Standalone IO DeviceNet Interface User Manual

User Manual

Effective March 2011
New Information

Powering Business Worldwide

Disclaimer of Warranties and Limitation of Liability

The information, recommendations, descriptions, and safety notations in this document are based on Eaton Electrical Inc. and/or Eaton Corporation's ("Eaton") experience and judgment, and may not cover all contingencies. If further information is required, an Eaton sales office should be consulted.

Sale of the product shown in this literature is subject to the terms and conditions outlined in appropriate Eaton selling policies or other contractual agreement between Eaton and the purchaser.

THERE ARE NO UNDERSTANDINGS, AGREEMENTS, WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OTHER THAN THOSE SPECIFICALLY SET OUT IN ANY EXISTING CONTRACT BETWEEN THE PARTIES. ANY SUCH CONTRACT STATES THE ENTIRE OBLIGATION OF EATON. THE CONTENTS OF THIS DOCUMENT SHALL NOT BECOME PART OF OR MODIFY ANY CONTRACT BETWEEN THE PARTIES. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental, or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information, recommendations, and descriptions contained herein.

The information contained in this manual is subject to change without notice.

Cover Photo: Standalone IO DeviceNet Interface

Support Services

The goal of Eaton is to ensure your greatest possible satisfaction with the operation of our products. We are dedicated to providing fast, friendly, and accurate assistance. That is why we offer you so many ways to get the support you need. Whether it's by phone, fax, or e-mail, you can access Eaton's support information 24 hours a day, seven days a week. Our wide range of services is listed below.

You should contact your local distributor for product pricing, availability, ordering, expediting, and repairs.

Web Site

Use the Eaton Web site to find product information. You can also find information on local distributors or Eaton's sales offices.

Web Site Address

www.eaton.com/electrical

EatonCare Customer Support Center

Call the EatonCare Support Center if you need assistance with placing an order, stock availability or proof of shipment, expediting an existing order, emergency shipments, product price information, returns other than warranty returns, and information on local distributors or sales offices.

Voice: 877-ETN-CARE (386-2273) (8:00 a.m.–6:00 p.m. EST)
FAX: 800-752-8602
After-Hours Emergency: 800-543-7038
(6:00 p.m.–8:00 a.m. EST)

If you are in the U.S. or Canada, and have OI or PLC questions, you can take advantage of our toll-free line for technical assistance with hardware and software product selection, system design and installation, and system debugging and diagnostics. Technical support engineers are available for calls during regular business hours.

Technical Resource Center

Voice: 877-ETN-CARE (386-2273) (8:00 a.m.–5:00 p.m. EST)

FAX: 828-651-0549

e-mail: TRC@Eaton.com

European PanelMate Support Center

This engineering company, located in Zurich, Switzerland, provides high-level quality support and repair assistance for your PanelMate products. You will receive technical and application support.

For Customers in Europe, contact:

BFA Solutions, Ltd.
Voice: +41 1 806.64.44 (9:00 a.m.–5:00 p.m. CET)

e-mail: gk@bfa.ch

www.bfa.ch

Repair and Upgrade Service

Additional support is also available from our well-equipped Repair and Upgrade Service department. If you have questions regarding the repair or upgrade of an OI product, contact your local distributor.

Repair and Upgrade Service (support for OI)

Voice:
877-ETN-CARE (877-386-2273) (8:00 a.m.–5:00 p.m. EST)
414-449-7100 (8:00 a.m.–5:00 p.m. EST)

FAX: 614-882-3414

e-mail: TRC@eaton.com

Table of Contents

List of Figures

List of Tables

Safety

Definitions and Symbols

WARNING

This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully.

This symbol is the "Safety Alert Symbol." It occurs with either of two signal words: CAUTION or WARNING, as described below.

WARNING

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the CAUTION may, if not avoided, lead to serious results. Important safety measures are described in CAUTION (as well as WARNING).

Hazardous High Voltage

WARNING

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.

Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electronic controllers or rotating machinery.

Warnings and Cautions

WARNING

Only apply 24 Vdc to the communication module fieldbus connection. Use of any other voltage may result in personal injury, property damage and damage to the module.

Introduction

System Overview

The C441K and C441L DeviceNet modules provide DeviceNet communication to the C440 overload and monitoring relay. The DeviceNet module with 24 Vdc IO (C441L) and the DeviceNet module with 120 Vac IO (C441K) provide four inputs and two B300 relay outputs.

The DeviceNet module includes the following significant features:

- Control and monitoring of the base device
- No special software application required for normal setup. MAC ID and baud rate are set with DIP switches
- Four isolated or unisolated 24 Vdc inputs or four isolated 120 Vac inputs
- Two B300 relay outputs controllable from DeviceNet

Conformance

The DeviceNet communication adapter conforms to the ODVA DeviceNet and CIP specifications.

The DeviceNet adapter only supports a single bi-color green/red Module/Network status LED.

Indicator LEDs

Usage—Module Network Status	
Off	Device is not online. • The device has not completed the Dup_MAC_ID test yet. • The device may not be powered.
Flashing green	The device is operating in a normal condition and the device is online with no connections in the established state. • The device has passed the Dup_MAC_ID test, is online, but has not established connections to other nodes. • The device is not allocated to a master.
Green	The device is operating in a normal condition and the device is online with connections in the established state. • The device is allocated to a master.
Flashing red	Any one or more of the following conditions: • Recoverable fault • One or more I/O connections are in the timed-out state • No network power present
Solid red	The device has an unrecoverable fault; may need replacing. Failed communication device. The device has detected an error that has rendered it incapable of communicating on the network (duplicate MAC ID, or bus-off)

Configuration by Software Tool

The DeviceNet adapter will be configurable by CH Studio and any other tool that does explicit messaging based on the provided EDS file.

Hardware

Catalog Numbers

Product Selection

Description	Catalog Number
DeviceNet module with 24 Vdc inputs and 120 Vac/24 Vdc relay outputs (MCS version)	**C441L**
DeviceNet module with 120 Vac inputs and 120 Vac/24 Vdc relay outputs (MCS version)	**C441K**

Environmental Ratings

Environmental Ratings

Description		Rating
Transportation and storage	Temperature	–50° to 80°C (–58° to 176°F)
	Humidity	5–95% non-condensing
Operating	Temperature	–40° to 55°C (–40° to 131°F)
	Humidity	5–95% non-condensing
	Altitude	Above 2000m (6600 ft), consult factory
	Shock IEC 60068-2-27	15G any direction for 11 ms
	Vibration IEC 60068-2-6	5–150 Hz, 5G, 0.7 mm maximum peak-to-peak
	Pollution degree	2

Approvals/Certifications

Electrical/EMC	Rating
ESD immunity (IEC61000-4-2)	+/–8 kV air, +/–4 kV contact
Radiated immunity (IEC61000-4-3)	10V/m 80–1000 MHz, 80% amplitude modulation at 1 kHz
Fast transient (IEC61000-4-4)	+/–1 kV communications
Surge (IEC61000-4-5)	+/–1 kV shield-to-ground
RF conducted (IEC61000-4-6)	10V, 0.15–80 MHz
Ingress protection code	IP20
Radiated and conducted emissions	EN55011 Class A
Agency certifications	UL® 508
	cUL® (CSA® C22.2 No. 14)
	CE (low voltage directive)
	DeviceNet conformance tested

Electrical Ratings

Electrical Requirements

Description	Requirement
Voltage range	18–30 Vdc
Current draw	Approx. 18 mA

The DeviceNet module is powered off the 24 Vdc DeviceNet subnet. The DeviceNet communication module does not power the associated base device (Motor Insight, C440, S611, etc.), and therefore will remain active when the base device power is disconnected.

This device is for use with an Eaton UL listed power supply, Catalog Numbers PSS55A, PSS55B, PSS55C, or PS160E.

Note: Any UL listed power supply with an isolated 30 Vdc voltage output may be used, provided that a UL listed or recognized fuse rated no more than 4A maximum be installed.

⚠ WARNING

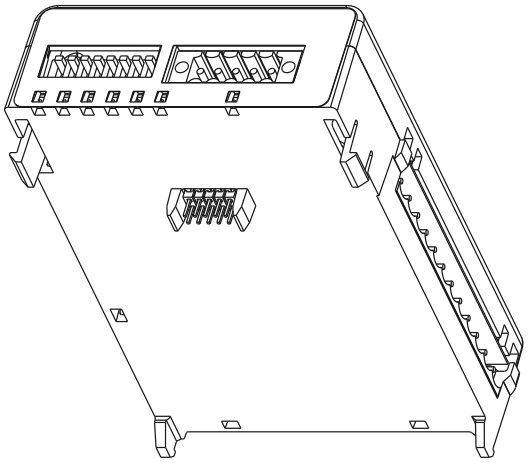
Only apply 24 Vdc to the communication module fieldbus connection. Use of any other voltage may result in personal injury, property damage and damage to the module.

Mounting

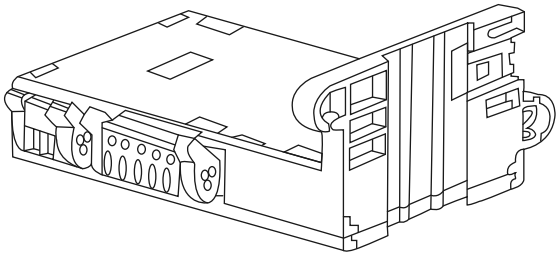
The DeviceNet modules are designed to be installed on the right side of the Motor Insight base unit or the C440-COM-ADP.

1. Align module with side of Motor Insight base unit or C440-COM-ADP.
2. Slide module bottom pegs into appropriate slots.
3. Rotate module up and gently click the base unit and module together.
4. Connect DeviceNet cable and IO connector if desired.

C441x Communication Module

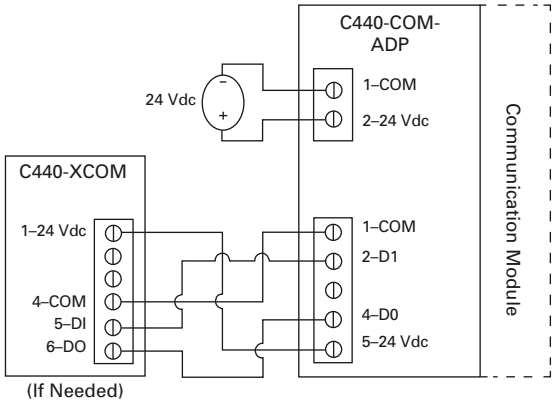


C440-COM-ADP



C440-COM-ADP Wiring

C440 to C440-COM-ADP Wiring



Input Behavior

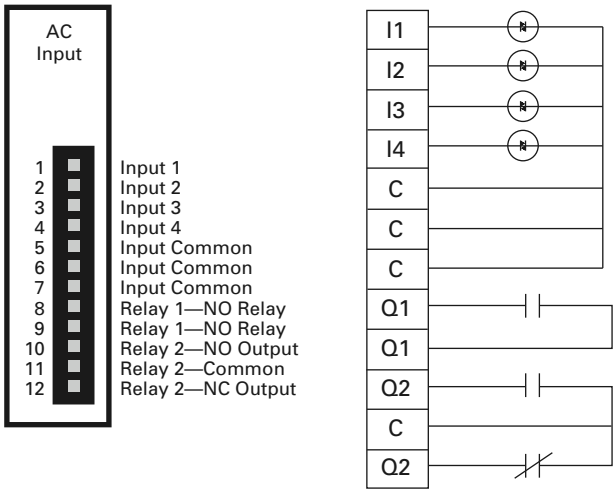
Each terminal of the field connection accepts two wires of the following size:

Field Terminal Wire Capability

Wire Type	Wire Size	Terminal Torque (in-lbs)
Solid Cu–90C	#14–#22	4.5
Stranded Cu–90C	#16–#22	4.5

120 Vac Input Requirements

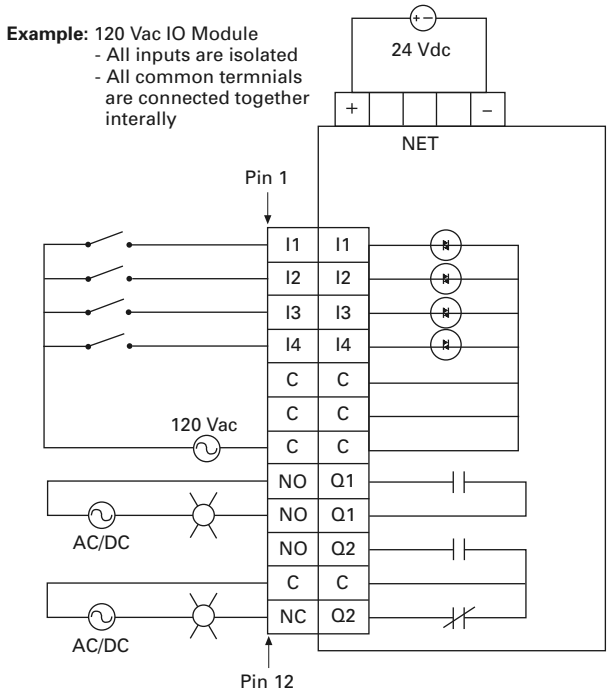
The 120 Vac input is an isolated input. It requires an external AC supply to drive the inputs. There are three common tie points provided for the four inputs.



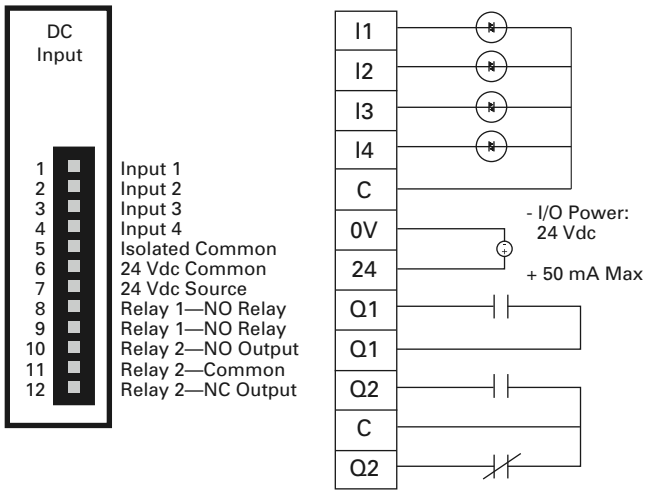
120 Vac Input Specifications

Specification	Value
Number of inputs	4
Nominal voltage	120 Vac
Nominal current	7 mA
Operating range	80–140 Vac
Operating frequency	50/60 Hz
Signal delay maximum	30 ms
Input type	IEC 61131-2, type 1 digital

24 Vdc Input Requirements



The 24 Vdc input circuit is capable of both isolated and unisolated behavior. The isolated inputs share a single common tie point. A 24 Vdc current limited source/ground is provided in situations that require locally supplied input signal voltage. To use the unisolated inputs tie the 24 Vdc ground/common to the isolated common.

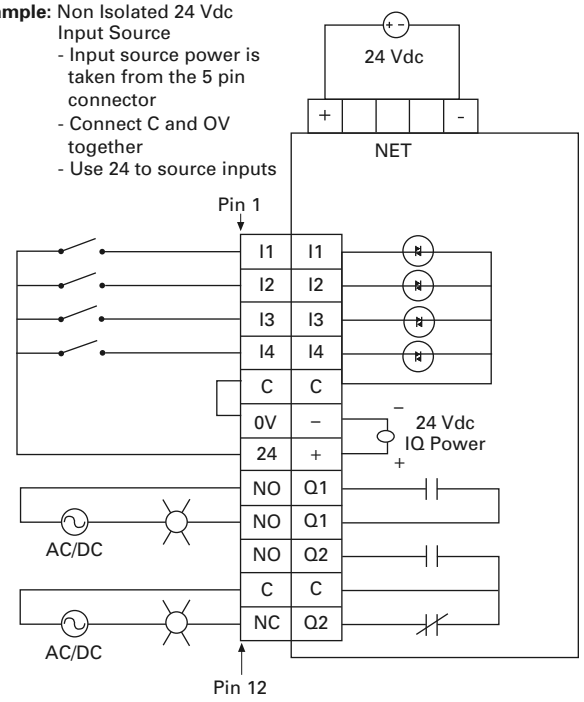


Note: Do not connect a 24 Vdc source to pins 6 and 7. The "I/O Power: 24 Vdc" is to be used only in conjunction with the inputs. It is a 24 Vdc output intended to only supply signal power for the inputs. When using the 24 Vdc input supply, pin 6 should only be connected to pin 5 (24 Vdc input supply common to input common). See example wiring diagrams. Any device using the provided 24 Vdc input supply must have 500V isolation from ground. Example devices include pushbuttons.

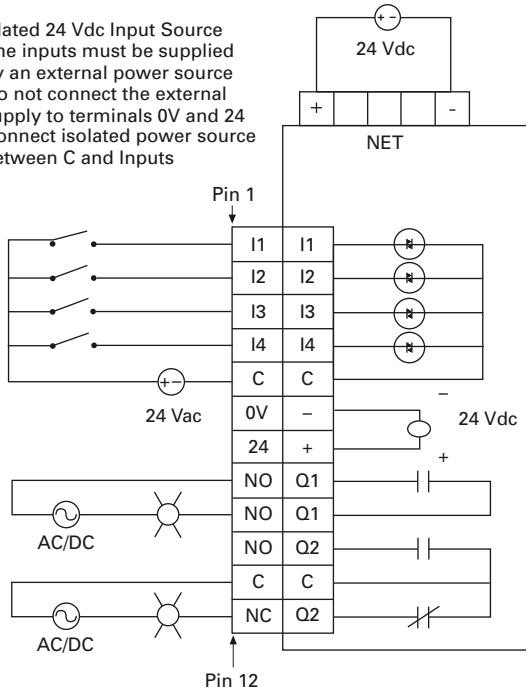
24 Vdc Input Specifications

Specification	Value
Number of inputs	4
Nominal voltage	24 Vdc
Nominal current	5 mA
Type	Current sinking
Input type	IEC 61131-2, type 1 digital
Maximum 24 Vdc source current	50 mA
Isolation voltage	250 Vac

Example: Non Isolated 24 Vdc Input Source
- Input source power is taken from the 5 pin connector
- Connect C and OV together
- Use 24 to source inputs



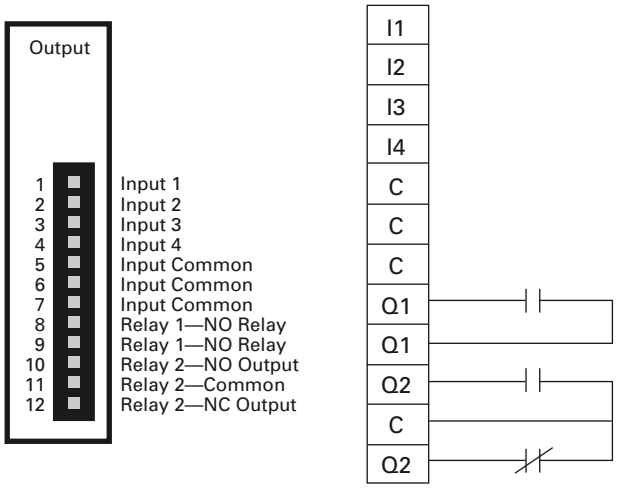
Example: Isolated 24 Vdc Input Source
- The inputs must be supplied by an external power source
- Do not connect the external supply to terminals 0V and 24
- Connect isolated power source between C and Inputs



Relay Output Behavior

Relay Outputs

Two relay outputs are provided, one Form A (NO) and one Form C (NO, NC). See wiring guide below.



Relay Specifications

Specification	Value
Number contacts	2 independent relays (1 Form C, 1 Form A)
Thermal contact	5A
Rated insulation voltage	300 Vac
Maximum operating voltage	120 Vac
Maximum operating current	5A
Electrical life	1 x 10^5 operations
Mechanical life	1 x 10^7 operations

Pilot Duty Relay

Specification	Value
Pilot duty rating	B300
Thermal continuous test current	5A
Maximum current (120 Vac)—Make/break	30A/3A
Maximum VA (volt-amperes)—Make/break	3600 VA/360 VA

DeviceNet Configuration

DeviceNet Baud Rate Configuration DIP Switches 7, 8

The DeviceNet baud rate is configured using the DIP switches on the face of the device.

DIP Switch Baud Rate Selection

B0 (Sw7)	B1 (Sw8)	Baud
OFF	OFF	125k (Default)
ON	OFF	250k
OFF	ON	500k
ON	ON	Software configuration

DeviceNet MAC ID Selection

The DeviceNet MAC ID is configured using the DIP switches on the face of the device.

DIP Switch Behavior

DIP Switch	Value
6	32
5	16
4	8
3	4
2	2
1	1
6	32

To set a MAC ID of 25, DIP switches 5, 4 and 1 need to be turned on, with all others off. Default is Mac ID 63 (all on).

Standalone IO DeviceNet Interface Details

Standalone IO DeviceNet Full Profile

Standalone IO DeviceNet Full Profile (9 Objects)

Class	Object	Number of Instances
0x01	Identity	1
0x02	Message router	1
0x03	DeviceNet	1
0x04	Assembly	4 (See assembly object details)
0x05	Connection	3
0x08	Discrete input point	4
0x09	Discrete output point	2
0x94	DeviceNet interface	1
0x99	Test only	1 (unpublished)

Identity Object, Class 0x01, (Standalone I/O)

Identity Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x05	Reset	0	Instance 1: Initializes adapter to the Power-up state
0x05	Reset	1	Instance 1: Writes default values to all instance attributes AND then saves all non-volatile attributes to FLASH memory AND then performs the equivalent of a Reset(0)
0x05	Reset	101	Vendor Specific Reset–Perform Intercom divorce. If the comm module is not connected to a base device, the comm module will assume the Discrete IO profile. If the comm module is connected to a base device, it will marry to the C440 and assume the Overload profile.
0x0E	Get_Attributes_Single	N/A	Returns the contents of the specified data
0x10	Set_Attributes_Single	Value	Modifies an attribute value

Identity Instance Attributes (Standalone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
1	—	Get	Vendor ID	UINT	Identification of each vendor by number	The constant 68.
2	—	Get	Device type	UINT	Indication of general type of product	The constant 0x07 for general purpose discrete I/O device.
3	—	Get	Product code	UINT	Identification of a particular product of an individual vendor	The constant 0x1103 (Standalone I/O DeviceNet Interface with 24 Vdc IO) or 0x1104 (Standalone I/O DeviceNet Interface with 120 Vac IO)
4	—	Get	Revision	STRUCT of:	Revision of the item the identity object represents	—
			Major revision	USINT	—	0x02
			Minor revision	USINT	—	0x01
5	—	Get	Status	WORD	Summary status of device	See status section for details
6	—	Get	Serial number	UDINT	Serial number of device	32 bit vendor specific serial number
7	—	Get	Product name	SHORT_ STRING	Human readable identification	—
8	—	Get	State	USINT	Present state of the device as represented by the state transition diagram	0 = Nonexistent 1 = Device self testing 2 = Standby 3 = Operational 4 = Major recoverable fault 5 = Major unrecoverable fault
176 (0xB0)	NV	Get/Set	User label (tag name)	SHORT_ STRING	User Assigned ASCII string of 16 characters or less	—

Status

This attribute represents the current status of the entire device. Its value changes as the state of the device changes. The Status attribute is a WORD, with the following bit definitions:

Bit Definitions for Instance #1, Status Attribute of Identity Object (Standalone I/O)

Bit (s)	Called	Definition
0	Owed	—
1	—	Reserved, set to zero.
2	Configured	TRUE indicates that the application of the device has been configured to do something different than the out-of-box defaults. This does not include configuration of the communications.
3	—	Reserved, set to zero.
4–7	—	Reserved, set to zero.
8	Minor recoverable fault	TRUE indicates that the device detected a problem with itself, which is thought to be recoverable. The problem does not cause the device to go into one of the faulted states.
9	Minor unrecoverable fault	TRUE indicates that the device detected a problem with itself, which is thought to be unrecoverable. The problem does not cause the device to go into one of the faulted states.
10	Major recoverable fault	TRUE indicates that the device detected a problem with itself, which caused the device to go into the Major Recoverable Fault state.
11	Major unrecoverable fault	TRUE indicates that the device detected a problem with itself, which caused the device to go into the Major Unrecoverable Fault state. See Behavior section.
12, 13	—	Reserved, set to zero.
14, 15	—	Reserved, set to zero.

State

This attribute is an indication of the resent state of the device. Note that the nature of a Major Unrecoverable Fault could be such that it may not be accurately reflected by the State attribute.

This attribute reflects the dynamic status of the adapter. The defined states are:

Defined States

Value	State Name	Description
0	Non-existent	This state will never be visible from within a device. This state is principally intended for a tool to be able to represent the lack of an instance in a physical device.
1	Device self testing	Power-up or Reset operation. Will not be visible from within a device because communications are not active in this state.
2	Standby	This state is reported while needs commissioning due to an incorrect or incomplete configuration.
3	Operational	This state is reported when the adapter is powered up, configured and operating normally.
4	Major recoverable fault	—
5	Major unrecoverable fault	—

Message Router Object, Class 0x02 (Standalone I/O)

Message Router Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x0E	Get_Attribute_Single	N/A	Returns the value of the specified attribute

Message Router Instance Attributes (Standalone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
1	—	Get	Object list	STRUCT of:	A list of supported objects	Structure with an array of object class codes supported by the device
				UINT	Number of supported classes in the classes array	The number of class codes in the classes array
				ARRAY of UINT	List of supported class codes	The class codes supported by the device
2	—	Get	Number available	UINT	Maximum connections supported	Count the maximum number of connections supported
3	—	Get	Number active	UINT	Number of connections currently used by system components	Current count of the number of connections allocated to system communication

DeviceNet Object, Class 0x03 (Standalone I/O)

DeviceNet Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x0E	Get_Attribute_Single	N/A	Returns the value of the specified attribute
0x4B	Allocate	Values	Allocate_Master/Slave_Connection_Set
0x4C	Release	Value	Release_Group_2_Identifier_Set

DeviceNet Instance Attributes (Standalone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5	—	Get	Allocation information	STRUCT of:	—	—
			Allocations choice byte	BYTE	Indicates which connections are active	Bit 0–Explicit Bit 1–Poll Bit 2–Bit Strobe
			Master's MAC ID	USINT	MAC ID of Master (from Allocate)	Range 0–63, 255 Modified via Allocate only
6	—	Get	MAC ID switch changed	BOOL	The Node Address Switches have changed since last power-up/reset	0 = No change 1 = Change since last reset or power-up
7	—	Get	Baud rate switch changed	BOOL	The Baud Rate Switch(es) have changed since last power-up/reset	0 = No change 1 = Change since last reset or power-up
8	—	Get	MAC ID switch value	USINT	Actual value of node address switches	Range 0–63
9	—	Get	Baud rate switch value	USINT	Actual value of baud rate switches	Range 0–3

Assembly Object, Class 0x04 (Standalone I/P)

The Assembly Object binds attributes of multiple objects, which allows data to or from each object to be sent or received over a single connection. Assembly objects can be used to bring input data or output data. The terms input and output are defined from the networks point of view. An input will produce data on the network and an output will consume data from the network. Various data sets can be exchanged using I/O messaging. The data set to be exchanged is determined by selecting an input and an output assembly.

The adapter is designed with 2 I/O connections (poll and bit strobe). These connections use the assemblies selected in the vendor specific DeviceNet Interface object (0x94).

Assembly Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x0E	Get_Attribute_Single	N/A	Returns the value of the specified attribute
0x4B	Allocate	Values	Allocate_Master/Slave_Connection_Set

Assembly Instance Attributes (Standalone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Description of Attribute	Semantics of Values
3	—	Set	Data	ARRAY of BYTE	—	—

Assembly Instance (Standalone I/O)

Type	Instance	Usage	Name
Input	3 (0x03)	Poll, bit	Four point input with no status bits
Input	107 ① (0x06B)	Poll, bit strobe	Four point input and two point output
Output	32 ② (0x20)	Poll, bit strobe	Two point output with no status bits
Output	111 ③ (0x6F)	Bit strobe	Accepts eight bytes of bit strobe command to trigger bit strobe response

① Indicates default assembly instance used in both poll and bit strobe connection.
② Indicates default assembly instances used in poll connection.
③ Indicates default assembly instances used in bit strobe connection.

Input Assembly 107 (Standalone I/O)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input 4	Input 3	Input 2	Input 1	Output 2	Output 1	Reserved	Reserved

Output Assembly 32

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	—	—	—	—	—	—	Out 2	Out 1

Output Assembly 111—Bit Strobe Command (Standalone I/O)

Sixty-four bits of strobe data, one per MAC ID. The data is ignored by the Standalone I/O DeviceNet adapter.

Connection Object, Class 0x05 (Standalone I/O)

Connection Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x05	Reset	N/A	Resets the inactivity/watchdog timer Transitions from timed out or deferred delete state to established
0x0E	Get_Attributes_Single	N/A	Returns the contents of the specified data
0x10	Set_Attributes_Single	Value	Modifies an attribute value

Connection Object Instance #1 Attributes (Explicit Messaging) (Standalone I/O)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
1	Get	—	State	USINT	State of the object Default = 0x03
2	Get	—	Instance_Type	USINT	Indicates either I/O or messaging connection Default = 0x00
3	Get	—	TransportClass_Trigger	BYTE	Defines behavior of the connection Default= 0x83
4	Get	—	Produced_Connection_ID	UINT	Placed in CAN identifier field when the connection transmits Default = 0x0000 (although this default will never be visible)
5	Get	—	Consumed_Connection_ID	UINT	CAN Identifier field value that denotes message to be received Default = 0x0000 (although this default will never be visible)
6	Get	—	Initial_Comm_Characteristics	BYTE	Defines the message group(s) across which productions and consumptions associated with this connection occur Default = 0x21 This indicates that the slave's explicit messaging connection produces and consumes across message group 2. Additionally, this value indicates that the slave's MAC ID appears in the CAN identifier fields of the Group 2 messages that the slave consumes and produces.
7	Get	—	Produced_Connection_Size	UINT	Maximum number of bytes transmitted across this connection Default = 500
8	Get	—	Consumed_Connection_Size	UINT	Maximum number of bytes received across this connection Default = 500

Connection Object Instance #1 Attributes (Explicit Messaging) (Standalone I/O), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
9	Get/Set	—	Expected_Packet_Rate	UINT	Defines timing associated with this connection Default = 0x09C4 (2500 ms)
10 _ 11	—	—	N/A	N/A	Not used. These attribute IDs have been obsoleted and are no longer defined for a connection object.
12	Get/Set	—	Watchdog_Timeout_Action	USINT	Defines how to handle inactivity/watchdog timeouts Default = 0x01 (Auto_Delete)
13	Get	—	Produced_Connection_Path_Length	UINT	Number of bytes in the Produced_Connection_Path attribute Default = 0x0000
14	Get	—	Produced_Connection_Path	Packed EPATH	Specifies the application object(s) whose data is to be produced by this connection object. See DeviceNet Volume I, Appendix I Default = Null PATH
15	Get	—	Consumed_Connection_Path_Length	UINT	Number of bytes in the Consumed_Connection_Path attribute Default = 0x00
16	Get	—	Consumed_Connection_Path	Packed EPATH	Specifies the application object(s) that are to receive the data consumed by this connection Object. See DeviceNet Volume I, Appendix I Default = Null PATH

Connection Object Instance #2 Attributes (Polled I/O) (Standalone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
1	Get	—	State	USINT	State of the object Default = 0x01
2	Get	—	Instance_Type	USINT	Indicates either I/O or messaging connection Default = 0x01
3	Get	—	TransportClass_Trigger	BYTE	Defines behavior of the connection Default = 0x83
4	Get	—	Produced_Connection_ID	UINT	Placed in CAN identifier field when the connection transmits
5	Get	—	Consumed_Connection_ID	UINT	CAN Identifier Field value that denotes message to be received
6	Get	—	Initial_Comm_Characteristics	BYTE	Defines the message group(s) across which productions and consumptions associated with this connection occur Default = 0x01
7	Get	—	Produced_Connection_Size	UINT	Maximum number of bytes transmitted across this connection
8	Get	—	Consumed_Connection_Size	UINT	Maximum number of bytes received across this connection
9	Get/Set	—	Expected_Packet_Rate	UINT	Defines timing associated with this connection Default = 0x0000
10 _ 11	—	—	N/A	N/A	Not used. These attribute IDs have been obsoleted and are no longer defined for a connection object
12	Get/Set	—	Watchdog_Timeout_Action	USINT	Defines how to handle inactivity/watchdog timeouts Default = 0x00
13	Get	—	Produced_Connection_Path_Length	UINT	Number of bytes in the Produced_Connection_Path attribute Default and fixed as 0x03
14	Get/Set	NV	Produced_Connection_Path	Packed EPATH	Specifies the application object(s) whose data is to be produced by this connection object. Default assembly instance 107 (0x6B): "0x62 0x36 0x42" Allowable EPATHS: 3 (0x03) "0x62 0x30 0x33" 107 (0x6B): "0x62 0x36 0x42"
15	Get	—	Consumed_Connection_Path_Length	UINT	Number of bytes in the Consumed_Connection_Path attribute Default and fixed as 0x03
16	Get/Set	NV	Consumed_Connection_Path	Packed EPATH	Specifies the application object(s) that are to receive the data consumed by this connection object Default assembly instance 32 (0x20) "0x62 0x32 0x30" Allowable EPATHS: 32 (0x20) "0x62 0x32 0x30" 105 (0x69): "0x62 0x36 0x39"

Connection Object Instance #3 Attributes (Bitstrobe I/O) (Standalone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
1	Get	—	State	USINT	State of the object Default = 0x01
2	Get	—	Instance_Type	USINT	Indicates either I/O or messaging connection Default = 0x01
3	Get	—	TransportClass_Trigger	BYTE	Defines behavior of the connection Default = 0x83
4	Get	—	Produced_Connection_ID	UINT	Placed in CAN identifier field when the connection transmits
5	Get	—	Consumed_Connection_ID	UINT	CAN Identifier field value that denotes message to be received
6	Get	—	Initial_Comm_Characteristics	BYTE	Defines the message group(s) across which productions and consumptions associated with this connection occur Default = 0x02
7	Get	—	Produced_Connection_Size	UINT	Maximum number of bytes transmitted across this connection Default and fixed as 0x08
8	Get	—	Consumed_Connection_Size	UINT	Maximum number of bytes received across this connection Default and fixed as 0x08
9	Get/set	—	Expected_Packet_Rate	UINT	Defines timing associated with this connection Default = 0x0000
10 _ 11	—	—	N/A	N/A	Not used. These attribute IDs have been obsoleted and are no longer defined for a connection object
12	Get/set	—	Watchdog_Timeout_Action	USINT	Defines how to handle inactivity/watchdog timeouts Default = 0x00
13	Get	—	Produced_Connection_Path_Length	UINT	Number of bytes in the Produced_Connection_Path attribute Default and fixed as 0x03
14	Get/set	—	Produced_Connection_Path	Packed EPATH	Specifies the assembly instance whose data is to be produced by this connection object Default assembly instance 107 (0x6B): "0x62 0x36 0x42"
15	Get	—	Consumed_Connection_Path_Length	UINT	Number of bytes in the Consumed_Connection_Path attribute Default and fixed as 0x03
16	Get/set	—	Consumed_Connection_Path	Packed EPATH	Specifies the application object(s) that are to receive the data consumed by this connection object Default and fixed as assembly instance 111 (0x6F) "0x62 0x36 0x46"

Discrete Input Object, Class 0x08 (Standalone I/O)

Discrete Input Point Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x0E	Get_Attributes_Single	N/A	Returns the contents of the specified data
0x10	Set_Attributes_Single	Value	Modifies an attribute value

Discrete Input Point Object Instance #1-4 (C440)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
3	—	Get	Value	BOOL	Input point value
101	—	Set	Debounce	UDINT	Debounce time

Input Point Value

The input point value reflects the current state of the associated input terminal.

Discrete Output Object, Class 0x09, (Standalone I/O)

The Discrete Output Point (DOP) Object models discrete outputs in a product. Note that the term "output" is defined from the network's point of view. An output will consume data from the network. The output is read from this object's VALUE attribute and applied to the output terminal.

Discrete Output Point Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x0E	Get_Attributes_Single	N/A	Returns the contents of the specified data
0x10	Set_Attributes_Single	Value	Modifies an attribute value

Discrete Input Point Object Instance #1-4 (C440)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
3	—	Set	Value	BOOL	Output point value
5	NV	Set	Fault action	BOOL	Action taken on output's value in communication fault state
6	NV	Set	Fault value	BOOL	User-defined value for use with fault action attribute
7	NV	Set	Idle action	BOOL	Action taken on output's value in communication idle state
8	NV	Set	Idle value	BOOL	User-defined value for use with idle action attribute

Output Point Value

The output is read from this object's VALUE attribute and applied to the output terminal.

Communication Fault Action

Determines the action to be taken at the output terminal when a communications fault occurs.

If this attribute is set to "0," then output terminal will be set to the state determined by attribute "Communications fault value."

If the attribute is set to "1," then the output terminal is not changed due to a communications fault.

Default: "0"

Communication Fault Value

Determines the value to be applied to the output terminal if a communications fault occurs AND the "Communication fault action" attribute is set to "0".

Default: 0.

Idle Action

Determines the action to be taken at the output terminal when communication idle occurs. If this attribute is set to "0," then output terminal will be set to the state determined by attribute "Idle value."

If the attribute is set to "1," then the output terminal is not changed due to a communications idle event.

Default: "0"

Idle Value

Determines the value to be applied to the output terminal if a communications idle event occurs AND the "Idle action" attribute is set to "0".

Default: 0.

DeviceNet Interface Object, Class 0x94, (Standalone I/O)

DeviceNet Interface Object Instance Services (Standalone I/O)

Service Code	Service Name	Service Data	Description
0x0E	Get_Attribute_Single	N/A	Returns the value of the specified attribute
0x10	Set_Attributes_Single	Value	Modifies an attribute value

DeviceNet Interface Object Instance Attributes (S611)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Value
1	NV	Set	MAC ID	USINT	MAC ID in use when baud rate switch is set to 3 (B0: on, B1: on)	Range: 0 – 63 Default = 63
2	NV	Set	Baud rate	USINT	Baud rate in use when baud rate switch is set to 3 (B0: on, B1: on)	0 = 125k 1 = 250K 2 = 500k Default = 0
3	NV	Set	Poll input assembly select	USINT	Poll connection input assembly instance that is active	Default = 107
4	NV	Set	Bit strobe input assembly select	USINT	Bit strobe connection input assembly instance that is active	Default = 32
5	NV	Set	Poll output assembly select	USINT	Poll connection output assembly instance that is active	Default = 32

MAC ID and Baud Rate

The MAC ID and Baud Rate are determined by attributes 1 and 2 when the baud rate switches are set to value 3 (B0 = ON and B1 = ON). The switch values determine MAC ID and Baud Rate when the baud rate switches are not set to 3.

Eaton's Electrical Sector is a global leader in power distribution, power quality, control and automation, and monitoring products. When combined with Eaton's full-scale engineering services, these products provide customer-driven PowerChain™ solutions to serve the power system needs of the data center, industrial, institutional, public sector, utility, commercial, residential, IT, mission critical, alternative energy and OEM markets worldwide.

PowerChain solutions help enterprises achieve sustainable and competitive advantages through proactive management of the power system as a strategic, integrated asset throughout its life cycle, resulting in enhanced safety, greater reliability and energy efficiency. For more information, visit www.eaton.com/electrical.

Eaton Corporation
Electrical Sector
1111 Superior Ave.
Cleveland, OH 44114
United States
877-ETN-CARE (877-386-2273)
Eaton.com

Printed in USA
Publication No. MN04210001E / Z10846
March 2011

Powering Business Worldwide