

The DVT Ethernet IO Module (CON-IOE)



Revision 4

(11/11/04)



Ethernet Bus Coupler

Digital
Output

Digital
Input

DVT Breakout Module
(CON-IOE-BRK)

DVT Ethernet IO Module (CON-IOE)

Installation of DVT Ethernet IO Module (CON-IOE)

Hardware Mechanical Installation:

The CON-IOE is designed to be mounted on NS 35 DIN rail. The terminals are grounded when connected to the DIN rail.

This document is using the DVT Industrial Power Supply (ACC-24I).

Mount the Industrial power supply (ACC-24I) on a horizontal piece of NS 35 DIN rail. The power supply is designed to dissipate heat, but can only do this when the power supply is mounted horizontally, Input terminals facing downward. See Figure 1.

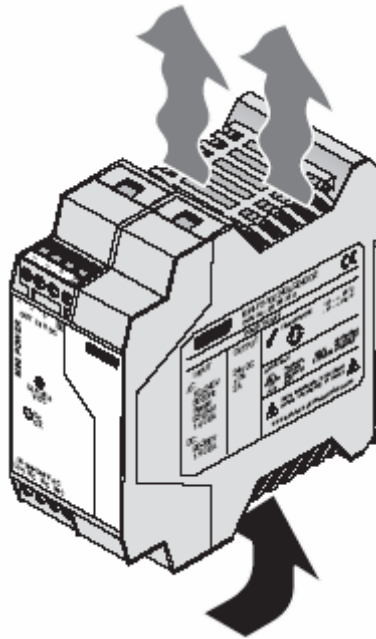


Figure 1

Hardware Electrical Installation:

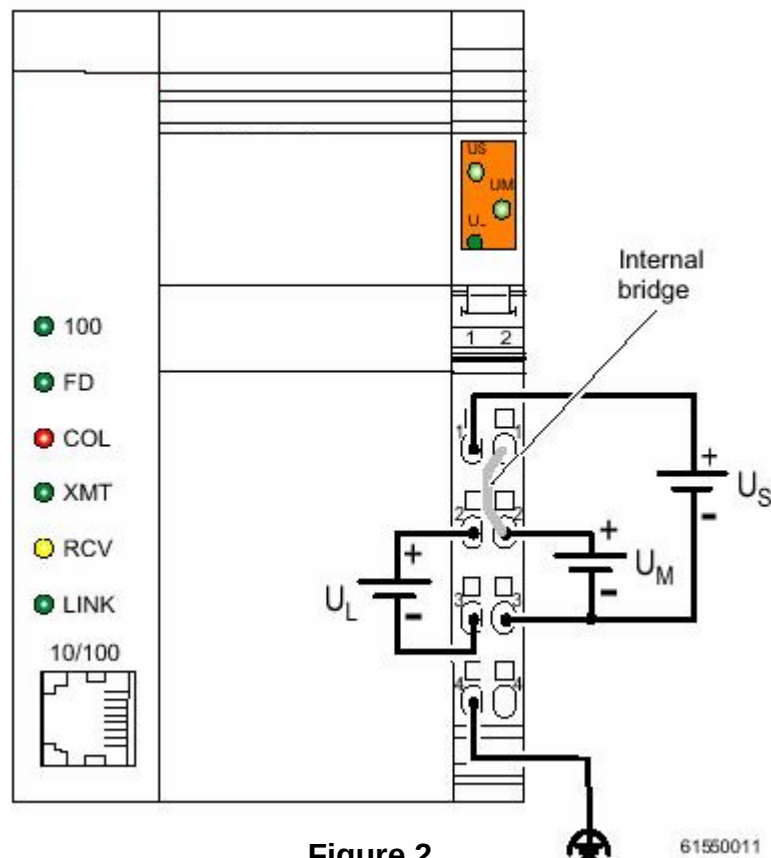
The Ethernet IO Module requires a 24VDC supply voltage. The Industrial power supply (ACC-24I), provided by DVT is recommended and will be used in this procedure. The ACC-24I is rated at 2 Amp; this is below the total maximum current the CON-IOE is capable of handling. You should spec out your power supply based on the type of IO being used.

Separate supply voltages can be used for US, UM and UL if isolation is desired. Refer to the Specification section for more information.

- UM - 24VDC for the Main circuit power, 8 Amp capacity
- US - 24VDC for the Segment circuit power, 8 Amp capacity
- UL - 24VDC for the Logic circuit (Communication), 2 Amp capacity

For this document we are connecting them to a single power supply

- Connect +24VDC to pins 1.1, 1.2, and 2.2 on the CON-IOE. (See Figure 2)
- Connect -24VDC to pins 1.3 and 2.3 on the CON-IOE. (See Figure 2)



Connect the Breakout Module to the power source.

- Connect +24VDC to pins 1.2, and/or 2.2 (RED Terminals) on the Power In Module (CON-PDM). (See Figure 3)
- Connect -24VDC to pins 1.3 and/or 2.3 (Blue Terminals) on the Power In Module (CON-PDM). (See Figure 3)

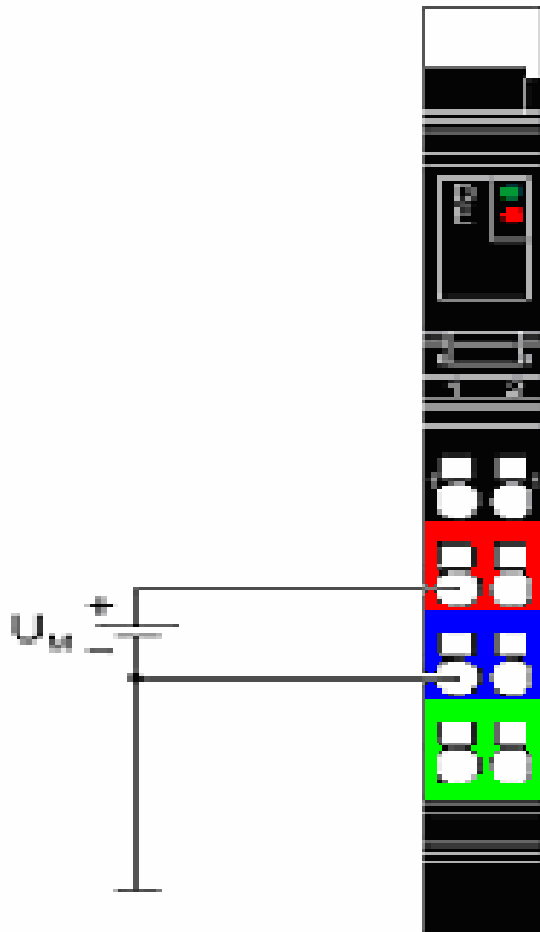


Figure 3

Configuration of DVT Ethernet IO Module (CON-IOE)

Configuring the module is done by using a Configuration Wizard. The Wizard is called “DVT External Communication Device Wizard” or DVT ECD for short. The wizard is used to define the IP address the device will use along with the I/O assignments. The wizard is also able to configure the Ethernet to Serial converter.

Installing the DVT ECD Wizard

The application is available on the included CD when you purchase the device and is also available at www.DVTSensors.com.

Locate and run the file “DVT ECD Installation Wizard.exe”. This file will install the “DVT ECD Wizard” on your PC.

Once the installation is completed, the program will be located in the “Start Menu — Programs — DVT Applications — DVT ECD Wizard — DVT ECD Wizard”. A shortcut is not created on the desktop automatically.

Executing the DVT ECD Wizard

When the application starts you are presented with the following screen. See Fig.4

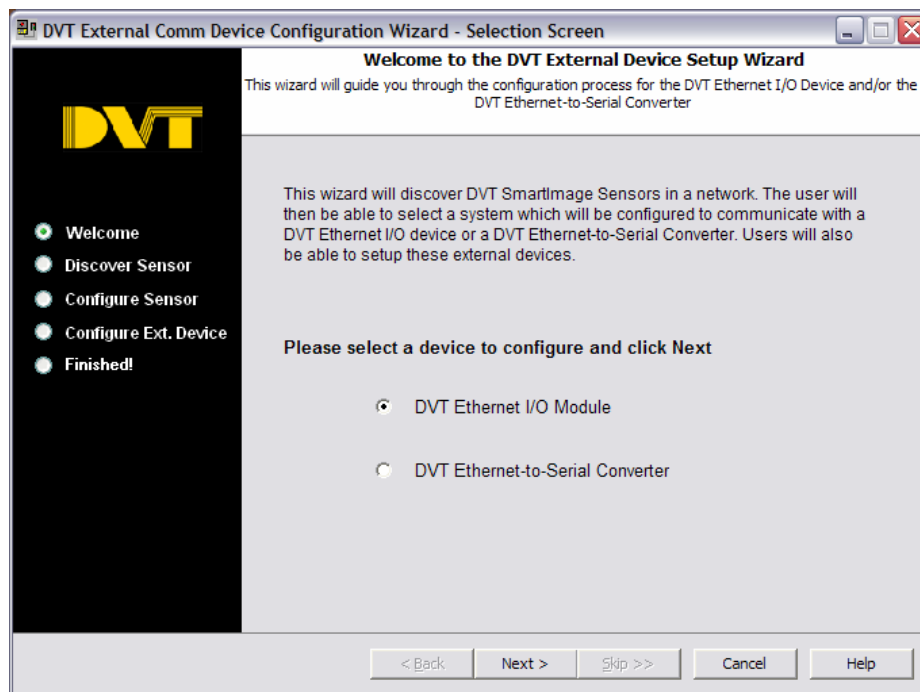


Fig.4

- Select the device that you would like to Configure. Here you can choose the Ethernet I/O Module or the Ethernet to Serial converter. This document will only cover the Ethernet I/O Module.
- Click "Next"
- The next screen contains a list of cameras you can configure to communicate to the I/O Module. See Fig. 5.

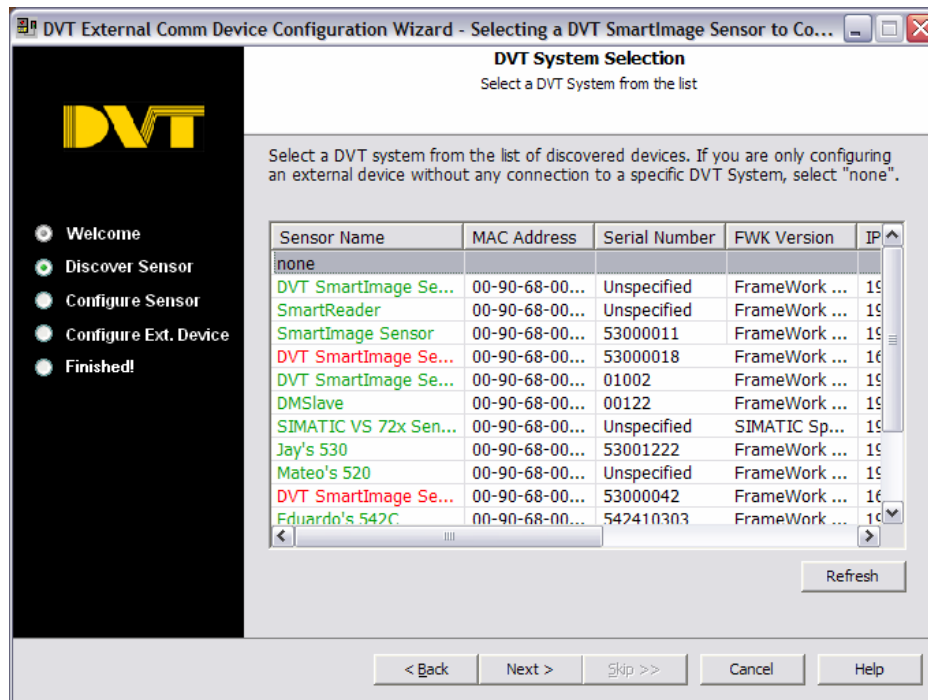


Fig. 5

- If you have a camera you want to assign to the I/O module select it from the table. Cameras in **RED** cannot be connected to because the IP address is configured incorrectly. If you do not have a specific camera to use at this time select "none" from the table.
- When "none" is selected, the steps used to configure the inputs and outputs on the module are skipped. You are only going to assign the IP address to the Ethernet I/O Module.
- In this document we are going to pick a camera from the table. Click on the desired camera.
- Click "Next"

- The next screen contains the Input assignments. See Fig. 6

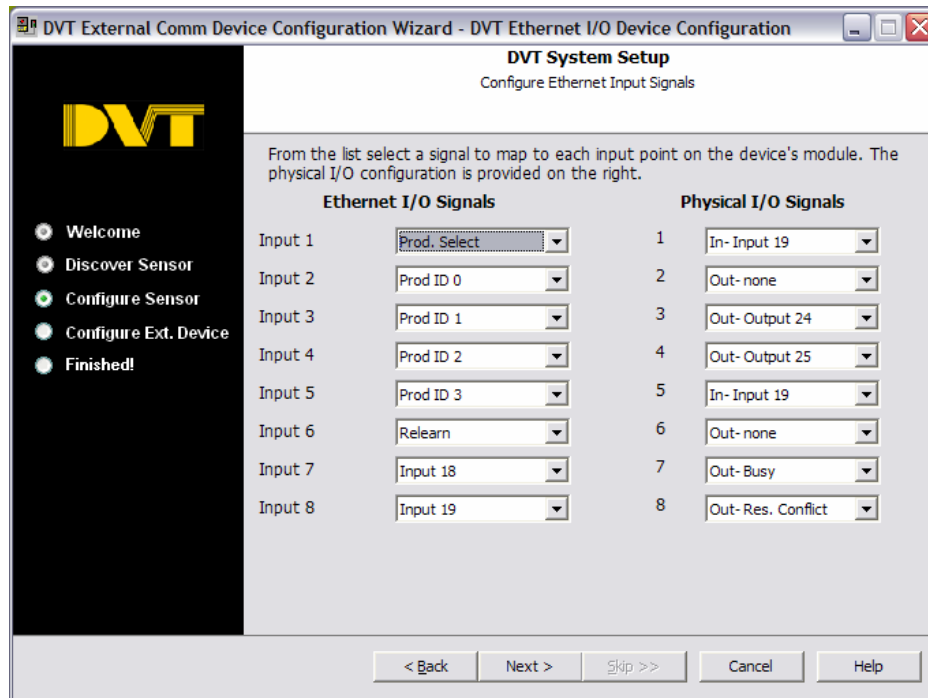


Fig. 6

- There are two columns of information. The right column displays the configuration of the Breakout board portion of the camera I/O. The left column displays the Input assignments for the Ethernet I/O Module.
- Set the inputs the way you desire. ****NOTE** It is recommended that the Trigger not be used on the Ethernet Input device. There could be lag on the network that may cause delays in the inspection.**
- Note: It is not possible to have the same assignment on each device. If there is a conflict you will receive a message. See Fig. 6a



Fig. 6a

- Click "Next"

- The next screen is similar to the previous one but it is the Outputs assignment screen. See Fig.7
- Again, there are two columns one contains the Breakout board settings and the other is the Output assignments for the Ethernet I/O Module.
- Set the outputs the way you desire. ****NOTE** It is recommended that the Strobe not be used on the Ethernet Output device. There could be lag on the network that may cause adverse results in the inspection.**
- Note: It is not possible to have the same assignment on each device. If there is a conflict you will receive a message. See Fig. 6a
- Located at the bottom of the window is information regarding the background script that the ECD Wizard is going to create. The default settings are recommended. If the name or registers are being used by another script you can change them here.
- Click "Next"

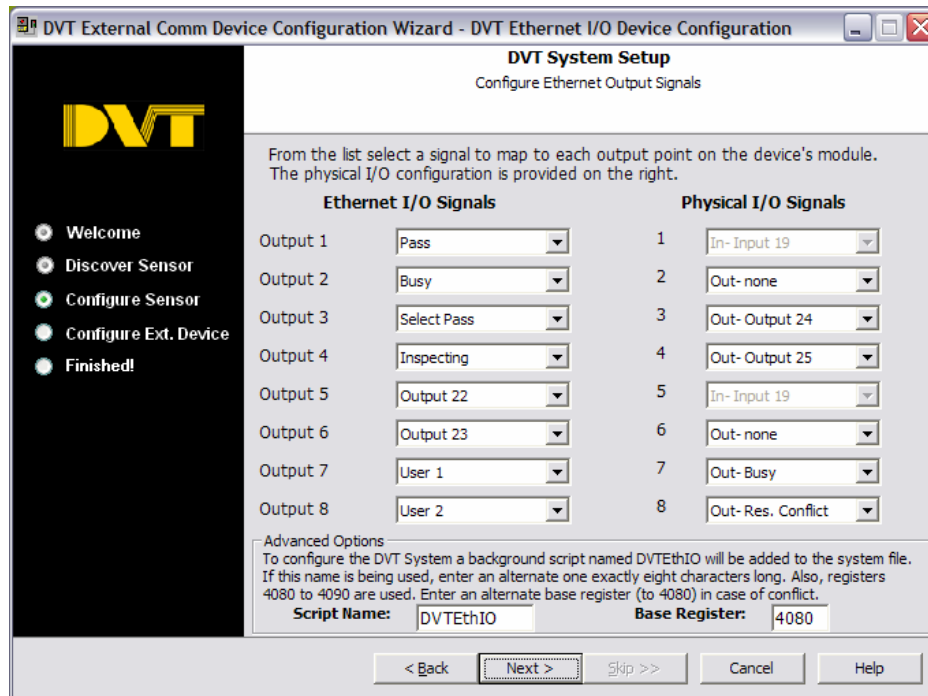


Fig. 7

- The next screen is the External Device Configuration screen. See Fig. 8. This screen is where the Ethernet I/O Module is assigned the IP address.

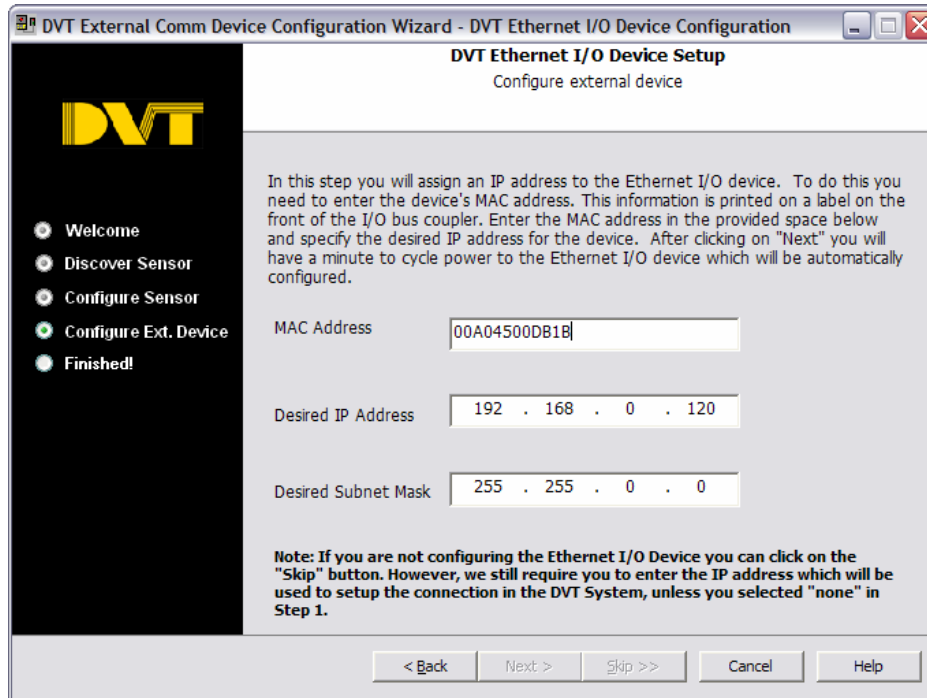


Fig. 8

- Enter the MAC address in the field provided. The MAC address is located on a label placed on the front of the Ethernet I/O Module. The MAC address is made up of alphanumeric characters separated by periods. Do not include the periods when entering this number.
- Enter the IP address you want the Ethernet I/O Module to use, along with the Subnet Mask.
- Click “Next”

- You will see a progress bar appear on the screen. See Fig. 9 The progress bar informs you of the status of the configuration.
- When the progress bar says “Please Cycle Power to the Ethernet I/O Module Now...” you have 60 seconds to power cycle the device. Cycling the power initializes the device with the settings you defined.

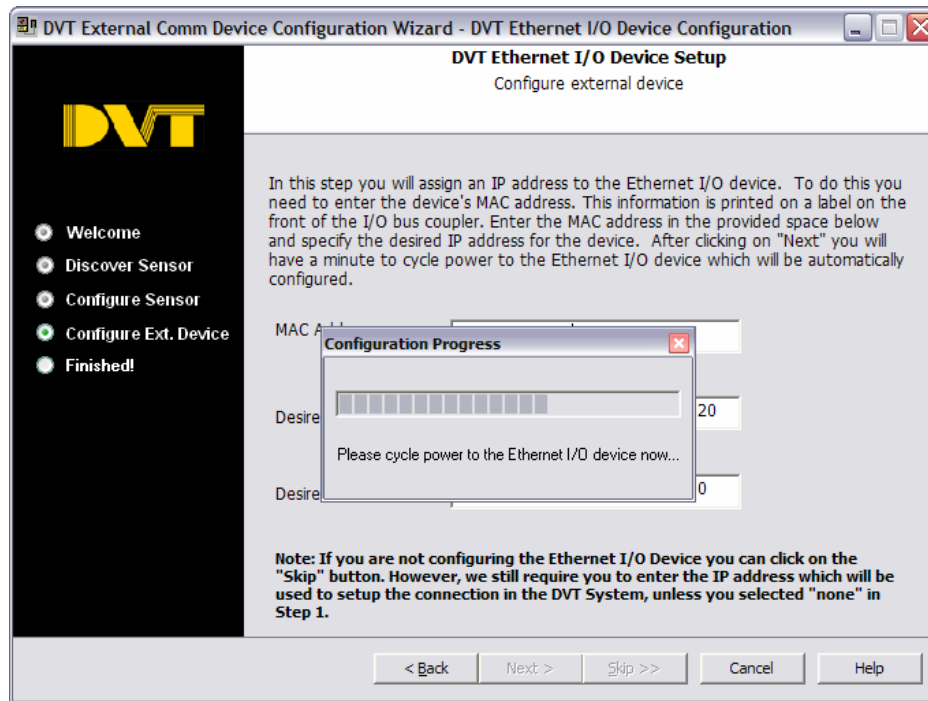


Fig. 9

- If everything worked correctly you are presented with this screen. See Fig. 10

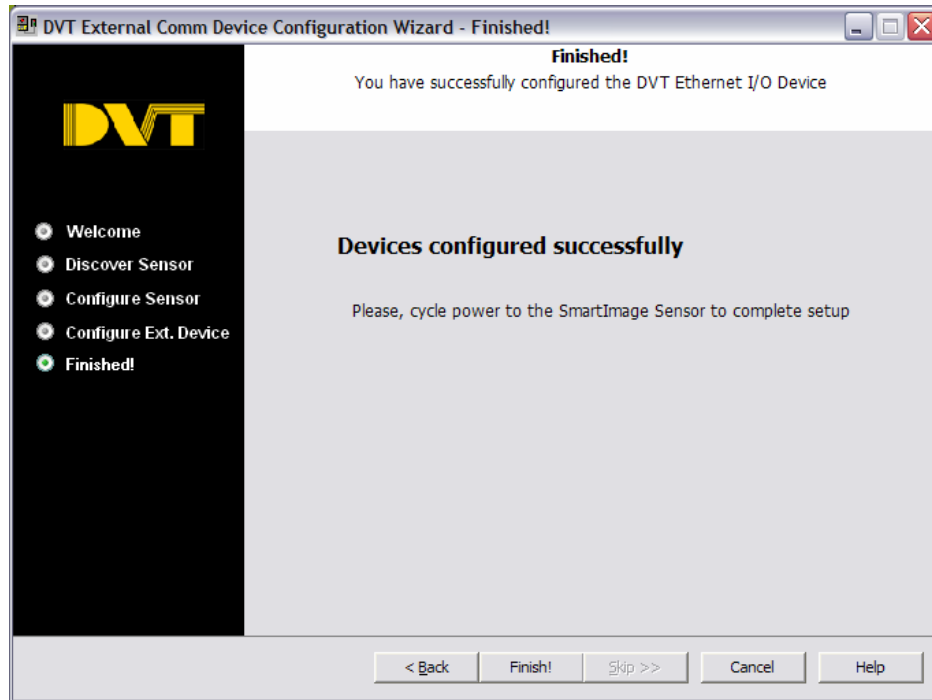
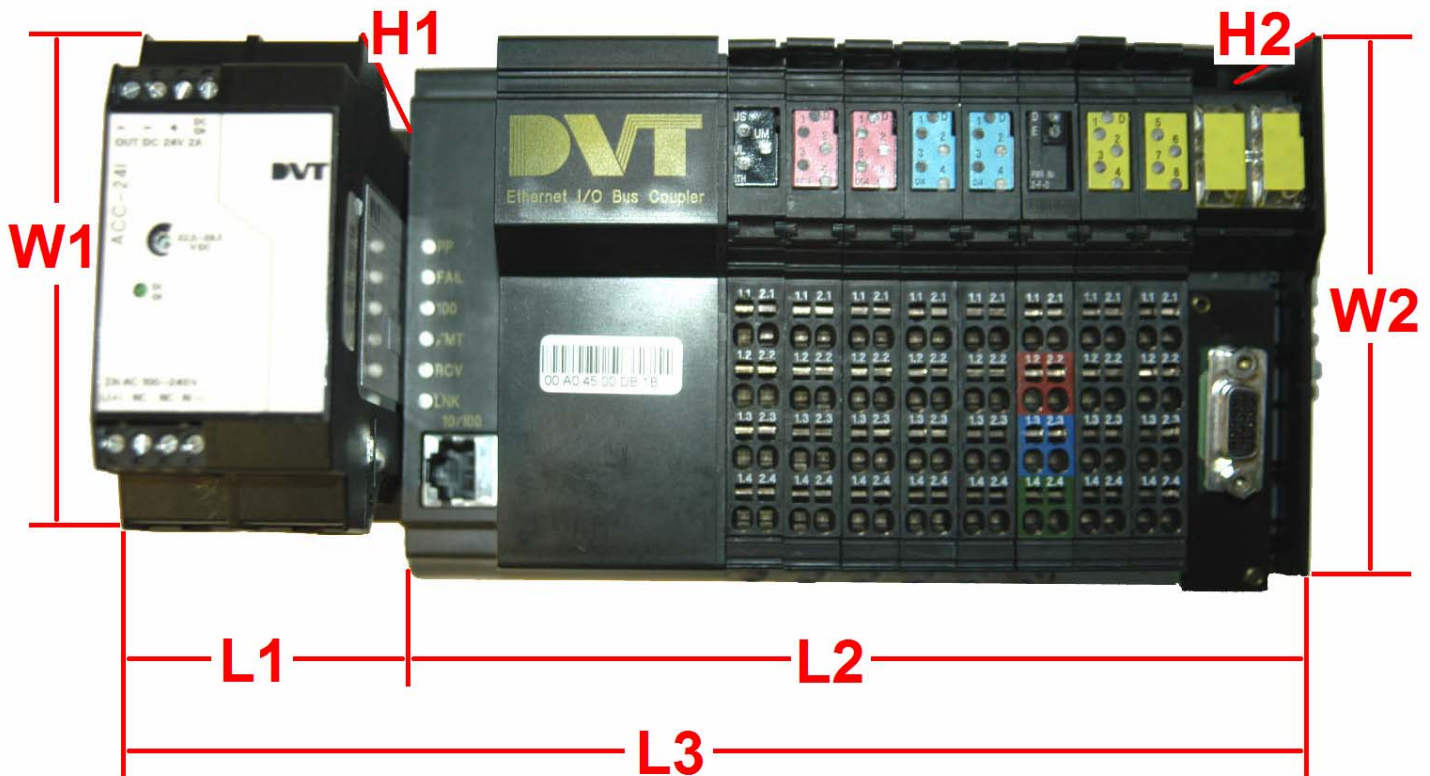


Fig. 10

- Click "Finish!" to exit the wizard.
- Cycle power to the DVT SmartImage Sensor to start communication between the configured devices

Specifications

Dimensions



ACC-24I Dimensions:

L1 1.75"
W1 3.875"
H1 4.375"

CON-IOE Dimensions:

L2 7.8125"
W2 4.875"
H2 2.75"

Overall Length of Power Supply and Ethernet IO Module:

L3 9.5625"

Voltage Descriptions

Main Circuit UM

Description The main circuit with the main voltage UM starts at the bus coupler or a power terminal and is led through all subsequent modules until it reaches the next power terminal. A new circuit that is electrically isolated from the previous one begins at the next power terminal.

Several power terminals can be used with one station.

Function Several independent segments can be created within the main circuit. The main circuit provides the main voltage for these segments. For example, a separate supply for the cameras can be provided this way.

Voltage The maximum voltage in the circuit is 24VDC.

Current Carrying Capacity The maximum current carrying capacity is 8 A (total current with the segment circuit). If the value of the common GND potential jumper for UM and US is reached (total current of US and UM), a new power terminal must be used.

Segment Circuit US

Description The segment circuit with segment voltage US starts at the Ethernet bus coupler or a supply terminal (power terminal or segment terminal) and is led through all subsequent modules until it reaches the next supply terminal.

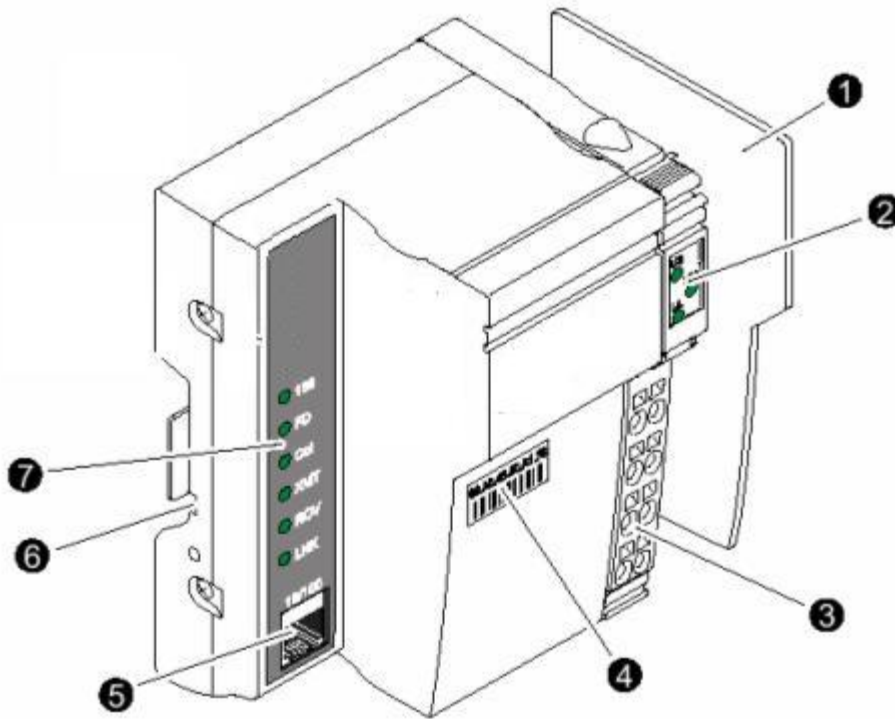
Function You can use several segment terminals within a main circuit, and therefore segment the main circuit. It has the same reference ground as the main circuit. This means the circuits with different fuses can be created within the station without cross wiring.

Voltage The maximum voltage in the circuit is 24VDC.

Current Carrying Capacity The maximum current carrying capacity is 8 A (total current with the main circuit). If the limit value of the common potential jumper for UM and/or US is reached (total current of US and UM), a new power terminal must be used.

Ethernet Bus Module

Structure of Ethernet Bus Module



The bus terminal has the following components:

- 1 End plate to protect the last Inline module
- 2 Inline diagnostic indicators
- 3 24 V DC supply and functional earth ground connector
(not supplied as standard - order as accessory)
- 4 MAC address in clear text and as a barcode
- 5 Ethernet interface (twisted-pair cables in RJ45 format)
- 6 Two PE contacts for grounding the bus terminal using a DIN rail (on the back of the module)
- 7 Ethernet status and diagnostic indicators

Ethernet Bus Module

Status of Indicator Lights on Ethernet Bus Module

Des.	Color	Status	Meaning
Electronics Module			
UL	Green	ON	24 V supply, 7 V communications power/interface supply OK
		OFF	24 V supply, 7 V communications power/interface supply not OK
UM	Green	ON	Voltage is present in the main circuit (+24 V DC)
		OFF	Voltage is not present in the main circuit
US	Green	ON	24 V segment supply is present
		OFF	24 V segment supply is not present
Ethernet Port			
100	Green	ON	Operation at 100 Mbps
		OFF	Operation at 10 Mbps
FD	Green	ON	Data transmission in full duplex mode
		OFF	Data transmission in half duplex mode
COL	Red	ON	Collision of data telegrams
		OFF	Transmission of telegrams without a collision
XMT	Green	ON	Data telegrams are being sent
		OFF	Data telegrams are not being sent
RCV	Yellow	ON	Data telegrams are being received
		OFF	Data telegrams are not being received
LNK	Green	ON	Physical network connection ready-to-operate
		OFF	Physical network connection interrupted or not present

Ethernet Bus Module

Connector Assignment for the Ethernet Bus Module

Terminal Point	Assignment		Wire Color/Remark
Connector	Power Connector		
1.1	24 V DC (U_S)	24 V segment supply	The supplied voltage is directly led to the voltage jumper.
1.2	24 V DC (U_L)	24 V supply	The communications power for the bus terminal and the connected local bus devices is generated from this power. The 24 V analog power (U_{ANA}) for the local bus devices is also generated.
2.1, 2.2	24 V DC (U_M)	Main power	The main power is diverted to the local bus devices via the voltage jumpers.
1.3	LGND	Reference potential logic ground	The potential is the reference ground for the communications power.
2.3	SGND	Reference potential segment ground	The reference potential is directly routed to the potential jumper and is, at the same time, ground reference for the main and segment supply.
1.4, 2.4	FE	Functional earth ground (FE)	The functional earth ground must be connected to the 24 V DC supply/functional earth ground connection. The contacts are directly connected with the voltage jumper and FE springs on the bottom of the housing. The terminal is grounded when it is snapped onto a grounded DIN rail. Functional earth ground is only used to discharge interference.

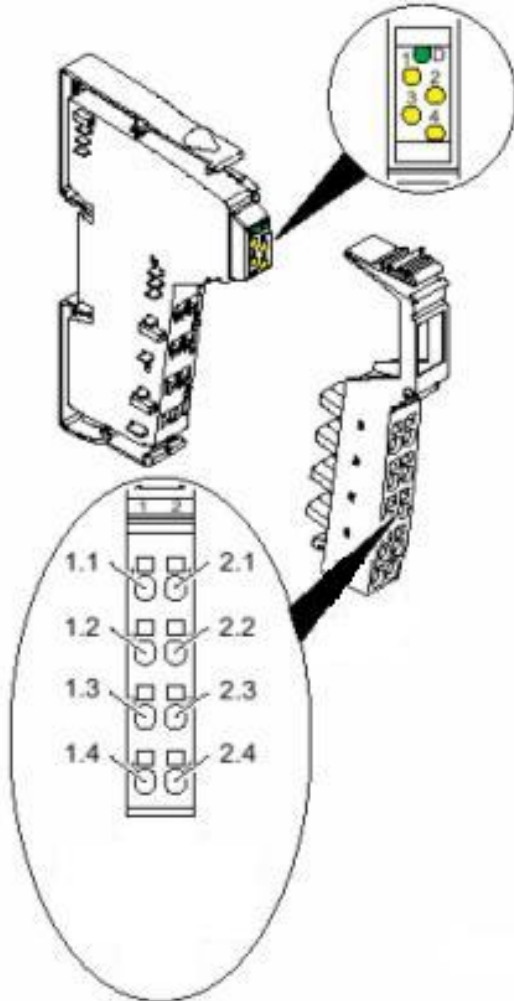


The maximum total current through the voltage jumpers is 8 A.



The functional earth ground must be connected to the 24 V DC supply/functional earth ground connection.

Digital Output Module



Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2, 3, 4	Yellow	Status indicators of the outputs

Terminal Assignment

Terminal Point	Assignment
1.1	Signal output (OUT 1)
2.1	Signal output (OUT 2)
1.2, 2.2	Ground contact (GND) for 2- and 3-wire termination
1.3, 2.3	FE connection for 3-wire termination
1.4	Signal output (OUT 3)
2.4	Signal output (OUT 4)

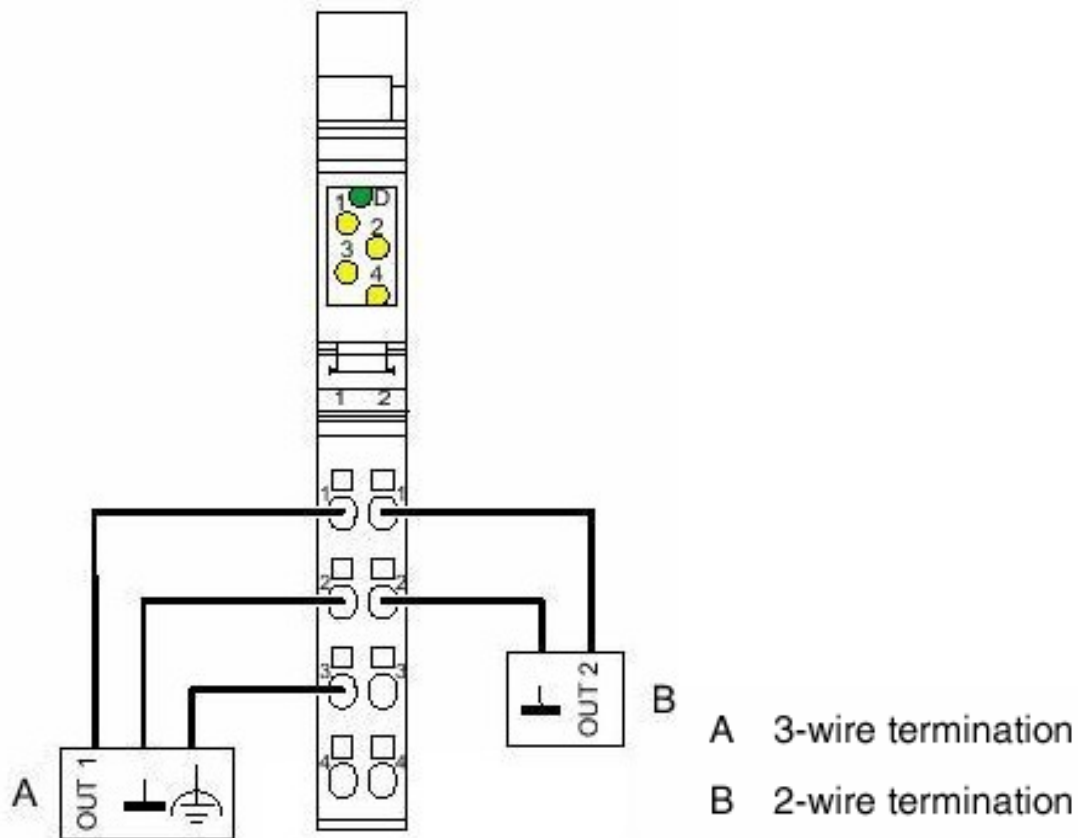
Features

- Connections for four digital actuators
- Connection of actuators in 2- and 3-wire technology
- Nominal current per output: 0.5 A.
- Total current of the terminal: 2 A.
- Short-circuit and overload protected outputs
- Diagnostic and status indicators

Internal Circuit Diagram

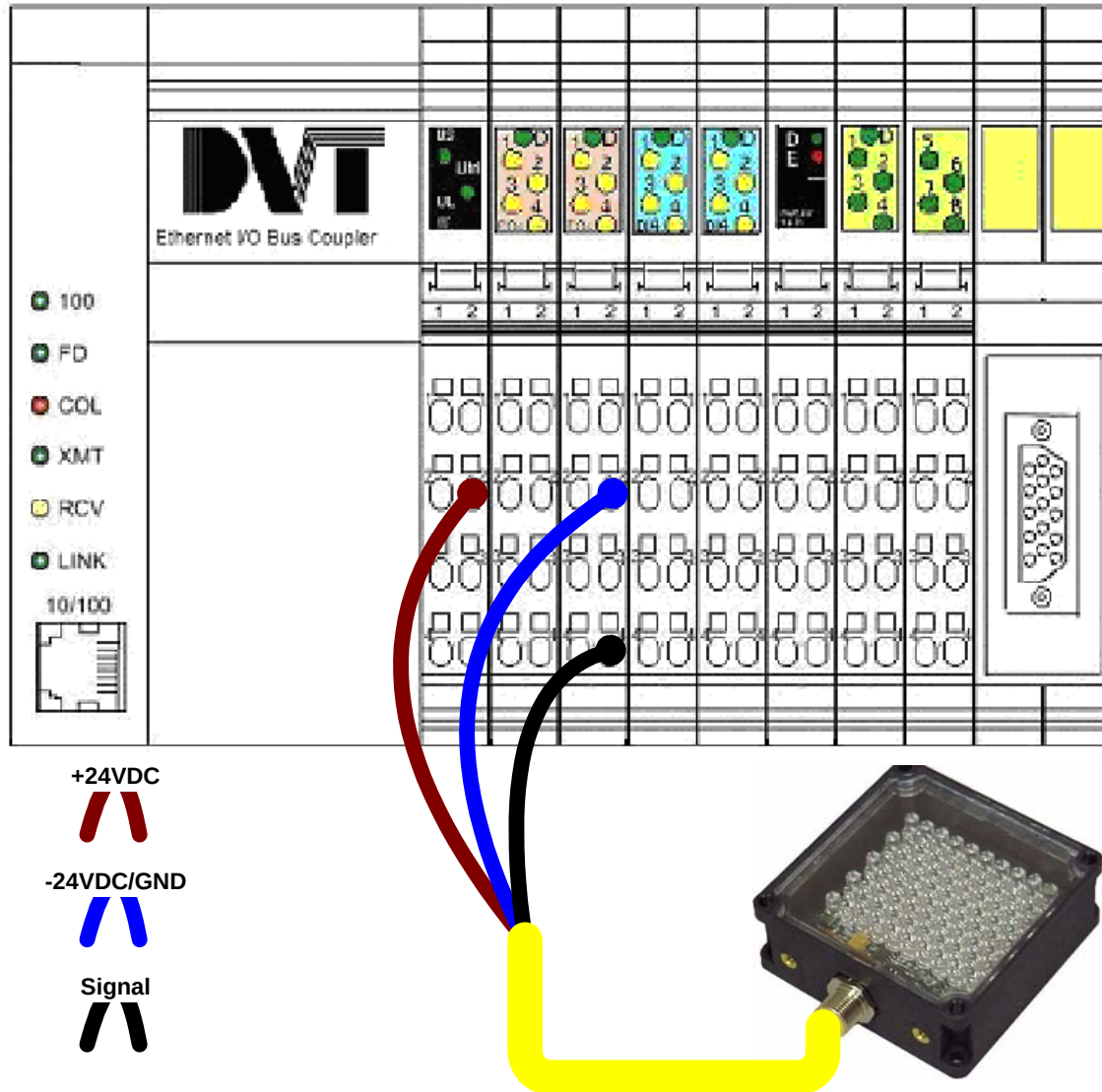


Digital Output Module



Digital Output Module Connection Example

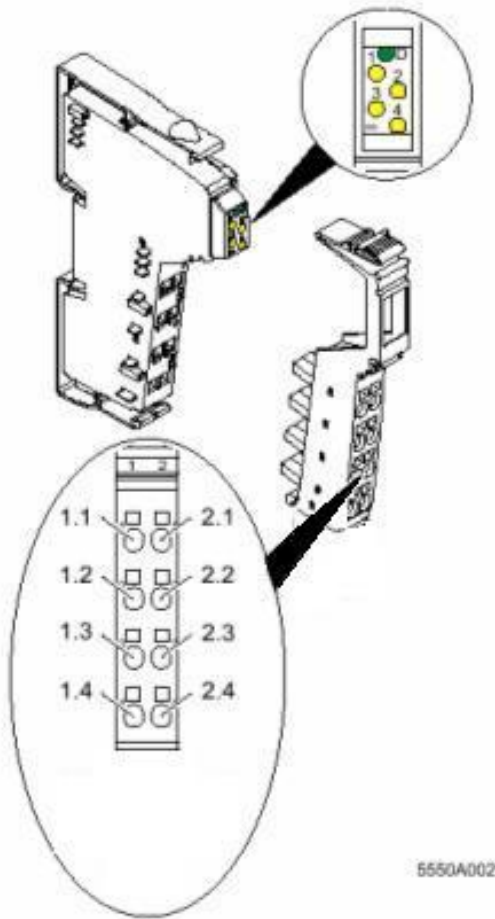
DVT LED Brick light to Output 8



Brown Wire to +24 VDC -- Terminal 1.2 or 2.2 on Power In module
 Blue Wire to -24 VDC/GND -- Terminal 1.2 or 2.2 on Digital Output Module
 Black Wire to Signal 8 -- Terminal 2.4 on Digital Output Module

****NOTE**** It is recommended that the Strobe not be used on the Ethernet Output device. There could be lag on the network that may cause adverse results in the inspection.

Digital Input Module



Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2, 3, 4	Yellow	Status indicators of the inputs

Terminal Assignment

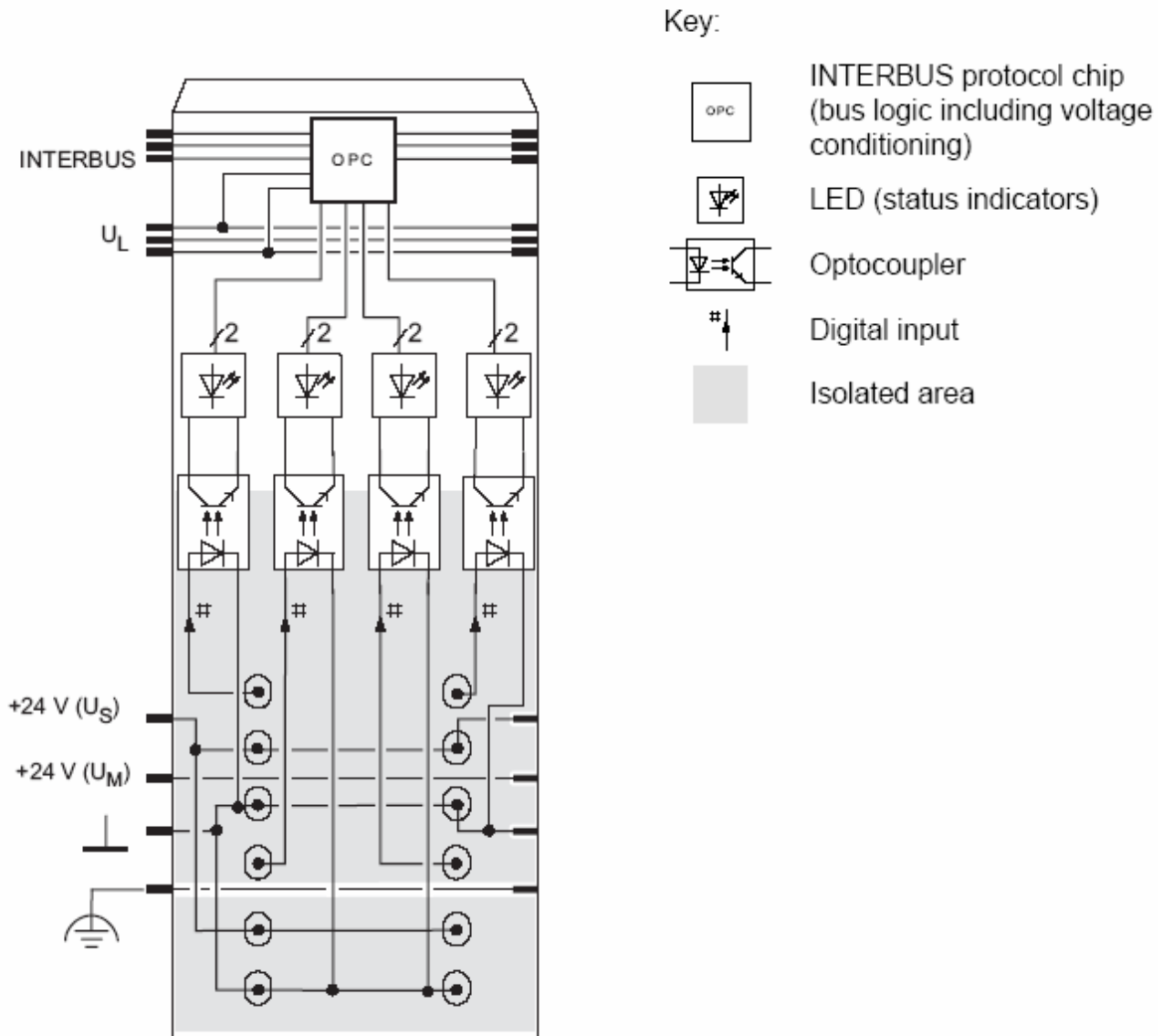
Terminal Point	Assignment
1.1	Signal input 1 (IN 1)
2.1	Signal input 2 (IN 2)
1.2, 2.2	Segment voltage U_S for 2- and 3-wire termination
1.3, 2.3	Ground contact (GND) for 3-wire termination
1.4	Signal input 3 (IN 3)
2.4	Signal input 4 (IN 4)

Features

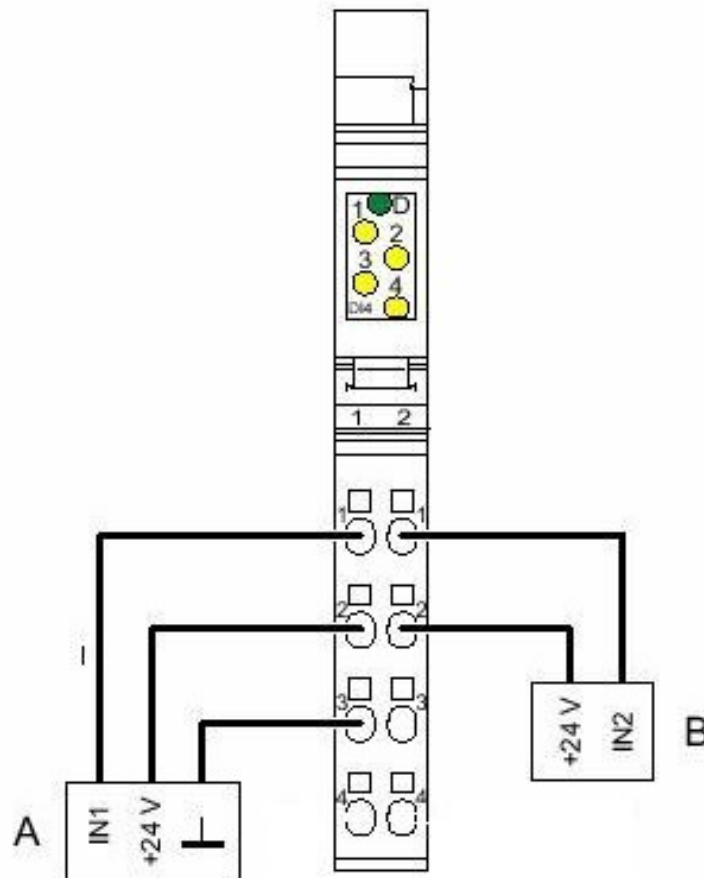
- Four digital sensors can be connected
- Connection of 2- and 3-wire sensors
- Maximum permissible load current per sensor: 250 mA.
- Maximum permissible load current from the terminal: 1.0 A.
- Diagnostic and status indicators

Digital Input Module

Internal Circuit Diagram



Digital Input Module



Typical sensor connections

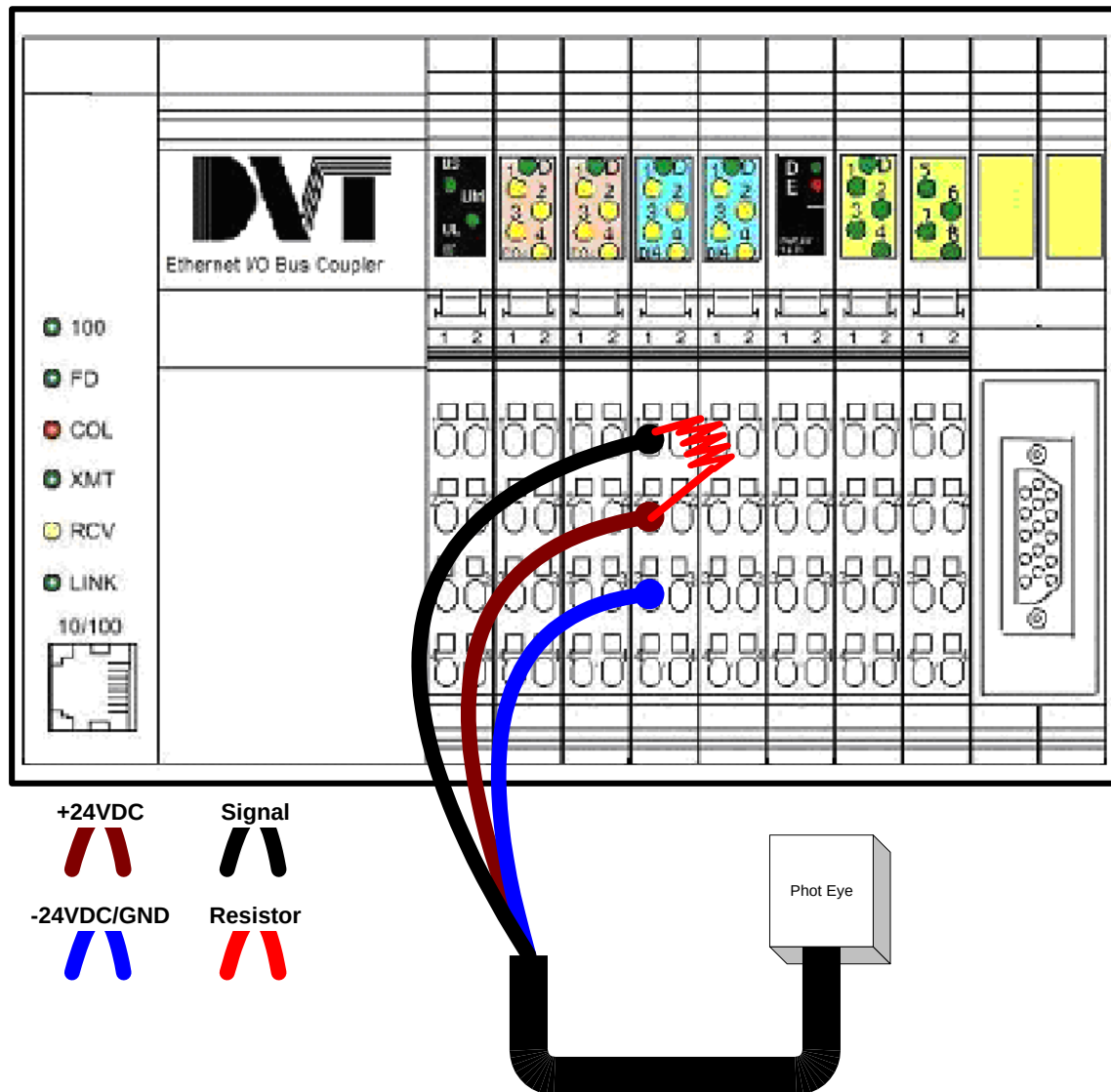
A 3-wire termination

B 2-wire termination

Digital input Module

Connection Example

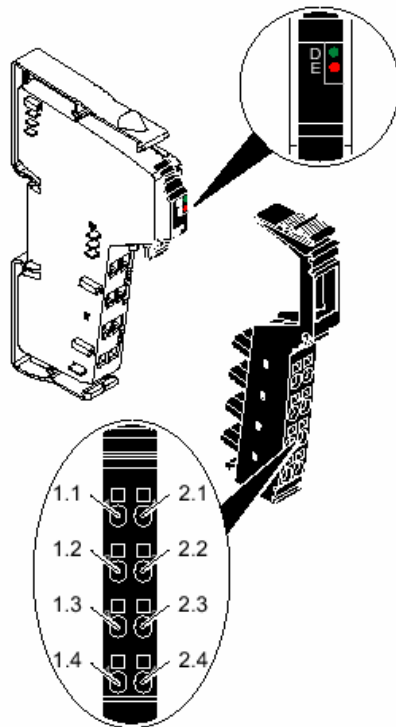
Photo eye to Input 1



Brown Wire to +24 VDC -- Terminal 1.2 or 2.2 on Power In module
 Blue Wire to -24 VDC/GND -- Terminal 1.3 or 2.3 on Digital Input Module
 Black Wire to Signal 1 -- Terminal 1.1 on Digital Input Module
 Pull Down Resistor between Black and Brown – Approximately 1K ohm

****NOTE**** It is recommended that the Trigger not be used on the Ethernet Input device. There could be lag on the network that may cause delays in the inspection.

Power In Module for Breakout Module



6394A003

Figure 1 IB IL 24 PWR IN/2-F-D
with appropriate connector

Function Identification

Black

Local LED Diagnostic Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
		ON: INTERBUS is active
		Flashing:
		0.5 Hz: Communications power is present, INTERBUS is not active
		2 Hz: Communications power is present, supply voltage U_M is not present
		4 Hz: Communications power is present, local bus error
E	Red	Fuse
		OFF: Fuse is OK
		ON: Fuse has blown



If the supply voltage U_M is not present and the fuse is missing or has blown, an I/O error message is sent to the higher-level control or computer system.



A blown or missing fuse is indicated by both LED diagnostic indicators. The red LED E lights up and the green LED D flashes at 2 Hz.

Power In Module for Breakout Module

Terminal Assignment

Terminal Point	Assignment
1.1, 2.1	Measuring points for the segment circuit U_S
1.2, 2.2	Supply points for the main circuit U_M (+24 V) These terminal points are connected with each other and with the potential jumper of the main supply U_M via the fuse. The potential jumpers of the main circuit U_M and the segment circuit U_S (both protected) have a combined current carrying capacity of 6.3 A.
1.3, 2.3	Ground contact (GND) for main and segment circuit The reference potential is directly routed to the potential jumper and is, at the same time, ground reference for the main and segment voltage.
1.4, 2.4	FE connection The contacts are directly connected with the potential jumper and the FE spring on the bottom of the housing. The terminal is grounded when it is snapped onto a grounded DIN rail.
	Terminal points 1.2 and 1.3 are connected with a capacitor to FE.

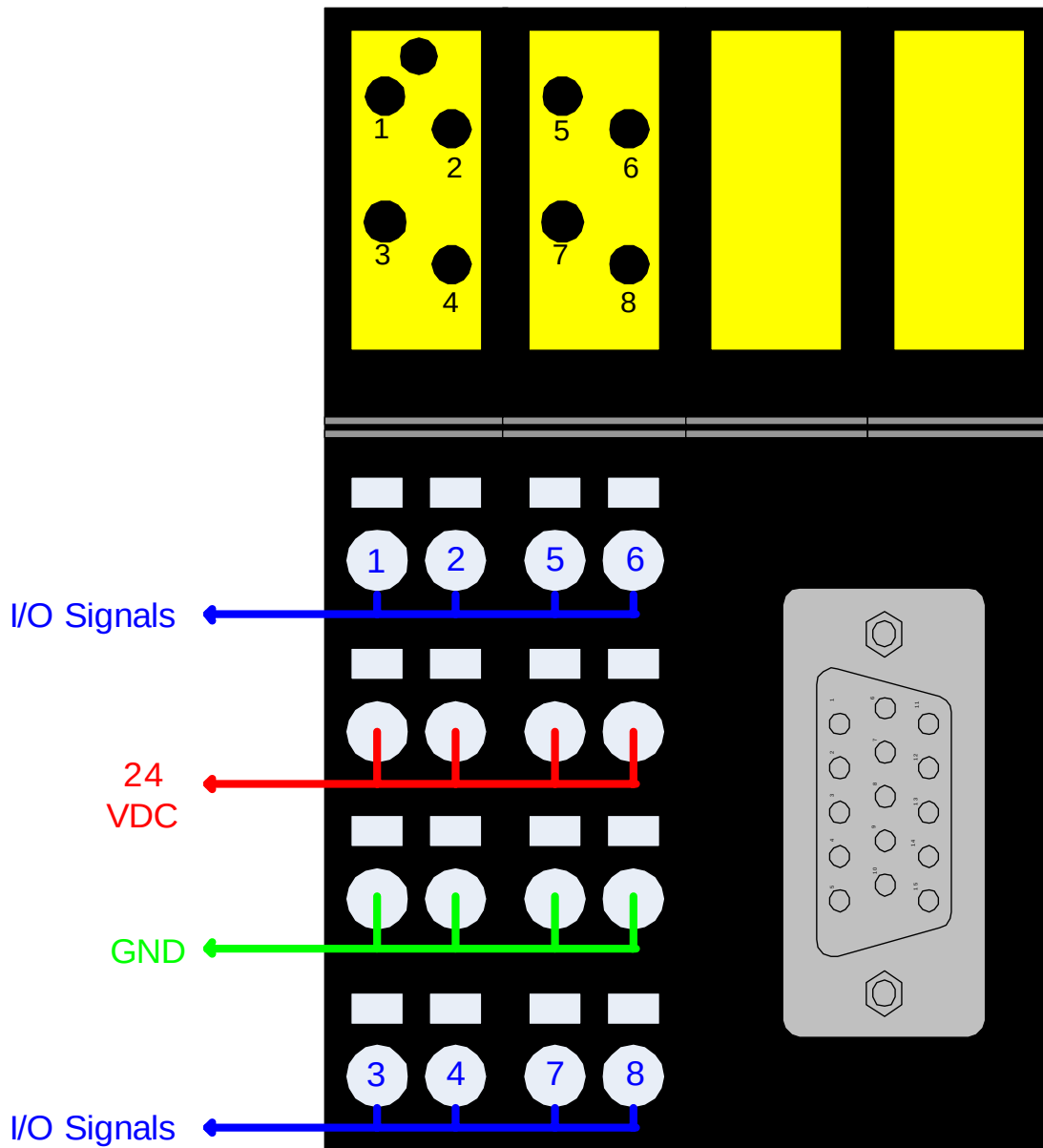


Observe the current carrying capacity

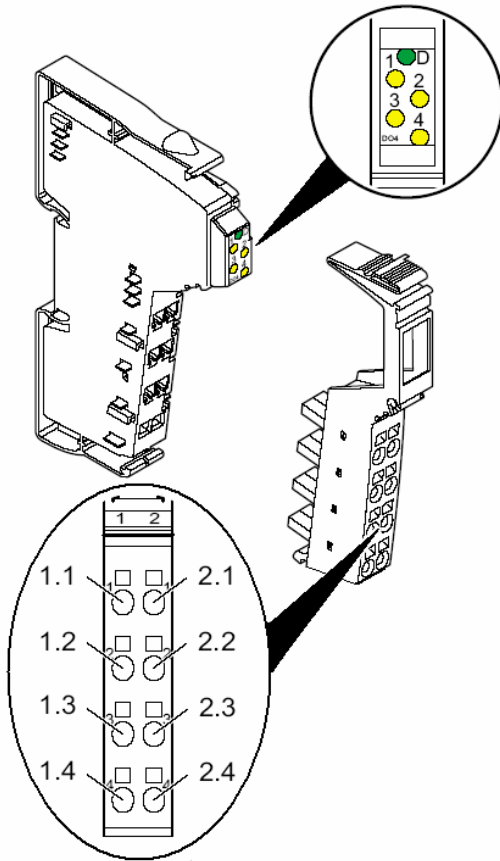
The maximum total current flowing through the potential jumpers must not exceed 6.3 A.

DVT Breakout Module

I/O Pin-out



DVT Digital Input/Output Module



Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2, 3, 4	Yellow	Status indicators of the outputs

Terminal Assignment

Terminal Point	Assignment
1.1	Signal 1
2.1	Signal 2
1.2	24VDC
2.2	24VDC
1.3	GND
2.3	GND
1.4	Signal 3
2.4	Signal 4

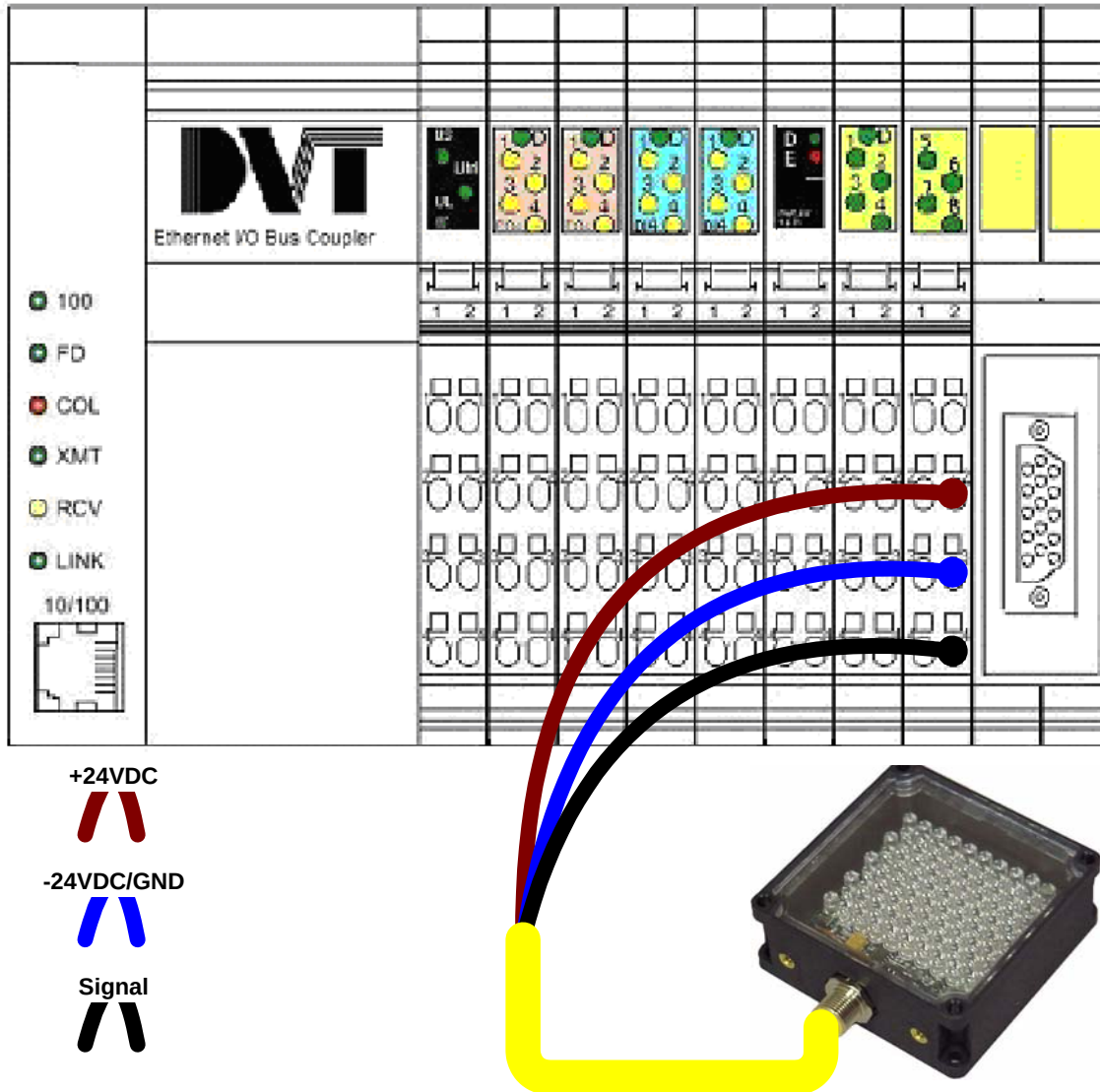
Features

- Connections for four digital signals
- Connection of actuators in 2- and 3-wire technology
- Nominal current per output: 0.5 A.
- Total current of the terminal: 2 A.
- Short-circuit and overload protected outputs
- Diagnostic and status indicators

DVT Digital Input/Output Module

Connection Example

DVT LED Brick light to Output 8

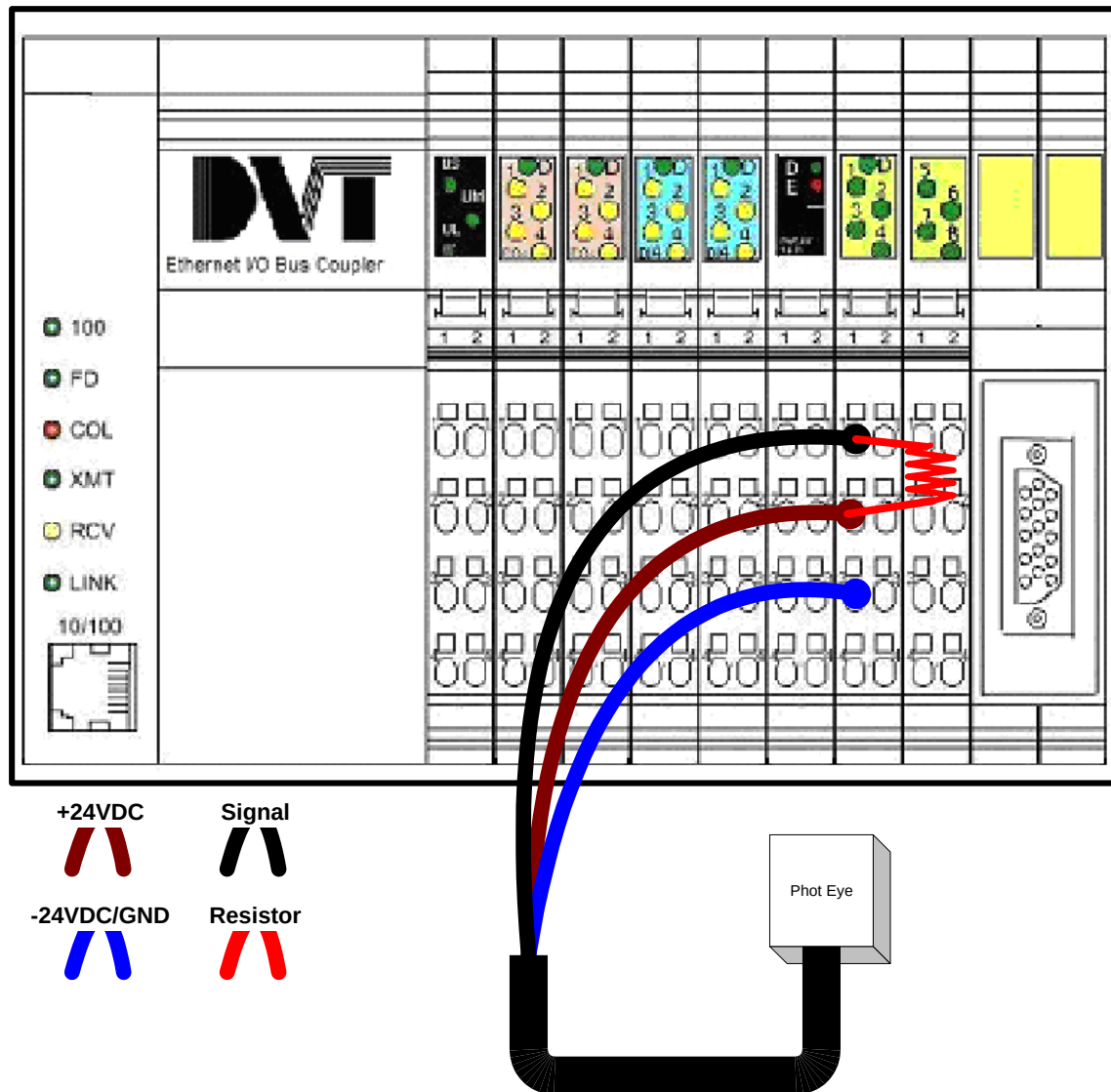


Brown Wire to +24 VDC -- Terminal 1.2 or 2.2 on Power In module
Blue Wire to -24 VCD -- Terminal 1.3 or 2.3 on Power In Module
Black Wire to Signal 8 -- Terminal 2.4 on right most DVT I/O Module

DVT Digital Input/Output Module

Connection Example

Photo eye to Input 1

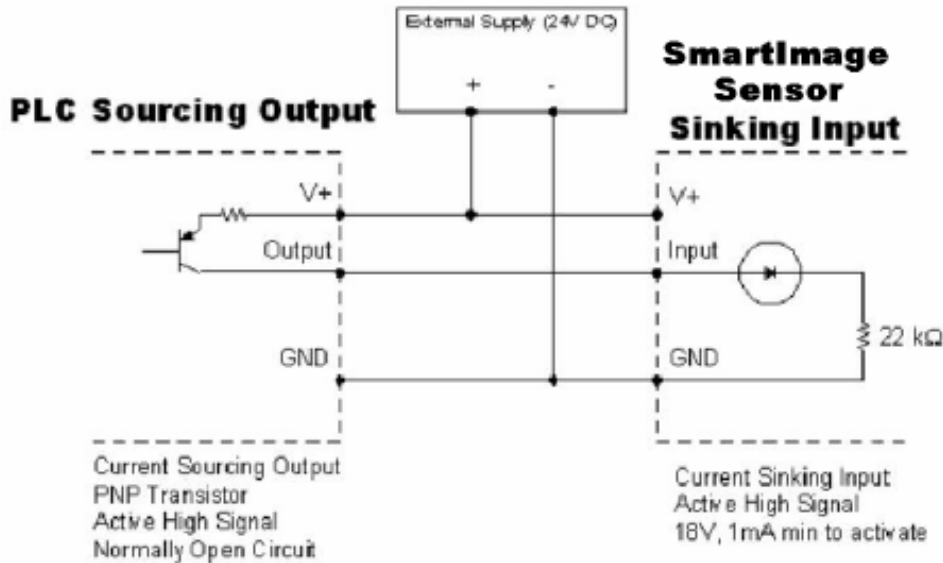


Brown Wire to +24 VDC -- Terminal 1.2 or 2.2 on Power In module
Blue Wire to -24 VDC -- Terminal 1.3 or 2.3 on Power In Module
Black Wire to Signal 1 -- Terminal 1.1 on left most DVT I/O Module
Optional Resistor between Brown and Black
On this example a pull up resistor of approximately 1K ohm was used to trigger the input.

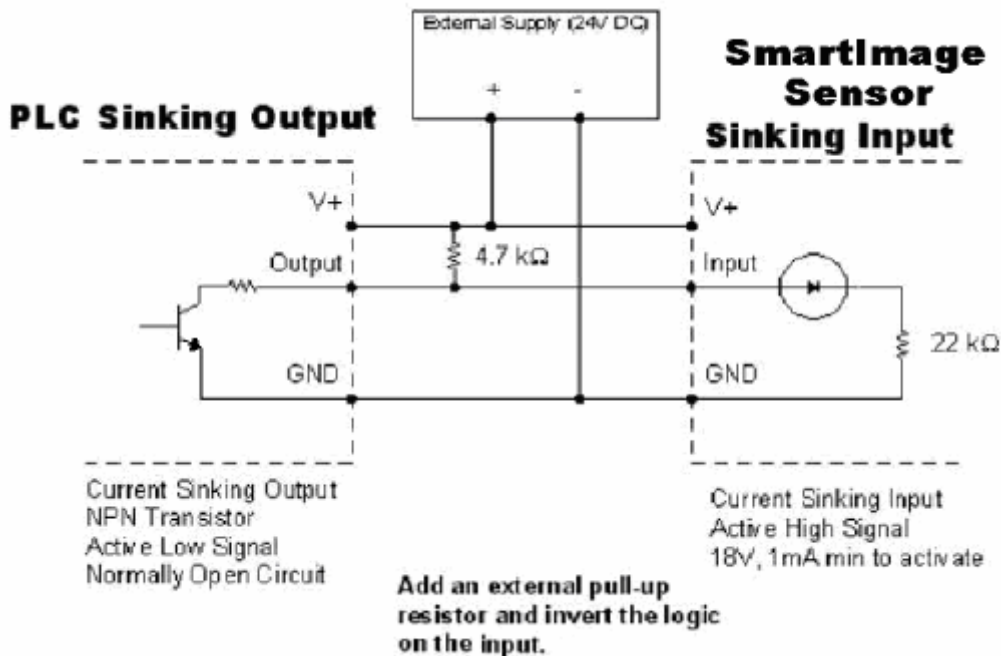
Connection Diagrams for the non isolation terminals

The following diagrams illustrate different methods to connect the SmartImage Sensor to external devices using the set of terminals without isolation.

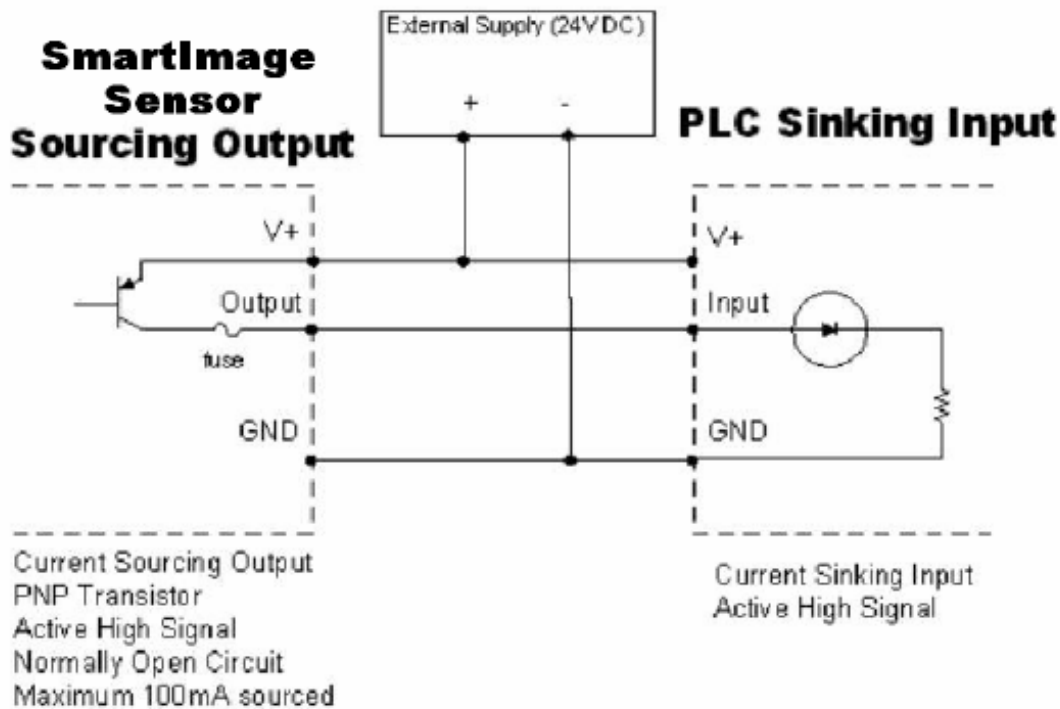
PLC Sourcing Output – SmartImage Sensor Sinking Input



PLC Sinking Output – SmartImage Sensor Sinking Input



SmartImage Sensor Sourcing Output – PLC Sinking Input



SmartImage Sensor Sourcing Output – PLC Sourcing Input

