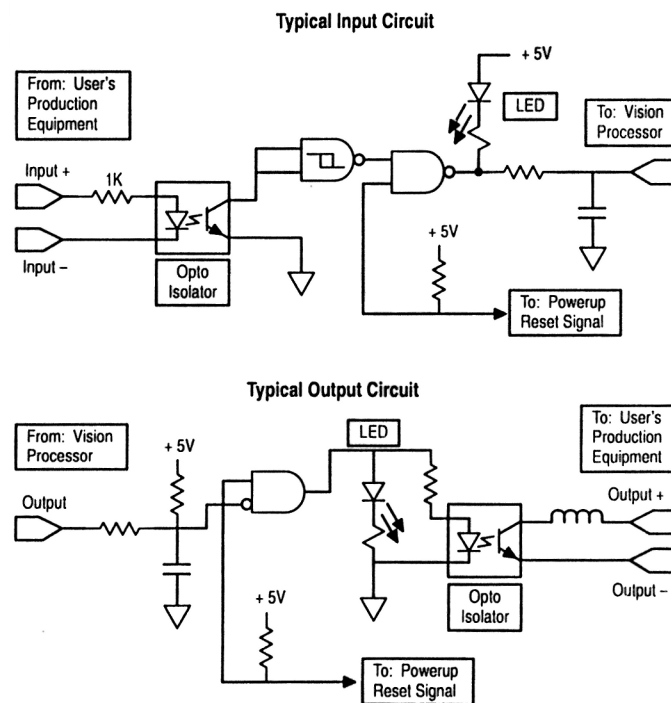


Figure 7 – I/O Expansion Module Schematics

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Specifications

Feature	Description
Inputs and Outputs	<ul style="list-style-type: none">• Eight independent discrete inputs, optically isolated.• Eight independent discrete outputs, optically isolated.
Operating Voltage (Field Side)	<ul style="list-style-type: none">• 5v to 24v DC.
Power	<ul style="list-style-type: none">• +5v DC, supplied from the In-Sight processor.
Maximum Output Current	<ul style="list-style-type: none">• 15 mA (sink or source).
ON State Voltage Drop	<ul style="list-style-type: none">• 0.8v DC @ 10 mA, 2.6v DC @ 15 mA.
OFF State Leakage Current	<ul style="list-style-type: none">• 100 μA; maximum @ 15v DC.
Output Delay	<ul style="list-style-type: none">• ON: 6 μSec.• OFF: 130 μSec @ 5 mA; 95 μSec @ 10 mA; 85 μSec @ 15 mA.
Input Resistance	<ul style="list-style-type: none">• ~ 1000 Ohms.
Input State Current	<ul style="list-style-type: none">• ON: 3.5 to 15 mA.• OFF: 500 μA.
Input Delay	<ul style="list-style-type: none">• ON: 30 μSec @ 3.5 mA; 8 μSec @ 15 mA.• OFF: 45 μSec @ 3.5mA; 80 μSec @ 15 mA.
Field Wiring Size	<ul style="list-style-type: none">• 26 to 12 AWG
Terminal Block Torque	<ul style="list-style-type: none">• Maximum 7 in-lb (0.8 N-M).
Cable	<ul style="list-style-type: none">• 2.13 m (7 ft), supplied
Mechanical	<ul style="list-style-type: none">• Dimensions: 120 mm (4.75 in) wide x 60 mm (2.35 in) high x 83 mm (3.25 in) deep.• #3 DIN Rail mountable.
Environmental	<ul style="list-style-type: none">• Operating Temperature: 0 to 50°C (32 to 122°F).• Operating/Storage Humidity: 5 to 95% non-condensing.• Storage Temperature: -20 to 85°C (-4 to 185°F).

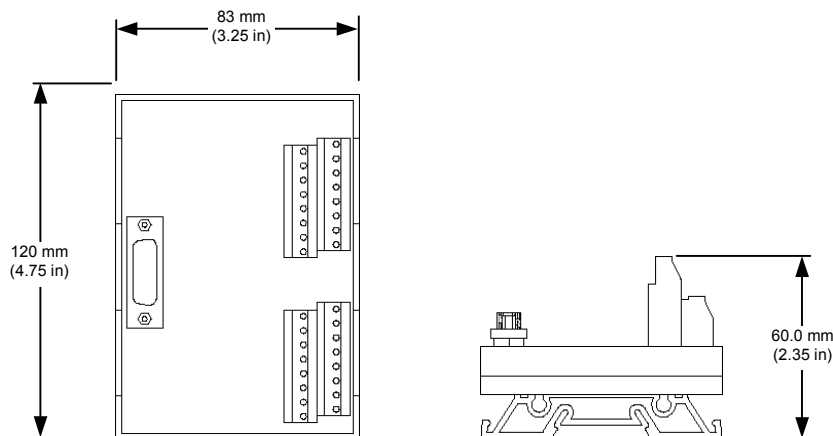


Figure 8 – Dimensions