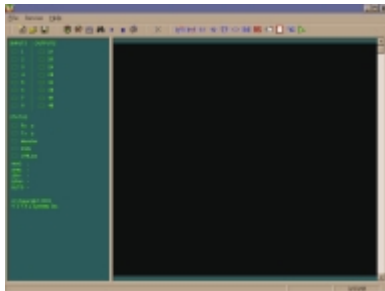


OMNICON-DNET88

INSTALLATION AND TECHNICAL MANUAL



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1.0 Product Overview

The OmniCon-DNET88 provides a low voltage programmable I/O device for DeviceNet network applications. The OmniCon-DNET88 is an enclosed module with 8 digital inputs and 8 digital outputs. The OmniCon-DNET88 is ideal for applications which need highly distributed I/O with the ability to manage information locally but also interact and trade information with a DeviceNet master control computer.

The OmniCon-DNET88 is compatible with all DeviceNet devices and networks. It is a slave device on the network, but has the capabilities of peer-to-peer messaging. This characteristic enables it to be standalone on the network. The OmniCon-DNET88 is programmed using the SuperLogic ladder software provided by Omni Automation, Inc. This versatile software greatly increases the functionality of the OmniCon-DNET88 and allows the end-user to create application specific control solutions.

The MacID addresses and configuration parameters are set locally or globally with the SuperLogic software and a direct serial connection to a device. They can also be set via the network, with SuperLogic Software and a computer containing an Omni Automation PCI network card. Ladder programs can also be downloaded with the above connections and the SuperLogic software.

2.0 Package Contents and Options

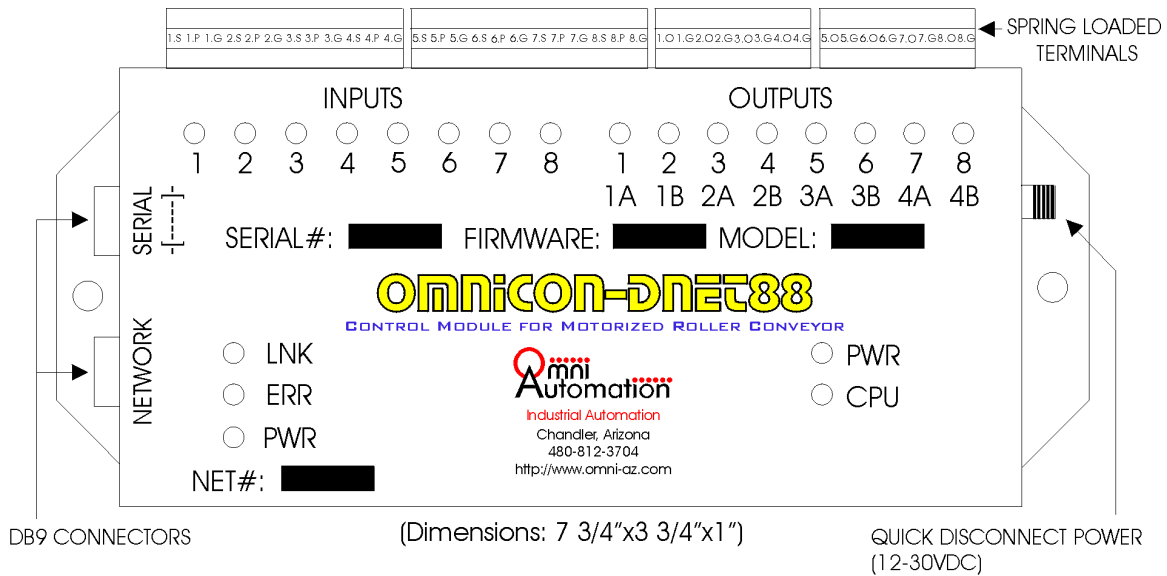
The following should be enclosed in your box:

1. One OmniCon-DNET88 device.
2. Instructions for the installation of the OmniCon-DNET88 device.

Optional components:

Part Number	Description
OA-8PPC	8 pole, gold plated output plug connector.
OA-12PPC	12 pole, gold plated input plug connector.
OA-CNDC	Drop cable with female DB9 plug for DeviceNet network.
OA-PCA	2 pole, plug and cable for device power.

3.0 OmniCon-DNET88 Hardware Layout and Properties



Outputs

1. 8 independent control outputs (common ground).
2. NPN open-collector type.
3. Maximum switching current of 0.5A at 24VDC.
4. Voltage drop; 0.06VDC @ 100mA, 0.35VDC @ 500mA

Inputs

1. 8 normally open type.
2. Sourcing signal required from sensor, 12 – 24VDC.
3. Signal current is 0.1mA nominal.
4. Sensor current from module limited to 1.25A.

Network

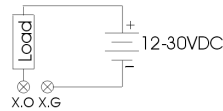
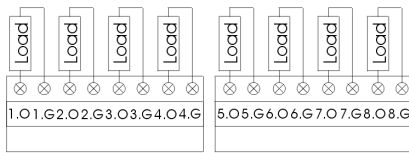
1. 18 – 24VDC network bus power.
2. CAN Controller – Philips SJA1000.
3. Optically isolated driver circuits with fast opto-couplers.

4.0 Mounting of OmniCon-DNET88

The device is self enclosed and can be mounted in field applications. The mounting holes can accommodate #10-32 screws.

5.0 Wiring Connections

Outputs Wiring Diagram



Alternate output connection using external power supply.

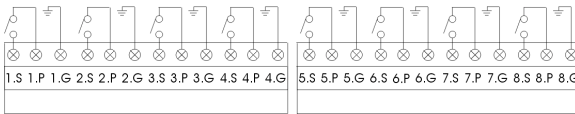
Terminal Labeling

X.O=Output to Device
X.G=GND

*Where "X" is the corresponding to output or zone number.

18 to 24 AWG Recommended for Spring Loaded Input/Output Terminals.
Terminal Labels can be changed to reflect user's application.

Input Wiring Diagram



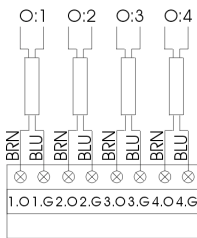
Terminal Labeling

X.S=Sourcing Signal
X.P= +24VDC
X.G=GND

*Where "X" is the corresponding to input or zone number.

18 to 24 AWG Recommended for Spring Loaded Input/Output Terminals.
Terminal Labels can be changed to reflect user's application.

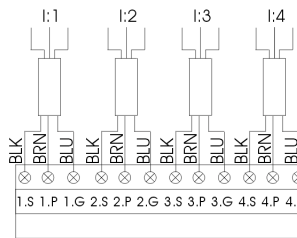
Standard Omni Automation Cable Connections



Outputs

Terminals

X.O = BRN = Output X.O
X.G = BLU = GND

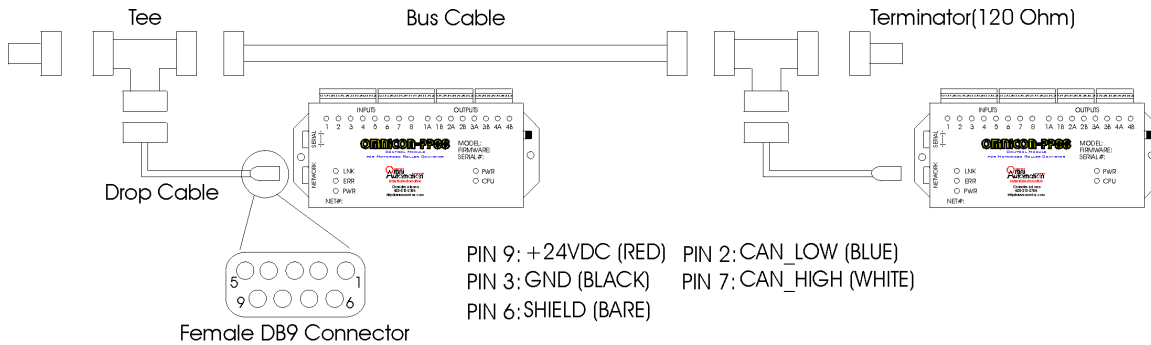


Inputs

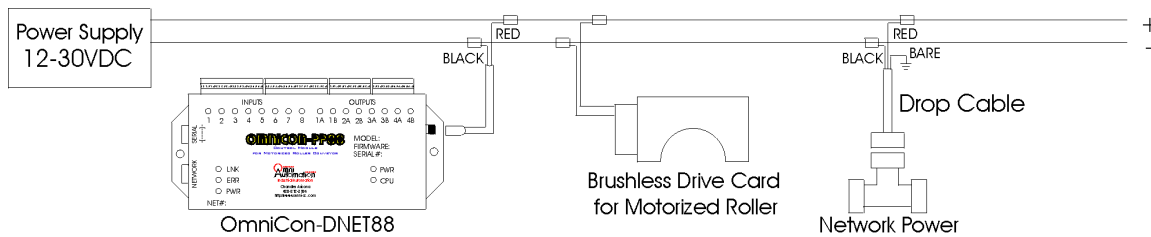
Terminals

X.S = BLK = SIGNAL
X.P = BRN = +24VDC
X.G = BLU = GND

Network Wiring Connections



Power Wiring Connections



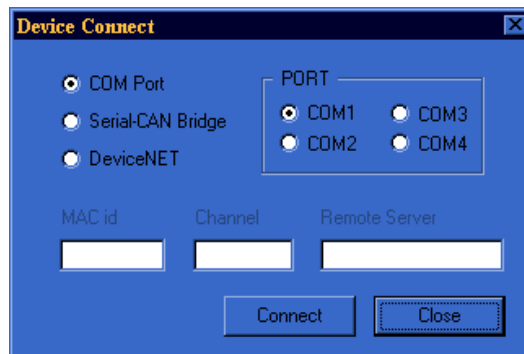
6.0 SuperLogic

The SuperLogic software is used to create and download ladder programs for the OmniCon-DNET88. It is also the interface used to connect to and configure the device parameters such as node address or zone count. The programming is a ladder logic based syntax with drag and drop functionality for increased user friendliness. SuperLogic's real-time program monitoring allows efficient debugging of programs and applications. SuperLogic expands the versatility of the OmniCon-DNET88 device by allowing specialized ladder programs to be created for many different applications. More extensive information on SuperLogic can be obtained through its manual and documentation.

7.0 Connecting to OmniCon-DNET88

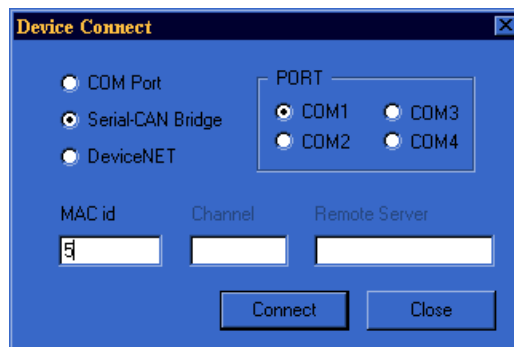
7.1 Direct Local Connection Through Serial Port

Physically connect a standard modem or serial cable between the serial port of the OmniCon-DNET88 device and COM port of the computer running SuperLogic software. From the SuperLogic Main menu, select the **Connect** option from the **Device** sub-menu. From the Device Connect pop-up window, select the **COM Port** radio button and the corresponding radio button of the **PORT** number. After selecting connect button from the pop-up window the OmniCon device will be “Online.” The Offline Status Indicator on left side of the workbench can visually verify this.



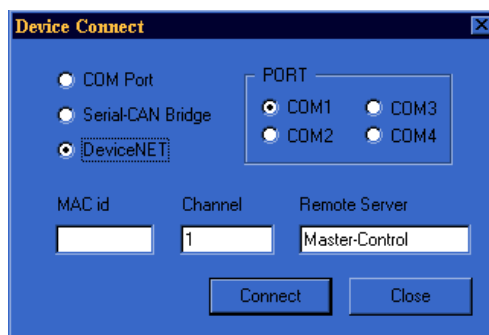
7.2 Global Connection Through Serial Port

Physically connect a standard modem or serial cable between the serial port of an OmniCon-DNET88 device and COM port of the computer running SuperLogic software. From the SuperLogic Main menu, select the **Connect** option from the **Device** sub-menu. From the Device Connect pop-up window, select the Serial-CAN Bridge radio button and enter the MAC id of the desired OmniCon device on the network. After selecting connect button from the pop-up window the OmniCon device will be “Online.” The Offline Status Indicator on left side of the workbench can visually verify this.



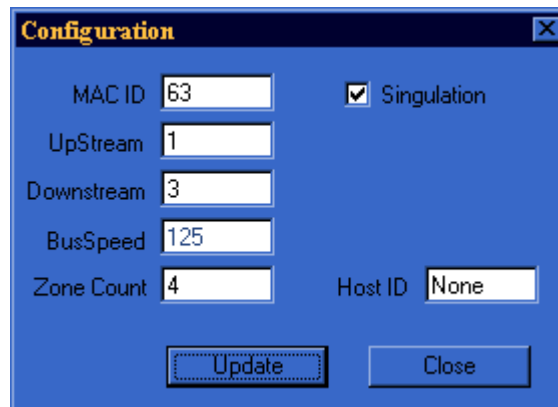
7.3 Network Connection Through PCI Network Card

A connection to an OmniCon device can take place via a OmniNet PCI network card over the DeviceNet network. From the SuperLogic Main menu, select the **Connect** option from the **Device** sub-menu. From the Device Connect pop-up window, select DeviceNet radio button and designate the MAC ID and Network Channel of the desired device. If OmniNet PCI Card is installed in a Remote Server computer enter the computer name in the Remote Server field. After selecting connect button from window the OmniCon device will go "Online". Offline Status Indicator on left side of the workbench can visually verify this.



8.0 Configuring an OmniCon-DNET88 Device.

While online with a device, make sure the OmniCon device is in "Program mode." Click the Configure option from the Device menu. The following configuration pop-up window will appear:



MAC ID	63	<input checked="" type="checkbox"/> Singulation
UpStream	1	
Downstream	3	
BusSpeed	125	
Zone Count	4	Host ID None

Update Close

MAC ID: The Node or Device ID of the device currently "Online" with. Range of MAC IDs (0 - 63)

Upstream: The MAC ID of the upstream OmniCon device. This data needs to be designated if the devices are controlling motorized roller conveyor. Otherwise, leave value as "None".

Downstream: The MAC ID of the downstream OmniCon device. This data needs to be designated if the devices are controlling motorized roller conveyor. Otherwise, leave value as "None".

BusSpeed: Network baud rates in KBPS, three possible DeviceNet network speeds (125K, 250K, and 500K).

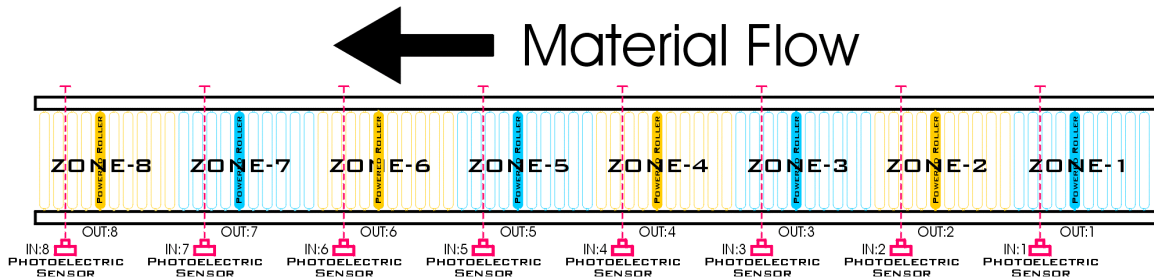
Zone Count: The number of motorized roller zones being controlled by the OmniCon device; the maximum Zone Count number is 8. Leave Value as "0" if not using standard accumulation program.

Singulation: This box is "checked" if the accumulation program is to operate in "singulation" mode. Otherwise, the accumulation program will operate in "slug" mode.

Host ID: MAC ID of PC Host with OmniNet PCI card (If PCI Host is present).

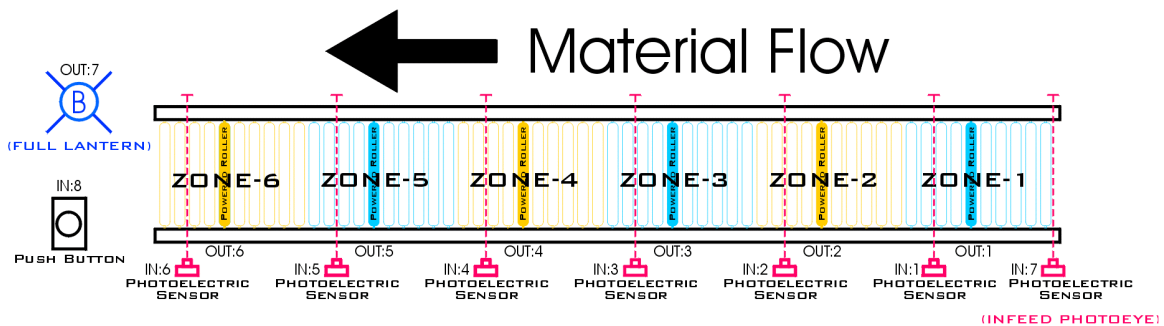
9.0 System Layouts for OmniCon

9.1 System Layout for Standard Accumulation Program



The OmniCon device is initialized with a standard accumulation ladder program. The OmniCon is equipped with 8 inputs/8 outputs and therefore can control up to 8 zones of accumulation conveyor. The standard accumulation program corresponds with the *above I/O diagram* (Input #1 and Output #1 in zone #1). The standard accumulation program allows users to configure the number of zones the OmniCon is controlling with out changing the program. The number of zones the device is controlling is configured through the SuperLogic programming and configuration software.

9.2 System Layout for Altered Accumulation Programs



The OmniCon device is initialized with a standard accumulation ladder program. This standard program can be changed and altered through the SuperLogic Ladder Programming Software. As in the **example** shown in the diagram above, if the OmniCon device is configured to control 6 zones, then the remaining I/O can be used to control other devices. The SuperLogic software allows users to create programs for any operation or application imaginable.

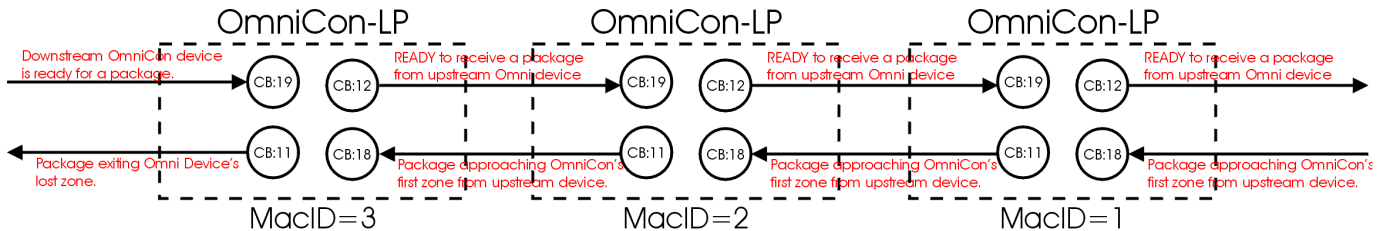
10.0 Control File Specifications

Control Bits and Words are internal data spaces that are predefined for configuration data or open for user definition. These bits and words are managed and manipulated through the SuperLogic software. The table below lists the data stored in the corresponding Control Bit and Control Word address.

Control Bit	Description
CB:1 - CB:10	Open for user definition.
CB:11	Package exiting OmniCon's last zone.
CB:12	OmniCon ready to receive a package from upstream device.
CB:13	OminCon is configured for start/stop system control.
CB:14	OmniCon is configured for singulation operation.
CB:15	Start state for start/stop system control.
CB:16	Stop state for start/stop system control.
CB:17	OmniCon device initialization bit. This bit pulses on device power-up.
CB:18	Package approaching OmniCon's first zone from upstream device.
CB:19	Downstream device is ready to accept a package.
CB:20	Lantern control, lantern output located through serial port.

Control Word	Description
CW:1 - CW:8	Open for user definition.
CW:9	Produce data buffer
CW:10	Consume data buffer
CW:11	MAC ID/Node ID for OmniCon device.
CW:12	MAC ID/Node ID for downstream OmniCon device.
CW:13	MAC ID/Node ID for upstream OmniCon device.
CW:14	MAC ID/Node ID for OmniCon device with start/stop system control.
CW:15	Number of zones OmniCon is controlling.
CW:16	MAC ID/Node ID for a explicit message target.
CW:17 - CW:22	Send explicit message buffer.
CW:25 - CW:30	Receive explicit message buffer.

11.0 OmniCon Network Interlocking



The Network Interlock Control Bits operate according to the diagram above. The network interlocking allows the OmniCon to pass packages from one device to the next, via network communications. The following explanation is with respect to the MacID=2 OmniCon-LP:

1. When the first zone of MacID=2 is ready for a package, then CB:12 is set to "true" in its ladder program. As a result, this will automatically set CB:19 to "true" in the ladder program of MacID=1.
2. When a package is exiting the last zone of MacID=1, then CB:11 is set to "true" in its ladder program. As a result, this will automatically set CB:18 to "true" in the ladder program of MacID=2.
3. When the first zone of MacID=3 is ready for a package, then CB:12 is set to "true" in its ladder program. As a result, this will automatically set CB:19 to "true" in the ladder program of MacID=2.
4. When a package is exiting the last zone of MacID=2, then CB:11 is set to "true" in its ladder program. As a result, this will automatically set CB:18 to "true" in the ladder program of MacID=3.

12.0 DeviceNet™ Specifications

The OmniCon-DNET88 applies the DeviceNet open protocol for communication over the network. The OmniCon-DNET88 is defined as a slave device on the DeviceNet network. It utilizes the explicit messaging set to execute peer-to-peer messaging to other OmniCon-DNET88 devices. This feature enables the OmniCon-DNET88 to be polled by a master DeviceNet Scanner for information without compromising the network interlocking capabilities between OmniCon-DNET88 devices.

12.1 Polled Messaging

The OmniCon-DNET88 supports DeviceNet polled messaging connections between itself and the master device on the DeviceNet network. A master device initiates the polled message connection by sending a poll data message to the OmniCon-DNET88 device. The master device can poll the OmniCon-DNET88 to **produce** or **consume** data to and from the network.

The OmniCon-DNET88 produced data provides I/O condition status, communication interlocking data, mode of device, start state, and the 2 bytes of data stored in the control word file index 9 (CW: 9).

Produced Data Format:

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	In 8	In 7	In 6	In 5	In 4	In 3	In 2	In 1
Byte 1	Out 8	Out 7	Out 6	Out 5	Out 4	Out 3	Out 2	Out 1
Byte 2	1	1	Ready to Upstream	Dnstream Ready	Package Exiting	Package Arriving	Start Mode	Program Mode
Byte 3	CW: 9.7	CW: 9.6	CW: 9.5	CW: 9.4	CW: 9.3	CW: 9.2	CW: 9.1	CW: 9.0
Byte 4	CW: 9.15	CW: 9.14	CW: 9.13	CW: 9.12	CW: 9.11	CW: 9.10	CW: 9.9	CW: 9.8

Similarly, the master scanner can send consume data via a **polled messaging connection** to the OmniCon-DNET88 device. The size of the consume data can be up to 2 bytes. The consume data is optional and the master may not send any data with the poll request (message size being 0). The consume data sent by the master is stored in the control word file at index 10 (CW: 10).

Consumed Data Format:

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	CW: 10.7	CW: 10.6	CW: 10.5	CW: 10.4	CW: 10.3	CW: 10.2	CW: 10.1	CW: 10.0
Byte 1	CW: 10.15	CW: 10.14	CW: 10.13	CW: 10.12	CW: 10.11	CW: 10.10	CW: 10.9	CW: 10.8

13.0 Status LEDs

The OmniCon-DNET88 features status LEDs for visual condition verification and troubleshooting inputs and outputs.

I/O LEDs	Illumination	Description
Input LEDs(1 - 8)	Green	The corresponding input state is being energized.
	Off	The corresponding input state is not being energized.
Output LEDs(1 – 8)	Green	The corresponding output is being enabled.
	Off	The corresponding output is not being enabled.

Mainboard LEDs	Illumination	Description
PWR	Green	Correct power supplied to OmniCon-DNET88.
	Off	Power not supplied to the OmniCon-DNET88.
CPU	Blink green rapidly	OmniCon-DNET88 is in “RUN” mode.
	Blink green in Heartbeat rhythm	OmniCon-DNET88 is in “PROGRAM” mode.

Network LEDs	Illumination	Description
LNK	Blink green	Transmit or Receive a message via the network.
	Off	Idle communication state.
ERR	Red	Network at device down, network communication is not possible.
	Blink Red	Device failed duplicate MacID test for network.
PWR	Green	Correct Power supplied to DeviceNet network.
	Off	Power not supplied to DeviceNet network.

14.0 Hardware Protection

Hardware Components	Protection Description
Board Power Circuitry	Reverse polarity protection.
Output Circuitry	Back EMF distortion protection.
Input Circuitry	Short circuit protection.
Network CAN Circuitry	Reverse polarity protection.

15.0 Specifications

Product Type	Programmable digital I/O
Function	Highly distributable programmable I/O for DeviceNet.
Network	DeviceNet
Voltage Range	Module: 12 – 30VDC; Network 18 – 30VDC
Current Consumption	Module: 210mA Max @ 24VDC, excluding motor or sensor current; Network: 40mA max.
Operating Temperature Range	-30 °C to 70 °C { -22 °F to 158 °F }
Storage Temperature Range	-55 °C to 85 °C { -67 °F to 185 °F }
Humidity	95% RH, non-condensing
Standards	Pending
Shock	10 g
Vibration	2 G, 10 to 50 Hz
Dimensions	7 ¾" x 3 ¾" x 1"
Housing Material	Steel
Weight	0.75 lbs.
Mounting	#10-32 screws
Inputs	8 N.O., sourcing sensors required; 12 – 24VDC
Input Signal Current	0.1mA nominal
Sensor Input Power	Powered from module, sharing common power. Module input current limited to 1.25A
Outputs	8 independent control outputs (common ground)
Output Type	NPN open collector outputs
Output Voltage Drop	0.06VDC @ 100mA, 0.35VDC @ 500mA
Max. Output Current	500mA maximum
Output Leakage Current	10µA maximum
Serial Port	1 RS232 port. 9600, 8bits, no parity, 1 stop bit; Modem cable compatible.
Wire Size (Recommended)	18 to 24 AWG stranded or solid
I/O Connectors	Spring loaded terminals with quick disconnect