

C441 DeviceNet Module (C441K, C441L, C441KS, C441LS)

User Manual

Effective January 2015
New Information



C441K & C441L



C441KS & C441LS

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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

This manual contains clearly marked cautions and warnings which are intended for your personal safety and to avoid any unintentional damage to the product or connected appliances.

Please read the information included in cautions and warnings carefully.

Introduction

The C441 DeviceNet modules enable DeviceNet communications for the following Eaton Devices:

- C441 Motor Insight overload and monitoring relay
- C440 Overload and monitoring relay
- S611 Soft Starter
- S811+ Soft Starter

The device can also be used stand-alone as DeviceNet I/O block.

The table below describes the products covered in this manual and their primary usage.

Table 1. Product Selection

Catalog Number	Description	Use With
C441K	Plug In DeviceNet Module with 120 Vac Inputs and Relay Outputs	C441 Motor Insight S611 Soft Starter
C441L	Plug In DeviceNet Module with 24 Vdc Inputs and Relay Outputs	C441 Motor Insight S611 Soft Starter
C441KS	Stand-alone DeviceNet Module with 120 Vac Inputs and Relay Outputs	C440 Overload As I/O Block S811+ Soft Starter
C441LS	Stand-alone DeviceNet Module with 24 Vdc Inputs and Relay Outputs	C440 Overload As I/O Block S811+ Soft Starter

The DeviceNet module provides the following key features:

- Supports DeviceNet protocol
- Standard 5-position DeviceNet connection
- 4 Discrete Input Points and 2 Output relays

Ratings

Ratings

The following ratings apply to the C441K, C441L, C441KS and C441LS.

Table 2. DeviceNet Physical Layer Ratings

Description	Rating
Media	DeviceNet Cable
DeviceNet Baud Rates	125 k, 250 k, 500 k
MAC ID	0–63

Table 3. Environmental Ratings—C441K, C441L Modules

Description	Rating	
Transportation and Storage	Temperature	–40 °C to +85 °C (–40 °F to +185 °F)
	Humidity	5–95% noncondensing
Operating	Temperature	–20 °C to +50 °C (–4 °F to +122 °F)
	Humidity	5–95% noncondensing
	Altitude	Above 2000 meters (6600 feet), consult factory
	Shock IEC 60068-2-27	15 G any direction for 11 milliseconds
	Vibration IEC 60068-2-6	5–150 Hz, 3 G, 0.42 mm maximum peak-to-peak
Pollution Degree	3	

Table 4. Environmental Ratings—C441KS, C441LS Modules

Description	Rating	
Transportation and Storage	Temperature	–40 °C to +85 °C (–40 °F to +185 °F)
	Humidity	5–95% noncondensing
Operating	Temperature	–20 °C to +50 °C (–4 °F to +122 °F)
	Humidity	5–95% noncondensing
	Altitude	Above 2000 meters (6600 feet), consult factory
	Shock IEC 60068-2-27	15 G any direction for 11 milliseconds
	Vibration IEC 60068-2-6	10–250 Hz, 5 G, 0.7 mm maximum peak-to-peak
Pollution Degree	3	

Table 5. Approvals and Certifications

Electrical/EMC	Rating
ESD Immunity (IEC61000-4-2)	± 8 kV Air, ± 4 kV contact
Radiated Immunity (IEC61000-4-3)	10 V/m 80–1000 MHz, 80% amplitude modulation at 1 kHz
Fast Transient (IEC61000-4-4)	± 2 kV using direct method
Surge (IEC61000-4-5)	± 2 kV line-to-ground
RF Conducted (IEC61000-4-6)	10 V, 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) 00VA DeviceNet Certified

Table 6. Input Power Supply Requirements

Description	Rating
Voltage Range	18–30 Vdc
Current Draw	18 mA (C441K and C441L) 30 mA (C441KS and C441LS)

Note: Any UL listed power supply with an isolated 24 Vdc voltage output can be used provided that a UL listed or recognized fuse rated no more than 4 A maximum is installed.

The C441K and C441KS provide connection for four AC Input points. The ratings for these inputs are:

Table 7. AC Input Ratings

Specification	Value
Number of Inputs	4
Nominal Voltage	120 Vac
Nominal Current	15 mA
Operating Range	80–140 Vac
Operating Frequency	50/60 Hz
Signal Delay Max.	30 ms
Input Type	IEC 61131-2, type 1 digital

The C441L and C441LS provide connection for four AC Input points. The ratings for these inputs are:

Table 8. DC Input Ratings

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

All units provide two output relays. The ratings of the relay outputs are:

Table 9. Relay Specifications

Specification	Value
Number of Contacts	2 Independent Relays (one Form A, one Form C)
Thermal Contact	5 A
Rated Insulation Voltage	300 Vac
Operating Voltage	240 Vac
Operating AC Current (Rated)	3 A at 120 Vac; 1.5 A at 240 Vac
Operating DC Current (Rated)	0.24 A at 110 Vdc; 0.1 A at 220 Vdc
Min. Operating Current	10 mA at 5 Vdc
Resistive Load Rating	5 A at 240 Vac; 5 A at 30 Vdc
Inductive Loading	2 A at 240 Vac; 2 A at 30 Vdc

Table 10. Pilot Duty Relay Requirements

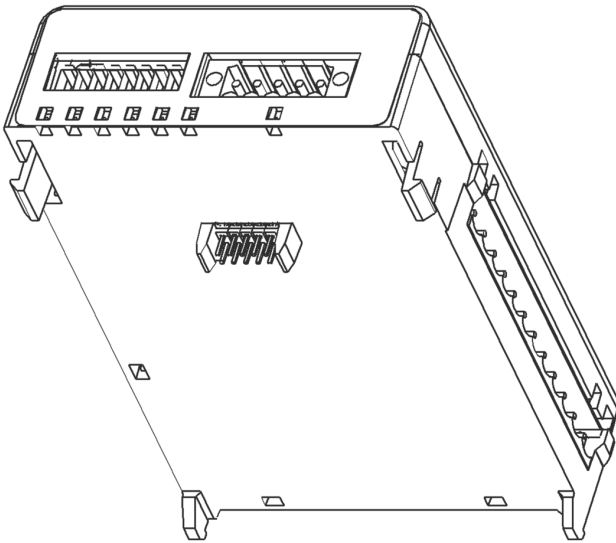
Specification	Value
Pilot Duty Rating	B300
Thermal Continuous Test Current	5 A
Max. Current (120 Vac)—Make/Break	30 A / 3 A
Max. Current (240 Vac)—Make/Break	15 A / 1.5 A
Max. VA (Volts-Amperes)—Make/Break	3600 VA / 360 VA

Mounting and Dimensions

C441K and C441L

The DeviceNet module is designed to be installed on the right side of the C441 Motor Insight base unit, or S611.

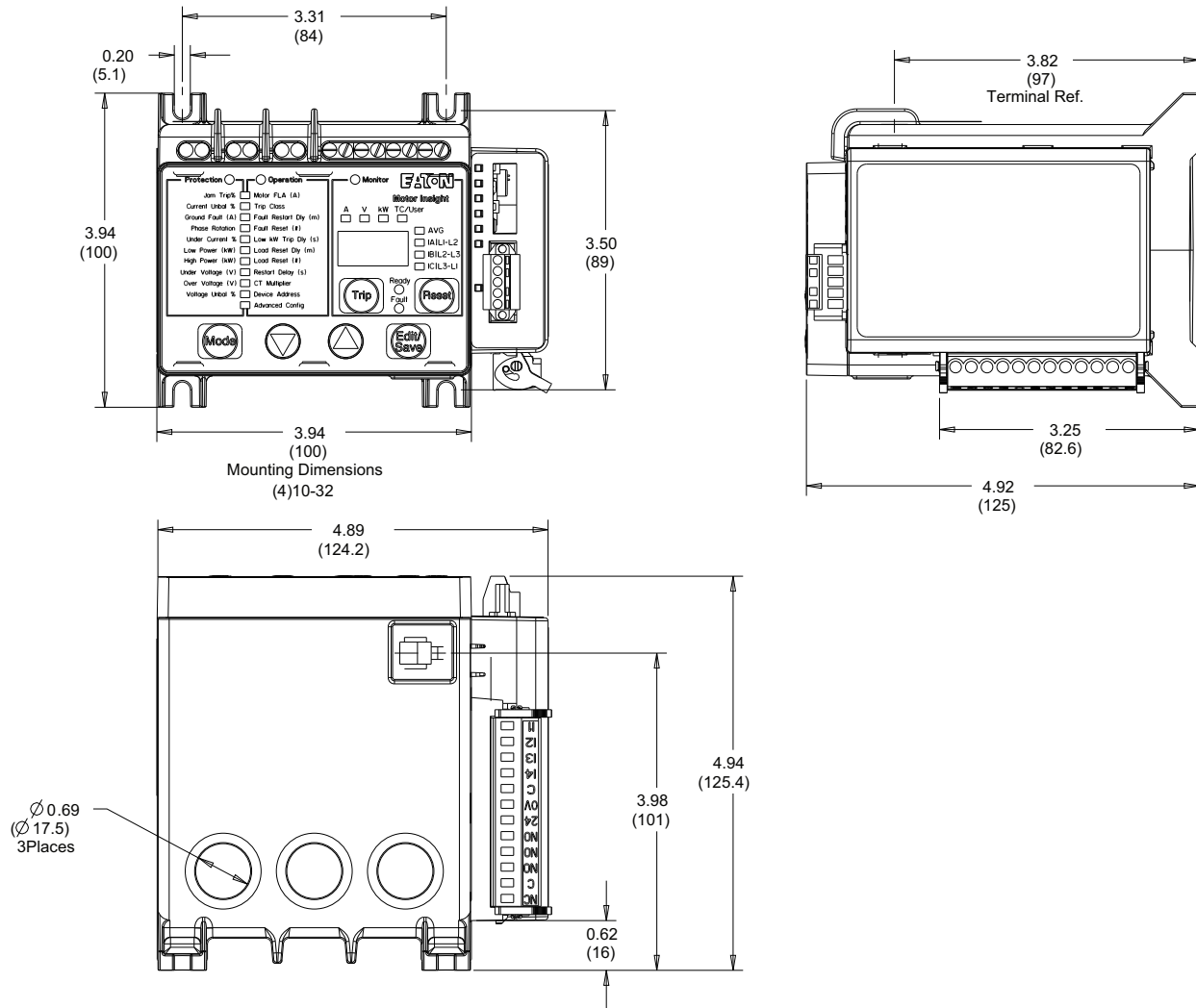
Figure 1. Installation Diagram



1. Align module with side of C441 Motor Insight base unit or S611.
2. Slide module bottom pegs in appropriate slots.
3. Rotate module up and gently click the base unit and module together.

The resulting dimensions of the C441 Motor Insight base unit and DeviceNet module is shown in **Figure 2**.

Figure 2. Product Dimensions (Attached to C441 Base Unit)



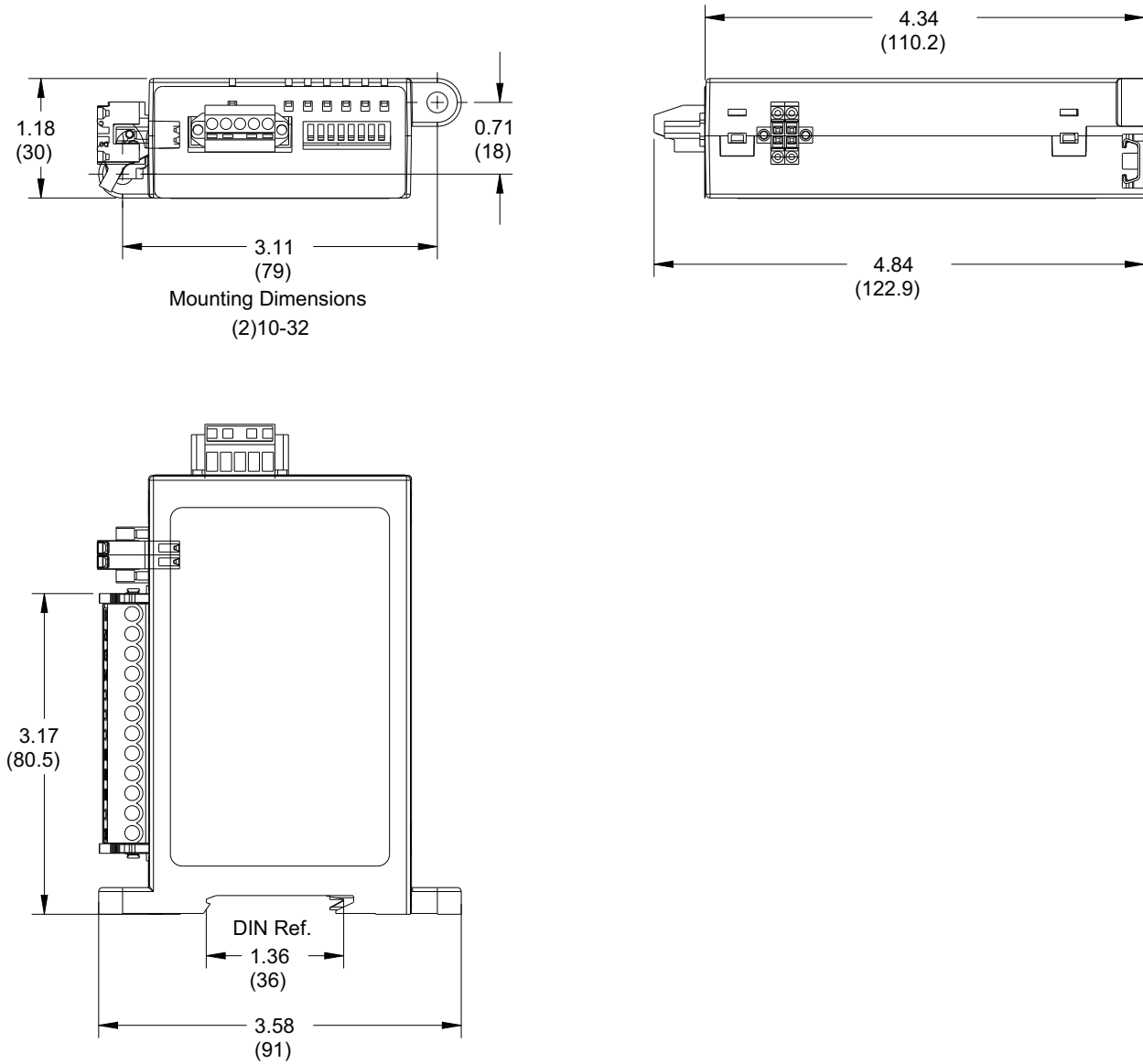
Mounting and Dimensions

C441KS and C441LS

The C441KS and C441LS have both screw mounting feet and a DIN rail spring mounting feature.

To mount the adapter to a DIN rail, place the bottom of the device on the rail first then apply gentle upward force while pushing the device flat against the DIN rail.

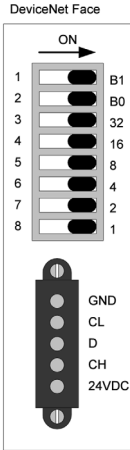
Figure 3. C441KS and C441LS Dimensions and Mounting



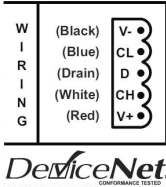
Connections and Switch Settings

The figures below depict the connection points, LED indicators, Dip switches and I/O terminal block.

Figure 4. Connection Points, LED Indicators, DIP Switches and I/O Terminal Block



CURRENT DRAW: 18mA
 TERMINAL TORQUE: .25Nm (2.25 lb-in)



Setting the MAC ID and Baud Rate

Set the DeviceNet MAC ID and Baud Rate

The MAC ID and baud rate are set using DIP switches on the face of the module. The MAC ID is in binary with the major units numbered to the left of the switch on the side label. Adding up the major units set to ON determines the MAC ID of the module.

Example: To set the MAC ID to 25, start from the top (or 32) and set the switches to:

OFF (32), ON (16), ON (8), OFF (4), OFF (2), ON (1)
 (16+8+1=25).

The baud rate is set using the configuration switches B0 and B1.

Table 11. Configuration Switches

B1	B0	Baud
OFF	OFF	125 k
OFF	ON	250 k
ON	OFF	500 k
ON	ON	Software configured

Table 12. MAC ID Configuration Switches

Value
32
16
8
4
2
1

Connecting the I/O Points and Power Supply

Figure 5. C441K— 120 Vac Input Specification

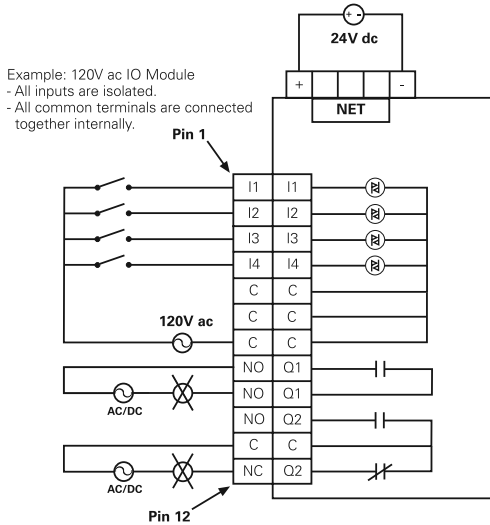


Figure 7. C441L—24 Vdc Input Specification, Non-Isolating

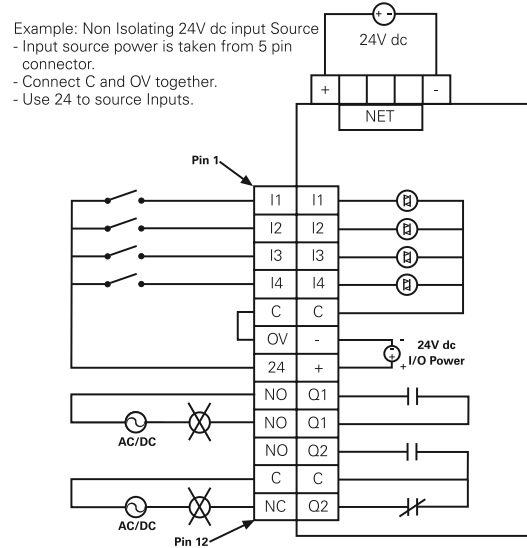


Figure 6. C441L—24 Vdc Input Specification, Isolated

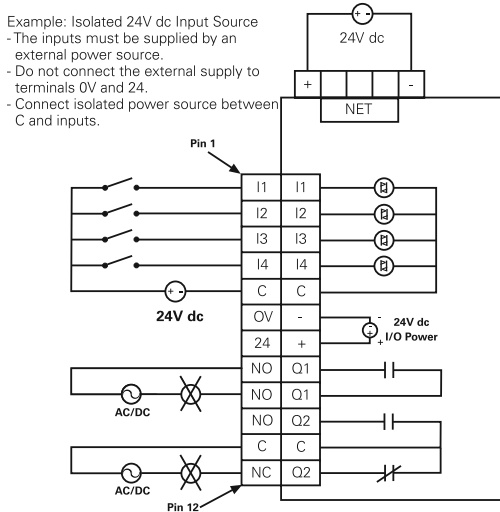


Figure 8. S811+ to C441KS and C441LS Wiring Diagram

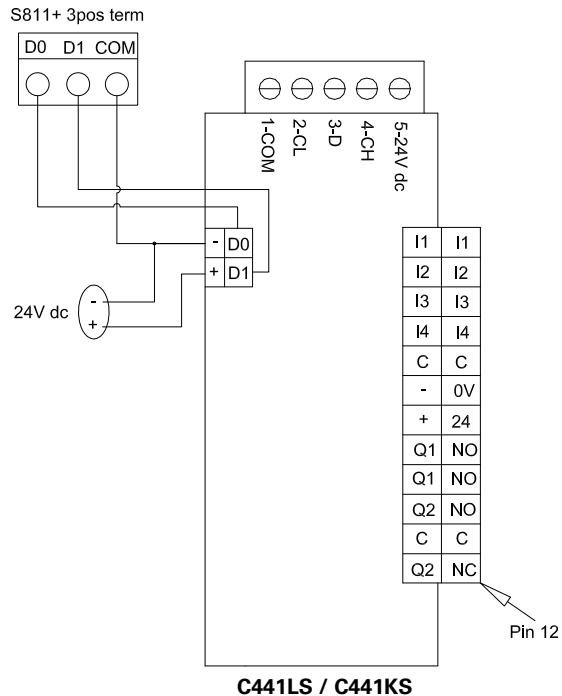


Figure 9. C440 to C441KS and C441LS Wiring Diagram

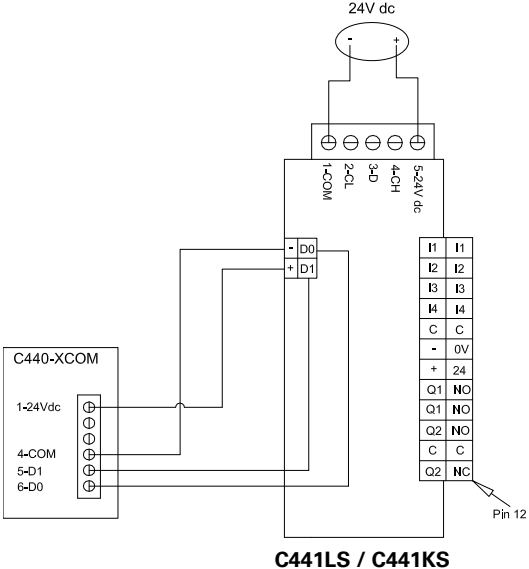
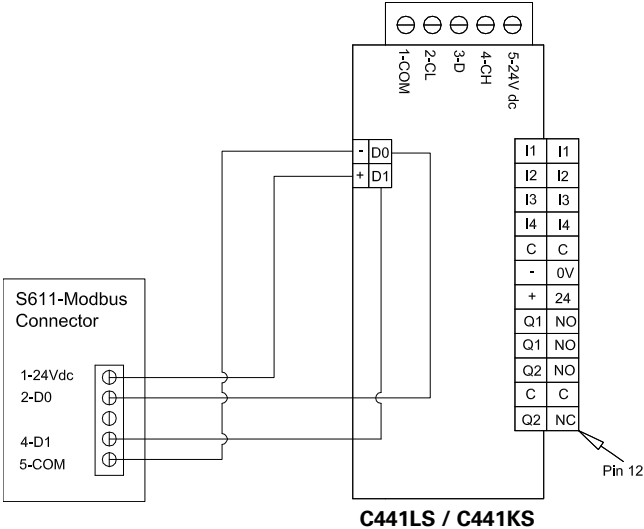


Figure 10. S611 to C441KS and C441LS Wiring Diagram



The S611 can be wired to the C441KS / C441LS or connected to the C441K / C441L.

Status Indicators

The C441 DeviceNet adapter supports a single bi-color green/red Module/Network status LED.

Table 13. 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)

There are also status LEDs for the 4 inputs and the 2 outputs, indicating their state. If power is applied to an input, its corresponding LED will illuminate and if an output is instructed to energize by the DeviceNet master, its corresponding LED will illuminate.

The Input Status Indicator states are described in the table below.

Table 14. Input Status (I1–I4) Indicator

Indicator State	Description
Off	Field Input signal is off
On Solid	Field Input signal is on

The Output Status Indicator states are described in the table below.

Table 15. Output Status (O1–O2) Indicator

Indicator State	Description
Off	Field Output signal is off
On Solid	Field Output signal is on

Configuration

Configuration Using an EDS File

Multiple EDS files are available for the DeviceNet Module depending on the configuration of the module:

- Connected to the C441 Motor Insight
- Connect to the C440 overload relay
- Connected to the S611 Soft Starter
- Connected to the S811+ Soft Starter
- Stand-Alone I/O

These EDS files can be imported into any DeviceNet configuration tools that support EDS files including Eaton's CHStudio and Rockwell's RSNetworkx for DeviceNet.

The EDS files can be downloaded from the Eaton web site: <http://www.eaton.com/electrical>

Installing CHStudio on Windows 7

CHStudio will run in Windows® 7 but it must be installed in Windows 2000 compatibility mode. This is done per the following:

- Right click on the "Setup.exe" application file and choose Properties
- Select the Compatibility tab
- Select "Run this program in compatibility mode for:"
- From the drop down menu, select Windows 2000

You will need admin rights to install the software, but will not need admin rights to run it.

DeviceNet Protocol Support

Replacing an Advantage Starter (WPONIDNA) or an *IT* Starter (DSNAP) on DeviceNet with a C441 Motor Insight (C441K/L) or a C440 Overload Relay (C441KS/LS)

The C441 Motor Insight (C441K/L) and the C440 Overload Relay (C441KS/LS) contain DeviceNet I/O Assemblies with the same size and I/O layout as those of the Advantage Starter (WPONIDNA) and *IT* Starter (DSNAP). These assemblies provide seamless migration paths from legacy motor control platforms to the new C440/C441 solutions. No program changes are required. Follow the procedure below and select the appropriate I/O assemblies from the table provided.

1. Download the latest .eds file from the Eaton website for the C441 Motor Insight (C441K/L) or for the C440 Overload Relay (C441KS/LS) (www.eaton.com/software). Select "DeviceNet Electronic Data Sheets."
2. Register the appropriate .eds file into the RSNetworkx for DeviceNet software.
3. Disconnect the Advantage/WPONIDNA or *IT* starter/DSNAP from the network, noting the MAC ID of the device (The WPONIDNA indicates its MAC ID with the "NA" LED: each red flash represents 10 and each green flash represents 1. The DSNAP MAC ID is set with its DIP switches).
4. The baud rate used on the network is most likely 125 kBaud. This must be verified before adding a C440 or C441 Motor Insight to the network. Once verified, the MAC ID and baud rate can be set on the C441K/L/KS/LS DeviceNet interface modules via their DIP switches as follows:

Table 16. MAC ID

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

Table 17. Baud Rate

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

5. Connect the C441 Motor Insight (C441K/L) or C440 overload (C441KS/LS) along with either an *XT* or Freedom contactor as a replacement for the Advantage Starter (WPONIDNA) or *IT* Starter (DSNAP) to the DeviceNet network.

6. Start RSNetworkx for DeviceNet and go online with the network.
7. Select the device that was just added and open the Property pages for this Device, select the Parameters tab and choose upload.
8. Scroll down to the "Poll Input Assembly Select" and "Poll Output Assembly Select" parameters and change these assembly values to match the I/O assembly layouts previously used by the device being replaced. Use **Table 18** below to select the correct I/O assembly values to enter. Select Apply and Download.
9. Open the Properties for the DeviceNet Scanner and select the Scanlist tab and upload the scan list.
10. An "Electronic Key Mismatch" window will be displayed, indicating a device with a different Device Type has been substituted at the same MAC ID. Select "Update Key" and the WPONIDNA or DSNAP will be replaced with the name of the new device. The scanner will also clear the error and begin polling the new device, provided the correct I/O assemblies were selected with the same lengths as those of the device replaced.
11. Select Apply then Download the new scan list to the scanner. No program changes are needed and the DeviceNet scanner should now be successfully polling the new device, with full monitoring and control capabilities.

Table 18. Compatible Assemblies

Assembly Type	DSNAP Assemblies	Compatible C440/C441 Assemblies	Number of Bytes
Input	51, 53, 54, 60, 114	151	1
Input	102, 103	153	5
Input	105, 106	152	4
Input	108, 109	154	6
Output	03, 05	150	1

Assembly Type	WPONIDNA Assemblies	Compatible C440/C441 Assemblies	Number of Bytes
Input	50, 51, 52, 53, 54, 100	161	1
Input	101, 102, 103	162	5
Input	104, 105, 106	164	7
Input	107, 108, 109	163	6
Output	01, 02, 03, 04, 05	160	1

Note: The I/O layouts for these assemblies can be found on the next page.

Names rather than numbers are used in the .eds file for the WPONIDNA as follows.

50: Basic Overload
51: Extended Overload
52: Basic Motor Control
53: Extended Motor Control 1
54: Extended Motor Control
100: Advantage Contactor
101: Advantage Overload
102: Advantage Motor Starter
103: Advantage Expanded Motor Starter
104: Advantage Overload Phase Currents
105: Advantage Starter Phase Currents
106: Advantage Expanded Starter Phase Currents
107: Advantage Overload with Fault Code
108: Advantage Motor Starter with Fault Code
109: Advantage Expanded Motor Starter with Fault Code
01: Basic Contactor Assembly
02: Basic Overload Assembly
03: Basic Motor Starter
04: Extended Contactor Assembly
05: Extended Motor Starter Assembly

Supported Connections

The DeviceNet modules allow the connected device to connect on DeviceNet. It is connected as a DeviceNet slave and supports both explicit and implicit messages.

The Implicit messages supported include:

- Polled
- Bit Strobe

DeviceNet Object Model for C441 Motor Insight

Motor Insight DeviceNet Full Profile (12 Objects)

Table 19. Motor Insight DeviceNet—Class

Class	Object	Number of Instances
0x01	Identity	1
0x02	Message Router	1
0x03	DeviceNet	1
0x04	Assembly	(See assembly object details)
0x05	Connection	3
0x08	Discrete Input Point	4
0x09	Discrete Output Point	2
0x29	Control Supervisor	1
0x2C	Overload	1
0x93	Voltage Monitor	1
0x94	DeviceNet Interface	1
0x99	TestOnly	1 (unpublished)

Identity Object, Class 0x01 (Motor Insight)

Table 20. Identity Instance Services (Motor Insight)

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 comm module is not connected to a Motor Insight, the comm module will assume the Discrete I/O profile. If the comm module is connected to a Motor Insight, it will marry to the Motor Insight 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

Table 21. Identity Instance Attributes (Motor Insight)

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 3 for overload
3		Get	Product Code	UINT	Identification of a particular product of an individual vendor	The constant 0x1101, 0x1102, 0x112, or 0x1123
4		Get	Revision	STRUCT of:	Revision of the item the Identity Object represents	
			Major Revision	USINT		The constant 0x02
			Minor Revision	USINT		The constant 0x06

Table 21. Identity Instance Attributes (Motor Insight), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
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	
177 (0xB1)	NV	Get	DSP Firmware Version	UINT	Version of MI base unit DSP firmware	
178 (0xB2)	NV	Get	UI Firmware Version	UINT	Version of UI micro-controller firmware	
179 (0xB3)	NV	Get	Unit ID	UINT	A number representing the maximum catalog FLA	Unit ID Cat No. 0x00BA (186)—C441BA 0x00BB (187)—C441BB 0x00CA (202)—C441CA 0x00CB (203)—C441CB 0x00DA (218)—C441DA 0x00DB (219)—C441DB 0x00EA (234)—C4410109(x) 0x00EB (235)—C4410590(x)

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:

Table 22. Bit Definitions for Instance #1, Status Attribute of Identity Object (Motor Insight)

Bit(s)	Called	Definition
0	Owned	
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" default. 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 present 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:

Table 23. 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 (Motor Insight)

No class or instance attributes are supported.

Table 24. Message Router Instance Services (Motor Insight)

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

Table 25. Message Router Instance Attributes (Motor Insight)

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 max 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 (Motor Insight)

Table 26. DeviceNet Instance Services (Motor Insight)

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

Table 27. DeviceNet Instance Attributes (Motor Insight)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5		Get	Allocation Information	STRUCT of:		
			Allocation 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
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 (Motor Insight)

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 bind input data or output data. The terms “input” and “output” are defined from the network’s 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)**.

Table 28. Assembly Instance Services (Motor Insight)

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

Table 29. Assembly Instance Attributes (Motor Insight)

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

Table 30. Assembly Instances (Motor Insight)

Type	Instance	Usage	Name
Input	50	Poll, Bit Strobe	Basic Overload (ODVA Overload Profile)
Input	51	Poll, Bit Strobe	Extended Overload (ODVA Overload Profile)
Input	107 ①	Poll, Bit Strobe	Extended Overload with Discrete Input and Output Points
Input	100 ②	Poll	User Defined Input Assembly Short
Input	110	Poll	User Defined Input Assembly Long
Output	2	Poll	Basic Overload (ODVA Overload Profile)
Output	105 ②	Poll	Basic Overload with Discrete Output Points
Output	111 ① (0x6F)	Bit Strobe	Accepts 8 bytes of bit strobe command to trigger bit strobe response
Input	151 (0x97)	Poll	Extended Motor Starter—DSNAP
Input	152 (0x98)	Poll	Abbreviated Motor Starter—DSNAP
Input	153 (0x99)	Poll	DSNAP Motor Starter
Input	154 (0x9A)	Poll	DSNAP Motor Starter with Fault Code
Output	150 (0x96)	Poll	Motor Starter—DSNAP
Input	161 (0xA1)	Poll	Extended Motor Control—Advantage
Input	162 (0xA2)	Poll	Advantage Motor Starter
Input	163 (0xA3)	Poll	Advantage Motor Starter with Fault Code
Input	164 (0xA4)	Poll	Advantage Expanded Starter Phase Currents
Output	160 (0xA0)	Poll	Motor Starter—Advantage

Notes

- ① Indicates default assembly instances used in bit strobe connection.
- ② Indicates default assembly instances used in poll connection.

Table 31. Input Assembly 50 (Motor Insight Basic Overload)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0								Faulted

Table 32. Input Assembly 51 (Motor Insight Extended Overload)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0							Warning	Faulted

Table 33. Input Assembly 107 (Motor Insight)

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	Warning	Faulted

Input Assembly 100 (Motor Insight Short Assembly)

Values are selected from the list defined below.

Table 34. Input Assembly 100 (Motor Insight Short Assembly)

Byte	Word	Value	Default Value
0	0	Value selected by DeviceNet interface object, attribute 7	Device Status (Low Byte) (See Control Supervisor Object)
1			L1 Current (Low Byte)
2	1	Value selected by DeviceNet interface object, attribute 8	L1 Current (High Byte)
3			L2 Current (Low Byte)
4	2	Value selected by DeviceNet interface object, attribute 9	L2 Current (High Byte)
5			L3 Current (Low Byte)
6	4	Value selected by DeviceNet interface object, attribute 10	L3 Current (High Byte)
7			L1 Current (Low Byte)

Input Assembly 110 (Motor Insight Long Assembly)

Values are selected from the list defined below.

Table 35. Input Assembly 110 (Motor Insight Long Assembly)

Byte	Word	Value	Default Value
0	0	Value selected by DeviceNet interface object, attribute 12	Device Status (Low Byte) (See Control Supervisor Object)
1			Device Status (High Byte)
2	1	Value selected by DeviceNet interface object, attribute 13	L1 Current (Low Byte)
3			L1 Current (High Byte)
4	2	Value selected by DeviceNet interface object, attribute 14	L2 Current (Low Byte)
5			L2 Current (High Byte)
6	3	Value selected by DeviceNet interface object, attribute 15	L3 Current (Low Byte)
7			L3 Current (High Byte)
8	4	Value selected by DeviceNet interface object, attribute 16	Field Inputs (Low Byte)
9			Field Inputs (High Byte)
10	5	Value selected by DeviceNet interface object, attribute 17	RMS Current Ave (Low Byte)
11			RMS Current Ave (High Byte)
12	6	Value selected by DeviceNet interface object, attribute 18	RMS Voltage VAB (Low Byte)
13			RMS Voltage VAB (High Byte)
14	7	Value selected by DeviceNet interface object, attribute 19	RMS Voltage VBC (Low Byte)
15			RMS Voltage VBC (High Byte)
16	8	Value selected by DeviceNet interface object, attribute 20	RMS Voltage VCA (Low Byte)
17			RMS Voltage VCA (High Byte)
18	9	Value selected by DeviceNet interface object, attribute 21	RMS Voltage Ave (Low Byte)
19			RMS Voltage Ave (High Byte)

Table 36. Input Assembly 100 and 110 Selection List (Motor Insight)

Value	Description
0	Assembly terminator
1	Device Status Data—(See control supervisor object)
2	RMS Current IA
3	RMS Current IB
4	RMS Current IC
5	RMS Current Average
6	RMS Voltage VAB
7	RMS Voltage VBC
8	RMS Voltage VCA
9	RMS Voltage Average
10	Total kW
11	Voltage Unbalance Percent
12	Current Unbalance Percent
13	Apparent Power Factor
14	Residual Ground Current Deciamps
15	Frequency
16	Overload Thermal Pile
17	Trip Reason
18	Overload Status
19	Error Code
20	Field Inputs

Table 37. Output Assembly 2

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset		

Table 38. Output Assembly 105

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0			Remote Trip			Fault Reset	Out 2	Out 1

Table 39. Output Assembly 111—Bit Strobe Command (Motor Insight)

Sixty-four bits of strobe data, one per MAC ID. The data is ignored by the Motor Insight DeviceNet adapter.

Note: For the DSNAP and WPONIDNA Input Assemblies, “CtlFromNet” (bit5) reflects the state of Input 3. On the C441 DeviceNet module, “AtRef” (bit7) reflects the state of Input 4.

Table 40. Input Assembly 151—FVR/FVNR (C441 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted

Table 41. Input Assembly 152—FVR/FVNR (C441 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted
1					% Thermal			
2					% FLA			
3					Fault Code Low Byte Only			

Table 42. Input Assembly 153—FVR/FVNR (C441 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted
1					% Thermal			
2					Ave Current Low Byte			
3					Ave Current High Byte			
4					% FLA			

Table 43. Input Assembly 154—FVR/FVNR (C441 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted
1					% Thermal			
2					Ave Current Low Byte			
3					Ave Current High Byte			
4					Last Fault Code Low Byte			
5					Last Fault Code High Byte			

Table 44. Output Assembly 150—FVR/FVNR (C441 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset	Run 2	Run 1

Table 45. Input Assembly 161—FVR/FVNR (C441 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted

Table 46. Input Assembly 162—FVR/FVNR (C441 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted
1					% Thermal			
2					Ave Current Low Byte			
3					Ave Current High Byte			
4					% Phase Imbalance			

Table 47. Input Assembly 163—FVR/FVNR (C441 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted
1					% Thermal			
2				Ave Current Low Byte				
3				Ave Current High Byte				
4				Last Fault Code Low Byte				
5				Last Fault Code High Byte				

Table 48. Input Assembly 164—FVR/FVNR (C441 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1	Warning	Faulted
1				Phase Current L1 Low Byte				
2				Phase Current L1 High Byte				
3				Phase Current L2 Low Byte				
4				Phase Current L2 High Byte				
5				Phase Current L3 Low Byte				
6				Phase Current L3 High Byte				

Table 49. Output Assembly 160—FVR/FVNR (C441 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset	Run 2	Run 1

Connection Object, Class 0x05 (Motor Insight)

Table 50. Connection Instance Services (Motor Insight)

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

Table 51. Connection Object Instance #1 Attributes (Explicit Messaging) (Motor Insight)

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)

Table 51. Connection Object Instance #1 Attributes (Explicit Messaging) (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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
9	Get/Set		expected_packet_rate	UINT	0, 2500–FFFF Defines timing associated with this Connection Default = 0x09C4 (2500 milliseconds)
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

Table 52. Connection Object Instance #2 Attributes (Polled I/O) (Motor Insight)

Attr ID	Access Rule	NV	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

Table 52. Connection Object Instance #2 Attributes (Polled I/O) (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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 100: "0x62 0x36 0x34." Allowable EPATHS: 107 (0x6B) : "0x62 0x36 0x42" 100 (0x64) : "0x62 0x36 0x34" 110 (0x6C) : "0x62 0x36 0x45" 151 (0x97) : "0x62 0x39 0x37" 152 (0x98) : "0x62 0x39 0x38" 153 (0x99) : "0x62 0x39 0x39" 154 (0x9A) : "0x62 0x39 0x41" 161 (0xA1) : "0x62 0x41 0x31" 162 (0xA2) : "0x62 0x41 0x32" 163 (0xA3) : "0x62 0x41 0x33" 164 (0xA4) : "0x62 0x41 0x34"
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 EPAT	Specifies the Application Object(s) that are to receive the data consumed by this Connection Object. Default assembly instance 105 (0x69): "0x62 0x36 0x39." Allowable EPATHS: 2 (0x02) : "0x62 0x30 0x32" 150 (0x96) : "0x62 0x39 0x36" 160 (0xA0) : "0x62 0x41 0x30"

Table 53. Connection Object Instance #3 Attributes (Bitstrobe I/O) (Motor Insight)

Attr ID	Access Rule	NV	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

Table 53. Connection Object Instance #3 Attributes (Bitstrobe I/O) (Motor Insight), 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 = 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 Default assembly instance 107 "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 (Motor Insight)**Table 54. Discrete Input Point Instance Services (Motor Insight)**

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

Table 55. Discrete Input Point Object Instance #1–4 (Motor Insight)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
3		Get	Value	BOOL	0 = off; 1 = on
101		Set	Debounce	UDINT	Milliseconds 1 to 1000 ms

Input Point Value

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

Discrete Output Object, Class 0x09 (Motor Insight)

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.

Table 56. Discrete Output Point Instance Services (Motor Insight)

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

Table 57. Discrete Input Point Object Instance #1–2 (Motor Insight)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
3		Set	Value	BOOL	Output point value 0 = off; 1 = on
5	NV	Set	Fault Action	BOOL	Action taken on output’s value in Communication Fault state (see below for details) 0 = Fault Value attribute; 1 = no change
6	NV	Set	Fault Value	BOOL	User-defined value for use with Fault Action attribute (see below for details) 0 = off; 1 = on
7	NV	Set	Idle Action	BOOL	Action taken on output’s value in Communication Idle state (see below for details) 0 = Idle Value attribute; 1 = no change
8	NV	Set	Idle Value	BOOL	User-defined value for use with Idle Action attribute (see below for details) 0 = off; 1 = on

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.

Control Supervisor Object, Class 0x29 (Motor Insight)**Table 58. Control Supervisor Instance Services (Motor Insight)**

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
0x05	Reset	N/A	Resets the device to start-up state

Table 59. Control Supervisor Instance Attributes (Motor Insight)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
10		Get	Faulted/Tripped	BOOL	1 = Fault Occurred (latched) 0 = No Faults present
11		Get	Warning	BOOL	1 = Warning (not latched) 0 = No Warnings present
12		Set	FaultRst	BOOL	0 ≥ 1 = Fault Reset 0 = No action (Overload Reset)
13		Get	FaultCode	UINT	If in Faulted state, Fault Code indicates the fault that caused the transition to Faulted state. If not in Faulted state, Fault Code indicates the fault that caused the last transition to the Faulted state.
17		Set	ForceFault	BOOL	0 ≥ 1 = Force Fault 0 = No action
101		Get	Device Status	WORD	Device Bit Array Bit 0: Trip Bit1: Warn Bit2: Output #1 Bit3: Output #2 Bit4: Input #1 Bit5: Input #2 Bit6: Input #3 Bit7: Input #4 Bit8: Overload Power Lost Bit 9–15: reserved
102		Get	Trip Reason	WORD	Fault (Trip) Reason Bit Array Bit 0: Fault Lockout Bit1: Relay Off Command Bit2: Contactor Failure Bit3: Under Current Bit4: Overload Bit5: Ground Fault Bit6: Current Unbalance Bit7: Current Single-Phase Bit8: Reserved Bit9: High Power (kW) Bit10: Over Voltage Bit11: Under Voltage Bit12: Voltage Unbalance Bit13: Over Current Bit14: Low Power (kW) Bit15: Phase Reversal

Table 59. Control Supervisor Instance Attributes (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
103		Get	Overload Status	WORD	Overload Status Bit Array Bit 0: Overload Trip Bit1: Ground Fault Trip Bit2: High Power Trip Bit3: reserved Bit4: reserved Bit5: reserved Bit6: reserved Bit7: Relay Closed Bit 8–15: reserved
104		Get	Warning Status	WORD	Warning Bit Array Bit 0: Low Voltage Bit1: High Voltage Bit2: Voltage Unbalance Bit3: Low Power Bit4: Reverse Phase Bit5: Current Unbalance Bit6: Voltage Single-Phase Bit7: Current Single-Phase Bit8: Ground Fault Phase Bit9–15: reserved
105	NV	Set	Comm Fault Trip Action	BOOL	Action taken on trip state in Comm Fault state 0 = Use Comm Fault Trip Value attribute 1 = no affect
106	NV	Set	Comm Fault Trip Value	BOOL	User-defined value for use with Comm Fault Trip Action attribute 0 = no affect; 1 = trip
107	NV	Set	Idle Trip Action	BOOL	Action taken on trip state in Communication Idle state 0 = Use Idle Trip Value attribute; 1 = no change
108	NV	Set	Idle Trip Value	BOOL	User-defined value for use with Idle Trip Action attribute 0 = no affect; 1 = trip
109	NV	Get	Fault Log 0	UINT	
110	NV	Get	Fault Log 1	UINT	
111	NV	Get	Fault Log 2	UINT	
112	NV	Get	Fault Log 3	UINT	
113	NV	Get	Fault Log 4	UINT	
114	NV	Get	Fault Log 5	UINT	
115	NV	Get	Fault Log 6	UINT	
116	NV	Get	Fault Log 7	UINT	
117	NV	Get	Fault Log 8	UINT	
118	NV	Get	Fault Log 9	UINT	
119		Set	Clear Last Fault Log Entry	BOOL	0 ≥ 1 = Fault Entry Cleared 0 = No action

Table 59. Control Supervisor Instance Attributes (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
120	NV	Set	Trip Enable/Disable	WORD	Trip Enable/Disable bit array Bit 0: Enable Ground Fault Trip Bit 1: Enable Voltage Unbalance Trip Bit 2: Enable Current Unbalance Trip Bit 3: Enable Under Current Trip Bit 4: Enable Phase Loss Trip Bit 5: Enable Jam Bit 6: Enable LKW Trip Bit 7: Enable HKW Trip Bit 8: Enable Overvoltage Trip Bit 9: Enable Undervoltage Trip Bit 10: Enable Phase Order Trip
121 ①	NV	Get/Set	Aux Relay Config Byte 1	WORD	Only available for 120 V Control Power models. Each bit of this configuration parameter enables (value 1) or disables (value 0) a fault for the auxiliary relay. The meanings of the bits are: 0x01: Ground Fault 0x02: Voltage Unbalance 0x04: Current Unbalance 0x08: Under Current 0x10: Phase Loss 0x20: Jam
122 ①	NV	Get/Set	Aux Relay Config Byte 2	WORD	Only available for 120 V Control Power models. Each bit of this configuration parameter enables (value 1) or disables (value 0) a fault for the auxiliary relay. The meanings of the bits are: 0x01: Low Power 0x02: High Power 0x04: Over Voltage 0x08: Under Voltage 0x10: Phase Order 0x20: Overload 0x40: Supply Frequency Fault
123 ①	NV	Get/Set	Aux Relay Reset Delay	UINT	Only available for 120 V Control Power models. 0: Automatic reset of the auxiliary relay disabled 1–500: automatic auxiliary relay reset delay since last auxiliary relay fault
124 ①		Get	Aux Relay Reason	WORD	120 Vac Control Power models only Relay Off Command 0x0002—Relay was turned off Contactor Failure 0x0004—Current phase loss without voltage phase loss Under Current 0x0008 Overload 0x0010 Ground Fault 0x0020 Current Unbalance 0x0040 Current Single-Phase 0x0080—Current phase loss with voltage phase loss Supply Frequency Fault 0x0100 High Power (kW) 0x0200 Over Voltage 0x0400 Under Voltage 0x0800 Voltage Unbalance 0x1000 Over Current 0x2000 Low Power (kW) 0x4000 Phase Reversal 0x8000
125 ②	NV	Get/Set	Anti-backspin time	USINT	A fault will be generated after every motor stop—no resets will be permitted during the backspin period Range = 0 to 3600 seconds

Notes

① CP 120 V Versions only.

② Supported in MI-CP-HVR only.

Faulted/Tripped

A condition exists that is out of the normal operating range of the device. This condition has been configured to cause the device to enter the faulted or tripped state.

Fault Reset

Commands the device out of the faulted state. A transition from 0 to 1 will cause the fault reset.

Initial Value	Commended Value	Result
0	0	No Action
0	1	Reset Fault
1	0	No Action
1	1	No Action

Fault Status

Displays the Motor Insight fault status register.

Device Status

Displays the Motor Insight status as described in the instance attributes table.

Overload Object, Class: 0x2C (Motor Insight)

Table 60. Overload Instance Service (Motor Insight)

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

Table 61. Overload Instance Attributes (Motor Insight)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
4	NV	Set	TripClass	USINT	Trip Class Setting 5 to 30
5		Get	AvgCurrent	INT	2–9 Amps 1–5 Amps 60–135 Amps 120–270 Amps (C4410109NOUI EIEC C441CP) 240–540 Amps 20–90 Amps 10–45 Amps 6.67–30 Amps 5–22.5 Amps
6		Get	%PhImbal	USINT	% Phase Imbalance
7		Get	%Thermal	USINT	Displayed in percentage—0% cold motor, 100% will cause and overload trip (0–255)

Table 61. Overload Instance Attributes (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
8		Get	Current L1	INT	2–9 Amps 1–5 Amps 60–135 Amps 120–270 Amps (C4410109NOUI EIEC C441CP) 240–540 Amps 20–90 Amps 10–45 Amps 6.67–30 Amps 5–22.5 Amps
9		Get	Current L2	INT	2–9 Amps 1–5 Amps 60–135 Amps 120–270 Amps (C4410109NOUI EIEC C441CP) 240–540 Amps 20–90 Amps 10–45 Amps 6.6–30 Amps 5–22.5 Amps
10		Get	Current L3	INT	2–9 Amps 1–5 Amps 60–135 Amps 120–270 Amps (C4410109NOUI EIEC C441CP) 240–540 Amps 20–90 Amps 10–45 Amps 6.67–30 Amps 5–22.5 Amps
11		Get	Ground Current	INT	Ground Current Units: 100 mA
101	NV	Set	Motor Run Time	UINT	Reset by writing zero
102	NV	Set	Start Count	UINT	Reset by writing zero
103	NV	Set	CT Multiplier	UINT	1 to 5 For 90 Amp Units: 1–4, number of conductors through CT. For 9 Amp Units: 1–2, number of conductors through CT; For 9 Amp Units, CT multipliers: 3 (150:5), 4 (300:5), 5 (600:5) Cat No C441BB, C441CB, C441DB 1-4 Cat No C441BA, C441CA, C441DA 1, 2, 3 (150:5), 4 (300:5), 5 (600:5)
104			Reserved		
105	NV	Set	Motor FLA	UINT	200 to 900 (for CT multiplier 1) Setting is in Amps x 100 Cat No C441BB, C441CB, C441DB 5–22.5 Amps (CT Multiplier = 4) 6.67–30 Amps (CT Multiplier = 3) 10–45 Amps (CT Multiplier = 2) 20–90 Amps (CT Multiplier = 1) Cat No C441BA, C441CA, C441DA 1–5 Amps (CT Multiplier = 2) 2–9 Amps (CT Multiplier = 1) 60–135 Amps (CT Multiplier = 3) 120–270 Amps (CT Multiplier = 4) 240–540 Amps (CT Multiplier = 5)

Table 61. Overload Instance Attributes (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
106		Get	Power Factor	UINT	Power Factor x100 (inductive 0–100)
107		Get	Motor Power (kW)	UINT	kW x100 (kW x10 for external CTs)
108		Get	Motor Fault Time to restart	UINT	Seconds remaining
109		Get	Load Fault Time to restart	UINT	Seconds remaining
110	NV	Set	Load Fault Reset Delay	UINT	2–500 (20) Minutes See Register 443 to enable Automatic Load Fault Reset Delay calculator
111	NV	Set	Load Fault Num Reset Attempts	UINT	0 = Manual Mode, 1–4, 5 = Auto reset mode
112	NV	Set	Motor Fault Reset Delay	UINT	2–500 (8) Minutes See Register 434 for application to Overload Fault
113	NV	Set	Motor Fault Num Restarts Attempts	UINT	0–10 0 = Manual, 1–4, 5 = Auto reset mode See Register 434 for application to Overload Fault
114	NV	Set	Run Transition Time Seconds	UINT	1–180 seconds
115	NV	Set	Run Transition Percent of FLA	UINT	25–125%
116	NV	Set	Ground Fault Trip Mode	UINT	0 = Trip on ground fault—default 1 = Alarm-no-trip
117	NV	Set	Ground Fault Pickup Delay Seconds	UINT	1–60 (30) Seconds
118	NV	Set	Ground Fault Pickup Level	UINT	30 to 200 for CT multiplier 1 Setting in Amps x 100 Cat No C441BB, C441CB, C441DB 3–20 A (CT Multiplier = 1) 1.5–10 (CT Multiplier = 2) 1–6.66 (CT Multiplier = 3) 0.75–5 (CT Multiplier = 4) Default setting is 10 A Cat No C441BA, C441CA, C441DA 0.3–2.0 A (CT Multiplier = 1) 0.15–1.0 (CT Multiplier = 2) 9–60 (CT Multiplier = 3) 18–120 (CT Multiplier = 4) 36–240 (CT Multiplier = 5) Default setting is 1 A Use Register 433 to enable/disable Use Register 421 to set trip delay
119	NV	Set	Current Unbalance Trip Delay Seconds	UINT	1–20 (10) Seconds
120	NV	Set	Current Unbalance Trip Pickup Level Percent	UINT	1–30% (15%)
121	NV	Set	Jam Trip Delay Seconds	UINT	1–20 (2) Seconds

Table 61. Overload Instance Attributes (Motor Insight), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
122	NV	Set	Jam PickupLevel	UINT	50–400% of Motor FLA (register 407) Use Register 433 to enable/disable Use Register 424 to set trip delay
123	NV	Set	Current Phase Loss Pickup Delay	UINT	1–20 (10) Seconds
124	NV	Set	High Kw Trip Time	UINT	1–60 (5) Seconds
125	NV	Set	High Kw Trip Limit	UINT	40–990 for 441CP 120 V Default value is the maximum value in the range. Registers 407 (Motor FLA) and 403 (CT Multiplier) control the range of this parameter. Use Register 433 to enable/disable Use Register 429 to set trip delay
126	NV	Set	Low Power Trip Delay Seconds	UINT	1–60 (5) Seconds
127	NV	Set	Low Power Pickup Level	UINT	Setting is in kW x 100 Default value is the minimum value in the range. Registers 407, Motor FLA, and 403, CT Multiplier, control the range of this parameter. Use Register 433 to enable/disable Use Register 423 to set trip delay
128	NV	Set	Under Current Pickup Delay Seconds	UINT	1–60 (5) Seconds
129	NV	Set	Under Current Trip Pickup Level	UINT	10–90% (50%) of Motor FLA (Register 407) Use Register 433 to enable/disable Use Register 422 to set trip delay
130	NV	Set	Overload Reset Mode	UINT	0 = manual reset mode—default 1 = apply Register 417 and 420 to overload fault
131	NV	Set	Load Fault Reset Delay Calculator	BOOL	0 = disabled—default 1 = enabled
132 ①	NV	Set	Overload on start enable	USINT	0 = Disabled 1 = Enabled
133 ①	NV	Set	GF on start enable	USINT	0 = Disabled 1 = Enabled

Note

① Supported in MI-CP-HVR only.

Voltage Monitor Object, Class 0x93 (Motor Insight)**Table 62. Voltage Monitor Instance Services (Motor Insight)**

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

Table 63. Voltage Monitor Instance Attributes (Motor Insight)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
1		Get	Rms Voltage Vab	UINT	L1-L2 RMS Voltage
2		Get	Rms Voltage Vbc	UINT	L2-L3 RMS Voltage
3		Get	Rms Voltage Vca	UINT	L3-L1 RMS Voltage
4		Get	Rms Voltage Avg	UINT	Average RMS Voltage
5		Get	Voltage Unbalance Percent	UINT	
6		Get	Frequency	UINT	HZ x 100
7	NV	Set	Voltage Faults Trip Mode	UINT	0 = Trip on supply fault 1 = Alarm-no-trip (inhibit start)—default
8	NV	Set	Under Voltage Trip Pickup Level	UINT	170–264 V (216 V)C441BA, C441BB 323–528 V (432 V)C441CA, C441CB 489–660 V (540 V)C441DA, C441DB Use Register 433 to enable/disable Use Register 426 to set trip delay Use Register 435 to configure supply fault alarm behavior
9	NV	Set	Under Voltage Trip Delay	UINT	1–20 (10) Seconds
10	NV	Set	Over Voltage Trip Pickup Level	UINT	170–264 V (264 V)C441BA, C441BB 323–528 V (528 V)C441CA, C441CB 489–660 V (540 V)C441DA, C441DB Use Register 433 to enable/disable Use Register 427 to set trip delay Use Register 435 to configure supply fault alarm behavior
11	NV	Set	Over Voltage Trip Delay	UINT	1–20 (10) Seconds
12	NV	Set/Get	Voltage Unbalance Trip Pickup Level	UINT	1–20% (6%) Use Register 433 to enable/disable Use Register 428 to set trip delay Use Register 435 to configure supply fault alarm behavior
13	NV	Set	Voltage Unbalance Trip Delay	UINT	1–20 (10) Seconds
14	NV	Set	Phase Order	UINT	0 = Trip Disabled, 1 = ACB, 2 = ABC (1)
15	NV	Set	Restart Delay	UINT	0–500 (10) Seconds
16	NV	Get	Supply Fault—Time To Restart	UINT	Seconds remaining
100 ①	NV	Set/Get	Wire Config	USINT	0 = Three-Phase 1 = Single-Phase Voltage and Current 2 = Three-Phase current only (HVR style only)
101 ①	NV	Set/Get	PT Ratio	USINT	Indicates a PT Ratio: 120 step down Range = 0 to 8000, (zero indicates no PT connected)

Note

① Supported in MI-CP-HVR only.

DeviceNet Interface Object, Class 0x94 (Motor Insight)**Table 64. DeviceNet Interface Object Instance Services (Motor Insight)**

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

Table 65. DeviceNet Interface Object Instance Attributes (Motor Insight)

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 = 100, Valid Values: 50, 51, 107, 100, 110
4	NV	Set	Bit Strobe Input Assembly Select	USINT	Bit Strobe Connection Input Assembly instance that is active	Default = 107, Valid Values: 50, 51, 107
5	NV	Set	Poll Output Assembly Select	USINT	Poll Connection Output Assembly instance that is active	Default = 105, Valid Values 2, 105
6		Get	Short Assembly User Input, Size	USINT	Total size of assembly 100 as determined by user selected input list items	Determined by the placement of the "0" below
7	NV	Set	Short Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of short user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
8	NV	Set	Short Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of short user input assembly	Default = 2; L1 Current
9	NV	Set	Short Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of short user input assembly	Default = 3; L2 Current
10	NV	Set	Short Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of short user input assembly	Default = 4; L3 Current
11		Get	Long Assembly User Input, Size	USINT	Total size of assembly 110 as determined by user selected input list items	Determined by the placement of the "0" below
12	NV	Set	Long Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of long user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
13	NV	Set	Long Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of long user input assembly	Default = 2; L1 Current
14	NV	Set	Long Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of long user input assembly	Default = 3; L2 Current
15	NV	Set	Long Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of long user input assembly	Default = 4; L3 Current
16	NV	Set	Long Assembly User Input, Word 4 Param	USINT	Data item assigned to Word 4 of long user input assembly	Default = 20 Field Inputs
17	NV	Set	Long Assembly User Input, Word 5 Param	USINT	Data item assigned to Word 5 of long user input assembly	Default = 5 Current Ave
18	NV	Set	Long Assembly User Input, Word 6 Param	USINT	Data item assigned to Word 6 of long user input assembly	Default = 6 Voltage VAB

Table 65. DeviceNet Interface Object Instance Attributes (Motor Insight), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Value
19	NV	Set	Long Assembly User Input, Word 7 Param	USINT	Data item assigned to Word 7 of long user input assembly	Default = 7 Voltage VBC
20	NV	Set	Long Assembly User Input, Word 8 Param	USINT	Data item assigned to Word 8 of long user input assembly	Default = 8 Voltage VCA
21	NV	Set	Long Assembly User Input, Word 9 Param	USINT	Data item assigned to Word 9 of long user input assembly	Default = 9 Voltage Ave

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.

DeviceNet Object Model for C440 Overload Relay

C440 DeviceNet Full Profile (11 Objects)

Table 66. C440 DeviceNet Full Profile—Class

Class	Object	Number of Instances
0x01	Identity	1
0x02	Message Router	1
0x03	DeviceNet	1
0x04	Assembly	7 (See assembly object details)
0x05	Connection	3
0x08	Discrete Input Point	4
0x09	Discrete Output Point	2
0x29	Control Supervisor	1
0x2C	Overload	1
0x94	DeviceNet Interface	1
0x99	TestOnly	1 (unpublished)

Identity Object, Class 0x01 (C440)

Table 67. Identity Instance Services (C440)

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 comm module is not connected to a C440, the comm module will assume the Discrete I/O profile. If the comm module is connected to a C440, 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

Table 68. Identity Instance Attributes (C440)

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 3 for overload
3		Get	Product Code	UINT	Identification of a particular product of an individual vendor	The constant 0x1110 (C440 DeviceNet Interface with 24 Vdc I/O) or 0x1111 (C440 DeviceNet Interface with 120 Vac I/O)
4		Get	Revision	STRUCT of:	Revision of the item the Identity Object represents	
			Major Revision	USINT		The constant 0x02
			Minor Revision	USINT		The constant 0x01

Table 68. Identity Instance Attributes (C440), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5		Get	Status	WORD	Summary status of device	See status section for details
6		Get	Serial Number	UDINT	Serial number of comm 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	
177 (0xB1)		Get	C440 Firmware Version	UINT	Version of C440 base unit firmware	
180 (0xB4)		Get	C440 Expansion Board ID	USINT	Returns a code to indicate what is in the C440 expansion port	0 = No expansion board 1 = 120 Vac 2 = RS-485
181 (0xB5)		Get	C440 Serial Number	UDINT	32bit Vendor Specific Serial Number	
182 (0xB6)		Get	C440 Hardware Revision	UINT	Hardware revision of C440 base unit; stored as a 2 byte number with a major and minor revision.	
183 (0xB7)		Get	C440 Product Code	UINT	Eaton product code. If the number is odd—it is Ground Fault Capable	
184 (0xB8)		Get	C440 Firmware Checksum	UDINT	The 32 bit checksum of the base C440 firmware	
185 (0xB9)		Get	C440 Firmware Build Number	UINT		

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:

Table 69. Bit Definitions for Instance #1, Status Attribute of Identity Object (C440)

Bit(s)	Called	Definition
0	Owned	
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” default. 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.

Table 69. Bit Definitions for Instance #1, Status Attribute of Identity Object (C440), continued

Bit(s)	Called	Definition
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 present 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:

Table 70. Defined States

Value	State Name	Definition
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 (C440)**Table 71. Message Router Instance Services (C440)**

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

Table 72. Message Router Instance Attributes (C440)

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 max 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 (C440)

Table 73. DeviceNet Instance Services (C440)

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

Table 74. DeviceNet Instance Attributes (C440)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5	Get		Allocation Information	STRUCT of:		
			Allocation 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 (C440)

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 bind input data or output data. The terms “input” and “output” are defined from the network’s 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).

Table 75. Assembly Instance Services (C440)

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

Table 76. Assembly Instance Attributes (C440)

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

Table 77. Assembly Instances (C440)

Type	Instance	Usage	Name
Input	50 (0x32)	Poll, Bit Strobe	Basic Overload (ODVA Overload Profile)
Input	107 ① (0x6B)	Poll, Bit Strobe	Extended Overload with Discrete Input and Output Points
Input	120 ② (0x78)	Poll	User Defined Input Assembly Short
Input	130 (0x82)	Poll	User Defined Input Assembly Long
Output	2 (0x02)	Poll	Basic Overload (ODVA Overload Profile)
Output	105 ② (0x69)	Poll	Basic Overload with Discrete Output Points
Output	111 ① (0x6F)	Bit Strobe	Accepts 8 bytes of bit strobe command to trigger bit strobe response
Input	151 (0x97)	Poll	Extended Motor Starter—DSNAP
Input	152 (0x98)	Poll	Abbreviated Motor Starter—DSNAP
Input	153 (0x99)	Poll	DSNAP Motor Starter
Input	154 (0x9A)	Poll	DSNAP Motor Starter with Fault Code
Output	150 (0x96)	Poll	Motor Starter—DSNAP
Input	161 (0xA1)	Poll	Extended Motor Control—Advantage
Input	162 (0xA2)	Poll	Advantage Motor Starter
Input	163 (0xA3)	Poll	Advantage Motor Starter with Fault Code
Input	164 (0xA4)	Poll	Advantage Expanded Starter Phase Currents
Output	160 (0xA0)	Poll	Motor Starter—Advantage

Notes

- ① Indicates default assembly instances used in bit strobe connection.
 ② Indicates default assembly instances used in poll connection.

Table 78. Input Assembly 50 (C440)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0								Faulted

Table 79. Input Assembly 107 (C440)

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	Faulted

Input Assembly 120 (C440 Short Assembly)

Values are selected from the list defined below.

Table 80. Input Assembly 120 (C440 Short Assembly)

Byte	Word	Value	Default Value
0	0	Value selected by DeviceNet interface object, attribute 7	Device Status (Low Byte) (See Control Supervisor Object)
1			Device Status (High Byte)
2	1	Value selected by DeviceNet interface object, attribute 8	Present Fault Bits Current (Low Byte)
3			Present Fault Bits Current (High Byte)
4	2	Value selected by DeviceNet interface object, attribute 9	Average Current (Low Byte)
5			Average Current (High Byte)
6	3	Value selected by DeviceNet interface object, attribute 10	Thermal Memory % Current (Low Byte)
7			Thermal Memory % Current (High Byte)

Input Assembly 130 (C440 Long Assembly)

Values are selected from the list defined below.

Table 81. Input Assembly 130 (C440 Long Assembly)

Byte	Word	Value	Default Value
0	0	Value selected by DeviceNet interface object, attribute 12	Device Status (Low Byte) (See Control Supervisor Object)
1			Device Status (High Byte)
2	1	Value selected by DeviceNet interface object, attribute 13	L1 Current (Low Byte)
3			L1 Current (High Byte)
4	2	Value selected by DeviceNet interface object, attribute 14	L2 Current (Low Byte)
5			L2 Current (High Byte)
6	3	Value selected by DeviceNet interface object, attribute 15	L3 Current (Low Byte)
7			L3 Current (High Byte)
8	4	Value selected by DeviceNet interface object, attribute 16	RMS Current Ave (Low Byte)
9			RMS Current Ave (High Byte)
10	5	Value selected by DeviceNet interface object, attribute 17	Current as a % of FLA (Low Byte)
11			Current as a % of FLA (High Byte)
12	6	Value selected by DeviceNet interface object, attribute 18	Overload Thermal Pile (Low Byte)
13			Overload Thermal Pile (High Byte)
14	7	Value selected by DeviceNet interface object, attribute 19	Frequency (Low Byte)
15			Frequency (High Byte)
16	8	Value selected by DeviceNet interface object, attribute 20	Phase Imbalance percentage (Low Byte)
17			Phase Imbalance percentage (High Byte)
18	9	Value selected by DeviceNet interface object, attribute 21	Present fault bits (Low Byte)
19			Present fault bits (High Byte)

Table 82. Input Assembly 120 and 130 Selection List (C440)

Value	Description
0	Assembly Terminator
1	Device Status
2	RMS Current IA
3	RMS Current IB
4	RMS Current IC
5	RMS Current Average
6	Current as a % of FLA
7	Phase Imbalance Percentage
8	Frequency
9	Overload Thermal Pile Memory Percentage
10	Present Fault Bits (trip reason)
11	Feature Status
12	Device Temperature
13	Ground Current (RMS)
14	Ground Fault Percentage

Table 83. Output Assembly 2

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset		

Table 84. Output Assembly 105

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0			Test Trip			Fault Reset	Out 2	Out 1

Output Assembly 111—Bit Strobe Command (C440)

Sixty-four bits of strobe data, one per MAC ID. The data is ignored by the C440 DeviceNet adapter.

Note: For the DSNAP and WPONIDNA Input Assemblies, “CtlFromNet” (bit5) reflects the state of Input 3. On the C440 DeviceNet module, “AtRef” (bit7) reflects the state of Input 4.

Table 85. Input Assembly 151—FVR/FVNR (C440 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted

Table 86. Input Assembly 152—FVR/FVNR (C440 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted
1					% Thermal			
2					% FLA			
3					Fault Code Low Byte Only			

Table 87. Input Assembly 153—FVR/FVNR (C440 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted
1					% Thermal			
2					Ave Current Low Byte			
3					Ave Current High Byte			
4					% FLA			

Table 88. Input Assembly 154—FVR/FVNR (C440 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted
1					% Thermal			
2					Ave Current Low Byte			
3					Ave Current High Byte			
4					Last Fault Code Low Byte			
5					Last Fault Code High Byte			

Table 89. Output Assembly 150—FVR/FVNR (C440 DSNAP)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset	Run 2	Run 1

Table 90. Input Assembly 161—FVR/FVNR (C440 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted

Table 91. Input Assembly 162—FVR/FVNR (C440 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted
1					% Thermal			
2					Ave Current Low Byte			
3					Ave Current High Byte			
4					% Phase Imbalance			

Table 92. Input Assembly 163—FVR/FVNR (C440 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted
1					% Thermal			
2				Ave Current Low Byte				
3				Ave Current High Byte				
4				Last Fault Code Low Byte				
5				Last Fault Code High Byte				

Table 93. Input Assembly 164—FVR/FVNR (C440 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Ref		CtrlFromNet		Running 2	Running 1		Faulted
1				Phase Current L1 Low Byte				
2				Phase Current L1 High Byte				
3				Phase Current L2 Low Byte				
4				Phase Current L2 High Byte				
5				Phase Current L3 Low Byte				
6				Phase Current L3 High Byte				

Table 94. Output Assembly 160—FVR/FVNR (C440 WPONI)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset	Run 2	Run 1

Connection Object, Class 0x05 (C440)**Table 95. Connection Instance Services (C440)**

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

Table 96. Connection Object Instance #1 Attributes (Explicit Messaging) (C440)

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)

Table 96. Connection Object Instance #1 Attributes (Explicit Messaging) (C440), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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
9		Get/ Set	expected_packet_rate	UINT	Defines timing associated with this Connection Default = 0x09C4 (2500 milliseconds)
10–11		N/A	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

Table 97. Connection Object Instance #2 Attributes (Polled I/O) (C440)

Attr ID	Access Rule	NV	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

Table 97. Connection Object Instance #2 Attributes (Polled I/O) (C440), 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 = 0x0000
10–11		N/A	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 120 "0x62 0x37 0x38" Allowed EPATHs: 50 (0x32) : "0x62 0x33 0x32" 107 (0x6B) : "0x62 0x36 0x42" 120 (0x78) : "0x62 0x37 0x38" 130 (0x82) : "0x62 0x38 0x32" 151 (0x97) : "0x62 0x39 0x37" 152 (0x98) : "0x62 0x39 0x38" 153 (0x99) : "0x62 0x39 0x39" 154 (0x9A) : "0x62 0x39 0x41" 161 (0xA1) : "0x62 0x41 0x31" 162 (0xA2) : "0x62 0x41 0x32" 163 (0xA3) : "0x62 0x41 0x33" 164 (0xA4) : "0x62 0x41 0x34"
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 105 "0x62 0x36 0x39". Allowed EPATHs: 2 (0x02) : "0x62 0x30 0x32" 105 (0x69) : "0x62 0x36 0x39" 150 (0x96) : "0x62 0x39 0x36" 160 (0xA0) : "0x62 0x41 0x30"

Table 98. Connection Object Instance #3 Attributes (Bit Strobe I/O) (C440)

Attr ID	Access Rule	NV	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

Table 98. Connection Object Instance #3 Attributes (Bit Strobe I/O) (C440), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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	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 "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 "0x62 0x36 0x46"

Discrete Input Object, Class 0x08 (C440)

Table 99. Discrete Input Point Instance Services (C440)

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

Table 100. 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	The input debounce can be set for each input point. The debounce value is set in milliseconds Minimum time is 1 ms Maximum debounce time is 1000 ms

Input Point Value

The input point value shall reflect current state of the associated input terminal.

Discrete Output Object, Class 0x09 (C440)

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.

Table 101. Discrete Output Point Instance Services (C440)

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

Table 102. Discrete Output Point Object Instance #1–2 (C440)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
3		Set	Value	BOOL	Output point value (see below for details)
5	NV	Set	Fault Action	BOOL	Action taken on output’s value in Communication Fault state (see below for details)
6	NV	Set	Fault Value	BOOL	User-defined value for use with Fault Action attribute (see below for details)
7	NV	Set	Idle Action	BOOL	Action taken on output’s value in Communication Idle state (see below for details)
8	NV	Set	Idle Value	BOOL	User-defined value for use with Idle Action attribute (see below for details)

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.

Control Supervisor Object, Class 0x29 (C440)

Table 103. Control Supervisor Instance Services (C440)

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
0x05	Reset	N/A	Resets the device to start-up state

Table 104. Control Supervisor Instance Attributes (C440)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
10		Get	Faulted/Tripped	BOOL	1 = Fault Occurred (latched) 0 = No Faults present
12		Set	FaultRst	BOOL	0 ≥ 1 = Fault Reset 0 = No action (Overload Reset)
17		Set	ForceFault	BOOL	0 ≥ 1 = Force Fault 0 = No action
101		Get	Device Status	WORD	Device Bit Array Bit 0: Tripped Bit 1: unused Bit 2: Output #1 Bit 3: Output #2 Bit 4: Input #1 Bit 5: Input #2 Bit 6: Input #3 Bit 7: Input #4 Bit 8: Overload power lost Bit 9: Comm adapter low voltage Bit 10: 1 = Running, 0 = Stopped or tripped Bit 11-15: reserved
102		Get	Present fault bits	WORD	Present Fault Bits Bit Array Faults are cleared when the device is either reset by the network or detects current flowing. The fault bits are defined as follows: Bit Feature 0 Overload Fault 1 Phase Imbalance 2 Phase Loss Fault 3 Ground Fault 4 Network Trip Command 5 NV Memory Failure 6 Reserved
103		Get	Motor Control State/ Overload State	USINT	Motor Control States: 0 = Stopped 1 = Running 2 = Tripped
105	NV	Set	Comm Fault Trip Action	BOOL	Action taken on trip state in Comm Fault state 0 = Use Comm Fault Trip Value attribute 1 = no affect
106	NV	Set	Comm Fault Trip Value	BOOL	User-defined value for use with Comm Fault Trip Action attribute 0 = no affect; 1 = trip

Table 104. Control Supervisor Instance Attributes (C440), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
107	NV	Set	Idle Trip Action	BOOL	Action taken on trip state in Communication Idle state 0 = Use Idle Trip Value attribute; 1 = no change
108	NV	Set	Idle Trip Value	BOOL	User-defined value for use with Idle Trip Action attribute 0 = no affect; 1 = trip
130		Get	Device Feature Status	WOR	The feature status bits are defined as follows: Bit Feature 0, 1: Class Index (00 = Class 10a; 01 = Class 10; 10 = Class 20; 11 = Class 30) 2: Phase Loss/Imbalance Enabled 3: Ground Fault Enabled 4: Auto Reset Enabled 5: Remote Reset Active 8: Dip Switch Position 0 9: Dip Switch Position 1 10: Dip Switch Position 2 11: Dip Switch Position 3 12-15: Reserved
131		Get	Device Temperature in degrees	INT	Temperature as seen by the base device microcontroller, 10% accuracy
132		Get	Frequency	UINT	Line frequency measured by the device in deci Hz

Faulted/Tripped

A condition exists that is out of the normal operating range of the device. This condition has been configured to cause the device to enter the faulted or tripped state.

Fault Reset

Commands the device out of the faulted state. A transition from 0 to 1 will cause the fault reset.

Initial Value	Commended Value	Result
0	0	No Action
0	1	Reset Fault
1	0	No Action
1	1	No Action

Overload Object, Class 0x2C (C440)**Table 105. Overload Instance Service (C440)**

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

Table 106. Overload Instance Attributes (C440)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
6		Get	%PhImbal	USINT	% Phase Imbalance
7		Get	%Thermal	USINT	% Thermal Capacity
100	NV	Get	TripClass	USINT	Trip Class Setting 5 to 30
105		Get	FLA Current	UINT	The present FLA setting. The potentiometer selects this value. The value is scaled by the multiplier.
140		Get	AvgCurrent	UINT	Average of the three-phase currents, scaled by the current multiplier
141		Get	Current L1	UINT	Actual motor phase current L1, scaled by the current multiplier
142		Get	Current L2	UINT	Actual motor phase current L2, scaled by the current multiplier
143		Get	Current L3	UINT	Actual motor phase current L3, scaled by the current multiplier
144		Get	Ground Current	UINT	RMS Ground Current, scaled by the current multiplier
150		Get	Maximum Device FLA	UINT	This is the max FLA setting possible in this device. The value is scaled by the current multiplier.
151		Get	Minimum Device FLA	UINT	This is the min FLA setting possible in this device. The value is scaled by the current multiplier.
152		Get	Current Multiplier	UINT	This value indicates the multiplier applied to the current values. For example: If the multiplier is 10 then all currents are read out in deci-amperes. 1 A = > 10; Divide the given current value (attribute 140, 141, 142, etc) by the value in this location to convert to Amperes.
153		Get	Current as a % of FLA	UINT	Presents the average current as a percent of the FLA setting.
154		Get	Ground Fault %	USINT	Percent of Ground Fault measured. $GF\% = GFC / (0.5) * FLA$

DeviceNet Interface Object, Class 0x94 (C440)**Table 107. DeviceNet Interface Object Instance Services (C440)**

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

Table 108. DeviceNet Interface Object Instance Attributes (C440)

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 = 125 k 1 = 250 k 2 = 500 k Default = 0
3	NV	Set	Poll Input Assembly Select	USINT	Poll Connection Input Assembly instance that is active	Default = 120 50, 107, 120, 130, 151, 152, 153, 154, 161, 162, 163, 164
4	NV	Set	Bit Strobe Input Assembly Select	USINT	Bit Strobe Connection Input Assembly instance that is active	Default = 107
5	NV	Set	Poll Output Assembly Select	USINT	Poll Connection Output Assembly instance that is active	Default = 105
6		Get	Short Assembly User Input, Size	USINT	Total size of assembly 120 as determined by user selected input list items	Determined by the placement of the "0" below
7	NV	Set	Short Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of short user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
8	NV	Set	Short Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of short user input assembly	Default = 10; Present Fault Bits
9	NV	Set	Short Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of short user input assembly	Default = 5; Average Current
10	NV	Set	Short Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of short user input assembly	Default = 9; Thermal Memory %
11		Get	Long Assembly User Input, Size	USINT	Total size of assembly 130 as determined by user selected input list items	Determined by the placement of the "0" below
12	NV	Set	Long Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of long user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
13	NV	Set	Long Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of long user input assembly	Default = 2; L1 Current
14	NV	Set	Long Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of long user input assembly	Default = 3; L2 Current
15	NV	Set	Long Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of long user input assembly	Default = 4; L3 Current
16	NV	Set	Long Assembly User Input, Word 4 Param	USINT	Data item assigned to Word 4 of long user input assembly	Default = 5 Current Avg

Table 108. DeviceNet Interface Object Instance Attributes (C440), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Value
17	NV	Set	Long Assembly User Input, Word 5 Param	USINT	Data item assigned to Word 5 of long user input assembly	Default = 6 Current as a % of FLA
18	NV	Set	Long Assembly User Input, Word 6 Param	USINT	Data item assigned to Word 6 of long user input assembly	Default = 9 Thermal Mem. %
19	NV	Set	Long Assembly User Input, Word 7 Param	USINT	Data item assigned to Word 7 of long user input assembly	Default = 8 Frequency
20	NV	Set	Long Assembly User Input, Word 8 Param	USINT	Data item assigned to Word 8 of long user input assembly	Default = 7 Phase unbalance %
21	NV	Set	Long Assembly User Input, Word 9 Param	USINT	Data item assigned to Word 9 of long user input assembly	Default = 10 Faults latched

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.

Table 109. C440 DCI Parameter to DeviceNet Object Access

BF - DCI DB Creator.xls (AccuRev time stamp 2/17/10)	BF Modbus Address	Object	Default Assembly, Device Status
DCI_C440_MOTOR_CTRL_STATE	299	Control Supervisor	
DCI_C440_CURRENT_PHASE_A	300	Overload, Assembly	130
DCI_C440_CURRENT_PHASE_B	301	Overload, Assembly	130
DCI_C440_CURRENT_PHASE_C	302	Overload, Assembly	130
DCI_C440_CURRENT_AVE	303	Overload, Assembly	120, 130
DCI_C440_THERMAL_MEM_PERC	304	Overload, Assembly	120, 130
DCI_C440_FAULTS_LATCHED	305	Control Supervisor, Assembly	120, 130
DCI_C440_CURRENT_PERC_FL A	306	Overload, Assembly	
DCI_C440_PHASE_IMBALANCE	307	Overload, Assembly	130
DCI_C440_GROUND_FAULT_PERC	308	Overload, Assembly	
DCI_C440_GROUND_CURRENT_RMS	309	Overload, Assembly	
DCI_C440_FL A	310	Overload	
DCI_C440_FL A_CLASS	311	Overload	
DCI_C440_FREQUENCY	312	Control Supervisor, Assembly	130
DCI_C440_FEATURE_STATUS	313	Control Supervisor, Assembly	
DCI_C440_TEMPERATURE	314	Control Supervisor, Assembly	
DCI_C440_VBOOST_VOLTAGE	315	TestOnly	
DCI_C440_VCC_VOLTAGE	316	TestOnly	
DCI_C440_BOARD_ID_ATOD_VAL	317	Identity	
DCI_C440_TRIP_OR_RESET	331	Control Supervisor, Assembly	
DCI_C440_MIN_FL A	395	Overload	
DCI_C440_MAX_FL A	396	Overload	
DCI_C440_CURRENT_MULTIPLIER	397	Overload	

Table 109. C440 DCI Parameter to DeviceNet Object Access, continued

BF - DCI DB Creator.xls (AccuRev time stamp 2/17/10)	BF Modbus Address	Object	Default Assembly, Device Status
DCI_C440_PRODUCT_CODE	398	Identity	
DCI_C440_SERIAL_NUM	399	Identity	
DCI_C440_HARDWARE_REV	401	Identity	
DCI_C440_CFG_SELECTION ①	402	TestOnly	
DCI_C440_FLTA_OVERRIDE ①	403	TestOnly	
DCI_C440_FIRMWARE_REV	427	Identity	
DCI_C440_FIRMWARE_CHECKSUM	429	Identity	

Note

① Debug parameter.

DeviceNet Object Model for S611 Soft Starter

S611 DeviceNet Full Profile (13 Objects)

Table 110. S611 DeviceNet Full Profile—Class

Class	Object	Number of Instances
0x01	Identity	1
0x02	Message Router	1
0x03	DeviceNet	1
0x04	Assembly	10 (See assembly object details)
0x05	Connection	3
0x08	Discrete Input Point	4
0x09	Discrete Output Point	2
0x29	Control Supervisor	1
0x2C	Overload	1
0x2D	Soft Start	1
0x93	Voltage Monitor	1
0x94	DeviceNet Interface	1
0x99	TestOnly	1 (unpublished)

Identity Object, Class 0x01 (S611)

Table 111. Identity Instance Services (S611)

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 comm module is not connected to a S611, the comm module will assume the Discrete I/O profile. If the comm module is connected to a S611, 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

Table 112. Identity Instance Attributes (S611)

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 0x17 for soft starter
3		Get	Product Code	UINT	Identification of a particular product of an individual vendor	The constant 0x1119 (S611 DeviceNet Interface with 24 Vdc I/O) or 0x111A (S611 DeviceNet Interface with 120 Vac I/O)

Table 112. Identity Instance Attributes (S611), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
4		Get	Revision	STRUCT of:	Revision of the item the Identity Object represents	
			Major Revision	USINT		The constant 0x02
			Minor Revision	USINT		The constant 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	
177 (0xB1)	NV	Get	DSP Firmware Version	UINT	Version of S611 base unit DSP firmware	
178 (0xB2)	NV	Get	UI Firmware Version	UINT	Version of UI microcontroller firmware	
179 (0xB3)	NV	Get	S611 Unit ID	UINT	A number representing the maximum catalog FLA	Unit IDs: 52, 65, 77, 96, 125, 156, 180, 240, 302, 361, 414
183 (0xB7)	NV	Get	S611 Product Code	UINT	Eaton product code S611	
185 (0xB9)	NV	Get	S611 firmware build number	UINT		

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:

Table 113. Bit Definitions for Instance #1, Status Attribute of Identity Object (S611)

Bit(s)	Called	Definition
0	Owned	
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" default. 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.

Table 113. Bit Definitions for Instance #1, Status Attribute of Identity Object (S611), continued

Bit(s)	Called	Definition
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 present 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:

Table 114. 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 (S611)

Table 115. Message Router Instance Services (S611)

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

Table 116. Message Router Instance Attributes (S611)

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 max 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 (S611)**Table 117. DeviceNet Instance Services (S611)**

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

Table 118. DeviceNet Instance Attributes (S611)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5	Get		Allocation Information	STRUCT of:		
			Allocation 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 (S611)

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 bind input data or output data. The term “input” and “output” are defined from the network’s 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)**.

Table 119. Assembly Instance Services (S611)

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

Table 120. Assembly Instance Attributes (S611)

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

Table 121. Assembly Instances (S611)

Type	Instance	Usage	Name
Input	60 (0x3C)	Poll, Bit	Basic Soft Start
Input	107 (0x6B)	Poll, Bit Strobe	Extended Overload with Discrete Input and Output Points
Input	108 ① (0x6C)	Poll, Bit Strobe	Motor Control Status
Input	121 ② (0x79)	Poll	User Defined Input Assembly Short
Input	131 (0x83)	Poll	User Defined Input Assembly Long
Output	3 (0x03)	Poll	Basic Motor Starter
Output	105 (0x69)	Poll	Basic Overload with Discrete Output Points
Output	106 ② (0x6A)	Poll	Motor Control
Output	111 ① (0x6F)	Bit Strobe	Accepts 8 bytes of bit strobe command to trigger bit strobe response

Notes

- ① Indicates default assembly instances used in bit strobe connection.
- ② Indicates default assembly instances used in poll connection.

Table 122. Input Assembly 60 (S611 Basic Soft Start)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Bypass (At Reference)					Running1		Faulted

Table 123. Input Assembly 107 (S611)

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	Faulted

Table 124. Input Assembly 108 (S611 Device Status: Motor Control Status and I/O Status)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Permissive	CntrlFrmNet	S611 Fault Relay (Relay2)	S611 RuN/Aux Relay (Relay1)	Running1	Bypass	Fault
1	S611 Intercom Lost	Reserved	Input4	Input3	Input2	Input1	Output2	Output1

Input Assembly 121 (S611 Short Assembly)

Values are selected from the list defined below.

Table 125. Input Assembly 121 (S611 Short Assembly)

Byte	Word	Value	Default Value
0	0	Value selected by DeviceNet interface object, attribute 7	Device Status (Low Byte) (See Control Supervisor Object)
1			Device Status (High Byte)
2	1	Value selected by DeviceNet interface object, attribute 8	Average Current (Low Byte)
3			Average Current (High Byte)
4	2	Value selected by DeviceNet interface object, attribute 9	Average Voltage (Low Byte)
5			Average Voltage (High Byte)
6	4	Value selected by DeviceNet interface object, attribute 10	Thermal Pile % (Low Byte)
7			Thermal Pile % (High Byte)

Input Assembly 131 (S611 Long Assembly)

Values are selected from the list defined below.

Table 126. Input Assembly 131 (S611 Long Assembly)

Byte	Word	Value	Default Value
0	0	Value selected by DeviceNet interface object, attribute 12	Device Status (Low Byte) (See Control Supervisor Object)
1			Device Status (High Byte)
2	1	Value selected by DeviceNet interface object, attribute 13	L1 Current (Low Byte)
3			L1 Current (High Byte)
4	2	Value selected by DeviceNet interface object, attribute 14	L2 Current (Low Byte)
5			L2 Current (High Byte)
6	3	Value selected by DeviceNet interface object, attribute 15	L3 Current (Low Byte)
7			L3 Current (High Byte)
8	4	Value selected by DeviceNet interface object, attribute 16	Thermal Pile % (Low Byte)
9			Thermal Pile % (High Byte)
10	5	Value selected by DeviceNet interface object, attribute 17	RMS Current Ave (Low Byte)
11			RMS Current Ave (High Byte)
12	6	Value selected by DeviceNet interface object, attribute 18	RMS Voltage VAB (Low Byte)
13			RMS Voltage VAB (High Byte)
14	7	Value selected by DeviceNet interface object, attribute 19	RMS Voltage VBC (Low Byte)
15			RMS Voltage VBC (High Byte)
16	8	Value selected by DeviceNet interface object, attribute 20	RMS Voltage VCA (Low Byte)
17			RMS Voltage VCA (High Byte)
18	9	Value selected by DeviceNet interface object, attribute 21	RMS Voltage Ave (Low Byte)
19			RMS Voltage Ave (High Byte)

Table 127. Input Assembly 121 and 131 Selection List (S611)

Value	Description
0	Assembly terminator
1	Device Status Data—(See control supervisor object)
2	RMS Current IA
3	RMS Current IB
4	RMS Current IC
5	RMS Current Average
6	RMS Voltage VAB
7	RMS Voltage VBC
8	RMS Voltage VCA
9	RMS Voltage Average
10	Total kW
11	Voltage Unbalance Percent
12	Current Unbalance Percent

Table 127. Input Assembly 121 and 131 Selection List (S611), continued

Value	Description
13	Apparent Power Factor
14	Frequency
15	Overload Thermal Pile
16	Trip Reason
17	Motor Control Status
18	Average Pole Temp
19	Power Sign
20	Current Scale Factor
21	Residual Ground Current

Table 128. Output Assembly 3—Basic Motor Starter

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset		Run1

Table 129. Output Assembly 105

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0			Reserved			Fault Reset	Out 2	Out 1

Table 130. Output Assembly 106 (Motor Control-Extended)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Out 2	Out 1				Fault Reset	Permissive	Run1

Output Assembly 111—Bit Strobe Command (S611)

Sixty-four bits of strobe data, one per MAC ID. The data is ignored by the S611 DeviceNet adapter.

Connection Object, Class 0x05 (S611)

Table 131. Connection Instance Services (S611)

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

Table 132. Connection Object Instance #1 Attributes (Explicit Messaging) (S611)

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
9	Get/Set		expected_packet_rate	UINT	Defines timing associated with this Connection Default = 0x09C4 (2500 milliseconds) 0 to 65535
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) Explicit = 1 and 3 I/O = 0, 1, 2
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

Table 133. Connection Object Instance #2 Attributes (Polled I/O) (S611)

Attr ID	Access Rule	NV	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 0 to 65535
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 Explicit = 1 and 3 I/O = 0, 1, 2
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 121 (0x79): "0x62 0x37 0x39." Allowable EPATHS: 60 (0x3C) : "0x62 0x33 0x43" 107 (0x6B) : "0x62 0x36 0x42" 108 (0x6C) : "0x62 0x36 0x43" 121 (0x79) : "0x62 0x37 0x39" 131 (0x83) : "0x62 0x38 0x33"
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 106 (0x6A): "0x62 0x36 0x41." Allowable EPATHS: 3 (0x03) : "0x62 0x30 0x33" 105 (0x69) : "0x62 0x36 0x39" 106 (0x6A) : "0x62 0x36 0x41"

Table 134. Connection Object Instance #3 Attributes (Bitstrobe I/O) (S611)

Attr ID	Access Rule	NV	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 0 to 65535
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 Explicit = 1 and 3 I/O = 0, 1, 2
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 108 (0x6C)“0x62 0x36 0x43”
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 (S611)**Table 135. Discrete Input Point Instance Services (S611)**

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

Table 136. Discrete Input Point Object Instance #1–4 (S611)

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 (S611)

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.

Table 137. Discrete Output Point Instance Services (S611)

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

Table 138. Discrete Output Point Object Instance #1–2 (S611)

Attr ID	Access Rule	NV	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 (see below for details)
6	NV	Set	Fault Value	BOOL	User-defined value for use with Fault Action attribute (see below for details)
7	NV	Set	Idle Action	BOOL	Action taken on output’s value in Communication Idle state (see below for details)
8	NV	Set	Idle Value	BOOL	User-defined value for use with Idle Action attribute (see below for details)

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.

Control Supervisor Object, Class 0x29 (S611)**Table 139. Control Supervisor Instance Services (S611)**

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
0x05	Reset	N/A	Resets the device to start-up state

Table 140. Control Supervisor Instance Attributes (S611)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
3		Set	Run1	BOOL	
7		Get	Running1	BOOL	
10		Get	Fault Status	BOOL	1 = Fault Occurred (latched) 0 = No Faults present
12		Set	FaultRst	BOOL	0 ≥ 1 = Fault Reset 0 = No action (Overload Reset)
13		Get	FaultCode	UINT	If in Faulted state, Fault Code indicates the fault that caused the transition to Faulted state. If not in Faulted state, Fault Code indicates the fault that caused the last transition to the Faulted state.
15		Get	CtrlFromNet	BOOL	Status of Run/Stop control source 0 = Control is local 1 = Control is from network (note only settable via I/O terminal on S611)

Table 140. Control Supervisor Instance Attributes (S611), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
101		Get	Device Status	WORD	Device Bit Array, Bit: 0: Fault 1: Bypass 2: Running1 3: S611 RuN/Aux Relay (Relay 1) 4: S611 Fault Relay (Relay 2) 5: CtrlFromNet 6: Permissive 7: Reserved 8: Output #1 9: Output #2 10: Input #1 11: Input #2 12: Input #3 13: Input #4 14: DeviceNet Low Power 15: S611 Intercom Lost
102		Get	Trip Reason	UINT	Fault (Trip) Reason Bit Array, Bit: 0: Overload 1: Jam 2: Stall 3: Unbalance 4: Load Disconnect 5: Phase Loss 6: Mains Fault 7: Phase Reversal 8: Shorted SCR 9: SCR Not Firing 10: Pole Overtemp 11: Bypass Dropout 12: SCR Overcurrent 13: Contactor Overcurrent 14: Communication Fault 15: Other Device Fault
103		Get	Motor Status	UINT	Motor Control Status Bit Array, bit: 0: Run = bit 0 1: Reserved 2: In Bypass 3: Reserved 4: Reserved 5: Fault 6-10: Reserved 11: S611 <u>RuN/Aux Relay</u> (Relay 1) 12: S611 Fault (Relay 2) 13: CtrlFromNet 14: Permissive
105	NV	Set	Network Timeout	UINT	Enables action defined in S661 Comm fault behavior 0 = disable, 1 = enable (Default = 0)
106	NV	Set	Comm Loss Behavior	UINT	User-defined value for use with Comm Fault Trip Action attribute 1 = Fault, 2 = Hold Last State, 3 = Stop (Default = 1) See also Comm Loss Delay
107	NV	Set	Motor Ctrl Com Loss Act Disable	BOOL	When this value is TRUE the motor state will be unchanged after a communication loss event. A FALSE value will cause the Motor Control Communication Loss Value to be applied on a com loss.

Table 140. Control Supervisor Instance Attributes (S611), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
108	NV	Set	Motor Ctrl Com Loss Action Val	BOOL	Action to execute when a communication loss event occurs. 0 = Ignore (No Change) 1 = Stop
109	NV	Get	Fault Code	UINT	Fault Code and Fault Code List. When read as a single item it is the most recent fault. When read as a list, faults are listed in history order. Newest are at the beginning, oldest are at the end of the list. If the device is in the Faulted state, Fault Code indicates the fault that caused the transition to Faulted state. If not in the Faulted state, the Fault Code indicates the fault that caused the last transition to the Faulted state.
110	NV	Get	Fault Log 1	UINT	
111	NV	Get	Fault Log 2	UINT	
112	NV	Get	Fault Log 3	UINT	
113	NV	Get	Fault Log 4	UINT	
114	NV	Get	Fault Log 5	UINT	
115	NV	Get	Fault Log 6	UINT	
116	NV	Get	Fault Log 7	UINT	
117	NV	Get	Fault Log 8	UINT	
118	NV	Get	Fault Log 9	UINT	
119		Set/ Get	Clear Fault Queue	BOOL	Writing to this clears the entire Fault log queue
120	NV	Set/ Get	Trip Enable/Disable	UINT	Trip Enable/Disable bit array. Bit: 0: Overload 1: Jam 2: Stall 3: Current Imbalance 4: Load Disconnect 5: Phase Loss 6: Under Voltage 7: Over Voltage 8: Voltage Unbalance 9: Phase Reversal 10: Ground Fault 11: Overload On Start 12: Shorted SCR 13: SCR Not Firing 14: Over Temp
150	NV	Set/ Get	Motor Control	UINT	Motor Control Bit Array, bit: 0: Run 1: reserved 2: Permissive 3: Reset 4-15: reserved
151	NV	Set/ Get	Start Input Behavior	BOOL	Selects the behavior for the start input. When edge is selected, a start will only be performed on the rising edge of the start input. When level is selected, a start will occur any time the input is high. 0 = Edge, 1 = Level
152	NV	Set/ Get	Fault Relay (Relay 2) Configuration	UINT	0 = Faulted (default), 1 = Not Faulted

Table 140. Control Supervisor Instance Attributes (S611), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
153	NV	Set/ Get	RuN/Aux Relay (Relay 1) Configuration	UINT	Auxiliary Relay Configuration Behavior: 0 = Faulted 1 = Not Faulted 2 = Bypass 3 = Not In Bypass 4 = Motor Energized 5 = Motor Not Energized
154	NV	Set/ Get	User Interface Display Config	UINT	User Interface Display Configuration. Value = Description 0 = Thermal Capacity 1 = Power Factor 2 = Line Frequency 3 = Current Unbal % 4 = Voltage Unbalance % 5 = Average pole temp 6 = Pole A Temp 7 = Pole B Temp 8 = Pole C Temp 9 = None 10 = None
155	NV	Set/ Get	User Interface Lock	BOOL	Provides the ability to prevent the user interface from making configuration changes. 0 = Unlocked 1 = Locked
156	NV	Set/ Get	Command Register	UINT	1 = Clear Motor Run Hours 2 = Clear Motor Start Count 3 = Clear fault queue 255 = Force Overload Rest (TP = 0) 250 = Force Comm Fault (unpublished)
157	NV	Set/ Get	S611 Comm Fault Timeout	UINT	Milliseconds 1-65000

Faulted/Tripped

A condition exists that is out of the normal operating range of the device. This condition has been configured to cause the device to enter the faulted or tripped state.

Fault Reset

Commands the device out of the faulted state. A transition from 0 to 1 will cause the fault reset.

Initial Value	Commended Value	Result
0	0	No Action
0	1	Reset Fault
1	0	No Action
1	1	No Action

Fault Status

Displays the S611 fault status register.

Device Status

Displays the S611 status as described in the instance attributes table.

Overload Object, Class: 0x2C (S611)**Table 141. Overload Instance Service (S611)**

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

Table 142. Overload Instance Attributes (S611)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
4	NV	Set/ Get	Overload Class	USINT	Trip Class Setting 5 to 30
6		Get	Current Unbalance	USINT	Percent Current Phase Imbalance. (%)
7		Get	Overload Thermal Memory	USINT	Thermal Capacity 0% Cold Motor 100% Will Cause an Overload Trip (%)
101		Get	Total Run Time	UINT	Hours, Reset Through the Command Register (see Control Supervisor Object, attribute 156)
102		Get	Number of Starts	UINT	Reset Through the Command Register (see Control Supervisor Object, attribute 156)
105	NV	Set/ Get	Scaled Overload FLA	UINT	Amps * 10, range depends on frame 10–441 amps
106		Get	Power Factor	UINT	PF * 100
107		Get	Motor Power (kW)	UINT	kW * 10
119	NV	Set/ Get	Current Unbalance Trip Delay	UINT	Seconds 1–20 (5)
120		Set/ Get	Current Unbalance	UINT	Percent FLA, 0–100% (20)
121	NV	Set/ Get	Jam Trip Delay	UINT	seconds 1–200 (20)
122	NV	Set/ Get	Jam Trip Level	UINT	% FLA, 150–400% (400)
123	NV	Set/ Get	Phase Loss Trip Delay	UINT	seconds 1–20 (5)
130	NV	Set/ Get	S611 reset mode	UINT	0 = Manual, 1 = Auto
140		Get	AvgCurrent	UINT	Average of the three-phase currents Units: Amps * 10
141		Get	Phase A RMS Current	UINT	Actual motor phase current L1 Units: Amps * 10
142		Get	Phase B RMS Current	UINT	Actual motor phase current L2 Units: Amps * 10
143		Get	Phase C RMS Current	UINT	Actual motor phase current L3 Units: Amps * 10

Table 142. Overload Instance Attributes (S611), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
144		Get	Residual Ground Fault Current	UINT	Ground Current Units: Amps * 100
152		Get	Current Scale Factor	UINT	Scale Factor for Current. Use this value to scale the current values.
170	NV	Set	Load Disconnect trip level	UINT	% Rated, 1–50 (6)
171	NV	Set	Load disconnect trip delay	UINT	seconds 1–60 (5)
172	NV	Set	Load disconnect trip source	UINT	0 = Under Power, 1 = Under Current
173	NV	Set	Phase loss trip level	UINT	%, 0–100 (40)
174	NV	Get/ Set	Stall Trip Level	UINT	% FLA, 150–300 (200)
175		Get	Power Sign	INT	Indicates whether power is positive or negative (generator)

Soft Start Object, Class 0x2D (S611)

Table 143. Soft Start Instance Service (S611)

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

Table 144. Soft Start Instance Attributes (S611)

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
3		Get	AtReference	BOOL	Starting/stopping output voltage reference status 0 = Not at ref. 1 = Output at Voltage ref
4	NV	Get/ Set	Soft Start Method	USINT	1 = Voltage Ramp (no current limit) 2 = Current Limit (no voltage ramp) 100 = Pump start
7	NV	Get/ Set	RampTime1/Start Time	UINT	Tenths of seconds, (deciseconds) 5–1800 (200)
13	NV	Get/ Set	Kick Start Time	USINT	Seconds * 10, 0–2 (0)
14	NV	Get/ Set	Kick Start Initial Torque	UINT	%, 0–100 (0)
16	NV	Get/ Set	DecelTime/Stop Time	UINT	Seconds * 10, 0–120 (0) Motor Stop Ramp Time. Minimum time of 0 without pump option. Minimum time of 50 with pump stop enabled (deciseconds)
101		Get	Phase A Pole Temp	INT	deg C * 10
102		Get	Phase B Pole Temp	INT	deg C * 10
103		Get	Phase C Pole Temp	INT	deg C * 10
104		Get	Pole Temperature Avg	INT	deg C * 10

Table 144. Soft Start Instance Attributes (S611), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
105	NV	Get/ Set	Initial Torque	UINT	%, 0–100 (45)
107	NV	Get/ Set	Start Method	UINT	0 = Voltage ramp, no current limit 1 = No voltage ramp, current limit 2 = Pump start
108	NV	Get/ Set	Phase sequence	UINT	1 = ABC, 2 = ACB

Voltage Monitor Object, Class 0x93 (S611)**Table 145. Voltage Monitor Instance Services (S611)**

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

Table 146. Voltage Monitor Instance Attributes (S611)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description
1		Get	Rms Voltage Vab	UINT	L1-L2 RMS Voltage
2		Get	Rms Voltage Vbc	UINT	L2-L3 RMS Voltage
3		Get	Rms Voltage Vca	UINT	L3-L1 RMS Voltage
4		Get	Rms Voltage Avg	UINT	Average RMS Voltage
5		Get	Voltage Unbalance Percent	UINT	%, 0–100%
6		Get	Frequency	UINT	Hz x 100
8	NV	Set	Under Voltage Trip Level	UINT	%, 1–99 (90)
9	NV	Set	Under Voltage Trip Delay	UINT	Seconds 1–20 (10)
10	NV	Set	Over Voltage Trip Level	UINT	%, 101–120 (110)
11	NV	Set	Over Voltage Trip Delay	UINT	Seconds 1–20 (10)
12	NV	Set	V Unbalance Trip Level	UINT	%, 1–20 (6)
13	NV	Set	V Unbalance Trip Delay	UINT	Seconds 1–20 (10)
20	NV	Set	Motor Rated Voltage	UINT	Volts, 115–600, 480

DeviceNet Interface Object, Class 0x94 (S611)

Table 147. DeviceNet Interface Object Instance Services (S611)

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

Table 148. 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 = 125 k 1 = 250 k 2 = 500 k Default = 0
3	NV	Set	Poll Input Assembly Select	USINT	Poll Connection Input Assembly instance that is active	Default = 121 Values: 60, 107, 108, 121, 131
4	NV	Set	Bit Strobe Input Assembly Select	USINT	Bit Strobe Connection Input Assembly instance that is active	Default = 108 Values: 60, 107, 108
5	NV	Set	Poll Output Assembly Select	USINT	Poll Connection Output Assembly instance that is active	Default = 106
6		Get	Short Assembly User Input, Size	USINT	Total size of assembly 121 as determined by user selected input list items	Determined by the placement of the "0" below
7	NV	Set	Short Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of short user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
8	NV	Set	Short Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of short user input assembly	Default = 5; Avg RMS Current
9	NV	Set	Short Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of short user input assembly	Default = 9; Avg RMS Voltage
10	NV	Set	Short Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of short user input assembly	Default = 15; Thermal Pile %
11		Get	Long Assembly User Input, Size	USINT	Total size of assembly 131 as determined by user selected input list items	Determined by the placement of the "0" below
12	NV	Set	Long Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of long user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
13	NV	Set	Long Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of long user input assembly	Default = 2; L1 Current
14	NV	Set	Long Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of long user input assembly	Default = 3; L2 Current
15	NV	Set	Long Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of long user input assembly	Default = 4; L3 Current
16	NV	Set	Long Assembly User Input, Word 4 Param	USINT	Data item assigned to Word 4 of long user input assembly	Default = 15 Overload thermal pile
17	NV	Set	Long Assembly User Input, Word 5 Param	USINT	Data item assigned to Word 5 of long user input assembly	Default = 5 Current Ave
18	NV	Set	Long Assembly User Input, Word 6 Param	USINT	Data item assigned to Word 6 of long user input assembly	Default = 6 Voltage VAB

Table 148. DeviceNet Interface Object Instance Attributes (S611), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Value
19	NV	Set	Long Assembly User Input, Word 7 Param	USINT	Data item assigned to Word 7 of long user input assembly	Default = 7 Voltage VBC
20	NV	Set	Long Assembly User Input, Word 8 Param	USINT	Data item assigned to Word 8 of long user input assembly	Default = 8 Voltage VCA
21	NV	Set	Long Assembly User Input, Word 9 Param	USINT	Data item assigned to Word 9 of long user input assembly	Default = 9 Voltage Ave

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.

DeviceNet Object Model for S811+ Soft Starter

S811+ DeviceNet Full Profile (16 Objects)

Table 149. S811+ DeviceNet Full Profile—Class

Object	Class	Number of Instances
Identity	0x01	1
Message Router	0x02	1
DeviceNet	0x03	1
Assembly	0x04	14
Connection	0x05	3
Discrete Input Point	0x08	4
Discrete Output Point	0x09	2
Analog Input	0x0A	1
Control Supervisor	0x29	1
Overload	0x2C	1
Soft Start	0x2D	1
Device Status	0x8C	1
Voltage Monitor	0x93	1
DeviceNet Interface	0x94	1
Base Device Information	0x96	1
TestOnly	0x99	1 (unpublished)

Class 1 (0x01): Identity Object

Table 150. Identity Instance Services (S811+)

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)
0x0E	Get_Attributes_Single	N/A	Returns the contents of the specified data
0x10	Set_Attributes_Single	Value	Modifies an attribute value

Table 151. Identity Instance Attributes (S811+)

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 0x17 for soft starter
3		Get	Product Code	UINT	Identification of a particular product of an individual vendor	The constant 0x1142 (S811+ DeviceNet Interface with 24 Vdc I/O) or 0x1143 (S811+ DeviceNet Interface with 120 Vac I/O)

Table 151. Identity Instance Attributes (S811+), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics	
4		Get	Revision	STRUCT of:	Revision of the item the Identity Object represents		
			Major Revision	USINT			The constant 0x01
			Minor Revision	USINT			The constant 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	

Class 2 (0x02): Message Router Object**Table 152. Message Router Instance Services (S811+)**

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

Table 153. Message Router Instance Attributes (S811+)

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 max 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

Class 3 (0x03): DeviceNet Object**Table 154. DeviceNet Instance Services (S811+)**

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

Table 155. DeviceNet Instance Attributes (S811+)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5		Get	Allocation Information	STRUCT of:		
			Allocation 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
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

Class 4 (0x04): Assembly Object

Table 156. Assembly Instance Services (S811+)

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

Table 157. Assembly Instance Attributes (S811+)

Attr ID	NV	Access	Data Type	Name	Attribute Description
3	V	Set/Get	Array of BYTE	Data	Assembly Data. See sections below for instance definition.

Table 158. Assembly Instances List (S811+)

Type	Instance	Usage	Name
Output	5 (0x05)	Poll	Extended Soft Starter
Input	60 (0x3C)	Poll	Basic Soft Starter Input
Input	61 (0x3D)	Poll	Extended Soft Starter Input
Output	101 (0x65)	Poll	Extended Soft Starter w/relay outs
Input	102 (0x66)	Poll	Device Status
Input	110 (0x6E)	Poll	Status and Current (A)
Input	111 (0x6F)	Poll	Status and Current (0.1 A)
Input	120 (0x78)	Poll	Status measurement and Thermal
Input	121 (0x79)	Poll	Status measurement and Thermal
Input	130 (0x82)	Poll	Status, Current, Voltage, Thermal
Input	131 (0x83)	Poll	Status, Current, Voltage, Thermal
Input	140 (0x8C)	Poll	Full S811 Monitoring, Current in Amps
Input	141 (0x8D)	Poll	Full S811 Monitoring, Current in 0.1 A
Input	150 (0x96)	Poll	S811 Status

All Assembly data is little endian (low byte first).

Table 159. Output Assembly 5 (0x05): Extended Soft Starter

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	1	Extended Soft Starter	Extended soft start assembly. Bit = Description 0 = Run 1 1 = Run 2 (Ramp2) 2 = Fault Reset

Total Assembly Size (bytes): 1

Table 160. Input Assembly 60 (0x3C): Basic Soft Starter Input

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	1	Basic Soft Starter Input	Basic soft start Input. Bit = Description 0 = Faulted 2 = Running1 7 = Bypass (at reference)

Total Assembly Size (bytes): 1

Table 161. Input Assembly 61 (0x3D): Extended Soft Starter Input

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	1	Extended Soft Starter Input	Extended soft start input. Bit = Description 0 = Faulted 1 = Warning 2 = Running1 3 = Running2 (Ramp2) 4 = Ready 5 = CtrlFromNet 7 = Bypass (at reference)

Total Assembly Size (bytes): 1

Table 162. Output Assembly 101 (0x65): Extended Soft Starter w/Relay Outs

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	1	Extended Soft Starter w/ Relay Outs	Extended soft start assembly w/relay outputs. Bit = Description 0 = Run 1 1 = Run 2 (Ramp2) 2 = Fault Reset 4 = C441 Q1 relay out 5 = C441 Q2 relay out

Total Assembly Size (bytes): 1

Table 163. Input Assembly 102 (0x66): Device Status

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss

Total Assembly Size (bytes): 2

Input Assembly 110 (0x6E): Status and Current (A)

Assembly includes the status overview and motor current levels scaled in Amps. Word Size (bytes): 2

Table 164. Input Assembly 110 (0x6E): Status and Current (A)

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	6	Three-Phase RMS Line Current (amps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 1.0 A.

Total Assembly Size (bytes): 8

Input Assembly 111 (0x6F): Status and Current (0.1 A)

Assembly includes the status overview and motor current levels scaled in 0.1 A. Word Size (bytes): 2

Table 165. Input Assembly 111 (0x6F): Status and Current (0.1 A)

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	6	Three-Phase RMS Line Current (deciamps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 0.1 A.

Total Assembly Size (bytes): 8

Input Assembly 120 (0x78): Status Measurement and Thermal

Includes the Motor status, motor Ave Current scaled in Amps and Thermal value. Word Size (bytes): 2

Table 166. Input Assembly 120 (0x78): Status Measurement and Thermal

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss

Table 166. Input Assembly 120 (0x78): Status Measurement and Thermal, continued

Byte Offset	Word Offset	Size (bytes)	Name	Description
2	1	2	Three-Phase Ave Line Current (amps)	Scaled RMS average of the three-phase line current. This is the actual current flowing to the motor in 1.0 A.
4	2	1	% Thermal Pile Used	Thermal Pile Used Percentage—Trip at 100%
6	3	2	Motor Control Faults	S811+ Motor Control Fault Bit Field Bit Fault 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Estop 12 Reserved 13 Reserved 14 Reserved 15 Other

Total Assembly Size (bytes): 8

Input Assembly 121 (0x79): Status Measurement and Thermal

Includes the Motor status, motor Ave Current scaled in 0.1 A and Thermal value. Word Size (bytes): 2

Table 167. Input Assembly 121 (0x79): Status Measurement and Thermal

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss

Table 167. Input Assembly 121 (0x79): Status Measurement and Thermal, continued

Byte Offset	Word Offset	Size (bytes)	Name	Description
2	1	2	Three-Phase Ave Line Current (deciamps)	Scaled RMS average of the three-phase line current. This is the actual current flowing to the motor in 0.1 A.
4	2	1	% Thermal Pile Used	Thermal Pile Used Percentage—Trip at 100%
6	3	2	Motor Control Faults	S811+ Motor Control Fault Bit Field Bit Fault 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Estop 12 Reserved 13 Reserved 14 Reserved 15 Other

Total Assembly Size (bytes): 8

Input Assembly 130 (0x82): Status, Current, Voltage, Thermal

Assembly includes the status overview, motor current levels scaled in Amps, Pole Voltages and Thermal. Word Size (bytes): 2

Table 168. Input Assembly 130 (0x82): Status, Current, Voltage, Thermal

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	6	Three-Phase RMS Line Current (amps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 1.0 A.
8	4	1	% Thermal Pile Used	Thermal Pile Used Percentage—Trip at 100%
10	5	2	Average Current as % FLA	Average of the three-phase current as a percentage of the Motor Nameplate FLA setting
12	6	6	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)

Total Assembly Size (bytes): 18

Input Assembly 131 (0x83): Status, Current, Voltage, Thermal

Assembly includes the status overview, motor current levels scaled in 0.1 A, Pole Voltages and Thermal. Word Size (bytes): 2

Table 169. Input Assembly 131 (0x83): Status, Current, Voltage, Thermal

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	6	Three-Phase RMS Line Current (deciamps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 0.1 A.
8	4	1	% Thermal Pile Used	Thermal Pile Used Percentage—Trip at 100%
10	5	2	Average Current as % FLA	Average of the three-phase current as a percentage of the Motor Nameplate FLA setting
12	6	6	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)

Total Assembly Size (bytes): 18

Input Assembly 140 (0x8C): Full S811 Monitoring, Current in Amps

This includes the most common measurement values. Current values scaled in Amps. Word Size (bytes): 2

Table 170. Input Assembly 140 (0x8C): Full S811 Monitoring, Current in Amps

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	6	Three-Phase RMS Line Current (amps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 1.0 A.
8	4	2	Three-Phase Ave Line Current (amps)	Scaled RMS average of the three-phase line current. This is the actual current flowing to the motor in 1.0 A.

Table 170. Input Assembly 140 (0x8C): Full S811 Monitoring, Current in Amps, continued

Byte Offset	Word Offset	Size (bytes)	Name	Description
10	5	2	Average Current as % FLA	Average of the three-phase current as a percentage of the Motor Nameplate FLA setting
12	6	1	% Thermal Pile Used	Thermal Pile Used Percentage—Trip at 100%
14	7	6	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)
20	10	2	Ave Three-Phase Real Power (kW)	Average three-phase real power (in kW)
22	11	2	Power Factor	Power factor reading 0–1.0000 (in 0.0001)
24	12	1	Field Inputs	A bit field representing the input points. Bit = Description 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4
26	13	6	Power Pole Temperature	S811+ power pole temperature in 0.1 degrees C
32	16	2	Line Frequency	Frequency reading of incoming mains voltage (in 0.01 Hz)
34	17	2	Motor Control Faults	S811+ Motor Control Fault Bit Field Bit Fault 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Estop 12 Reserved 13 Reserved 14 Reserved 15 Other
36	18	2	Motor Control Warnings	S811+ Motor Control Warning Bit Field Bit Warning 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Other
38	19	6	Active Fault List	Will display up to 3 faults/warnings that are actively present
44	22	4	Total Motor Starts	Number of motor starts

Total Assembly Size (bytes): 48

Input Assembly 141 (0x8D): Full S811 Monitoring, Current in 0.1 A

This includes the most common measurement values. Current values scaled in 0.1 A. Word Size (bytes): 2

Table 171. Input Assembly 141 (0x8D): Full S811 Monitoring, Current in 0.1 A

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	6	Three-Phase RMS Line Current (deciamps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 0.1 A.
8	4	2	Three-Phase Ave Line Current (deciamps)	Scaled RMS average of the three-phase line current. This is the actual current flowing to the motor in 0.1 A.
10	5	2	Average Current as % FLA	Average of the three-phase current as a percentage of the Motor Nameplate FLA setting
12	6	1	% Thermal Pile Used	Thermal Pile Used Percentage—Trip at 100%
14	7	6	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)
20	10	2	Ave Three-Phase Real Power (kW)	Average three-phase real power (in kW)
22	11	2	Power Factor	Power factor reading 0–1.0000 (in 0.0001)
24	12	1	Field Inputs	A bitfield representing the input points. Bit = Description 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4
26	13	6	Power Pole Temperature	S811+ power pole temperature in 0.1 degrees C
32	16	2	Line Frequency	Frequency reading of incoming mains voltage (in 0.01Hz)

Table 171. Input Assembly 141 (0x8D): Full S811 Monitoring, Current in 0.1 A, continued

Byte Offset	Word Offset	Size (bytes)	Name	Description
34	17	2	Motor Control Faults	S811+ Motor Control Fault Bit Field Bit Fault 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Estop 12 Reserved 13 Reserved 14 Reserved 15 Other
36	18	2	Motor Control Warnings	S811+ Motor Control Warning Bit Field Bit Warning 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Other
38	19	6	Active Fault List	Will display up to 3 faults/warnings that are actively present
44	22	4	Total Motor Starts	Number of motor starts

Total Assembly Size (bytes): 48

Input Assembly 150 (0x96): S811 Status

Includes S811 status, motor faults, motor warnings, and Active fault codes. Word Size (bytes): 2

Table 172. Input Assembly 150 (0x96): S811 Status

Byte Offset	Word Offset	Size (bytes)	Name	Description
0	0	2	Device Status	Device Status Bit Array 0 = Running—RUN command active 1 = Jogging—Jog command active 2 = Permissive—Start allowed (must be 1 to start) 3 = Ramp2—Ramp2 settings active 4 = Local Control (0 = network; 1 = local) 5 = Faulted—S811+ fault present 6 = Warning—S811+ warning present (self clearing) 7 = In bypass—S811+ Bypass closed 8 = Output 1 9 = Output 2 10 = Input 1 11 = Input 2 12 = Input 3 13 = Input 4 14 = Alarm No Trip Enabled 15 = S811+ Internal Comm Loss
2	1	2	Motor Control Faults	S811+ Motor Control Fault Bit Field Bit Fault 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Estop 12 Reserved 13 Reserved 14 Reserved 15 Other

Table 172. Input Assembly 150 (0x96): S811 Status, continued

Byte Offset	Word Offset	Size (bytes)	Name	Description
4	2	2	Motor Control Warnings	S811+ Motor Control Warning Bit Field Bit Warning 0 PhaseLoss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Other
6	3	6	Active Fault List	Will display up to 3 faults/warnings that are actively present
12	6	20	Fault Queue	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue

Total Assembly Size (bytes): 32

Class 5 (0x05): Connection Object

Table 173. Connection Instance Services (S811+)

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

Table 174. Connection Object Instance #1 Attributes (Explicit Messaging) (S811+)

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)

Table 174. Connection Object Instance #1 Attributes (Explicit Messaging) (S811+), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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
9	Get/Set		expected_packet_rate	UINT	Defines timing associated with this Connection Default = 0x09C4 (2500 milliseconds)
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

Table 175. Connection Object Instance #2 Attributes (Polled I/O)

Attr ID	Access Rule	NV	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

Table 175. Connection Object Instance #2 Attributes (Polled I/O), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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 121 (0x79): "0x62 0x37 0x39." Allowable EPATHS: 60 (0x3C) : "0x62 0x33 0x43" 107 (0x6B) : "0x62 0x36 0x42" 108 (0x6C) : "0x62 0x36 0x43" 121 (0x79) : "0x62 0x37 0x39" 131 (0x83) : "0x62 0x38 0x33"
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 106 (0x6A): "0x62 0x36 0x41". Allowable EPATHS: 3 (0x03) : "0x62 0x30 0x33" 105 (0x69) : "0x62 0x36 0x39" 106 (0x6A) : "0x62 0x36 0x41"

Table 176. Connection Object Instance #3 Attributes (Bitstrobe I/O)

Attr ID	Access Rule	NV	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

Table 176. Connection Object Instance #3 Attributes (Bitstrobe I/O), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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 108 (0x6C)“0x62 0x36 0x43”
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”

Class 8 (0x08): Discrete Input Object

Table 177. Discrete Input Point Instance Services (S811+)

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

Table 178. Discrete Input Point Object Instance #1–4 (S811+)

Attrib	NV	Access	Data Type	Name	Description
3 (0x03)	V	Get	BOOL	Input State	Input point value. Val = State 0 = Off 1 = On
101 (0x65)	NV	Set/Get	UDINT	On/Off debounce	The debounce time applied to the input. The debounce applies to both rising and falling edge. (milliseconds)

Input Point Value

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

Class 9 (0x09): Discrete Output Object

Table 179. Discrete Output Point Instance Services (S811+)

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

Table 180. Discrete Output Point Object Instance #1–2 (S811+)

Attrib	NV	Access	Data Type	Name	Description
3 (0x03)	V	Set/Get	BOOL	Output State	Output point value. Val = Description 0 = Off 1 = On
5 (0x05)	NV	Set/Get	BOOL	Com Fault Action	When a communication fault occurs the output can execute two types of behavior. Value = Description 0 = Apply Fault Value 1 = No Change
6 (0x06)	NV	Set/Get	BOOL	Com Fault Value	Communication fault value to be applied. Value = Description 0 = Turn Relay Off 1 = Turn Relay On
7 (0x07)	NV	Set/Get	BOOL	Idle Action	When a communication idle state occurs the relay can execute two types of behavior. Value = Description 0 = Apply Idle Value 1 = No Change
8 (0x08)	NV	Set/Get	BOOL	Idle Value	Communication idle value to be applied. Value = Description 0 = Turn Relay Off 1 = Turn Relay On

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.

Class 10 (0x0A): Analog Input Object

Table 181. Analog Input Instance Service (S811+)

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

Table 182. Analog Input Instance Attributes (S811+)

Attrib	NV	Access	Data Type	Name	Description
3 (0x03)	V	Get	USINT	Analog Input Value (% of range)	Analog input reading (in percent of set range)
8 (0x08)	V	Get	USINT	Analog Value Data Type	Analog Input Value Data Type 0 = INT 1 = REAL 2 = USINT 3 = SINT 4 = DINT 5 = LINT 6 = UINT 7 = UDINT 8 = ULINT 9 = LREAL 100 = (Vendor specific) USINT. Value in % of selected range (only format supported)
100 (0x64)	V	Get	USINT	Analog Input Status	Status of the S811+ analog input 0x00 = Not Active 0x01 = Input under range 0x02 = Input over range 0x03 = Input in overdrive 0x04 = Input is in range
101 (0x65)	NV	Set/Get	USINT	Analog Input Data Range	Selected range of analog input 0x02 = 0–20 mA range 0x03 = 4–20 mA range
102 (0x66)	NV	Set/Get	USINT	Analog Input Trip Enable	Analog input trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
103 (0x67)	NV	Set/Get	USINT	Analog Input Trip Low Threshold	Low analog input trip threshold (in percent of selected analog range)
104 (0x68)	NV	Set/Get	USINT	Analog Input Trip High Threshold	High analog input trip threshold (in percent of selected analog range)
105 (0x69)	NV	Set/Get	UINT	Analog Input Trip Duration	Amount of time a low or high analog input condition must exist before a trip; 0.0–60.0 (in 0.1 secs)

Class 41 (0x29): Control Supervisor Object

Table 183. Control Supervisor Instance Services (S811+)

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
0x05	Reset	N/A	Resets the device to start-up state

Table 184. Control Supervisor Instance Attributes (S811+)

Attrib	NV	Access	Data Type	Name	Description
3 (0x03)	V	Set/Get	BOOL	Run1	Run the Soft Starter.
4 (0x04)	V	Set/Get	BOOL	Run2	Run the Soft Starter (ramp2)
7 (0x07)	V	Get	BOOL	Running1	Indicates if the motor is running standard ramp
8 (0x08)	V	Get	BOOL	Running2	Indicates if the motor is running ramp2
9 (0x09)	V	Get	BOOL	Ready	Soft Starter is not faulted
10 (0x0A)	V	Get	BOOL	Faulted	Fault present
11 (0x0B)	V	Get	BOOL	Warning	Warning present
12 (0x0C)	V	Set/Get	BOOL	Fault Reset	Reset Fault
15 (0x0F)	V	Get	BOOL	Control From Net	Control is coming from the network
22 (0x16)	V	Get	UDINT	Total motor starts	Total Motor Starts
100 (0x64)	NV	Set/Get	USINT	S811 Input1 cfg	Entry 1
101 (0x65)	NV	Set/Get	USINT	S811 Input2 cfg	Entry 2
102 (0x66)	NV	Set/Get	USINT	S811 Input3 cfg	Entry 3
103 (0x67)	NV	Set/Get	USINT	S811 Input4 cfg	Entry 4
104 (0x68)	NV	Set/Get	USINT	C441 Input1 cfg	Entry 5
105 (0x69)	NV	Set/Get	USINT	C441 Input2 cfg	Entry 6
106 (0x6A)	NV	Set/Get	USINT	C441 Input3 cfg	Entry 7
107 (0x6B)	NV	Set/Get	USINT	C441 Input4 cfg	Entry 8
108 (0x6C)	NV	Set/Get	USINT	S811 FormA relay cfg	Entry 1
109 (0x6D)	NV	Set/Get	USINT	S811 FormC relay cfg	Entry 2
110 (0x6E)	NV	Set/Get	USINT	C441 Output1 relay cfg	Entry 3
111 (0x6F)	NV	Set/Get	USINT	C441 Output2 relay cfg	Entry 4
112 (0x70)	NV	Set/Get	UINT	Custom fault code 1	Entry 1
113 (0x71)	NV	Set/Get	UINT	Custom fault code 2	Entry 2
114 (0x72)	NV	Set/Get	UINT	Custom fault code 3	Entry 3
115 (0x73)	NV	Set/Get	BOOL	Terminal Block control enable	Enables Local control at the terminal block
116 (0x74)	V	Get	BOOL	Run1 logic sense	Status of Run1 input logic sense (edge/level)
117 (0x75)	NV	Set/Get	BOOL	wiring config	0 = standard wiring; 1 = Inside the delta wiring
118 (0x76)	NV	Set/Get	BOOL	Pending start warning	Enables warning when start delay timers are used. Warning is issued while start command is pending
119 (0x77)	NV	Set/Get	UINT	Power up start delay	Time delay after power up before a start command can be issued
120 (0x78)	NV	Set/Get	UINT	Start delay	Time delay after a start command is issued before the S811+ will attempt start
121 (0x79)	NV	Set/Get	UINT	Run cmd start delay	User settable time delay between successive start profiles. Delay becomes active when start profile (ramp vs ramp2)changes between starts
122 (0x7A)	V	Get	UINT	Auto Reset Count	Number of auto reset attempts

Table 184. Control Supervisor Instance Attributes (S811+), continued

Attrib	NV	Access	Data Type	Name	Description
123 (0x7B)	NV	Set/Get	USINT	Fault Reset Mode	Fault reset mode 0x00 = manual reset 0x01 = auto reset 0x02 = power on reset (reset faults on power cycle)
124 (0x7C)	NV	Set/Get	UINT	Auto Reset Delay Time	Delay time after fault before attempting to auto reset
125 (0x7D)	NV	Set/Get	UINT	Auto Reset Attempt Limit	Max number of auto reset attempts; once reached, S811 requires manual reset to clear fault
126 (0x7E)	NV	Set/Get	USINT	Motor Comm Loss Action	Motor comloss action 0x00 = auto stop 0x01 = auto run1 0x02 = unavailable 0x03 = hold last state 0x04 = unavailable 0x05 = unavailable 0x06 = unavailable 0x07 = all stop fault (will trip S811+ and issue all stop fault)
127 (0x7F)	NV	Set/Get	UINT	Transient Motor Control Timeout	Motor control timeout for transient UI devices
128	NV	Set/Get	UINT	Motor Control Command Timeout	Motor control timeout—communication idle time which will cause a Motor Control Device Missing fault
129	V	Set/Get	USINT	Modbus Device Reset Register	Register performs reset services on S811+ over Modbus® 0x00 = no reset 0x01 = soft reset (power cycle reset) 0x02 = factory reset (reset device back to defaults) 0x03 = app parameter reset 0x04 = reserved 0x05 = reserved 0x06 = flush fault queue/list
130	NV	Set/Get	BOOL	Alarm—No Trip Enabled	

Class 44 (0x2C): Overload Object

Table 185. Overload Instance Service (S811+)

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

Table 186. Overload Instance Attributes (S811+)

Attrib	NV	Access	Data Type	Name	Description
4 (0x04)	NV	Set/Get	USINT	Overload Trip Class	Overload Trip Class (5–30; 20 default)
7 (0x07)	V	Get	USINT	% Thermal Pile used	Thermal Pile Used Percentage—Trip at 100%
100 (0x64)	V	Set/Get	UINT	Motor Nameplate FLA in 0.1 A	Full load amperage rating of motor scaled in 0.1 A (deciamps)
101 (0x65)	V	Get	UINT	Three-Phase Ave Line Current (deciamps)	Scaled RMS average of the three-phase line current. This is the actual current flowing to the motor in 0.1 A.
102 (0x66)	V	Get	UINT	Three-Phase RMS Line Current (deciamps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 0.1 A.
103 (0x67)	V	Get	UINT	Three-Phase RMS Line Current (deciamps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 0.1 A.

Table 186. Overload Instance Attributes (S811+), continued

Attrib	NV	Access	Data Type	Name	Description
104 (0x68)	V	Get	UINT	Three-Phase RMS Line Current (deciamps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 0.1 A.
105 (0x69)	V	Get	UINT	Average current as % FLA	Average of the three-phase current as a percentage of the Motor Nameplate FLA setting
106 (0x6A)	V	Get	UINT	Three-Phase Ave Line Current (amps)	Scaled RMS average of the three-phase line current. This is the actual current flowing to the motor in 1.0 A.
107 (0x6B)	V	Get	UINT	Three-Phase RMS Line Current (amps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 1.0 A.
108 (0x6C)	V	Get	UINT	Three-Phase RMS Line Current (amps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 1.0 A.
109 (0x6D)	V	Get	UINT	Three-Phase RMS Line Current (amps)	Scaled RMS three-phase line current. This is the actual current flowing to the motor in 1.0 A.
110 (0x6E)	V	Get	UINT	Ave Three-Phase Real Power (kW)	Average three-phase real power (in kW)
111 (0x6F)	V	Get	INT	Power Factor	Power factor reading 0–1.0000 (in 0.0001)
112 (0x70)	NV	Set/Get	USINT	Overload Trip Enable	Motor overload trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
113 (0x71)	V	Set/Get	BOOL	Enable Overload During Start	Enable the overload during start ramp 0x00 = overload is disabled during start ramp 0x01 = overload is enabled during start ramp
114 (0x72)	NV	Set/Get	USINT	Undercurrent Trip Enable	Low load current trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
115 (0x73)	NV	Set/Get	USINT	Undercurrent Trip Level (% FLA)	Low load current trip threshold in percent of the motor nameplate FLA setting
116 (0x74)	NV	Set/Get	UINT	Undercurrent Trip Duration	Amount of time a low current condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
117 (0x75)	NV	Set/Get	USINT	Motor Jam Trip Enable	Motor jam trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
118 (0x76)	NV	Set/Get	USINT	Motor Stall Trip Enable	Motor stall trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
119 (0x77)	NV	Set/Get	USINT	Phase Loss Trip Enable	Motor phase loss trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
120 (0x78)	NV	Set/Get	USINT	Motor Phase Loss Trip Level	Current phase loss trip threshold
121 (0x79)	NV	Set/Get	UINT	Motor Phase Loss Duration	Amount of time a phase loss condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
122 (0x7A)	NV	Set/Get	USINT	Phase Imbalance Trip Enable	Current phase imbalance trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable

Table 186. Overload Instance Attributes (S811+), continued

Attrib	NV	Access	Data Type	Name	Description
123 (0x7B)	NV	Set/Get	USINT	Motor Phase Imbalance Trip Level	Current imbalance trip threshold
124 (0x7C)	NV	Set/Get	UINT	Motor Phase Imbalance Trip Duration	Amount of time a current imbalance condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
125 (0x7D)	NV	Set/Get	USINT	Ave Power Trip Enable	Average power trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
126 (0x7E)	NV	Set/Get	UINT	Ave Power Low Trip Threshold	Low power trip threshold (in percent of rated W) rated W = $\sqrt{3} \times 0.8PF \times \text{motor FLA} \times \text{rated motor voltage}$
127 (0x7F)	NV	Set/Get	UINT	Ave Power High Trip Threshold	High power trip threshold (in percent of rated W) rated W = $\sqrt{3} \times 0.8PF \times \text{motor FLA} \times \text{rated motor voltage}$
128 (0x80)	NV	Set/Get	UINT	Ave Power Trip Duration	Amount of time a low or high power condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
129 (0x81)	NV	Set/Get	USINT	GND Fault Enable	GND fault trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
130 (0x82)	NV	Set/Get	UINT	GND Fault Inhibit From Start Delay	Parameter will mask the GND fault trip from the end of start ramp; 0.0–20.0 in 0.1 secs; Example: ramp time = 20, GND delay = 5, GND fault will be masked for 25 seconds after start command

Class 45 (0x2D): Soft Start Object

Table 187. Soft Start Instance Service (S811+)

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

Table 188. Soft Start Instance Attributes (S811+)

Attrib	NV	Access	Data Type	Name	Description
3 (0x03)	V	Get	BOOL	At Ref	Indicates whether the soft start is in bypass or not.
4 (0x04)	NV	Set/Get	USINT	Soft Start Method	Selects the ramp start method. 1 = Voltage Ramp (no current limit) 2 = Current Limit (no voltage ramp) 100 = Pump start
7 (0x07)	NV	Set/Get	UINT	Start Ramp Time	Motor start ramp time.
8 (0x08)	NV	Set/Get	USINT	Initial Starting Torque	Starting torque setting for ramp start
11 (0x0B)	NV	Set/Get	BOOL	Expected Incoming Phase Sequence	Expected phase sequence of incoming mains 0 = ABC 1 = ACB
16 (0x10)	NV	Set/Get	UINT	Stop Ramp Time	Motor stop ramp time. Parameter is not active when start method is set to pump
100 (0x64)	NV	Set/Get	UINT	Pump Stop Time	The amount of time to use for the pump stop ramp behavior. Parameter is active when pump start is selected for motor start method

Table 188. Soft Start Instance Attributes (S811+), continued

Attrib	NV	Access	Data Type	Name	Description
101 (0x65)	NV	Set/Get	USINT	Kickstart Duration	The amount of time to apply a kick start 0.0–2.0 (in 0.1 secs)
102 (0x66)	NV	Set/Get	USINT	Kickstart Starting Torque	Initial torque value for the kick start
103 (0x67)	NV	Set/Get	USINT	Ramp2 Soft Start Method	Selects the ramp2 start method. 1 = Voltage Ramp (no current limit) 2 = Current Limit (no voltage ramp) 100 = Pump start
104 (0x68)	NV	Set/Get	UINT	Ramp2 Start Ramp Time	Motor start ramp time for ramp2.
105 (0x69)	NV	Set/Get	USINT	Ramp2 Initial Starting Torque	Starting torque setting for ramp2 start
106 (0x6A)	NV	Set/Get	BOOL	Ramp2 Expected Phase Sequence	Expected phase sequence of incoming mains for ramp2 start 0 = ABC 1 = ACB
107 (0x6B)	NV	Set/Get	USINT	Ramp2 Kickstart Duration	The amount of time to apply a kick start 0.0–2.0 (in 0.1 secs) for ramp2 start
108 (0x6C)	NV	Set/Get	USINT	Ramp2 Kickstart Starting Torque	Initial torque value for the kick start for ramp2
109 (0x6D)	NV	Set/Get	UINT	Ramp2 Stop Ramp Time	Motor stop ramp time for ramp2. Parameter is not active when ramp2 start method is set to pump
110 (0x6E)	NV	Set/Get	UINT	Ramp2 Pump Stop Time	The amount of time to use for the pump stop ramp2 behavior. Parameter is active when pumpstart is selected for ramp2 motor start method
111 (0x6F)	V	Get	INT	Power Pole Temperature	S811+ power pole temperature in 0.1 degrees C
112 (0x70)	V	Get	INT	Power Pole Temperature	S811+ power pole temperature in 0.1 degrees C
113 (0x71)	V	Get	INT	Power Pole Temperature	S811+ power pole temperature in 0.1 degrees C
114 (0x72)	NV	Set/Get	USINT	Temperature Sensor Trip Enable	Temperature sensor trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
115 (0x73)	NV	Set/Get	USINT	SCR Not Firing Trip Enable	SCR not firing trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
116 (0x74)	NV	Set/Get	USINT	SCR Shorted Trip Enable	Shorted SCR trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable

Class 140 (0x8C): Device Status Object**Table 189. Device Status Instance Services (S811+)**

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

Table 190. Device Status Instance Attributes (S811+)

Attrib	NV	Access	Data Type	Name	Description
1 (0x01)	V	Get	USINT	Motor status	Motor Control Status Word for S811+ Bit Description 0 Running1—RUN1 command active 1 Running2—Jog command active 2 Permissive—Start allowed (must be 1 to start) 3 Ramp2—Ramp2 settings active 4 Local Control (0 = network; 1 = local) 5 Faulted—S811+ fault present 6 Warning—S811+ warning present (self clearing) 7 In bypass—S811+ Bypass closed
2 (0x02)	V	Get	USINT	S811 input status	The Discrete data Input register will show the active/inactive status of S811+ hardwired and networked inputs. Bits 3.0 indicate the status of the S811+ terminal block inputs and bits 7.4 indicate the status of the network inputs located in the Network Data Input Register (C441 communication adapter inputs #1–4 when connected) Bit Description 0 S811+ discrete input#1 status 1 S811+ discrete input#2 status 2 S811+ discrete input#3 status 3 S811+ discrete input#4 status 4 Network input#1 status (C441 Com adapter input #1) 5 Network input#2 status (C441 Com adapter input #2) 6 Network input#3 status (C441 Com adapter input #3) 7 Network input#4 status (C441 Com adapter input #4)
3 (0x03)	V	Get	USINT	S811 output status	The Discrete data Output register bits 1.0 indicate the status of the S811+ relays and bits 3.2 indicate the status of the network outputs being generated by the S811+ configurable output logic (C441 communication adapter outputs #1–2 when connected) Bit Description 0 S811+ discrete form A relay status 1 S811+ discrete form C relay status 2 Network output #1 status (C441 Com adapter output #1) 3 Network output #2 status (C441 Com adapter output #2) 4 5 6 7
4 (0x04)	V	Get	UINT	Active Fault #1	Will display up to 3 faults/warnings that are actively present
5 (0x05)	V	Get	UINT	Active Fault #2	Will display up to 3 faults/warnings that are actively present
6 (0x06)	V	Get	UINT	Active Fault #3	Will display up to 3 faults/warnings that are actively present
7 (0x07)	V	Get	UINT	Bit field (faults)	S811+ Motor Control Fault Bit Field Bit Fault 0 Phaseloss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Estop 12 Reserved 13 Reserved 14 Reserved 15 Other

Table 190. Device Status Instance Attributes (S811+), continued

Attrib	NV	Access	Data Type	Name	Description
8 (0x08)	V	Get	UINT	Bit field (warnings)	S811+ Motor Control Warning Bit Field Bit Warning 0 PhaseLoss 1 Phase Imbalance 2 Thermal Pile 3 Overcurrent 4 Breaker Fault 5 GND Fault 6 Motor Stall 7 Motor Jam 8 OverTemp 9 UnderLoad 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Other
9 (0x09)	V	Get	UINT	Most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
10 (0x0A)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
11 (0x0B)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
12 (0x0C)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
13 (0x0D)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
14 (0x0E)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
15 (0x0F)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
16 (0x10)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
17 (0x11)	V	Get	UINT	next most recent fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
18 (0x12)	V	Get	UINT	Oldest fault	S811+ fault Queue Queue will hold up to the last 10 faults. Fault codes are not repeated in queue
19 (0x13)	V	Set/Get	BOOL	Clear Fault Queue	Set this parameter to TRUE to clear the fault queue.

Class 147 (0x93): Voltage Monitor Object**Table 191. Voltage Monitor Instance Services (S811+)**

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

Table 192. Voltage Monitor Instance Attributes (S811+)

Attrib	NV	Access	Data Type	Name	Description
1 (0x01)	V	Get	UINT	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)
2 (0x02)	V	Get	UINT	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)
3 (0x03)	V	Get	UINT	Three-Phase RMS Mains Voltage	Three-Phase RMS Mains voltage reading (in volts)
4 (0x04)	V	Get	UINT	Line Frequency	Frequency reading of incoming mains voltage (in 0.01 Hz)
5 (0x05)	V	Get	USINT	Incoming Phase Sequence	Phase sequence of incoming mains voltage 0 = ABC 1 = ACB
6 (0x06)	V	Get	UINT	DC Control Voltage	DC Control Voltage reading in 0.001 V
7 (0x07)	NV	Set/Get	UINT	Motor Rated Volts	Rated voltage of the motor
8 (0x08)	NV	Set/Get	USINT	Under Voltage Trip Enable	Under voltage trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
9 (0x09)	NV	Set/Get	USINT	Under Voltage Trip Threshold	Under voltage trip threshold (in percent of rated motor voltage)
10 (0x0A)	NV	Set/Get	UINT	Under Voltage Trip Duration	Amount of time an under voltage condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
11 (0x0B)	NV	Set/Get	USINT	Over Voltage Trip Enable	Over voltage trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable
12 (0x0C)	NV	Set/Get	USINT	Over Voltage Trip Threshold	Over voltage trip threshold (in percent of rated motor voltage)
13 (0x0D)	NV	Set/Get	UINT	Over Voltage Trip Duration	Amount of time an over voltage condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
14 (0x0E)	NV	Set/Get	USINT	Voltage Imbalance Trip Level	Voltage imbalance trip threshold
15 (0x0F)	NV	Set/Get	UINT	Voltage Imbalance Trip Duration	Amount of time a voltage imbalance condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
16 (0x10)	NV	Set/Get	UINT	Incoming Line Frequency Rating	Expected frequency of incoming mains voltage
17 (0x11)	NV	Set/Get	USINT	Line Frequency Trip	Line frequency deviation trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable

Table 192. Voltage Monitor Instance Attributes (S811+), continued

Attrib	NV	Access	Data Type	Name	Description
18 (0x12)	NV	Set/Get	USINT	Frequency Deviation Trip Threshold	Line frequency deviation trip threshold (in percent of rated line frequency)
19 (0x13)	NV	Set/Get	UINT	Frequency Trip Duration	Amount of time a frequency deviation condition must exist before a trip; 0.0–60.0 (in 0.1 secs)
20 (0x14)	NV	Set/Get	USINT	Phase Reversal Trip Enable	Phase reversal trip enable 0x00 = disable 0x01 = fault enable 0x02 = warning enable

Class 148 (0x94): DeviceNet Interface Object**Table 193. DeviceNet Interface Object Instance Services (S811+)**

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

Table 194. DeviceNet Interface Object Instance Attributes (S811+)

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 = 125 k 1 = 250 k 2 = 500 k Default = 0
3	NV	Set	Poll Input Assembly Select	USINT	Poll Connection Input Assembly instance that is active	Default = 121
4	NV	Set	Bit Strobe Input Assembly Select	USINT	Bit Strobe Connection Input Assembly instance that is active	Default = 108
5	NV	Set	Poll Output Assembly Select	USINT	Poll Connection Output Assembly instance that is active	Default = 106
6 ①		Get	Short Assembly User Input, Size	USINT	Total size of assembly 121 as determined by user selected input list items	Determined by the placement of the "0" below
7 ①	NV	Set	Short Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of short user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)
8 ①	NV	Set	Short Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of short user input assembly	Default = 5; Avg RMS Current
9 ①	NV	Set	Short Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of short user input assembly	Default = 9; Avg RMS Voltage
10 ①	NV	Set	Short Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of short user input assembly	Default = 15; Thermal Pile %
11 ①		Get	Long Assembly User Input, Size	USINT	Total size of assembly 131 as determined by user selected input list items	Determined by the placement of the "0" below
12 ①	NV	Set	Long Assembly User Input, Word 0 Param	USINT	Data item assigned to Word 0 of long user input assembly	Default = 1; Device Status (Control Supervisor Attr 101)

Table 194. DeviceNet Interface Object Instance Attributes (S811+), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Value
13 ①	NV	Set	Long Assembly User Input, Word 1 Param	USINT	Data item assigned to Word 1 of long user input assembly	Default = 2; L1 Current
14 ①	NV	Set	Long Assembly User Input, Word 2 Param	USINT	Data item assigned to Word 2 of long user input assembly	Default = 3; L2 Current
15 ①	NV	Set	Long Assembly User Input, Word 3 Param	USINT	Data item assigned to Word 3 of long user input assembly	Default = 4; L3 Current
16 ①	NV	Set	Long Assembly User Input, Word 4 Param	USINT	Data item assigned to Word 4 of long user input assembly	Default = 15 Overload thermal pile
17 ①	NV	Set	Long Assembly User Input, Word 5 Param	USINT	Data item assigned to Word 5 of long user input assembly	Default = 5 Current Ave
18 ①	NV	Set	Long Assembly User Input, Word 6 Param	USINT	Data item assigned to Word 6 of long user input assembly	Default = 6 Voltage VAB
19 ①	NV	Set	Long Assembly User Input, Word 7 Param	USINT	Data item assigned to Word 7 of long user input assembly	Default = 7 Voltage VBC
20 ①	NV	Set	Long Assembly User Input, Word 8 Param	USINT	Data item assigned to Word 8 of long user input assembly	Default = 8 Voltage VCA
21 ①	NV	Set	Long Assembly User Input, Word 9 Param	USINT	Data item assigned to Word 9 of long user input assembly	Default = 9 Voltage Ave

Note

① Not implemented (6–21).

Class 150 (0x96): Base Device Information Object

Table 195. Base Device Information Object Instance Services (S811+)

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

Table 196. Base Device Information Object Instance Attributes (S811+)

Attr ID	NV	Access Rule	Data Type	Name	Description
1 (0x01)	NV	Set/Get	SHORT_STRING	Assigned Name	User defined ASCII name.
2 (0x02)	V	Get	UINT	Firmware Version List	Firmware version—AVR, DSP
3 (0x03)	V	Get	UINT	Firmware Version List	Firmware version—AVR, DSP
4 (0x04)	V	Get	UINT	Hardware Version	Hardware version

DeviceNet Object Model for Stand-Alone I/O

Stand-Alone I/O DeviceNet Full Profile (9 Objects)

Table 197. Stand-Alone I/O DeviceNet Full Profile

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	TestOnly	1 (unpublished)

Identity Object, Class 0x01 (Stand-Alone I/O)

Table 198. Identity Instance Services (Stand-Alone 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 I/O 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

Table 199. Identity Instance Attributes (Stand-Alone 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 (Stand-Alone I/O DeviceNet Interface with 24 Vdc I/O) or 0x1104 (Stand-Alone I/O DeviceNet Interface with 120 Vac I/O)
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

Table 199. Identity Instance Attributes (Stand-Alone I/O), continued

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
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:

Table 200. Bit Definitions for Instance #1, Status Attribute of Identity Object (Stand-Alone I/O)

Bit(s)	Called	Definition
0	Owned	
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" default. 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 present 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:

Table 201. 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 (Stand-Alone I/O)**Table 202. Message Router Instance Services (Stand-Alone I/O)**

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

Table 203. Message Router Instance Attributes (Stand-Alone 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 max 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 (Stand-Alone I/O)**Table 204. DeviceNet Instance Services (Stand-Alone 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

Table 205. DeviceNet Instance Attributes (Stand-Alone I/O)

Attr ID	NV	Access Rule	Name	Data Type	Attribute Description	Semantics
5	Get		Allocation Information	STRUCT of:		
			Allocation 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 (Stand-Alone I/O)

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 bind input data or output data. The terms “input” and “output” are defined from the network’s 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)**.

Table 206. Assembly Instance Services (Stand-Alone 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

Table 207. Assembly Instance Attributes (Stand-Alone I/O)

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

Table 208. Assembly Instances (Stand-Alone I/O)

Type	Instance	Usage	Name
Input	3 (0x03)	Poll, Bit	4 point input with no status bits
Input	107 ① (0x6B)	Poll, Bit Strobe	4 point input and 2 point output
Output	32 ② (0x20)	Poll, Bit Strobe	2 point output with no status bits
Output	111 ③ (0x6F)	Bit Strobe	Accepts 8 bytes of bit strobe command to trigger bit strobe response

Notes

- 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.

Table 209. Input Assembly 3 (Stand-Alone 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

Table 210. Input Assembly 107 (Stand-Alone 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

Table 211. 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 (Stand-Alone I/O)

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

Connection Object, Class 0x05 (Stand-Alone I/O)**Table 212. Connection Instance Services (Stand-Alone 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

Table 213. Connection Object Instance #1 Attributes (Explicit Messaging) (Stand-Alone 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

Table 213. Connection Object Instance #1 Attributes (Explicit Messaging) (Stand-Alone I/O), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
8	Get		consumed_connection_size	UINT	Maximum number of bytes received across this Connection Default = 500
9	Get/Set		expected_packet_rate	UINT	Defines timing associated with this Connection Default = 0x09C4 (2500 milliseconds)
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

Table 214. Connection Object Instance #2 Attributes (Polled I/O) (Stand-Alone I/O)

Attr ID	Access Rule	NV	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

Table 214. Connection Object Instance #2 Attributes (Polled I/O) (Stand-Alone I/O), continued

Attr ID	Access Rule	NV	Name	Data Type	Attribute Description
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"

Table 215. Connection Object Instance #3 Attributes (Bitstrobe I/O) (Stand-Alone I/O)

Attr ID	Access Rule	NV	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 (Stand-Alone I/O)**Table 216. Discrete Input Point Instance Services (Stand-Alone 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

Table 217. 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 (Stand-Alone 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.

Table 218. Discrete Output Point Instance Services (Stand-Alone 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

Table 219. Discrete Input Point Object Instance #1–4 (C440)

Attr ID	Access Rule	NV	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 (Stand-Alone I/O)**Table 220. DeviceNet Interface Object Instance Services (Stand-Alone 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

Table 221. DeviceNet Interface Object Instance Attributes

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.

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