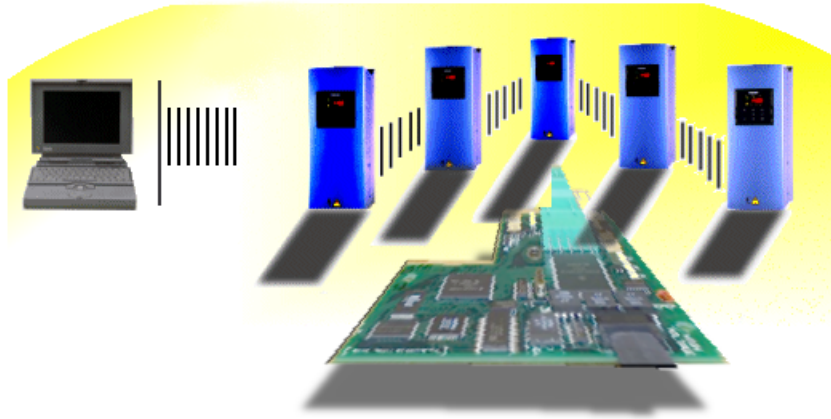


VACON
CX/CXL/CXS
FREQUENCY CONVERTERS



Vacon
DeviceNet
Option Board

Subject to changes without notice.

FOR SMOOTH CONTROL



vacon

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1. INTRODUCTION

DeviceNet is an open network based on CAN that is designed to allow low cost industrial control devices to communicate with each other. DeviceNet is defined in terms of an abstract object model which presents the suite of communication services available and describes the externally visible behaviour of a DeviceNet node. The DeviceNet Model is application independent. DeviceNet provides the communication services needed by various types of applications. Many of today's lower level industrial control devices must retain their low cost/low resource characteristics even when directly connected to a network. DeviceNet takes this into consideration by defining a specific instance of the Model for communications typically seen in a Master/Slave application. This is referred to as the Predefined Master/Slave Connection Set.

VACON drives can be connected to the DeviceNet using the CX212OPT fieldbus board. The drive can then be controlled, monitored and programmed from the Host system.

CX212OPT meets the requirements of the ODVA 2.0 specifications for the AC/DC Drives profile.

The DeviceNet board shall be installed in the space reserved for it inside the VACON frequency converter.

This instruction manual must be thoroughly read and understood before using the DeviceNet option board. Please keep this instruction manual in a safe place for future reference.

WARNING !



Internal components and circuit boards are at high potential when the drive is connected to the power source. This voltage is extremely dangerous and may cause death or severe injury if you come in contact with it.

2. SPECIFICATIONS

DeviceNet Connections	Interface	Pluggable connector (5.08mm)
	Transfer method	CAN
	Transfer cable	2 wire twisted shielded cable with 2 wire bus power cable and drain
	Electrical isolation	500 V DC
Communications	ODVA 2.0 Compliant	
	Message types	IO Polling Explicit
	Baud rates	125 Kbaud 250 Kbaud 500 Kbaud
	Product Code	0x01 (1)
	Product Type	0x02 (AC Drive)
	Vendor ID	0x1BB (Vaasa Control)
Electrical	DeviceNet	Network supply voltage: 11...25 V DC Network input current: 28 mA typical, 125 mA inrush (24 V DC)
	Other	All other power derived from VACON inverter power supply
Environment	Ambient operating temperature	-10...55 °C
	Storage temperature	-40...60 °C
	Humidity	< 95%, no condensation allowed
	Altitude	Max. 1000 meters
	Vibration	0.5 G at 9 – 200 Hz
Safety		Fulfils EN50178 standard

Table 1. CX212OPT DeviceNet Specification

3. INSTALLATION

3.1 Installation of the CX212OPT in Vacon CXS type frequency converter

The DeviceNet board shall be installed according to the instructions below (see table 3-1).

NOTE! These instructions apply only to field installations. Otherwise, the board has already been installed for you at the factory.

Before doing any commissioning, carefully read the safety instructions in the "VACON Frequency converter, User Manual" Chapter "SAFETY".

Verify receipt of all the DeviceNet board parts: **DeviceNet board (1)**, **data cable (blue terminal) (2)**, **fixing screw (3)**, **stand sleeve (4)**, **power cable (black terminal) (5)**, **protective plastic board (6)**, and **mounting board (7)**. See Figure below.

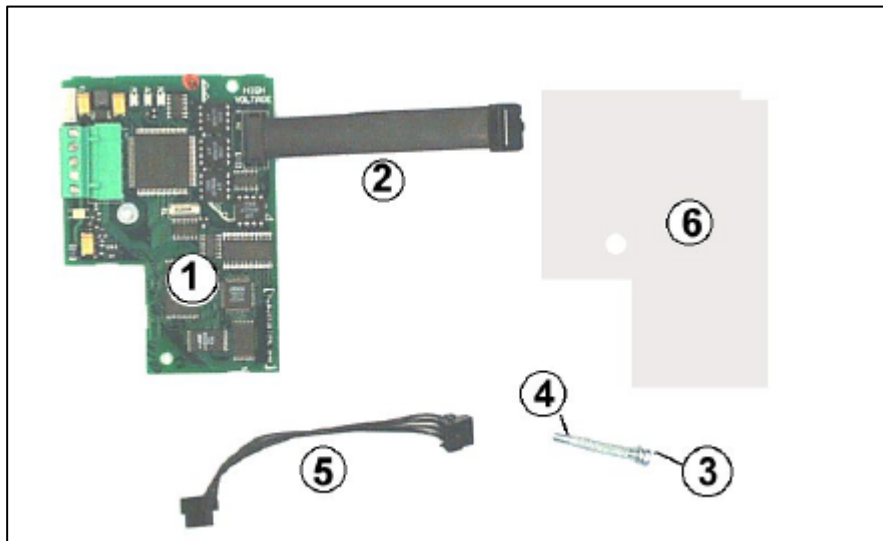

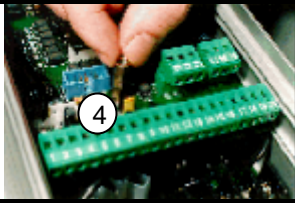
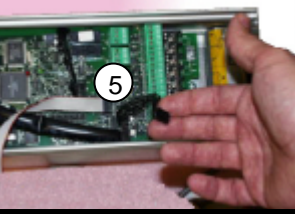
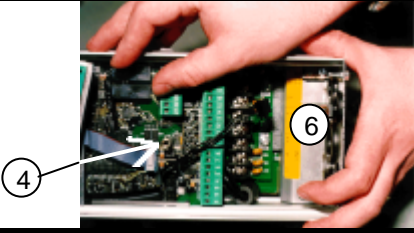
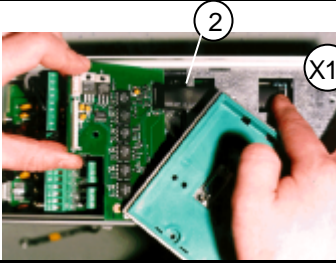
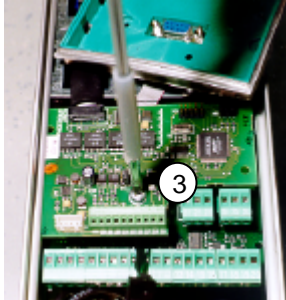


Figure 1. Components of the DeviceNet board

If the delivery does not correspond to your order, please contact the supplier immediately. Only a competent personnel should carry out the electrical installation.

Disconnect the VACON Frequency converter from the power source. Wait 5 minutes before opening the cover of the Drive.

<p>A</p>	<p>Remove the control panel and the panel base.</p>	
<p>B</p>	<p>Remove the fixing screw from the control board and replace it with a stand sleeve (4).</p>	
<p>C</p>	<p>Connect the power cable (5) to terminal X5 of the control board. The power cable can also be connected to terminal X6 if terminal X5 is already reserved by the power cable from the power board.</p>	
<p>D</p>	<p>Remove the protective foil of the plastic board and place the plastic board (6) above the control board. Be sure to place the plastic board correctly so that the stand sleeve (4) comes out through the hole on the board.</p>	
<p>E</p>	<p>Place the DeviceNet board (1) on the protective plastic board (6) and connect the data cable (2) to terminal X14 of the control board. The stand sleeve should come out through the metal-edged hole.</p>	
<p>F</p>	<p>Secure the DeviceNet board on the stand sleeve with the screw (3) attached.</p>	



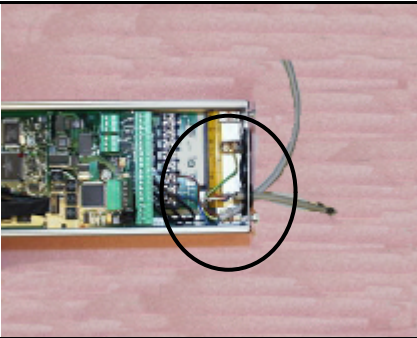
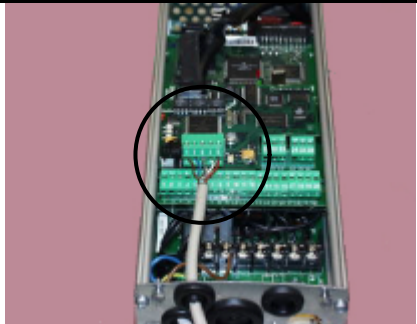
G	Connect the power cable (5) to terminal X1 on the CX212OPT.	
H	Attach the control panel base with four screws.	
I	Check the connections. Remove all foreign objects inside the frequency converter. Restore back the control panel and drive cover.	

Figure 2. Installation in Vacon CXS frequency converter

3.1.1. Connection of DeviceNet drop-line cable [Vacon CXS]

The following instructions lead you through the connection of the CX212OPT to the DeviceNet system, the power-up of the board and the grounding.

A	Lead the DeviceNet drop-line cable through the upper left rubber-covered hole on the bottom of the VACON drive.	
B	Connect the 4 colored wires into connector X4 in the following order from left: black, blue, NONE, white, red . Bend the bare cable in the middle backwards along the drop-line cable. See point C below.	

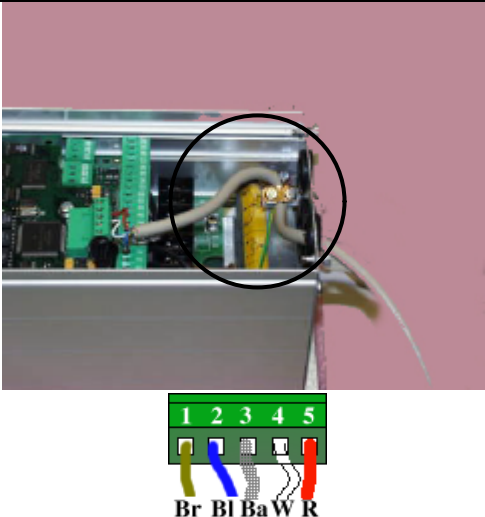
<p>C</p>	<p>There are two ways of grounding the DeviceNet drop-line cable.</p> <ol style="list-style-type: none"> 1) Bend the drop-line cable to a curve and ground it to the frame by fixing the cable lug around it at the stripped point, see picture on the right. This manner of grounding is recommended because it protects the device better from disturbances. 2) Connect the bare wire between the colored ones in terminal 3 as shown in picture on lower right. <p>NOTE: In case of several frequency drives in the DeviceNet system, only ONE of them shall be grounded according to 1). Grounding for the remaining devices shall take place according to 2).</p>	
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Figure 3. Connection of the drop-line cable (Vacon CXS)

3.2. Installation of the CX212OPT in Vacon CX/CXL type frequency converters

The DeviceNet fieldbus board shall be installed according to the instructions below (see table 3-2).

NOTE! These instructions apply only to field installations. Otherwise, the board has already been installed for you at the factory.

Before doing any commissioning, carefully read the safety instructions in the "VACON Frequency converter, User's Manual" Chapter "SAFETY".

Verify receipt of all the DeviceNet board parts: **DeviceNet board (1), data cable (blue terminal) (2), fixing screw (3), stand sleeve (4), power cable (black terminal) (5), protective plastic board (6), and mounting board (7).** See Figure below.

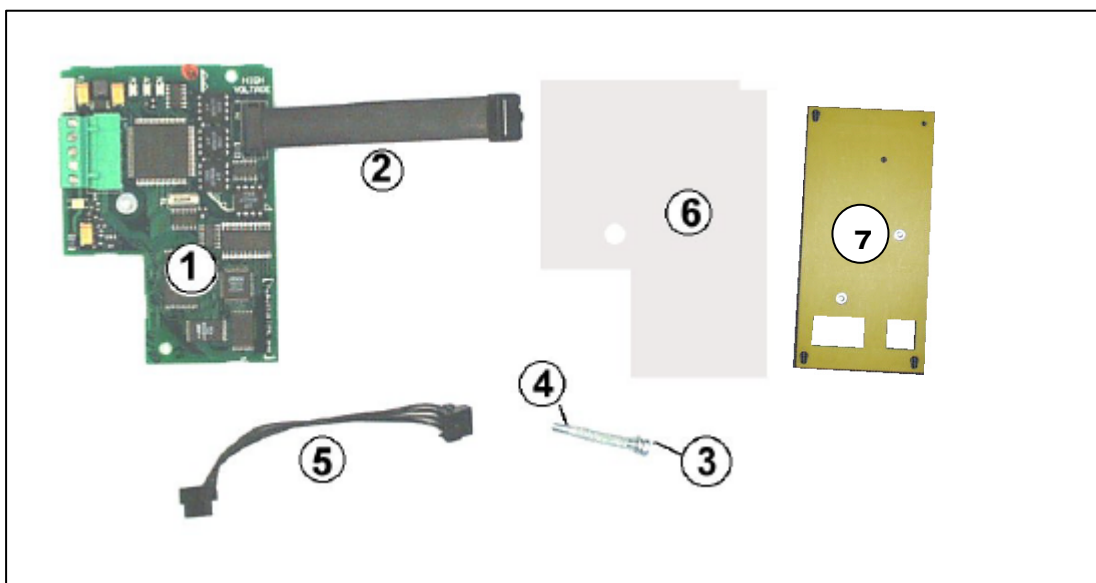


Figure 4. Components of Vacon DeviceNet board (CX/CXL)

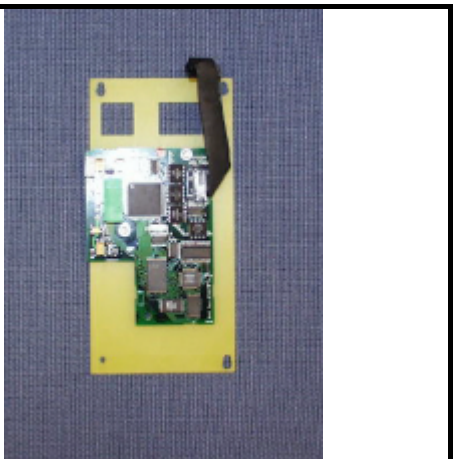
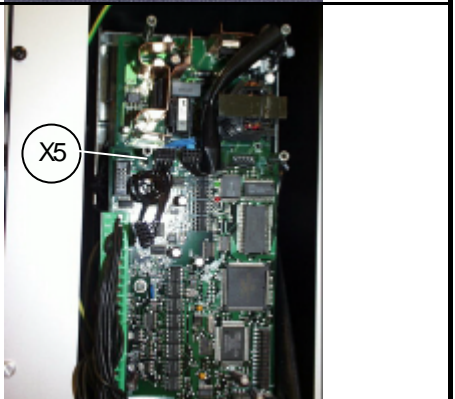
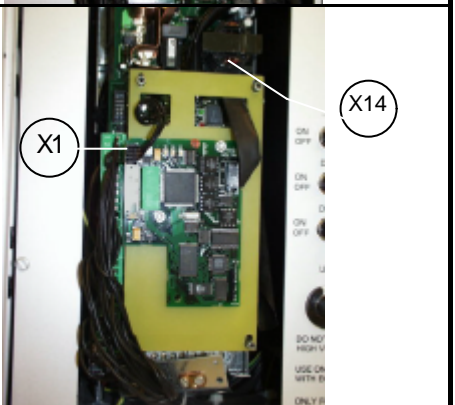
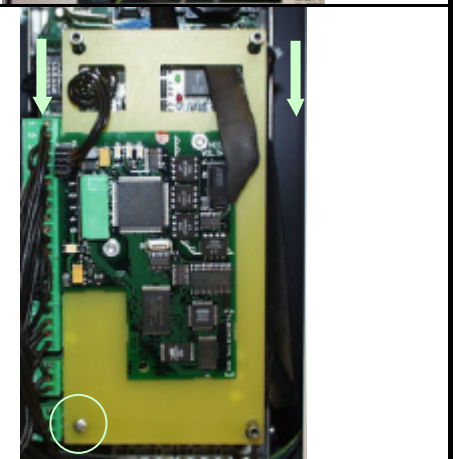
<p>A</p>	<p>Fix the DeviceNet fieldbus board (1) on the mounting board (7) with the two screws at- tached. Make sure that the installation is stable</p>	
<p>B</p>	<p>Connect the other end of the power cable (5) to terminal X5 of the control board. The power cable can also be connected to terminal X6 if terminal X5 is already reserved by the power cable from the power board</p>	
<p>C</p>	<p>Lead the power cable (5) through the smaller opening and connect it to terminal X1 on the CX212OPT. Put also the data cable (2) through the larger opening and connect it to terminal X14 of the control board. Place the mounting board (7) with the CX212OPT above the control board by the three stand-offs.</p>	
<p>D</p>	<p>Push the mounting board (7) downwards so that the narrow parts of the holes in the board hit the slots on the stand-offs. Fix the mounting board (7) with a screw at the lower left angle.</p>	

Figure 5. Installation of the DeviceNet board in Vacon CX/CXL type frequency converters

3.2.1. Connection of DeviceNet drop-line cable [CX/CXL]

The following instructions lead you through the connection of the CX212OPT to the DeviceNet system, the power-up of the board and the grounding.




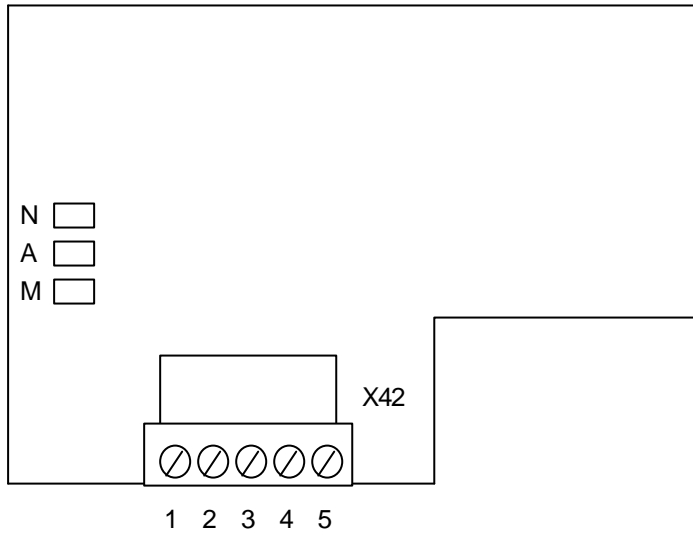
A	<p>Lead the DeviceNet drop-line cable through the upper left rubber-covered hole on the bottom of the VACON drive.</p>	
B	<p>Connect the 4 coloured wires into connector X4 in the following order from left: black, blue, NONE, white, red. Bend the bare cable in the middle backwards along the drop-line cable. See point C below</p>	
C	<p>There are two ways of grounding the DeviceNet drop-line cable.</p> <ol style="list-style-type: none"> 1) Bend slightly the drop-line cable and ground it to the frame by fixing the cable lug around it at the stripped part. See picture on the right. This way of grounding is recommended because it protects the device better from disturbances. 2) Connect the bare wire (see point B) between the coloured ones to terminal 3 as shown in picture on lower right. <p>NOTE: In case of several frequency drives in the DeviceNet system, only ONE of them shall be grounded according to 1). Grounding for the remaining devices shall take place according to 2).</p>	

Figure 6. Connection of the drop-line cable (Vacon CX/CXL).

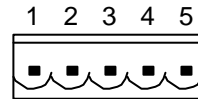
4. CONNECTIONS

4.1. Board layout



DeviceNetConnector (X4):

1	V-	Black
2	CAN_L	Blue
3	Drain	Bare
4	CAN_H	White
5	V+	Red



Diagnostic LED:

N	Network Status, bi-color (red/green)
A	Node Address, bi-color (red/green)
M	Module Status, bi-color (red/green)

LED Definitions see chapter 6.1

5. CONFIGURATION

FIRST READ HOW TO COMMISSION THE DRIVE IN THE VACON DRIVE USER'S MANUAL (CHAPTER 8.)

Commissioning of the DeviceNet board:

Check that Multi-purpose Control Application II (or e.g. Fieldbus Application) is selected.

- Parameter P0.1 = 0

For further information about the use of parameters, see VACON Drive User's Manual, Chapter 7. More information on the loading and saving of system parameters can be found in the VACON Drive User's Manual, Chapter 11.

Set active control source to DeciveNet:

1. Check that the control panel is not the active control source.
(See VACON Drive User's manual, Chapter 7.)
2. Check that parameter 10.1 "Fieldbus control select" is set to value 1(On).

DeviceNet Configuration Tool

Before using the CX212OPT option board, you must configure the device baud rate and node address to the desired values. This can be accomplished by using a DeviceNet configuration tool (Cutler-Hammer "Netview", Allen Bradley "DeviceNet Manager", etc.). The default baud rate and node address is 125 Kbaud and 63, respectively. All devices must have the same baud rate.

Since all new devices are factory set to node address 63, it is usually not a good idea to leave the address set to 63.

You must also check or set following attributes before use:

Basic and Motor Control Class (160) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
26 0x1A	Polled Input Assembly Type	Get_Attribute_Single, Set_Attribute_Single	71 70 73	C7	Input assembly used by the polled connection
27 0x1B	Polled Output Assembly Type	Get_Attribute_Single, Set_Attribute_Single	21 20 23	C7	Output assembly used by the polled connection

Protection Class (166) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
151 0x97	SafeStateType	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C6	<p>Selects Safe State response to errors which specify safe state operation. Currently only a loss of connection other than by de-allocation is a safe state error.</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>0 = DriveFault (fault and stop) 1 = No Action (hold last speed) 2 = Preset Speed/Direction</p>
152 0x98	PresetDir	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C1	<p>Sets safe state direction of rotation if the Safe State Behavior attribute specifies "Preset Speed/Direction" .</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>Inverter will require external stop.</p> <p>0 = Forward 1 = Reverse</p>
153 0x99	PresetRPM	Get_Attribute_Single, Set_Attribute_Single	0 0 30000	C7	<p>Sets safe state speed reference (RPM) if the Safe State Behavior attribute specifies "Preset Speed/Direction".</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>Inverter will require external stop.</p>
154 0x9A	PresetTq	Get_Attribute_Single, Set_Attribute_Single	0 0 10000	C7	<p>Sets safe state torque reference (0,00%) if the Safe State Behavior attribute specifies "Preset Speed/Direction".</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>Inverter will require external stop.</p>

6. VACON DEVICENET INTERFACE

Features of the VACON DeviceNet Interface:

- Direct control of VACON (e.g. Run, Stop, Direction, Speed reference, Fault reset)
- Full access to all VACON parameters
- Monitor VACON status (e.g. Output frequency, Output current, Fault code)

6.1.LED definitions and diagnostic

The CX212OPT includes three LED status indicators: Module status, Node address and Network status. Module Status (**M**) provides information about the DeviceNet module. Network Status (**N**) provides information about the status of the network connection.

Module Status LED

LED	Meaning
Off	There is no power applied to the CX212OPT.
Green	The CX212OPT is operating normally.
Flashing Green	The CX212OPT is in the Standby state, or the device needs commissioning due to configuration missing, incomplete or incorrect.
Flashing Red	The CX212OPT has detected a Recoverable Fault
Red	The CX212OPT has detected an Unrecoverable Fault.

Network Status LED

LED	Meaning
Off	CX212OPT is not on-line. - The device has not completed the Dup_MAC_ID test yet. - If the Module Status LED is off, the device is not powered.
Green	The CX212OPT is on-line and allocated to a Master.
Flashing Green	The CX212OPT has passed the Dup_MAC_ID test, is on-line, but is not allocated to a master.
Flashing Red	One or more I/O Connections are in the Timed-Out state.
Red	The CX212OPT cannot communicate on the network (Duplicate MAC ID, or Bus-off).

The Node Address (**A**) LED blinks the MAC ID of the unit while it is powered. The unit displays the tens digit with red blinks, and the ones digits with green blinks. The unit plays the tens, then ones, and finally delays about 2 second before repeating the sequence.

An LED test is performed at power-up. The following sequence performed:

1. All LED's off
2. All LED's green (0.25 s)
3. All LED's red (0.25 s)
4. All LED's off
5. Start of normal operation

6.2. Reset Service

The following table lists the different types of resets supported by the Identity Object. Resetting the CX212OPT interface to its out-of-box configuration will set ALL attributes to their default values and change the response of the drive to a loss of communications with the CX212OPT. The device will have to be re-configured for your application before resuming normal operation.

Resetting the VACON inverter to its out-of-box configuration will set ALL inverter parameters to their default values. Before restarting the inverter, you must verify that it is properly configured for your application.

Value:	Type of Reset:
0	Emulate as closely as possible the cycling of power to the CX212OPT DeviceNet Interface. This value is the default if this parameter is omitted. The VACON drive shall be stopped if it is running.
1	Return the CX212OPT DeviceNet Interface AND the VACON Drive as closely as possible to the out-of-box (C-H factory default) configuration, then emulate cycling of power as closely as possible. The VACON Drive shall be stopped if it is running.

6.3. Message Types

The CX212OPT allows an VACON Frequency converter to operate as a slave device on a DeviceNet network. The CX212OPT supports Explicit Messages and Polled I/O Messages of the predefined master/slave connection set. It *does not* support the Explicit Unconnected Message Manager (UCMM).

As a group 2 slave device, the CX212OPT supports the following message types.

CAN Identifier Field	Group 2 Message Type
10xxxxxx111	Duplicate MAC ID Check Messages
10xxxxxx110	Unconnected Explicit Request Messages
10xxxxxx101	Master I/O Poll Command Messages
10xxxxxx100	Master Explicit Request Messages
10xxxxxx011	Slave Explicit Response Messages
01111xxxxxx	Slave Poll Response Messages

xxxxxx = Communication Interface Node Address

6.4. List of Object Classes

The Communication Interface supports the following object classes.

Class	Object
0x01	Identity
0x02	Message Router
0x03	DeviceNet
0x04	Assembly
0x05	DeviceNet Connection
0x28	Motor Data
0x29	Control Supervisor
0x2A	AC/DC Drive
0xA0	Basic and Motor Control
0xA1	Input and Fieldbus Control
0xA2	Output and Supervision
0xA3	Drive and Torque Control
0xA6	Protections
0xAA	Monitoring Data

6.5. List of Services

The Services supported by these object classes are shown below.

Service Code (in hex)	Service Name	Identity		Message Router		DeviceNet		Assembly		Connection		Motor Data		Control Supervisor		AC/DC Drive		Objects	
		Class	Inst	Class	Inst	Class	Inst	Class	Inst	Class	Inst	Class	Inst	Class	Inst	Class	Inst	Class	Inst
05	Reset (Type 0, 1)		Y								Y								
0E	Get_Attribute_Single	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10	Set_Attribute_Single		Y		Y		Y		Y		Y		Y		Y		Y		Y
14	Error Response	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
18	Get Member	Y		Y		Y		Y		Y		Y		Y		Y		Y	
4B	Allocate_Master/Slave_Connection_Set						Y												
4C	Release_Master/Slave_Connection_Set						Y												
Vendor Specific Services																			
47	CH Get Member	Y		Y		Y		Y		Y		Y		Y		Y		Y	

6.6. List of Data Types

The attribute list that follows includes information on the Data Type of each attribute. The following tables explain the Data, Structure, and Array Type codes used in the Data Type column. For further information see Appendix J of the ODVA DeviceNet specification 2.0

Elementary Data Types

Data Type Name	Data Type Code (in hex)	Data Type Description
BOOL	C1	Logical Boolean with values TRUE and FALSE
SINT	C2	Signed 8-bit integer value
INT	C3	Signed 16-bit integer value
USINT	C6	Unsigned 8-bit integer value
UINT	C7	Unsigned 16-bit integer value
UDINT	C8	Unsigned 32-bit integer value
BYTE	D1	bit string - 8-bits
WORD	D2	bit string - 16-bits
SHORT_STRING	DA	character sting (1 byte per character, 1 byte length indicator)

Constructed Data Types

Type Code	Description
A1	Abbreviated array type encoding
A2	Formal structure type encoding

Appendix 1

VACON DeviceNet Interface Errors

The CX212OPT DeviceNet interface record the following events in the Event List FIFO:

VACON Event Name	Event Code	Event Description
No event	0x00	Default value in EventList entries.
Drive Communication Error	0x01	Inverter interface communication error with the drive.
I/O Connection Timeout – Fault_Stop	0x02	Control Supervisor transitions to Fault_Stop.
I/O Connection Timeout – No Action	0x03	Control Supervisor remains in Enabled State. Hold last speed
I/O Connection Timeout – Preset Direction and Speed	0x04	Control Supervisor remains in Enabled State. Run at preset direction and speed.
Explicit Connection Timeout – Fault_Stop	0x05	Control Supervisor transitions to Fault_Stop.
Explicit Connection Timeout – No Action	0x06	Control Supervisor remains in Enabled State. Hold last speed
Explicit Connection Timeout – Preset Direction and Speed	0x07	Control Supervisor remains in Enabled State. Run at preset direction and speed.
Low DeviceNet Voltage	0x08	Connection timeout may occur next.
Bus Off	0x09	Connection timeout may occur next.
CAN Overrun	0x0C	Connection timeout may occur next.
Configuration Consistency Value (CRC) mismatch	0x0E	The device's configuration is incorrect or incomplete. Major Recoverable Fault. An Identity Reset type 1 is needed for recovery.
Microprocessor watchdog timeout	0x0F	The device detected a serious problem with itself. Major Unrecoverable Fault.
Received explicit message is too big	0x10	Message is ignored.
Received IO message is too big	0x11	Message is ignored.
Parameter Range Error	0x12	An out-of-range parameter value exists in the drive.
I/O Connection Released – Fault_Stop	0x14	Control Supervisor transitions to Fault_Stop.
I/O Connection Released – No Action	0x15	Control Supervisor remains in Enabled State. Hold last speed
I/O Connection Released – Preset Direction and Speed	0x16	Control Supervisor remains in Enabled State. Run at preset direction and speed.
Receive_Idle – Fault_Stop	0x17	Control Supervisor transitions to Fault_Stop.
Receive_Idle – No Action	0x18	Control Supervisor remains in Enabled State. Hold last speed
Receive_Idle – Preset Direction and Speed	0x19	Control Supervisor remains in Enabled State. Run at preset direction and speed.
Explicit Connection Released – Fault_Stop	0x1A	Control Supervisor transitions to Fault_Stop.
Explicit Connection Released – No Action	0x1B	Control Supervisor remains in Enabled State. Hold last speed
Explicit Connection Released – Preset Direction and Speed	0x1C	Control Supervisor remains in Enabled State. Run at preset direction and speed.
Connection unable to read message	0x21	Error detected by connection object code
Connection unable to send message	0x22	Error detected by connection object code
Consumer unable to read message	0x23	Error detected by connection object code
Producer unable to send message	0x24	Error detected by connection object code
Producer unable to send buffer	0x25	Error detected by connection object code
Producer unable to send acknowledgment	0x26	Error detected by CX212OPT connection object code
Unexpected notification that message was	0x27	Error detected by connection object code

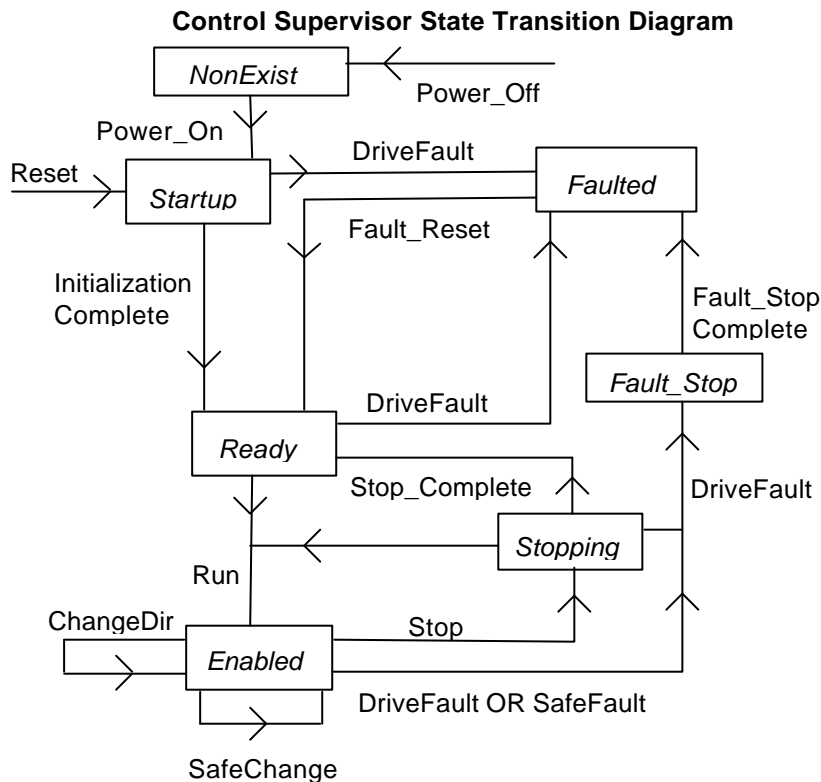
sent		
Explicit reply is too big	0x31	Error detected by connection object code
First fragment of an IO message is too big	0x34	Error detected by connection object code
Reassembled IO message is too big	0x35	Error detected by connection object code
IO message is too big for producer	0x36	Error detected by connection object code
IO/Explicit message is too big for producer	0x37	Error detected by connection object code

Appendix 2

Control Supervisor Behaviour

Control Supervisor State Transition Diagram

The State Transition Diagram provides a graphical description of the states and corresponding state transitions for the control supervisor.



Control Supervisor State Transition Diagram Explanation

Old State	Input Conditions						Event	Results	
	CtrlFromNet	Run1Var	Run2Var	IdleMode	FwdMode	RevMode		New State	Action
x	x	x	x	x	x	x	Power_Off	NonExist	
x (except NonExist)	x	x	x	x	x	x	Reset	Startup	Faulted := 0; Ready := 0 FwdMode := 0; RevMode := 0 Run1Var := 0; Run2Var := 0
NonExist	x	x	x	x	x	x	Power_On	Startup	Faulted := 0; Ready := 0 FwdMode := 0; RevMode := 0 Run1Var := 0; Run2Var := 0
Startup	x	x	x	x	x	x	DriveFault	Faulted	Faulted := 1; FaultCode := x
Startup	x	x	x	x	x	x	Initialization Complete	Ready	Ready := 1
Ready	x	x	x	x	x	x	DriveFault	Faulted	Faulted := 1; FaultCode := x; Ready := 0
Ready	1	1	0	0	x	x	Run (Fwd)	Enabled	FwdMode := 1 (Start Forward)
Ready	1	0	1	0	x	x	Run (Rev)	Enabled	RevMode := 1 (Start Reverse)
Enabled	x	x	x	x	x	x	DriveFault	Fault_Stop	Faulted := 1; FaultCode := x (Initiate Faulted Stop) FwdMode := 0; RevMode := 0; Ready := 0
Enabled	1	0	0	x	x	x	Stop	Stopping	(Initiate Stop)
Enabled	1	1	0	0	0	1	ChangeDir (Fwd)	Enabled	FwdMode := 1; RevMode := 0 (Change to Forward)
Enabled	1	0	1	0	1	0	ChangeDir (Rev)	Enabled	FwdMode := 0; RevMode := 1 (Change to Reverse)
Enabled	1	x	x	x	x	x	SafeFault	Fault_Stop	Faulted := 1; FaultCode := x (Initiate Faulted Stop) FwdMode := 0; RevMode := 0; Ready := 0 Run1Var := 0; Run2Var := 0
Enabled	1	x	x	x	x	x	SafeChange	Enabled	FwdMode := Run1Var := NOT PresetDir RevMode := Run2Var := PresetDir SpeedRef := PresetSpeed TorqueRef := PresetTorque
Stopping	x	x	x	x	x	x	DriveFault	Fault_Stop	Faulted := 1; FaultCode := x (Initiate Faulted Stop) Ready := 0
Stopping	1	1	0	0	x	x	Run (Fwd)	Enabled	FwdMode := 1 (Start Forward)
Stopping	1	0	1	0	x	x	Run (Rev)	Enabled	RevMode := 1 (Start Reverse)
Stopping	x	0	0	x	x	x	Stop_Complete	Ready	
Fault_Stop	x	x	x	x	x	x	Fault_Stop Complete	Faulted	
Faulted	x	x	x	x	x	x	Fault_Reset	Ready	Faulted := 0; Ready := 1

Start Forward, Start Reverse, Change to Forward, Change to Reverse, and Stop (not Faulted Stop) are static outputs of the Control Supervisor state machine. They are commands to the drive when CtrlFromNet=1. When CtrlFromNet=0, control commands are from another source.

Other logic equations:

RefFromNet = (NetRef) AND (EnableFieldbus);

IF (RefFromNet)

```
{
  (Write reference frequency or torque to the drive whenever SpeedRef or TorqueRef are written.)
}
```

When performing changes to achieve programmed Safe State:

- (1) Run/Stop/Direction can be changed because CtrlFromNet must equal 1 when in the Enabled state.
- (2) Reference in the drive can be changed to PresetSpeed or PresetTorque only if (RefFromNet = 1).

Appendix 3

Input and Output Assemblies

Output 20

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						FaultReset		RunFwd
Byte 1								
Byte 2	Speed Reference (Low Byte)							
Byte 3	Speed Reference (High Byte)							

Output 21 (Default)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0		NetRef	NetCtrl			FaultReset	RunRev	RunFwd
Byte 1								
Byte 2	Speed Reference (Low Byte)							
Byte 3	Speed Reference (High Byte)							

Output 23

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0		NetRef	NetCtrl			FaultReset	RunRev	RunFwd
Byte 1								
Byte 2	Speed Reference (Low Byte)							
Byte 3	Speed Reference (High Byte)							
Byte 4	Torque Reference (Low Byte)							
Byte 5	Torque Reference (High Byte)							

Input 70

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						Running1		Faulted
Byte 1								
Byte 2	Speed Actual (Low Byte)							
Byte 3	Speed Actual (High Byte)							

Input 71 (Default)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	AtReference	RefFromNet	CtrlFromNet	Ready	Running2	Running1	Warning	Faulted
Byte 1	Drive State							
Byte 2	Speed Actual (Low Byte)							
Byte 3	Speed Actual (High Byte)							

Input 73

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	AtReference	RefFromNet	CtrlFromNet	Ready	Running2	Running1	Warning	Faulted
Byte 1	Drive State							
Byte 2	Speed Actual (Low Byte)							
Byte 3	Speed Actual (High Byte)							
Byte 4	Torque Actual (Low Byte)							
Byte 5	Torque Actual (High Byte)							

Appendix 4

CX212OPT Communication Interface Object Profiles

In the following list, attributes shown in **bold** are stored in the non-volatile memory of the CX212OPT or VACON drive and maintain their values after a power loss. All other settable attributes will power up at their default values.

Attributes listed in the **shaded area** in the following list must be set during the configuration of the CX212OPT while it is connected to a VACON drive. These attributes must be stored in non-volatile memory to maintain their values after power loss.

Before operating over DeviceNet, NetCtrl (Control Supervisor Object Class 41, Instance 1, Attribute 5) must be set to 1, "Network Control". Setting the speed of the drive over DeviceNet requires that NetRef (AC/DC Drive Object Class 42, Instance 1, Attribute 4) be set to 1, "Reference is From Network".

Identity Object

Class Code 0x01

Identity Class (1) – Class attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 1	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Identity" "Identity" "Identity"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A N/A N/A	A1 01 C7	Array of instance IDs supported by this class

Identity Class (1) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Vendor Id	Get_Attribute_Single	443 443 443	C7	Identification of each vendor by number
2 0x02	Device Type	Get_Attribute_Single	2 2 2	C7	Indication of the general type of product
3 0x03	Product Code	Get_Attribute_Single	1 1 1	C7	This is a code assigned by the vendor to describe the device. Product code determined by interrogating the connected drive.

4 0x04	Revision	Get_Attribute_Single	{1,11} {1,11} {1,11}	A2 02 C6 C6	Revision of the item the Identity Object represents
5 0x05	Status	Get_Attribute_Single	N/A 0 255	D2	Summary Status of the Device. Defined in ODVA DeviceNet spec. Bit 5 = User fault Bit 6 = Node fault Bit 7 = System fault
6 0x06	Serial Number	Get_Attribute_Single	N/A 0x30940000 0x37FFFFFF	C8	Serial Number of the device
7 0x07	Product Name	Get_Attribute_Single	"212OPT" "212OPT" "212OPT"	DA	Human readable identification
8 0x08	State	Get_Attribute_Single	N/A 0 5	C6	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
9 0x09	Configuration Consistency Value	Get_Attribute_Single	N/A 0 65535	C7	Contents identify configuration of device
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Message Router Object

Class Code 0x02

Message Router Class (2) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single		1 1 1 C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single		1 1 1 C7	
3 0x03	Number of Instances	Get_Attribute_Single		1 1 1 C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	

7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Message Router" "Message Router" "Message Router"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.F97
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A N/A N/A	A1 01 C7	Array of instance IDs supported by this class

Message Router Class (2) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Object List	Get_Attribute_Single	N/A N/A N/A	A2 04 C7 A1 01 C7	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

DeviceNet Object

Class Code 0x03

DeviceNet Class (3) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single		C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single		C7	
3 0x03	Number of Instances	Get_Attribute_Single		C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"DeviceNet"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A	A1 01 C7	Array of instance IDs supported by this class

DeviceNet Class (3) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	MAC ID	Get_Attribute_Single, Set_Attribute_Single	63	C6	Node Address.
2 0x02	Baud Rate	Get_Attribute_Single, Set_Attribute_Single	0	C6	The baud rate of the device. 00 = 125K 01 = 250K 02 = 500K
3	BOI [Bus Off Interrupt]	Get_Attribute_Single,		C1	
0x03		Set_Attribute_Single	0		

			1		
4	Bus-off Counter	Get_Attribute_Single,	0	C6	
0x04		Set_Attribute_Single	0		
			255		
5	0x05 Allocation Information	Get_Attribute_Single	N/A N/A N/A	A2 02 D1 C6	Allocation Choice Master's Mac ID Struct of:
					BYTE: Allocation Choice byte
					Bit 0 = explicit messaging
					Bit 1 = Polled I/O
					USINT: Master's Mac ID
					0-63 valid
					255 = unallocated
100	Bus-off Separation	Get_Attribute_Single,	50	C6	
0x64		Set_Attribute_Single	0 255		
176	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters
0xB0					

Assembly Object

Class Code 0x04

Assembly Class (4) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single		2 C7 2 2	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single		73 C7 73 73	
3 0x03	Number of Instances	Get_Attribute_Single		6 C7 6 6	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176}	A2 04 C7 A1 {1,176} 01 C7 {1,176}	
5 0x05	Optional service list	Get_Attribute_Single	{1,16}	A2 04 C7 A1 {1,16} 01 C7 {1,16}	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190	C7 190 190	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176	C7 176 176	
176 0xB0	Object Name	Get_Attribute_Single	"Assembly"	DA "Assembly" "Assembly"	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A	A1 08 A2 06 C7 DA DA A1 N/A 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A	A1 08 A2 06 C7 DA DA A1 N/A 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A	A1 01 C7 N/A N/A	Array of instance IDs supported by this class

Assembly Class (4) – Basic Control (20)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Data	Get_Attribute_Single		N/A A2 05 A1 01 N/A C1 D1 C3 N/A	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single		N/A DA N/A N/A	User Supplied name for the Instance. Maximum of 8 characters

Assembly Class (4) – Speed Control (21)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
---	----------------	----------	---------------------------	-----------	-------------

3 0x03	Data	Get_Attribute_Single	N/A N/A N/A	A2 05 A1 01 C1 D1 C3	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A, N/A, N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Assembly Class (4) – Torque Control (23)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Data	Get_Attribute_Single	N/A N/A N/A	A2 05 A1 01 C1 D1 C3	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Assembly Class (4) - Basic Status (70)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Data	Get_Attribute_Single	N/A N/A N/A	A2 05 A1 01 C1 D1 C3	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Assembly Class (4) - Speed Status (71)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Data	Get_Attribute_Single	N/A N/A N/A	A2 05 A1 01 C1 D1 C3	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Assembly Class (4) - Torque Status (73)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Data	Get_Attribute_Single	N/A N/A N/A	A2 05 A1 01 C1 D1 C3	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

DeviceNet Connection Object

Class Code 0x05

DeviceNet Connection Class (5) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 1	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	2 2 2	C7	
3 0x03	Number of Instances	Get_Attribute_Single	2 2 2	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"DeviceNet Connection" "DeviceNet Connection" "DeviceNet Connection"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A N/A N/A	A1 01 C7	Array of instance IDs supported by this class

DeviceNet Connection Class (5) - Explicit Connection Instance (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	State	Get_Attribute_Single	0 0 5	C6	State of the object
2 0x02	Instance Type	Get_Attribute_Single	0 0 0	C6	Indicates either I/O or messaging connection 0=Explicit
3 0x03	Transport Class Trigger	Get_Attribute_Single	0x83 0x83 0x83	D1	Defines Behavior of the connection
4 0x04	Produced Connection Id	Get_Attribute_Single	N/A 0x403	C7	Placed in CAN Identifier Field when the Connection Transmits

			0x5FB		
5 0x05	Consumed Connection Id	Get_Attribute_Single	N/A 0x404 0x5FC	C7	CAN Identifier Field value that denotes message to be received
6 0x06	Initial Comm Characteristics	Get_Attribute_Single	0x21 0x21 0x21	D1	Defines the Message Group(s) across which productions and consumptions associated with this
7 0x07	Produced Connection Size	Get_Attribute_Single	41 41 41	C7	Maximum number of bytes transmitted across this Connection
8 0x08	Consumed Connection Size	Get_Attribute_Single	41 41 41	C7	Maximum number of bytes received across this Connection
9 0x09	Expected Packet Rate	Get_Attribute_Single, Set_Attribute_Single	2500 0 65535	C7	Defines timing associated with this Connection
12 0x0C	Watchdog Timeout Action	Get_Attribute_Single, Set_Attribute_Single	1 1 3	C6	Defines how to handle Inactivity/Watchdog timeouts. 1-Auto Delete 3-Deferred Delete An attempt to set this attribute to the value 2 will result in an Invalid Attribute Value error.
13 0x0D	Produced Connection Path Length	Get_Attribute_Single	0 0 0	C7	Number of bytes in the produced_connection_path length attribute
14 0x0E	Produced Connection Path	Get_Attribute_Single	N/A N/A N/A	A1 01 C6	Application Obj. producing data on this connection
15 0x0F	Consumed Connection Path Length	Get_Attribute_Single	0 0 0	C7	Number of bytes in the consumed_connection_path length attribute
16 0x10	Consumed Connection Path	Get_Attribute_Single	N/A N/A N/A	A1 01 C7	Specifies the Application Object(s) that are to receive the data consumed by this Connection Object
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

DeviceNet Connection Class (5) - Polled IO Connection Instance (2)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	State	Get_Attribute_Single	0 0 4	C6	State of the object
2 0x02	Instance Type	Get_Attribute_Single	1 1 1	C6	Indicates either I/O or messaging connection 1 = I/O
3 0x03	Transport Class Trigger	Get_Attribute_Single	0x83 0x83 0x83	D1	Defines Behavior of the connection
4 0x04	Produced Connection Id	Get_Attribute_Single	N/A 0x3C0 0x3FF	C7	Placed in CAN Identifier Field when the Connection Transmits
5 0x05	Consumed Connection Id	Get_Attribute_Single	N/A 0x405 0x5FD	C7	CAN Identifier Field value that denotes message to be received

6 0x06	Initial Comm Characteristics	Get_Attribute_Single	1 1 1	D1	Defines the Message Group(s) across which productions and consumptions associated with this
7 0x07	Produced Connection Size	Get_Attribute_Single	4 0 6	C7	Maximum number of bytes transmitted across this Connection
8 0x08	Consumed Connection Size	Get_Attribute_Single	4 0 6	C7	Maximum number of bytes received across this Connection
9 0x09	Expected Packet Rate	Get_Attribute_Single, Set_Attribute_Single	0 0 65535	C7	Defines timing associated with this Connection
12 0x0C	Watchdog Timeout Action	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C6	Defines how to handle Inactivity/Watchdog timeouts. 1-Auto Delete 3-Deferred Delete An attempt to set this attribute to the value 2 will result in an Invalid Attribute Value error.
13 0x0D	Produced Connection Path Length	Get_Attribute_Single	6 6 6	C7	Number of bytes in the produced_connection_path length attribute
14 0x0E	Produced Connection Path	Get_Attribute_Single	N/A N/A N/A	A1 01 C6	Application Obj. producing data on this connection
15 0x0F	Consumed Connection Path Length	Get_Attribute_Single	6 6 6	C7	Number of bytes in the consumed_connection_path length attribute
16 0x10	Consumed Connection Path	Get_Attribute_Single	N/A N/A N/A	A1 01 C7	Specifies the Application Object(s) that are to receive the data consumed by this Connection Object
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Motor Data Object

Class Code 0x28

Motor Data Object Class (40) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 1	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Motor Data" "Motor Data" "Motor Data"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A N/A N/A	A1 01 C7	Array of instance IDs supported by this class

Motor Data Object Class (40) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Motor Type	Get_Attribute_Single	7 7 7	C6	Type of Motor Represented by This Instance 0 – Non-standard motor 1 - PM DC Motor 2 - FC DC Motor 3 - PM Synchronous Motor 4 - FC Synchronous Motor 5 - Switched Reluctance Motor 6 - Wound Rotor Induction Motor 7 - Squirrel Cage Induction Motor 8 - Stepper Motor 9 - Sinusoidal PM BL Motor 10 - Trapezoidal PM BL Motor

6 0x06	RatedCurrent[100mA]	Get_Attribute_Single	70 0 16000	C7	Rated Stator Current Units: [100mA]
7 0x07	RatedVoltage[V]	Get_Attribute_Single	230 180 690	C7	Rated Base Voltage Units: [V]
9 0x09	RatedFrequency[Hz]	Get_Attribute_Single	50 30 500	C7	Rated Electrical Frequency Units: [Hz]
12 0x0C	PoleCount[pair*2]	Get_Attribute_Single	4 2 16	C7	Number of poles in the motor
15 0x0F	BaseSpeed[RPM]	Get_Attribute_Single	1440 1 30000	C7	Nominal speed at rated frequency from nameplate Units: [RPM]
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Control Supervisor Object

Class Code 0x29

Control Supervisor Object Class (41) – Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 1	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	“Control Supervisor” “Control Supervisor” “Control Supervisor”	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A N/A N/A	A1 01 C7	Array of instance Ids supported by this class

Control Supervisor Object Class (41) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	Run1	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C1	Run Forward Request
4 0x04	Run2	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C1	Run Reverse Request
5 0x05	NetCtrl	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C1	Requests Run/Stop control to be local or from network

6 0x06	State	Get_Attribute_Single	N/A, 0 7	C6	State of Control Supervisor Instance 1 = Startup 2 = Not_Ready 3 = Ready 4 = Enabled 5 = Stopping 6 = Fault_Stop 7 = Faulted
7 0x07	Running1	Get_Attribute_Single	N/A, 0 1	C1	Running Forward Status 0 = Other state 1 = Running Forward
8 0x08	Running2	Get_Attribute_Single	N/A, 0 1	C1	Running Reverse Status 0 = Other state 1 = Running reverse
9 0x09	Ready	Get_Attribute_Single	N/A, 0 1	C1	Ready to Accept a Run Event 0 = Other state 1 = Ready to accept a Run Event
10 0x0A	Faulted	Get_Attribute_Single	N/A, 0 1	C1	Fault Occurred 0 = No faults present 1 = Fault occurred (latched)
11 0x0B	Warning	Get_Attribute_Single	N/A, 0 1	C1	Warning Present 0 = No warnings present 1 = Warning present (not latched)
12 0x0C	FaultRst	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C1	Fault Reset Request 0 = No action 0 -> 1 = Fault reset request 1 = No action
13 0x0D	FaultCode	Get_Attribute_Single	N/A, 0, 65535	C7	If in Faulted state, FaultCode indicates the fault that caused the transition to Faulted state. If not in Faulted state, FaultCode indicates the fault that caused the last transition to Faulted state. Fault codes are listed in DeviceNet Volume II, section 6-29.6
14 0x0E	WarnCode	Get_Attribute_Single	N/A, 0, 65535	C7	If in Enabled state, WarnCode indicates the lowest valued warning that caused the Warning bit to be TRUE. Warning codes are listed in DeviceNet Volume II, section 6-29.6
15 0x0F	CtrlFromNet	Get_Attribute_Single	N/A, 0 1	C1	Status of Run/Stop control source 0 = Control is local 1 = Control is from network
16 0x10	DNFaultMode	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C6	Action on loss of DeviceNet 0 = Fault and Stop 1 = Ignore 2 = Use preset speed and direction ATTENTION: Ignoring communication faults may result in equipment damage, personal injury, or death. Ensure that you understand how ignoring a communication fault may affect the operation of your system.
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

AC/DC Drive Object

Class Code 0x2A

AC/DC Drive Object Class (42) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 1	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"AC\DC Drive" "AC\DC Drive" "AC\DC Drive"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A N/A N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A N/A N/A	A1 01 C7	Array of instance IDs supported by this class

AC/DC Drive Object Class (42) - Instance Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
3 0x03	AtReference	Get_Attribute_Single	N/A 0 1	C1	1 = Drive actual at reference (speed or torque reference) based on mode
4 0x04	NetRef	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C1	Requests torque or speed reference to be local or from the network 0 = Set Reference not DN Control 1 = Set Reference at DN Control Note that the actual status of torque or speed reference is reflected in attribute 29, RefFromNet
6	DriveMode	Get_Attribute_Single,	1	C6	1 = Open loop speed (Frequency)

0x06		Set Attribute Single	1		3 = Torque control
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			3		
7 0x07	SpeedActual[RPM]	Get_Attribute_Single	N/A, 0 30000	C3	Actual drive speed (best approximation) Units: RPM
8 0x08	SpeedRef[RPM]	Get_Attribute_Single, Set_Attribute_Single	1 1 30000	C3	Speed reference Units: RPM
9 0x09	CurrentActual[100mA]	Get_Attribute_Single	N/A, 0 32767	C3	Actual motor phase current Units: 100mA
10 0x0A	CurrentLimit[100mA]	Get_Attribute_Single	N/A, 0 32767	C3	Motor phase current limit Units: 100mA
11 0x0B	TorqueActual[Nm]	Get_Attribute_Single	N/A, 0 32767	C3	Actual torque Units: Nm
12 0x0C	TorqueRef[Nm]	Get_Attribute_Single, Set_Attribute_Single	0 0 10000	C3	Torque reference Units: Nm
15 0x0F	PowerActual[W]	Get_Attribute_Single	N/A, 0 32767	C3	Actual output power Units: Watts
16 0x10	InputVoltage[V]	Get_Attribute_Single	N/A 180 690	C3	Input Voltage Units: Volts
17 0x11	OutputVoltage[V]	Get_Attribute_Single	N/A 0 690	C3	Output Voltage Units: Volts
18 0x12	AccelTime[64ms]	Get_Attribute_Single	47 1 46875	C7	Acceleration time Time from 0 to HighSpdLimit Units: ms / 64 Attribute 28 (TimeScale) defines scaling factor as 64
19 0x13	DecelTime[64ms]	Get_Attribute_Single	47 1 46875	C7	Deceleration time Time from HighSpdLimit to 0 Units: ms / 64
20 0x14	LowSpdLimit[RPM]	Get_Attribute_Single	0 0 30000	C7	Minimum speed limit Units: RPM
21 0x15	HighSpdLimit[RPM]	Get_Attribute_Single	1800 0 30000	C7	Maximum speed limit Units: RPM
29 0x1D	RefFromNet	Get_Attribute_Single	N/A 0 1	C1	Status of torque/speed reference 0 = Local torque/speed reference 1 = DeviceNet torque/speed reference
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A N/A N/A	DA	User Supplied name for the Instance. Maximum of 8 characters

Basic and Motor Control Object

Class Code 0xA0

Basic and Motor Control Class (160) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single		1 C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single		1 C7	
3 0x03	Number of Instances	Get_Attribute_Single		1 C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176}	A2 04 C7 A1 {1,176} 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16}	A2 04 C7 A1 {1,16} 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Basic and Motor Control", "Basic and Motor Control", "Basic and Motor Control",	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 01 C7	Array of instance IDs supported by this class

Basic and Motor Control Class (160) - Class Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	MinFreq[Hz]	Get_Attribute_Single, Set_Attribute_Single		0 C7	
2	MaxFreq[Hz]	Get_Attribute_Single, Set_Attribute_Single	50	C7	

0x02			1 500		
3 0x03	AccTime1[100ms]	Get_Attribute_Single, Set_Attribute_Single	30 1 30000	C7	Time from fmin (Minimum Frequency) to fmax (Maximum Frequency)
4 0x04	DecTime1[100ms]	Get_Attribute_Single, Set_Attribute_Single	30 1 30000	C7	Time from fmax (Maximum Frequency) to fmin (Minimum Frequency)
5 0x05	RefSelection	Get_Attribute_Single, Set_Attribute_Single	0 0 13	C7	0 = Vin 3 = Vin - lin 1 = lin 4 = lin - Vin 2 = Vin + lin 5 = Vin * lin 6 = Vin joystick control 7 = lin joystick control 8 = Signal from internal motor pot. 9 = Signal from internal motor pot. reset if unit is stopped 10 = Signal from internal motor pot. (stored in memory over mains break) 11 = Signal from internal motor pot. (stored in memory over mains break)
6 0x06	JogFrequencyRef	Get_Attribute_Single, Set_Attribute_Single	50 0 5000	C7	
7 0x07	CurrentLimit[100mA]	Get_Attribute_Single, Set_Attribute_Single	105 1 175	C7	Output current limit [A] of the unit
8 0x08	V/Hz Selection	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = Linear 1 = Squared 2 = Programmable U/f ratio
9 0x09	V/Hz Optimize	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = None 1 = Automatic torque boost
10 0x0A	MotorVolt[V]	Get_Attribute_Single, Set_Attribute_Single	230 180 690	C7	230 V VACON CX/CXL/CXS 400 V VACON CX/CXL/CXS 500 V VACON CX/CXL/CXS 690 V VACON CX/CXL/CXS
11 0x0B	MotorFreq[Hz]	Get_Attribute_Single, Set_Attribute_Single	50 30 500	C7	Frequency on the rating plate of the motor
12 0x0C	MotorSpeed[RPM]	Get_Attribute_Single, Set_Attribute_Single	1440 300 30000	C7	Speed (rpm) on the rating plate of the motor
13 0x0D	MotorAmps[100mA]	Get_Attribute_Single, Set_Attribute_Single	70 1 175	C7	Amps on the rating plate of the motor
14 0x0E	SupplyVolt[V]	Get_Attribute_Single, Set_Attribute_Single	x 6 22	C7	230 V VACON CX/CXL/CXS 400 V VACON CX/CXL/CXS 500 V VACON CX/CXL/CXS

690 V VACON CX/CXL/CXS					
15	GroupVisibility	Get_Attribute_Single, Set_Attribute_Single	0	C7	Visibility of the parameters: 0 = All parameter groups visible 1 = Only group 1 is visible
0x0F			0 1		
16	ProgramLock	Get_Attribute_Single, Set_Attribute_Single	0	C7	Disables parameter changes: 0 = Changes enabled 1 = Changes disabled
0x10			0 1		
26	Polled Input Assembly Type	Get_Attribute_Single, Set_Attribute_Single	71	C7	Input assembly used by the polled connection
0x1A			70 73		
27	Polled Output Assembly Type	Get_Attribute_Single, Set_Attribute_Single	21	C7	Output assembly used by the polled connection
0x1B			20 23		
61	ControlMode	Get_Attribute_Single, Set_Attribute_Single	0	C7	0 = Frequency control 1 = Speed control (open loop) 2 = Torque control (open loop)
0x3D			0 2		
62	Switching-Freq[100Hz]	Get_Attribute_Single, Set_Attribute_Single	100	C7	Dependant on kW
0x3E			10 160		
63	Max VoltFreq[Hz]	Get_Attribute_Single, Set_Attribute_Single	60	C7	
0x3F			30 500		
64	MaxVolt[%]	Get_Attribute_Single, Set_Attribute_Single	100	C7	
0x40			15 200		
65	Mid V/Hz Freq[Hz*10]	Get_Attribute_Single, Set_Attribute_Single	0	C7	
0x41			0 5000		
66	Mid V/Hz Volt[%*100]	Get_Attribute_Single, Set_Attribute_Single	0	C7	
0x42			0 10000		
67	Zero FreqVolt[%*100]	Get_Attribute_Single, Set_Attribute_Single	0	C7	
0x43			0 4000		
68	Overvolt Controller	Get_Attribute_Single, Set_Attribute_Single	1	C7	0 = Controller is not operating 1 = Controller is operating
0x44			0 1		

69 0x45	Undervolt Controller	Get_Attribute_Single, Set_Attribute_Single	1 0 1	C7	0 = Controller is not operating 1 = Controller is operating
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A, N/A, N/A	DA	Array of instance IDs supported by this class

Input and Fieldbus Object

Class Code 0xA1

Input and Fieldbus Control Class (161) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single		1 C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single		1 C7	
3 0x03	Number of Instances	Get_Attribute_Single		1 C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176}	A2 04 C7 A1 {1,176} 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16}	A2 04 C7 A1 {1,16} 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Input and Fieldbus Control", " Input and Fieldbus Control", " Input and Fieldbus Control "	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 01 C7	Array of instance IDs supported by this class

Input and Fieldbus Control Class (161) - Class Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
0x01	1 Start/Stop Select	Get_Attribute_Single, Set_Attribute_Single	0 0 4	C7	DIA1 DIA2 0 = Start forward Start reverse 1 = Start/Stop Reverse 2 = Start/Stop Run enable 3 = Start pulse Stop pulse 4 = Start/stop pulse Run enable
0x02	2 DIA3Function	Get_Attribute_Single, Set_Attribute_Single	7 0 11	C7	0 = Not used = Ext. fault, closing contact 2 = External fault, opening contact 3 = Run enable 4 = Acc./dec. time selection 5 = Reverse 6 = Jogging speed 7 = Fault reset 8 = Acc./dec. operation prohibit 9 = DC-braking command 10 = Torque control
0x03	3 DIB4Function	Get_Attribute_Single, Set_Attribute_Single	6 0 11	C7	0 = Not used = Ext. fault, closing contact 2 = External fault, opening contact 3 = Run enable 4 = Acc./dec. time selection 5 = Reverse 6 = Jogging speed 7 = Fault reset 8 = Acc./dec. operation prohibit 9 = DC-braking command 10 = Multi-Step speed select 1
0x04	4 DIB5Function	Get_Attribute_Single, Set_Attribute_Single	1 0 11	C7	0 = Not used = Ext. fault, closing contact 2 = External fault, opening contact 3 = Run enable 4 = Acc./dec. time selection 5 = Reverse 6 = Jogging speed 7 = Fault reset 8 = Acc./dec. operation prohibit 9 = DC-braking command 10 = Multi-Step speed select 2
0x05	5 DIB6Function	Get_Attribute_Single, Set_Attribute_Single	4 0 11	C7	0 = Not used = Ext. fault, closing contact 2 = External fault, opening contact 3 = Run enable 4 = Acc./dec. time selection 5 = Reverse 6 = Jogging speed 7 = Fault reset 8 = Acc./dec. operation prohibit 9 = DC-braking command 10 = Multi-Step speed select 3 11 = Motorised pot. speed down
0x06	6 Vin TypeSelect	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = 0—10 V 1 = Custom setting range 2 = -10—+10 V (can be used only with Joystick control)

0x07	7 Custom Vin-Min[%*100]	Get_Attribute_Single, Set_Attribute_Single	0 0 10000	C7	
0x08	8 Custom Vin-Max[%*100]	Get_Attribute_Single, Set_Attribute_Single	10000 0 10000	C7	
0x09	9 Vin Inversion	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = Not inverted 1 = Inverted
0x0A	10 Vin Filter-Time[10ms]	Get_Attribute_Single, Set_Attribute_Single	10 0 1000	C7	0 = No filtering
0x0B	11 Iin TypeSelect	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = 0—20 mA 1 = 4—20 mA 2 = Custom setting range
0x0C	12 Custom Iin-Min[%*100]	Get_Attribute_Single, Set_Attribute_Single	0 0 10000	C7	
0x0D	13 Custom Iin-Max[%*100]	Get_Attribute_Single, Set_Attribute_Single	10000 0 10000	C7	
0x0E	14 Iin Inversion	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = Not inverted 1 = Inverted
0x0F	15 Iin Filter-Time[10ms]	Get_Attribute_Single, Set_Attribute_Single	10 0 1000	C7	0 = No filtering
0x10	16 Vin MinScale[%]	Get_Attribute_Single, Set_Attribute_Single	0 -32000 32000	C3	0% = no minimum scaling
0x11	17 Vin Max-Scale[100%]	Get_Attribute_Single, Set_Attribute_Single	10000 -32000 32000	C3	100% = no maximum scaling
0x12	18 Iin MinScale[%]	Get_Attribute_Single, Set_Attribute_Single	0 -32000 32000	C3	0% = no minimum scaling
0x13	19 Iin MaxScale[100%]	Get_Attribute_Single, Set_Attribute_Single	10000 -32000 32000	C3	100% = no maximum scaling

20 0x14	Analog InSelect	Get_Attribute_Single, Set_Attribute_Single	0 0 4	C7	0 = Not use = Vin (analog voltage input) 2 = Iin (analog current input) 3 = Ain1 (option board) 4 = Ain2 (option board)	1
21 0x15	Analog InFunc	Get_Attribute_Single, Set_Attribute_Single	0 0 4	C7	0 = No function = Reduces current limit (par. 1.7) 2 = Reduces DC-braking current 3 = Reduces acc. and decel. times 4 = Reduces torque supervis. limit	1
51 0x33	FieldbusSelect	Get_Attribute_Single, Set_Attribute_Single	1 0 1	C7	0 = Control via I/O terminals 1 = Control via Fieldbus board	
52 0x34	DIC1Function	Get_Attribute_Single, Set_Attribute_Single	1 0 1	C7	0 = Fieldbus control 1 = External fault	
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A, N/A, N/A	DA	Array of instance Ids supported by this class	

Output and Supervision Object

Class Code 0xA2

Output and Supervision Class (162) – Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single		1 C7 1 1	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single		1 C7 1 1	
3 0x03	Number of Instances	Get_Attribute_Single		1 C7 1 1	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Output and Supervision", "Output and Supervision", "Output and Supervision"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 01 C7	Array of instance IDs supported by this class

Output and Supervision Class (162) - Class Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
0x01	1 AoutFunction	Get_Attribute_Single, Set_Attribute_Single	1 0 11	C7	0 = Not used = O/P frequency (0—fmax) 1 = Reference torque 2 = Motor speed (0—max. speed) 3 = O/P current (0—2.0 x InCX) 4 = Motor torque (0—2 x TnCX) 5 = Motor power (0—2 x PnCX) 6 = Motor voltage (0—100% x UnM) 7 = DC-link volt. 8 = Input signal Vin 9 = Input signal lin 10 = Reference frequency 11 = Reference torque
0x02	2 Aout Filter-Time[10ms]	Get_Attribute_Single, Set_Attribute_Single	100 1 1000	C7	
0x03	3 AoutInversion	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = Not inverted 1 = Inverted
0x04	4 AoutMinimum	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = 0 mA 1 = 4 mA
0x05	5 AoutScale[%]	Get_Attribute_Single, Set_Attribute_Single	100 10 1000	C7	
0x06	6 DoutFunction	Get_Attribute_Single, Set_Attribute_Single	1 0 22	C7	0 = Not used = Ready 1 = At speed 2 = Run 3 = Fault 4 = Fault inverted 5 = VACON overheat warning 6 = External fault or warning 7 = Reference fault or warning 8 = Warning 9 = Reversed 10 = Jogging speed selected 11 = At speed 12 = Motor regulator activated 13 = Output freq. limit superv. 1 14 = Output freq. limit superv. 2 15 = Torque limit supervision 16 = Reference limit supervision 17 = External brake control 18 = Control from I/O terminals 19 = Frequency converter temperature limit supervision 20 = Unrequested rotation direction 21 = External brake control inverted 22 = Termistor fault or warning
0x07	7 Rout1Function	Get_Attribute_Single, Set_Attribute_Single	2 0 21	C7	As attribute 6
	8 Rout2Function	Get_Attribute_Single,	3	C7	As attribute 6

0x08		Set_Attribute_Single	0 21		
9	Freq1SuperFunc	Get_Attribute_Single,	0	C7	0 = No 1 = Low limit 2 = High limit
0x09		Set_Attribute_Single	0 2		
10	Freq1SuperValue[Hz*10]	Get_Attribute_Single,	0	C7	
0x0A		Set_Attribute_Single	0 5000		
11	Freq2SuperFunc	Get_Attribute_Single,	0	C7	0 = No 1 = Low limit 2 = High limit
0x0B		Set_Attribute_Single	0 2		
12	Freq2SuperValue[Hz*10]	Get_Attribute_Single,	0	C7	
0x0C		Set_Attribute_Single	0 5000		
13	TorqueSuperFunc	Get_Attribute_Single,	0	C7	0 = No 1 = Low limit 2 = High limit
0x0D		Set_Attribute_Single	0 2		
14	TorqueSuper-Value[%]	Get_Attribute_Single,	1000	C7	
0x0E		Set_Attribute_Single	-2000 2000		
15	RefSuperFunc	Get_Attribute_Single,	1	C7	0 = No 1 = Low limit 2 = High limit
0x0F		Set_Attribute_Single	0 2		
16	RefSuper-Value[Hz*10]	Get_Attribute_Single,	0	C7	
0x10		Set_Attribute_Single	0 5000		
17	EB Off-delay[100ms]	Get_Attribute_Single,	5	C7	
0x11		Set_Attribute_Single	0 1000		
18	EB On-delay[100ms]	Get_Attribute_Single,	15	C7	
0x12		Set_Attribute_Single	0 1000		
19	TempSuperFunc	Get_Attribute_Single,	0	C7	0 = No 1 = Low limit 2 = High limit
0x13		Set_Attribute_Single	0 2		

20	TempSuper-Value[oC]	Get_Attribute_Single,	40	C3	Unit is Degree Centigrade
0x14		Set_Attribute_Single	-10 75		
176	User Label	Get_Attribute_Single,	N/A,	DA	Array of instance IDs supported by this class
0xB0		Set_Attribute_Single	N/A, N/A		

Drive and Torque Control Object

Class Code 0xA3

Drive and Torque Control Class (163) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 65535	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Drive and Torque Control", "Drive and Torque Control", "Drive and Torque Control",	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 01 C7	Array of instance IDs supported by this class

Drive and Torque Control Class (163) - Class Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
0x01	1 Ramp1	Get_Attribute_Single, Set_Attribute_Single	0 0 100	C7	0 = Linear >0 = S-curve acc./dec. time
0x02	2 Ramp2	Get_Attribute_Single, Set_Attribute_Single	0 0 100	C7	0 = Linear >0 = S-curve acc./dec. time
0x03	3 AccTime2	Get_Attribute_Single, Set_Attribute_Single	100 1 30000	C7	
0x04	4 DecTime2	Get_Attribute_Single, Set_Attribute_Single	100 1 30000	C7	
0x05	5 BrakeChop	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = Brake chopper not in use 1 = Brake chopper in use 2 = External brake chopper
0x06	6 StartFn	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = Ramp 1 = Flying start
0x07	7 StopFn	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = Coasting 1 = Ramp
0x08	8 DCBAmps	Get_Attribute_Single, Set_Attribute_Single	N/A, N/A, NA	C7	
0x09	9 DCBStopT	Get_Attribute_Single, Set_Attribute_Single	0 0 2500	C7	0 = DC-brake is off at Stop
0x0A	10 DCBStopFn	Get_Attribute_Single, Set_Attribute_Single	15 1 100	C7	
0x0B	11 DCBStartT	Get_Attribute_Single, Set_Attribute_Single	0 0 2500	C7	0 = DC-brake is off at Start
0x0C	12 Preset1	Get_Attribute_Single, Set_Attribute_Single	100 0 5000	C7	
0x0D	13 Preset2	Get_Attribute_Single, Set_Attribute_Single	150 0 5000	C7	

14	Preset3	Get_Attribute_Single, Set_Attribute_Single	200 0 5000	C7	
0x0E					
15	Preset4	Get_Attribute_Single, Set_Attribute_Single	250 0 5000	C7	
0x0F					
16	Preset5	Get_Attribute_Single, Set_Attribute_Single	300 0 5000	C7	
0x10					
17	Preset6	Get_Attribute_Single, Set_Attribute_Single	400 0 5000	C7	
0x12					
18	Preset7	Get_Attribute_Single, Set_Attribute_Single	500 0 5000	C7	
0x13					
51	TqRefSel	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = None 1 = Vin 2 = lin
0x33					
52	TqBias	Get_Attribute_Single, Set_Attribute_Single	0 -100 100	C3	0 = not in use
0x34					
53	TqGain	Get_Attribute_Single, Set_Attribute_Single	100 -320 320	C3	100 = no scaling
0x35					
54	TqTC	Get_Attribute_Single, Set_Attribute_Single	128 1 1000	C7	
0x36					
55	TqMin	Get_Attribute_Single, Set_Attribute_Single	300 1 1000	C7	
0x37					
101	Trail#	Get_Attribute_Single, Set_Attribute_Single	0 0 10	C7	0 = not in use
0x65					
102	TrialT	Get_Attribute_Single, Set_Attribute_Single	30 1 6000	C7	
0x66					
103	StartFn	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	0 = Ramp = Flying start
0x67					1
104	UVRestart	Get_Attribute_Single,	0	C7	0 = No 1 = Yes

0x68		Set_Attribute_Single	0 1		
105	OVR Restart	Get_Attribute_Single,	0	C7	0 = No 1 = Yes
0x69		Set_Attribute_Single	0 1		
106	OCR Restart	Get_Attribute_Single,	0	C7	0 = No 1 = Yes
0x6A		Set_Attribute_Single	0 1		
107	Ref Restart	Get_Attribute_Single,	0	C7	0 = No 1 = Yes
0x6B		Set_Attribute_Single	0 1		
108	Temp Restart	Get_Attribute_Single,	0	C7	0 = No 1 = Yes
0x6C		Set_Attribute_Single	0 1		
176	User Label	Get_Attribute_Single,	N/A,	DA	Array of instance IDs supported by this class
0xB0		Set_Attribute_Single	N/A, N/A		

Protections Object

Class Code 0xA6

Protections Class (166) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 65535	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Protections", "Protections", "Protections"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 01 C7	Array of instance IDs supported by this class

Protections Class (166) - Class Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
0x01	1 ResFlt	Get_Attribute_Single, Set_Attribute_Single	0 0 3	C7	0 = No action 1 = Warning par 4.7 2 = Fault, stop according to 3 = Fault, stop always by coasting
0x02	2 ExtFlt	Get_Attribute_Single, Set_Attribute_Single	2 0 3	C7	0 = No action 1 = Warning par 4.7 2 = Fault, stop according to 3 = Fault, stop always by coasting
0x03	3 PhaseSuper	Get_Attribute_Single, Set_Attribute_Single	2 0 2	C7	0 = No action 2 = Fault
0x04	4 EarthFlt	Get_Attribute_Single, Set_Attribute_Single	2 0 2	C7	0 = No action 2 = Fault
0x05	5 TempProtect	Get_Attribute_Single, Set_Attribute_Single	2 0 2	C7	0 = No action 1 = Warning 2 = Fault
0x06	6 TempBreakPtA	Get_Attribute_Single, Set_Attribute_Single	1000 500 1500	C7	2
0x07	7 TempZeroHzA	Get_Attribute_Single, Set_Attribute_Single	450 50 500	C7	2
0x08	8 TempTC	Get_Attribute_Single, Set_Attribute_Single	N/A 5 3000	C7	Default value is set according to motor nominal current
0x09	9 TempBreakPtHz	Get_Attribute_Single, Set_Attribute_Single	35 10 500	C7	
0x0A	10 StallProtect	Get_Attribute_Single, Set_Attribute_Single	1 0 2	C7	0 = No action 1 = Warning 2 = Fault
0x0B	11 StallA	Get_Attribute_Single, Set_Attribute_Single	1300 50 2000	C7	
0x0C	12 StallT	Get_Attribute_Single, Set_Attribute_Single	150 20 1200	C7	

13	MaxStallHz	Get_Attribute_Single, Set_Attribute_Single	25 1 500	C7	
0x0D					
14	ULProtect	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = No action 1 = Warning 2 = Fault
0x0E					
15	ULFWTq	Get_Attribute_Single, Set_Attribute_Single	500 100 1500	C7	
0x0F					
16	ULZeroHzTq	Get_Attribute_Single, Set_Attribute_Single	100 50 1500	C7	
0x10					
17	ULTime	Get_Attribute_Single, Set_Attribute_Single	200 20 6000	C7	
0x11					
18	SupplySuper	Get_Attribute_Single, Set_Attribute_Single	2 0 2	C7	
0x12					
19	ThermSuper	Get_Attribute_Single, Set_Attribute_Single	2 0 2	C7	0 = No action 1 = Warning 2 = Fault
0x13					
20	FbusFlt	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	0 = No action 1 = Warning 2 = Fault
0x14					
51	SkipHzL1	Get_Attribute_Single, Set_Attribute_Single	0 0 5000	C7	
0x33					
52	SkipHzH1	Get_Attribute_Single, Set_Attribute_Single	0 0 5000	C7	0 = Skip Frequency range 1 is off
0x34					
53	SkipHzL2	Get_Attribute_Single, Set_Attribute_Single	0 0 5000	C7	
0x35					
54	SkipHzH2	Get_Attribute_Single, Set_Attribute_Single	0 0 5000	C7	0 = Skip Frequency range 2 is off
0x36					

55 0x37	SkipHzL3	Get_Attribute_Single, Set_Attribute_Single	0 0 5000	C7	
56 0x38	SkipHzH3	Get_Attribute_Single, Set_Attribute_Single	0 0 5000	C7	0 = Skip Frequency range 3 is off
151 0x97	Safe State Type	Get_Attribute_Single, Set_Attribute_Single	0 0 2	C7	<p>Selects Safe State response to errors which specify safe state operation. Currently only a loss of connection other than by de-allocation is a safe state error.</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>0 = DriveFault (fault and stop) 1 = No Action (hold last speed) 2 = Preset Speed/Direction</p>
152 0x98	PresetDir	Get_Attribute_Single, Set_Attribute_Single	0 0 1	C7	<p>Sets safe state direction of rotation if the Safe State Behavior attribute specifies "Preset Speed/Direction".</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>Inverter will require external stop.</p> <p>0 = Forward 1 = Reverse</p>
153 0x99	PresetRPM	Get_Attribute_Single, Set_Attribute_Single	0 0 30000	C7	<p>Sets safe state speed reference (RPM) if the Safe State Behavior attribute specifies "Preset Speed/Direction".</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>Inverter will require external stop.</p>
154 0x9A	PresetTq	Get_Attribute_Single, Set_Attribute_Single	0 0 10000	C7	<p>Sets safe state torque reference (0,00%) if the Safe State Behavior attribute specifies "Preset Speed/Direction".</p> <p>Warning: Review the application for safe operation before specifying a value for this attribute.</p> <p>Inverter will require external stop.</p>
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	N/A, N/A, N/A	DA	Array of instance IDs supported by this class

Monitoring Data Object

Class Code 0xAA

Monitoring Data Class (170) - Class Attributes (0)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
1 0x01	Revision	Get_Attribute_Single	1 1 65535	C7	Revision of this object
2 0x02	Max Instance	Get_Attribute_Single	1 1 1	C7	
3 0x03	Number of Instances	Get_Attribute_Single	1 1 1	C7	
4 0x04	Optional attribute list	Get_Attribute_Single	{1,176} {1,176} {1,176}	A2 04 C7 A1 01 C7	
5 0x05	Optional service list	Get_Attribute_Single	{1,16} {1,16} {1,16}	A2 04 C7 A1 01 C7	
6 0x06	Max Class Attribute ID	Get_Attribute_Single	190 190 190	C7	
7 0x07	Max Instance Attribute ID	Get_Attribute_Single	176 176 176	C7	
176 0xB0	Object Name	Get_Attribute_Single	"Monitoring Data" "Monitoring Data" "Monitoring Data"	DA	ASCII Name for the object Class
180 0xB4	Class Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes a class attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
186 0xBA	Instance Attribute List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 08 A2 06 C7 DA DA A1 01 C6	Each Element describes an instance attribute. The Array's elements are structs as described in the semantics section. Individual elements are accessed using the Get Member service.
190 0xBE	Instance ID List	Get Member, CH_Get_Member	N/A, N/A, N/A	A1 01 C7	Array of instance IDs supported by this class

Monitoring Data Object Class (170) - Class Attributes (1)

#	Attribute Name	Services	Default, Minimum, Maximum	Data Type	Description
0x01	1 OutputHz	Get_Attribute_Single	N/A, 0, 500	C7	Frequency to the motor
0x02	2 MotorRPM	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 30000	C7	Calculated motor speed
0x03	3 MotorAmps	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 160	C7	Measured motor current
0x04	4 MotorTorque[%]	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, N/A,	C7	Calculated actual torque/nominal torque of the unit
0x05	5 MotorPower[%]	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, N/A	C7	Calculated actual power/nominal power of the unit power of the unit
0x06	6 MotorVolts	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 690	C7	Calculated motor voltage
0x07	7 DCLinkVolts	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, N/A	C7	Measured DC-link voltage
0x08	8 TempC	Get_Attribute_Single, Set_Attribute_Single	N/A, N/A, N/A	C7	Temperature of the heat sink
0x09	9 OpDayCount	Get_Attribute_Single, Set_Attribute_Single	N/A, N0, 65535	C7	Operating days 1), not resetable
0x0A	10 OpHrCount	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 65535	C7	Operating hours 2), can be reset with program-button #3
0x0B	11 MwhCount	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 65535	C7	Total MW-hours, not resetable
0x0C	12 MwhTripCount	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 65535	C7	MW-hours, can be reset with program-mable button #4
0x0D	13 VinVolts	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 10	C7	Voltage of the terminal Vin+ (control board)
0x0E	14 linmA	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 20	C7	Current of terminals lin+ and lin- (control board)
0x0F	15 DIAStatus	Get_Attribute_Single, Set_Attribute_Single	N/A, 0, 7	C7	0 = Open Input, 1 = Closed Input (Active)
16	DIBStatus	Get_Attribute_Single,	N/A,	C7	0 = Open Input, 1 = Closed Input (Active)

0x10		Set_Attribute_Single	0, 7		
17	OutStatus	Get_Attribute_Single,	N/A,	C7	0 = Open Input, 1 = Closed Input (Active)
0x11		Set_Attribute_Single	0, 7		
18	ControlProg	Get_Attribute_Single,	N/A,	C7	Version number of the control software
0x12		Set_Attribute_Single	0, 65535		
19	NomPower	Get_Attribute_Single,	N/A,	C7	Shows the power size of the unit
0x13		Set_Attribute_Single	1, 1000		
20	MotorTemp[%]	Get_Attribute_Single,	N/A,	C7	100%= temperature of motor has risen to nominal value
0x14		Set_Attribute_Single	0, N/A		
21	HzRef	Get_Attribute_Single,	N/A,	C7	Frequency reference
0x15		Set_Attribute_Single	0, 500		
22	TorqueRef	Get_Attribute_Single,	N/A,	C7	Torque reference when torque control in use
0x16		Set_Attribute_Single	0, N/A		
51	E1	Get_Attribute_Single,	N/A,	C7	
0x33		Set_Attribute_Single	0, 65535		
52	E2	Get_Attribute_Single,	N/A,	C7	
0x34		Set_Attribute_Single	0, 65535		
53	E3	Get_Attribute_Single,	N/A,	C7	
0x35		Set_Attribute_Single	0, 65535		
54	E4	Get_Attribute_Single,	N/A,	C7	
0x36		Set_Attribute_Single	0, 65535		
55	E5	Get_Attribute_Single,	N/A,	C7	
0x37		Set_Attribute_Single	0, 65535		
56	E6	Get_Attribute_Single,	N/A,	C7	
0x38		Set_Attribute_Single	0, 65535		
57	E7	Get_Attribute_Single,	N/A,	C7	
0x39		Set_Attribute_Single	0, 65535		
58	E8	Get_Attribute_Single,	N/A,	C7	
0x3A		Set_Attribute_Single	0, 65535		
59	EC	Get_Attribute_Single,	N/A,	C7	
0x3B		Set_Attribute_Single	0, 65535		
176	User Label	Get_Attribute_Single,	N/A,	DA	Array of instance IDs supported by this class
0xB0		Set_Attribute_Single	N/A, N/A		

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8.9.2000



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