Instruction Leaflet for the WPONIDNA

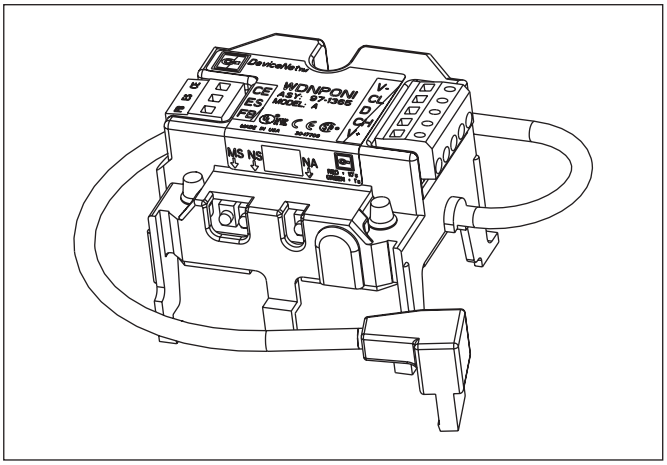


Fig. 1 WPONIDNA Module

DESCRIPTION

The WPONIDNA is the DeviceNet connection to the Advantage motor starter system. The WPONIDNA module is designed to plug into the Advantage with the cable and plug attached to the WPONIDNA. The module can be snapped onto the top or bottom of the Advantage unit. It can also be mounted separately using the mounting plate assembly (Catalog No. WPONIBASE). The module provides DeviceNet users with the ability to control and monitor the functions of the Advantage system at 125, 250, or 500 Kbaud. A separable connect is provided so that a HAND/OFF/AUTO hard contact may be used to selectively enable or disable the output of the control functions from the module without affecting its ability to monitor. A “feedback” input is provided so that the state of an auxiliary contact may be read over the DeviceNet network.

INSTALLATION

CAUTION

DO NOT INSTALL OR PERFORM MAINTENANCE ON THIS DEVICE WHILE EQUIPMENT IS ENERGIZED. DEATH OR SEVERE PERSONAL INJURY CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH INSTALLATION OR MAINTENANCE.

Only qualified persons as defined in the National Electric Code who are familiar with the installation, maintenance, and operation of this device and the equipment onto which it is to be installed, as well as applicable local, state, and national regulations and industry standards and accepted practices regarding safety of personnel and the equipment safety should be permitted to install, maintain, or operate this device.

These instructions are provided only as a general guide to such qualified persons and are not all-inclusive. They do not cover every application or circumstance which may arise in the installation, maintenance, or operation of this equipment. Users are advised to comply with all local, state, and national regulations and industry standards and accepted practices regarding safety of personnel and equipment safety.

CAUTION

REMOVE ALL POWER FROM THE INSTALLATION BEFORE ATTEMPTING TO INSTALL OR REMOVE THIS DEVICE. THIS SHOULD INCLUDE L1, L2, AND L3 AS WELL AS THE 3PEC TERMINALS OF ADVANTAGE.

ADVANTAGE MODELS A AND B WILL CONTINUE TO RUN IN THE LAST STATE IF THE COMMUNICATION LINK BETWEEN THE ADVANTAGE AND THE WPONIDNA IS LOST. MODELS C AND HIGHER WILL AUTOMATICALLY TURN OFF IN THE EVENT OF A COMMUNICATION FAILURE.

IF A MODEL A OR B IS USED, A MAINTAINED STOP PUSHBUTTON MUST BE WIRED BETWEEN 120VAC AND ADVANTAGE TERMINAL E TO INSURE THE STARTER CAN BE TURNED OFF IF THE COMMUNICATION LINK IS LOST.

Before installing the WPONIDNA, please review the following application limitations. **Do not** install the WPONIDNA if one or more of these conditions exist.

1. Do not install in locations where the temperature at the unit will fall outside the range of -25 to +70°C. Cooling equipment such as a fan should be used to lower the temperature if the 70°C limit is exceeded. Heating equipment should be provided if the -25 C limit is exceeded.
2. Do not install where the relative humidity will exceed 95% or where condensation will form due to rapid

temperature changes. A heater should be provided to prevent the formation of condensation.

3. Do not install where dust, salt, or iron particle densities are high.
4. Do not install where the unit may be subject to direct impact or high vibration.

Advantage Mounting Configurations		
Product	**Supported Attachment Line or Load**	**Slot Location**
L-2 Starter	Both	Outside edge of starter
L-2 Contactor	Both	Outside edge of contactor
L-2 Overload	Load Only	Outside edge of overload
3-4 Starter	Both	Under L1 and L3 Above T1 and T3
3-4 Contactor	Both	Under L1 and L3 Above T1 and T3
3-4 Overload	Load Only	Under L1 and L3
5-6 Starter	Both	Under L1 and L3 Above T2 and T3
5-6 Contactor	Both	Under L1 and L2 Above T2 and T3
5-6 Overload	Load Only	Under L1 and L2

Fig. 1 Advantage Mounting Configurations

Snap the module to the attachment slots on the Advantage starter, contactor, or overload according to Figure 1.

Plug the cable carefully into the side of the Advantage unit as shown in Figure 2. The two pins nearest the mounting plate are reserved for the remote reset and indication options.

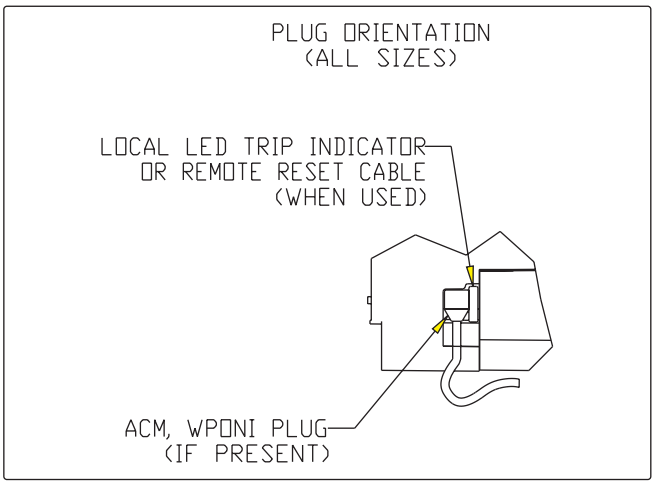


Fig. 2 Connection to the Advantage Options Port

CAUTION

NEVER PLUG THE WPONIDNA CABLE ONTO THE ADVANTAGE HOST WHILE THE HOST IS POWERED.

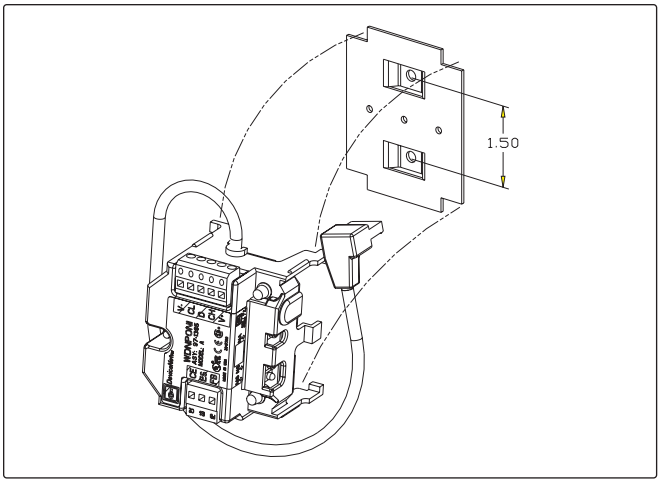


Fig. 3 WPONIDNA Mounted on WPONIBASE

The WPONIDNA may also be connected to an Advantage Control Module (ACM), or a WMETER. Since these options are generally mounted on the door or outside surface of the enclosure, it may not be possible to stretch the WPONIDNA cable back so that it can be mounted on the Advantage starter unit. In that case, a WPONIBASE should be used to mount the WPONIDNA as shown in Figure 3, or a WPONI3DNA should be ordered. This is a WPONIDNA with a 3-foot cable.

Plug the WPONIDNA cable carefully into the port on the back of the ACM or WMETER labeled WPONI/WMETER.

The five-point gray terminal block should be wired with wire that is approved for DeviceNet applications. The colors of wires may be matched to the silkscreened colors on the terminal block. The following chart lists some of the DeviceNet cable specifications for thick and thin cable types.

Cable Type	Electrical Characteristic	Specification at 1 MHZ
Both	Impedance	120 ohms
Both	Propagation Delay	1.36 nSec/ft max.
Both	Capacitance between Conductors	12 pf/ft
Both	Capacitance between a Conductor and the Shield	24 pf/ft
Thick	Capacitive Unbalance	370 pf/1000 ft
Thin	Capacitive Unbalance	620 pf/1000 ft
Thick	Attenuation at 125 KHz	0.13 db/100 ft
Thin	Attenuation at 125 KHz	0.29 db/100 ft

Fig. 4 Wiring Specification Guide

In addition, the configuration of the wiring system must comply with the rules for trunk and drop cable configuration and length. Following are the basic wiring rules.

- Terminating resistors are required on each end of the trunk line.
- The truck must be configured as a linear bus.
- Drop lines may be as long as 6m (20 feet), and may contain branches.
- Maximum total cable distance at all baud rates is 100m (328 feet) for thin cable.
- The maximum total cable distance for thick cable is
  125K baud = 500m (1640 feet)
  250K baud = 250m (820 feet)
  500K baud = 100m (328 feet)

The maximum length of mixed cables may be found by solving the following equation:

$$L_{Thick} + 5*L_{Thin} = 500m\ (1640\ feet)$$

L_{Thin} must not exceed 156m (511 feet)

There are two basic power configurations which may be used when wiring the DeviceNet connector. The first and most common configuration is to supply the DC power along with the DeviceNet signals. Figure 5 illustrates this configuration.

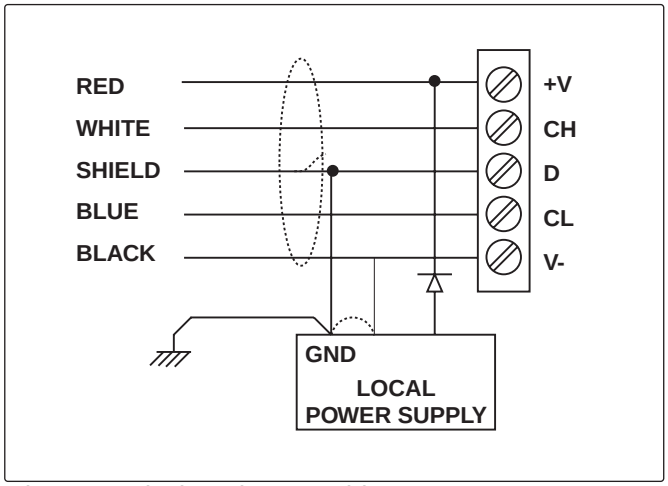


Fig. 5 Typical DeviceNet Wiring

In some applications where there are large installation distances or current draws involved, it may be desirable to supply the DC power from a locally referenced source. Care must be taken not to ground the system in more than one place. Figure 6 illustrates how a separate power supply may be wired at the WPONIDNA node.

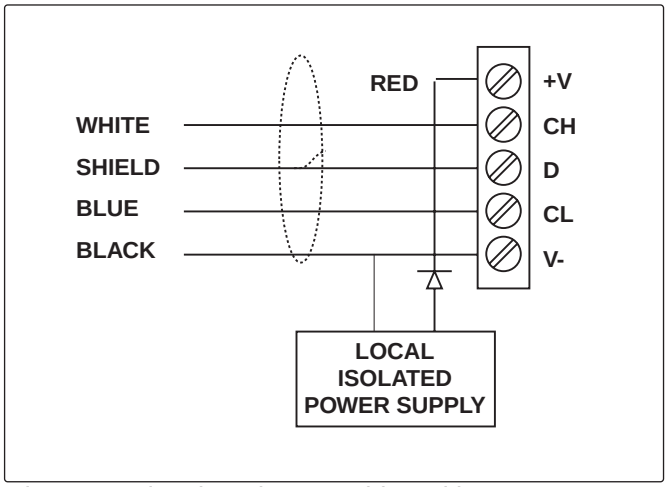


Fig. 6 Optional DeviceNet Wiring with Separate Power Source

The DeviceNet cable insulation should be stripped back approximately 1" from the end. Each of the wires should be stripped approximately 1/4". The terminals of the DeviceNet connector should be tightened to 5-7 in-lbs. Daisy-chaining of the drop cable can be accomplished by terminating both wires under one screw.

The three-point black connector supports the DeviceNet Can Enable input (**CE**) and the auxiliary feedback input (**FB**). The Can Enable is intended to allow the control functions of the WPONIDNA to be enabled or disabled locally via a hard contact. The **ES** terminal is a 120VAC output, which is intended to be the source of the voltage and wiring point for the **CE** and **FB** inputs. If the node is always to have the DeviceNet selected as the control mode, the **CE** and **ES** terminals can be jumpered. Figures 7A and 7B illustrate the use of these terminals to create a HAND/OFF/AUTO control circuit.

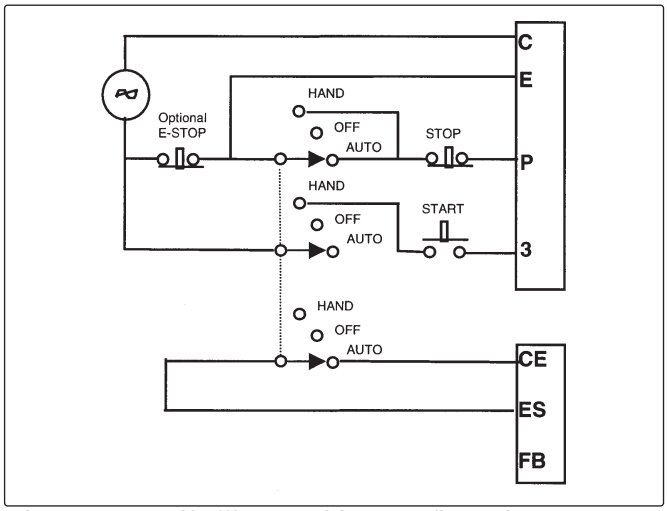


Fig. 7A Hand/Off/Auto Wiring Configuration

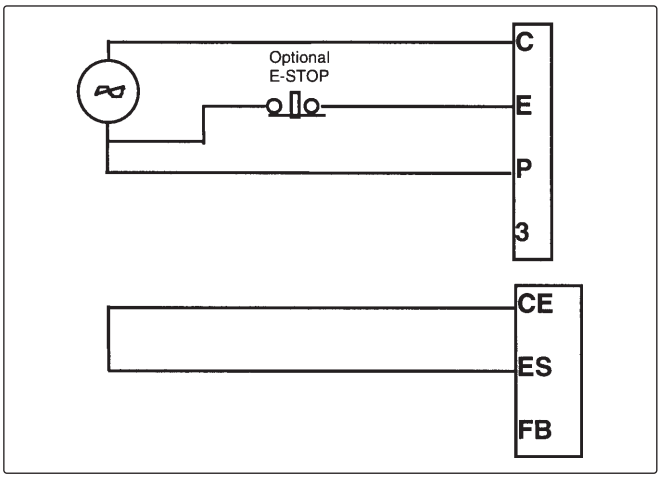


Fig.7B DeviceNet Auto Mode Only Wiring

Figure 7B illustrates the DeviceNet auto mode-only application of the WPONIDNA. Do not run the I/O wiring in the same duct as or bundled together with the power cables. I/O wiring length should not exceed 100m (328 feet).

CAUTION

FAILURE TO BREAK THE CONNECTION AT THE 3 TERMINAL ON ADVANTAGE MAY CAUSE THE UNIT TO CYCLE IF BOTH THE CE AND 3 SIGNALS ARE ACTIVE AT THE SAME TIME

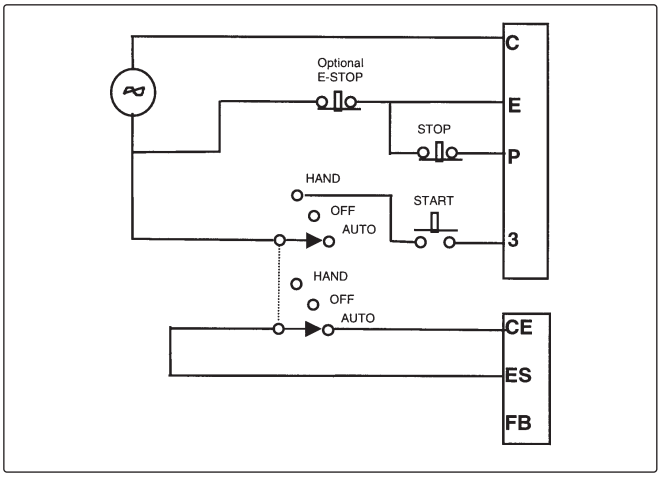


Fig. 7C DeviceNet Can Enable Wiring with Start/Stop

The DeviceNet Aux_FB input **FB** is intended to allow the network to read the contact state of the contactor. Figure 8 illustrates the use of the FB and ES terminals to add the auxiliary contact input on the DeviceNet network. An auxiliary contact must be added to the Advantage starter in order to use this feature. The ES terminal is referenced to the C terminal on the Advantage starter to which the WPONIDNA is attached. The Aux_FB data is available in many of the custom input assemblies.

The FB and CE inputs will accept 120VAC signals from any source as long as they are referenced to the Advantage host common.

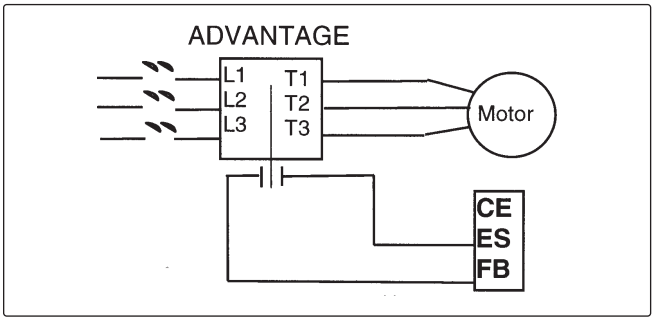


Fig. 8 Optional Auxiliary Input Wiring

APPLICATION OF THE WPONIDNA AND ACM S

The WPONIDNA is designed to operate with the ACMs and WMETERs. There are a few limitations which must be considered in applying the WPONIDNA with ACMs. The first consideration is that only ACMs with HAND/OFF/-AUTO (HOA) selector buttons should be used. Secondly, in this configuration the CE signal functions as a DeviceNet permissive and allows control commands to be passed through the WPONIDNA to the ACM. The ACM performs the HOA function. The remote auto wiring in the ACMs should not be used or unit cycling will result. The WMETER may always be inserted between a WPONIDNA and Advantage or ACM, but the response time will be affected. In general, the message response time is greatly increased using the various ACM combinations. Consult the Response Time Delay chart on Page 5 for the approximate response times.

REMOVING THE WPONIDNA

The WPONIDNA module is designed to snap on and remain snapped securely in high vibration applications. Therefore, the unit may be damaged if incorrectly removed from the Advantage. To remove the unit, first remove power from the Advantage and unplug the DevideNet and the three-point connectors. Gently pull the WPONIDNA module from the Advantage by removing the legs of the WPONIDNA on one side first.

OPTION CONSIDERATIONS WITH THE WPONDNA

The Advantage systems may have ACM and WMETER modules between the WPONIDNA and the motor which it is controlling. Each option adds a delay in the response time. Refer to chart on Page 5 for approximate response times.

A - WPONIDNA

B - WPONIDNA and WMETER

C - WPONIDNA and ACM

D - WPONIDNA and ACM and WMETER

RESPONSE TIME DELAY				
Config-uration	**Start to Aux = 1**	**Stop to Aux = 0**	**Start to Running 1 = 1**	**Stop to Running 1 = 0**
A	.225 sec.	.300 sec.	.225 sec.	.225 sec.
B	.425 sec.	1.4 sec.	2.7 sec.	3.7 sec.
C	.850 sec.	.475 sec.	1.5 sec.	1 sec.
D	1 sec.	1.3 sec.	5.7 sec.	6.5 sec.

POWER UP AND CONFIGURATION

Be sure that the HAND/OFF/AUTO selector, if installed, is in the proper position. Apply power to both the Advantage unit and the WPONIDNA unit. Refer to the Advantage Installation Leaflet to power the Advantage. The WPONIDNA may be powered by plugging the DeviceNet connector into the unit while the network is powered, or by powering the whole network up. The front panel LEDs will play the pattern in the table below.

POWER-UP LED PATTERN	
MS	- Green for approximately . 25 second
MS	- Red for approximately .25 second
MS	- Green
NS	- Green for approximately .25 second
NS	- Red for approximately .25 second
NS	- OFF until the Dup_MAC_ID test and a full ROM CRC check is complete (approximately 13 seconds)
NA	- Green for approximately .25 second
NA	- Red for approximately .25 second
NA	- OFF will begin to flash address sequence in approximately 16 seconds

There must be a minimum of two nodes with power for the Duplicate MAC ID check to complete successfully. All units power up with the MAC ID 63 programmed from the factory. Since the DeviceNet protocol checks for duplicate MAC ID's the MAC ID of the unit will generally have to be changed. This may be accomplished by using the Cutler-Hammer configuration tool "NetView". The NetView program supports a module identification mode so that the correct unit can be identified prior to configuration. For more information on configuring the unit and setting the MAC ID, see the user manual for Net View. There is a space provided on the label of the unit so that the MAC ID may be written for identification when the unit is not powered. Please refer to Appendix A of this installation leaflet for more information on the Device Net objects and features.

LED DEFINITION AND DIAGNOSTICS

Module Status (**MS**) provides information about the module such as the status to the power or memory systems.

State	LED	Meaning
No Power	OFF	There is no power to the device
Operational	Green	Device is operating normally
Standby	Flashing Green	Device needs commissioning
Minor Fault	Flashing Red	A recoverable fault has been detected
Unrecoverable Fault	Red	A non-recoverable fault has been detected. The device may need to be replaced
Self-Test	Flashing Green-Red	The device is performing a self-test

Network Status (**NS**) provides the status of the network connection.

State	LED	Meaning
Not Powered Not On-Line	OFF	MS OFF No power MS ON No device detected on network
On-Line Not Connected	Flashing Green	No connection has been established
Connected OK	Green	A connection has been established
Critical Link Failure	Red	Device cannot communicate on the network. (DupMac or BusOff)

The Node Address (**NA**) LED blinks the MAC ID of the unit while it is powered. The unit displays the tens digit with red blinks and the ones digit with green blinks. The unit plays the tens unit, then the ones, and finally delays about two seconds before repeating the sequence. An address of zero is not recommended. It will result in an "off" state for the NA LED. The NA LED will begin to flash the device address after the power-up initialization is completed (about 10 seconds).

FEATURES AVAILABLE VIA THE WPONIDNA

- Contactor Contact Position - Open/Closed (optional)
- Three Phase Motor Currents
- Thermal Capacity - Percent
- Network Readable Advantage Configuration
  - Trip Current
  - Overload Class
  - Phase Loss Enable/Disable
  - Phase Unbalance Enable/Disable
  - Ground Current-Sensing Enable/Disable
- Percent Current Imbalance
- Fault Diagnostics
- Start/Stop Control
- Remote Reset

SPECIFICATIONS

DeviceNet Connections

V+ - Min. Voltage 11V, Max. Voltage +27V
Inrush = 0.3A, 40mA steady state

V- - Common

CH - Reverse wiring protected to $\pm$27V

CL - Reverse wiring protected to $\pm$27V

D - Shield tie point

Device Net Wiring is UL and CSA Approved for:

Trunk-to-Trunk Wiring
Trunk-to-Drop Wiring
Drop-to-Drop Wiring
Tighten Terminals to 5 in-lbs

DeviceNet Control Wire

ES - 120VAC Voltage Output for CE/FB
50mA max.

CE - Voltage Input for CAN Enable
150VAC max. - 70VAC min.

FB - Voltage Input for Feedback
150VAC max. - 70VAC min.

DeviceNet Control Wire, Cont'd

Single Conductor Wire Size Range	-	#14 - #18 AWG
Paired Conductor Wire Sizes	-	#16, #18 AWG
Strip Length	-	3/16 - 1/4
Torque	-	5 lb-in

Ambient Temperature

Operating	-	-25 to +70°C ambient
Storage	-	-40 to +85°C

Relative Humidity

95% maximum, non-condensing

Vibration

5G	-	Operating
5G	-	Non-Operational

Shock

15G	-	Operating
30G	-	Non-Operational

Baud Rate

125, 250, 500 Kbaud

Connections

I/O Poll Group 2 only
Explicit
No UCMM

TROUBLESHOOTING HINTS

Problem	Possible Solution
No LEDs light on the module.	Check the +24V on the DeviceNet plug.
The Network Status NS LED fails to blink green after the power-up check.	Make sure there is a minimum of two devices with power on the network.
The NS LED is red after the power-up initialization is complete.	Check for a duplicate node address on the network.
The device fails to make a connection.	Check for correct MAC ID in the connection message.
The Advantage will not start.	Check to make sure that the Advantage E and P terminal has voltage. Check to make sure the configuration parameter NetCtrl is set to “1”.
The WPONIDNA trips on Communication Fault.	Check the connection between the WPONIDNA and the Advantage.
While using the Net-Solver program, all required functions are not available from the “POINT” drop down list.	Be sure that the WPONIDNA is attached to an Advantage starter and that the starter has power on the E and C terminals. Reconfigure the unit with NetView, being sure to select input and output assemblies which are supported by the actual Advantage configuration.

STILL NEED HELP???
Contact Cutler-Hammer Automation
Phone: (800) 809-2772
Option 6 for DeviceNet Hardware

APPENDIX A - DEVICENET IFORMATION

The WPONIDNA Communications Module allows an Advantage motor controller to operate as a slave device on a DeviceNet network. The Communication Module 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).

This appendix defines the DeviceNet message types, class services, and objects that are supported by the Communication Module.

As a Group 2 slave device, the Communication Module 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 Module Node Address

The Communication Module supports the following object classes.

Class	Object
0x01	Identity
0x02	Message Router
0x03	DeviceNet
0x04	Assembly
0x05	Connection
0x08	Input Point
0x29	Control Supervisor
0x2C	Overload

Attributes listed in **bold** in this appendix must be set during the configuration of the device. These attributes are stored in non-volatile memory and maintain their value after a power loss.

Before operating this device over DeviceNet, you must first set Network Control (Control Supervisor, Instance 1, Attribute 5) to Network Control. You can verify this by checking that CtrlFromNet = 1.

IDENTITY OBJECT

Identity Class (1), Class Attributes (0)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Revision	Get_Attribute_Single	Revision of this object	1, 1, 1
2 0x02	Max Instance	Get_Attribute_Single	Maximum instance number of an object currently created in this class level of the device	1, 1, 1
176 0xB0	Object Name	Get_Attribute_Single	ACSII Name for the object Class	“Identity”, “Identity”, “Identity”
180 0xB4	Class Attribute List	CH_Get_Member	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.	N/A, N/A, N/A
186 0xBA	Instance Attribute List	CH_Get_Member	Each element describes an instance attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	N/A, N/A, N/A

Identity Class (1), Instance Attributes (1)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Vendor ID	Get_Attribute_Single	Identification of each vendor by number	68, 68, 68
2 0x02	Device Type	Get_Attribute_Single	Indication of the general type of product	22, 3, 22
3 0x03	Product Code	Get_Attribute_Single	This is a code assigned by the vendor to describe the device	200, 200, 200
4 0x04	Revision	Get_Attribute_Single	Revision of the item the Identity Object represents	{4.2}, {4.2}, {4.2}
5 0x05	Status	Get_Attribute_Single	Summary Status of the Device Bit6: Node Fault Bit7: System Fault	0, 0, 65535
6 0x06	Serial Number	Get_Attribute_Single	Serial Number of the device	0, 90, 4294967295
7 0x07	Product Name	Get_Attribute_Single	Human readable identification	“WPONIDNA”, “WPONIDNA”, “WPONIDNA”
9 0x09	Config. Consist Value	Get_Attribute_Single	Contents identify configuration of device	0, 0, 65535
100 0x64	Advantage Size	Get_Attribute_Single	Identifies the Device the WPONIDNA is plugged into	N/A, N/A, N/A
176 0xB0	User Label	Get_Attribute_Single, Set_Attribute_Single	ASCII label given to the device by the user	“User Label”, N/A, N/A
177 0xB1	Fault_Value	Get_Attribute_Single	Error code for this device 1 = Transmit Error 2 = Data Overrun 3 = Data Size Error 4 = Undefined 5 = Config. CRC Fault 6 = Transmitter Full	0, 0, 6

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x05	No	Yes	Reset
0x0E	Yes	Yes	Get_Attribute_Single

Vendor Specific Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x47	Yes	No	CH_Get_Member

MESSAGE ROUTER

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

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
176 0xB0	Object Name	Get_Attribute_Single	ACSII Name for the object Class	“Message Router”, “Message Router”, “Message Router”

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

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Object_List	Get_Attribute_Single	This attribute contains a list of supported objects, the number of supported classes in the classes array, and a list of supported class codes	N/A, N/A, N/A

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

DEVICENET OBJECT

DeviceNet Class (3) - Class Attrributes (0)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Revision	Get_Attribute_Single	Revision of the DeviceNet Object Class Definition upon which the implementation is based.	2, 2, 2
176 0xB0	Object Name	Get_Attribute_Single	ACSII Name for the object Class	“DeviceNet”, “DeviceNet”, “DeviceNet”
180 0xB4	Class Attribute List	CH_Get_Member	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.	N/A, N/A, N/A
186 0xBA	Instance Attribute List	CH_Get_Member	Each element describes an instance attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	N/A, N/A, N/A

DeviceNet Class (3) - Instance Attrributes (1)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	**MAC ID**	**Get_Attribute_Single Set_Attribute_Single**	**Node address**	**63, 0, 63**
2 0x02	**Baud Rate**	**Get_Attribute_Single Set_Attribute_Single**	**The baud rate of the device 0 - 125K 1 - 250K 2 - 500K**	**0, 0, 2**
3 0x03	BOI	Get_Attribute_Single	Bus Off Interrupt 1 = Reset CAN chip and allow Group 4 faulted mode recovery	0, 0, 1
4 0x04	Bus Off Counter	Get_Attribute_Single, Set_Attribute_Single	Number of times CAN went to the bus-off state	0, 0, 255
5 0x05	Allocation Information	Get_Attribute_Single	Allocation Choice Master’s MAC ID NOTE: Required if using Master/Slave Connection Set ODVA 1.3, unclear in 2.0	N/A, N/A, N/A
192 0xC0	AddressLed Control	Get_Attribute_Single, Set_Attribute_Single	1 = Off 2 = Green 3 = Red	0, 0, 2

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attrribute_Single
0x4B	No	Yes	Allocate_Master/Slave_Connection_Set
0x4C	No	Yes	Release/Master/Slave_Connection_Set

Vendor Specific Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x47	Yes	No	CH Get Member

ASSEMBLY OBJECTS

Assembly Class (4) - Class Attributes (0)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
176 0xB0	Object Name	Get_Attribute_Single	ACSII Name for the object Class	“Assembly”, “Assembly”, “Assembly”

Assembly Class (4) - Class Attributes (1)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
3 0x03	Input Assembly	Get_Attribute_Single	Input to master from device node	53, 50, 113

Assembly Class (4) - Class Attributes (2)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
3 0x03	Output Assembly	Get_Attribute_Single	Output from master to device node	1, 1, 5

Note: Input and Output assembly instance values depend on what is set in the Connection Object Instance 2 Input and Output Assemblies

Input Assemblies

Instance 50 (32hex) Basic Overload/Contactor Assembly								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0								Faulted

Instance 51 (33hex) Extended Overload/Contactor Assembly								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0							Warning	Faulted

Instance 52 (34hex) Basic Motor Control								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0						Running1		Faulted Trip

Input Assemblies, Cont'd

Instance 53 (35hex) Extended Motor Control 1 (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0			CtrlFromNet	Ready		Running1	Warning	Faulted Trip

Instance 54 (36hex) Extended Motor Control (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0			CtrlFromNet	Ready	Running2	Running1	Warning	Faulted Trip

Instance 100 (64hex) Advantage Contactor (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1		Faulted Trip

Instance 101 (65hex) Advantage Overload (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0								Faulted
1	% Thermal Capacity							
2	Average Current (Low Byte)							
3	Average Current (High Byte)							
4	% Phase Imbalance							

Instance 102 (66hex) Advantage Motor Starter (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1	Warning	Faulted
1	% Thermal Capacity							
2	Average Current (Low Byte)							
3	Average Current (High Byte)							
4	% Phase Imbalance							

Input Assemblies, Cont'd

Instance 103 (67hex) Advantage Expanded Motor Starter (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready	Running2	Running1	Warning	Faulted
1	% Thermal Capacity							
2	Average Current (Low Byte)							
3	Average Current (High Byte)							
4	% Phase Imbalance							

Instance 104 (68hex) Advantage Overload Phase Currents (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0							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)							

Instance 105 (69hex) Advantage Starter Phase Currents (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1	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)							

Input Assemblies, Cont'd

Instance 106 (6Ahex) Advantage Expanded Starter Phase Currents (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready	Running2	Running1	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)							

Instance 107 (6Bhex) Advantage Overload with Fault Code (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0							Warning	Faulted
1	% Thermal Capacity							
2	Average Current (Low Byte)							
3	Average Current (High Byte)							
4	Fault Code (Low Byte)							
5	Fault Code (High Byte)							

Instance 108 (6Chex) Advantage Motor Starter with Fault Code (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1	Warning	Faulted
1	% Thermal Capacity							
2	Average Current (Low Byte)							
3	Average Current (High Byte)							
4	Fault Code (Low Byte)							
5	Fault Code (High Byte)							

Input Assemblies, Cont'd

Instance 109 (6Dhex) Advantage Expanded Motor Starter with Fault Code (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready	Running2	Running1	Warning	Faulted
1	% Thermal Capacity							
2	Average Current (Low Byte)							
3	Average Current (High Byte)							
4	Fault Code (Low Byte)							
5	Fault Code (High Byte)							

Instance 111 (6Fhex) Advantage Starter with Lockable ACM (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1	Warning	Faulted
1				Manual Override	ACM Disabled	Remote	Local	Of

Instance 112 (70hex) Advantage Starter with Lockable ACM and Average Current (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1	Warning	Faulted
1				Manual Override	ACM Disabled	Remote	Local	Of
2	% Thermal Capacity							
3	Average Current (Low Byte)							
4	Average Current (High Byte)							
5	Fault Code (Low Byte)							
6	Fault Code (High Byte)							

Input Assemblies, Cont'd

Instance 113 (71hex) Advantage Starter with Lockable ACM and Phase Current (see table for functional assignments)								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Aux_FB		CtrlFromNet	Ready		Running1	Warning	Faulted
1				Manual Override	ACM Disabled	Remote	Local	Of
2	Phase Current L1 (Low Byte)							
3	Phase Current L2 (High Byte)							
4	Phase Current L2 (Low Byte)							
5	Phase Current L2 (High Byte)							
6	Phase Current L3 (Low Byte)							
7	Phase Current L3 (High Byte)							

The following table indicates the I/O Assembly Data Attribute mapping for Input Assemblies

Data Component Name	**Class Name**	**Class Number**	**Instance Number**	**Attribute Name**	**Attribute Number**
Faulted	Supervisor	29hex	1	Faulted	10
Warning	Supervisor	29hex	1	Warning	11
Running1	Supervisor	29hex	1	Running1	7
Running2	Supervisor	29hex	1	Running2	8
Ready	Supervisor	29hex	1	Ready	9
CtrlFromNet	Supervisor	29hex	1	CtrlFromNet	15
LockEnabled	***Supervisor***	***29hex***	***1***	***LockEnabled***	***104***
Hand	***Supervisor***	***29hex***	***1***	***Hand***	***105***
Off	***Supervisor***	***29hex***	***1***	***Off***	***106***
Remote	***Supervisor***	***29hex***	***1***	***Remote***	***107***
Manual Override	***Supervisor***	***29hex***	***1***	***Manual/Override***	***108***
Aux_FB	Input Point	8hex	1	Value	3
Average Current	Overload	2Chex	1	AvgCurrent	5
% Phase Imbalance	Overload	2Chex	1	%PhImbal	6
% Thermal Capacity	Overload	2Chex	1	%Thermal	7
Phase Current L1	Overload	2Chex	1	PhaseCurrentL1	8
Phase Current L2	Overload	2Chex	1	PhaseCurrentL2	9
Phase Current L3	Overload	2Chex	1	PhaseCurrentL3	10

Output Assemblies

Instance 01 (01hex) Basic Contactor Assembly								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0								Run1

Instance 02 (02hex) Basic Overload Assembly								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0						FaultReset		

Instance 03 (03hex) Basic Motor Starter								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0						FaultReset		Run1

Instance 04 (04hex) Extended Contactor Assembly								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0							Run2	Run1

Instance 05 (05hex) Extended Motor Starter Assembly								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0						FaultReset	Run2	Run1

Instance 110 (6Ehex) Motor Starter with Lockable ACM								
Byte	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0					Lock Command	FaultReset		Run1

The following table indicates the I/O Assembly Data Attribute mapping for Output Assemblies

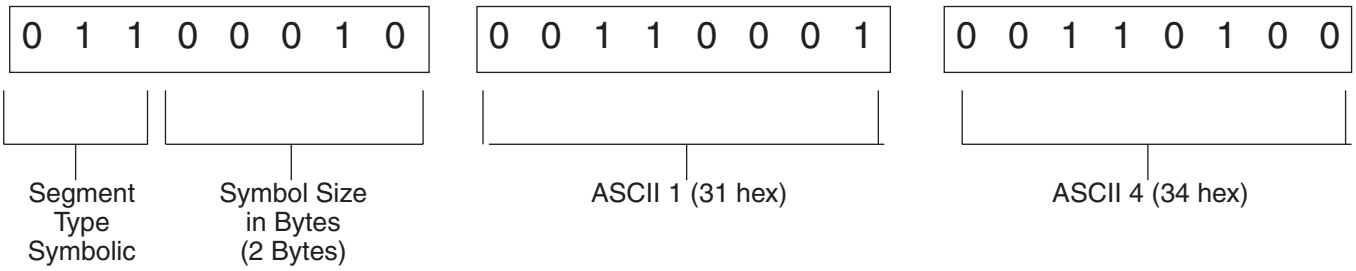
Data Component Name	Class Name	Class Number	Instance Number	Attribute Name	Attribute Number
Run1	Supervisor	29hex	1	Run1	3
Run2	Supervisor	29hex	1	Run2	4
FaultReset	Supervisor	29hex	1	FaultReset	12
Lock Command	**Supervisor**	**29hex**	**1**	**Lock Command**	**103**
FaultReset	Supervisor	29hex	1	FaultReset	12

Connection Paths to I/O Assembly Instances

The IO Assembly Instances are chosen for IO Connections by setting the “produced_connection_path” (attribute 14) and “consumed_connection_path” (attribute 16) attributes in the appropriate connection object

Motor Control Devices use the Symbolic Segment Type (see Appendix I, Volume 1) to specify paths to the I/O Assembly Instances in the Motor Control Hierarchy. I/O Assembly Instances are represented by ASCII strings that contain the hex number of the Assembly Instance whose path is to be chosen.

The following example shows the Symbolic Segment used to specify Output Assembly Instance 20 (14hex).



DEVICENET CONNECTION OBJECT

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

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Revision	Get_Attribute_Single	Revision of this Connection Object Class. Definition upon which the implementation is based. See description below for more details.	1, 1, 1
176 0xB0	Object Name	Get_Attribute_Single	ACSII Name for the object Class	“DeviceNet Connection”, “DeviceNet Connection”, “DeviceNet Connection”
180 0xB4	Class Attribute List	CH_Get_Member	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.	N/A, N/A, N/A
186 0xBA	Instance Attribute List	CH_Get_Member	Each element describes an instance attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	N/A, N/A, N/A

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

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	State	Get_Attribute_Single	State of the object 0 = nonexistent 1 = configuring 2 = waiting for connection ID 3 = established 4 = timed out 5 = deferred delete	0, 0, 5
2 0x02	Instance Type	Get_Attribute_Single	Indicates either IO or messaging connection	0, 0, 1
3 0x03	Transport Class Trigger	Get_Attribute_Single	Defines Behavior of the connection	0x83, 0, 255,
4 0x04	Produced Cnxn Id	Get_Attribute_Single	Placed in CAN Identifier field when the Connection Transmits	0, 0, 65535
5 0x05	Consumed Cnxn Id	Get_Attribute_Single	CAN Identifirer Field value that denotes message to be received	0, 0, 65535
6 0x06	Initial Co Characteristics	Get_Attribute_Single	Defines the Message Group(s) across which productions and consumptions associated with this	0x21, 0, 255
7 0x07	Produced Connection Size	Get_Attribute_Single	Maximum number of bytes transmitted across this Connection	7, 1, 65535
8 0x08	Consumed Connection Size	Get_Attribute_Single	Maximum number of bytes received across this Connection	7, 1, 65535
9 0x09	Expected Packet Rate	Get_Attribute_Single, Set_Attribute_Single	Defines timing associated with this Connection	0, 0, 65535
12 0x0C	Watchdog Timeout Action	Get_Attribute_Single, Set_Attribute_Single	Defines how to handle Inactivity/Watchdog timeouts 0 - Transition to time out 1 - Auto Delete 2 - Auto Reset 3 - Deferred Delete	0, 0, 3
13 0x0D	Produced Connection Path Length	Get_Attribute_Single	Number of bytes in the produced_connection_path length attribute	0, 0, 65535
14 0x0E	Produced Connection Path	Get_Attribute_Single	Application Object producing data on this connection	{ }, { }, { }
15 0x0F	Consumed Connection Path Length	Get_Attribute_Single	Number of bytes in the consumed_connection_path length attribute	0, 0, 65535
16 0x10	Consumed Connection Path	Get_Attribute_Single	Specifies the Application Object(s) that are to receive the data consumed by this Connection Object	{ }, { }, { }

DeviceNet Connection Class (5), Polled IO Connection Instance (2)
IO Poll Connection must be allocated to read these attributes and in the configuration status to write attributes 14 and 16

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	State	Get_Attribute_Single	State of the object 0 = nonexistent 1 = configuring 2 = waiting for connection ID 3 = established	0, 0, 5
2 0x02	Instance Type	Get_Attribute_Single	Indicates either IO or messaging connection 0 = Explicit message I = I/O message	0, 0, 1
3 0x03	Transport Class Trigger	Get_Attribute_Single	Defines Behavior of the connection	0x83, 0, 255
4 0x04	Produced Cnxn Id	Get_Attribute_Single	Placed in CAN Identifier field when the Connection Transmits	0, 0, 65535
5 0x05	Consumed Cnxn Id	Get_Attribute_Single	CAN Identifirer Field value that denotes message to be received	0, 0, 65535
6 0x06	Initial Co Characteristics	Get_Attribute_Single	Defines the Message Group(s) across which productions and consumptions associated with this	1, 0, 255
7 0x07	Produced Connection Size	Get_Attribute_Single	Maximum number of bytes transmitted across this Connection	0, 0, 7
8 0x08	Consumed Connection Size	Get_Attribute_Single	Maximum number of bytes received across this Connection	0, 0, 1
9 0x09	Expected Packet Rate	Get_Attribute_Single, Set_Attribute_Single	Defines timing associated with this Connection	0, 0, 65535
12 0x0C	Watchdog Timeout Action	Get_Attribute_Single	Defines how to handle Inactivity/Watchdog timeouts 0 - Transition to time out 1 - Auto Delete 2 - Auto Reset 3 - Deferred Delete	0, 0, 3
13 0x0D	Produced Connection Path Length	Get_Attribute_Single	Number of bytes in the produced_connection_path length attribute	3, 3, 3
14 0x0E	Produced Connection Path	Get_Attribute_Single, Set_Attribute_Single	Application Object producing data on this connection	{0x62, 0x33, 0x42}, {0x62, 0x33, 0x42}, {0x62, 0x33, 0x42}
15 0x0F	Consumed Connection Path Length	Get_Attribute_Single	Number of bytes in the consumed_connection_path length attribute	3, 3, 3
16 0x10	Consumed Connection Path	Get_Attribute_Single	Specifies the Application Object(s) that are to receive the data consumed by this Connection Object	{0x62, 0x33, 0x31}, {0x62, 0x33, 0x31}, {0x62, 0x33, 0x31}

DeviceNet Connection Class (5), Polled IO Connection Instance (2), Cont'd
IO Poll Connection must be allocated to read these attributes and in the configuration status to write attributes 14 and 16

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
100 0x64	**Input Assembly Type**	**Get_Attribute_Single, Set_Attribute_Single**	**Input Assembly Type 50 = Basic Overload/Contactor 51 = Extended Overload/Contactor 52 = Basic Motor Control 53 = Extended Motor Control 1 54 = Extended Motor Control 2 100 = Advantage Contactor 101 = Advantage Overload 102 = Advantage Motor Starter 103 = Advantage Expanded Starter 104 = Advantage Overload Phase Currents 105 = Advantage Starter Phase Currents 106 = Advantage Expanded Starter Phase Currents 107 = Advantage Overload Fault Code 108 = Advantage Starter Fault Code 109 = Advantage Expanded Starter Fault Code 111 = Advantage Overload with Lockable ACM 112 = Advantage Starter with Lockable ACM 113 = Advantage Expanded Starter with Lockable ACM**	**52, 50, 113**
101 0x65	**Output Assembly Type**	**Get_Attribute_Single, Set_Attribute_Single**	**Output Assembly Type 1 = Basic Contactor 2 = Basic Overload 3 = Basic Motor Starter 4 = Extended Contactor 5 = Extended Motor Starter 110 = Motor Starter with Lockable ACM**	**3, 1, 110**

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x05	No	Yes	Reset
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Vendor Specific Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x47	Yes	No	CH_Get_Member

DISCRETE INPUT POINT

Discrete Input Point Class (8), Class Attributes (0)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Revision	Get_Attribute_Single	Revision of this object	2, 1, 2
2 0x02	Max Instance	Get_Attribute_Single	Maximum instance number of an object currently created in this class level of the device	1, 1, 66535
176 0xB0	Class Name	Get_Attribute_Single	ACSII Name for the object Class	“Input Point”, “Input Point”, “Input Point”
180 0xB4	Class Attribute List		Each Element describes a class attribute. The Array’s elements are structs as described in ihe semantics section. Individual elements are accessed using the Get Member service.	N/A, N/A, N/A
186 0xBA	Instance Attribute List		Each element describes an instance attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	N/A, N/A, N/A

Discrete Input Point Class (8), Instance Attributes (1)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
3 0x03	Aux Feedback	Get_Attribute_Single	Input point value	0, 0, 1
4 0x04	Status	Get_Attribute_Single	Input point status	0, 0, 1

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

CONTROL SUPERVISOR

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

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Revision	Get_Attribute_Single	Revision of this object. NOTE: All class definitions are required to include this attribute. If the value is 01, then this attribute is optional in implementation. Otherwise, this attribute is required.	1, 1, 1
2 0x02	Max Instance	Get_Attribute_Single	Maximum instance number of an object currently created in this class level of the device	1, 1, 1
176 0xB0	Class Name	Get_Attribute_Single	ACSII Name for the object Class	“Control Supervisor”, “Control Supervisor”, “Control Supervisor”
180 0xB4	Class Attribute List	CH_Get_Member	Each Element describes a class attribute. The Array’s elements are structs as described in ihe semantics section. Individual elements are accessed using the Get Member service.	N/A, N/A, N/A
186 0xBA	Instance Attribute List	CH_Get_Member	Each element describes an instance attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	N/A, N/A, N/A

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

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
3 0x03	Run 1	Get_Attribute_Single, Set_Attribute_Single	See Run/Stop event matrix	0, 0, 1
4 0x04	Run 2	Get_Attribute_Single, Set_Attribute_Single		0, 0, 1
5 0x05	**NetCtrl**	**Get_Attribute_Single, Set_Attribute_Single**	**Requests Run/Stop control to be local or from network 0 = Local Control 1 = Network Control Note that the actual status of Run/Stop control is reflected in attribute 15, CtrlFromNet.**	**0, 0, 1**
6 0x06	State	Get-Attribute_Single	0 = Vendor Specific 1 = Startup 2 = Not_Read 3 = Read 4 = Enabled 5 = Stopping 6 = Fault_Stop 7 = Faulted	1, 0, 7
7 0x07	Running 1	Get_Attribute_Single	1 = (Enabled and Run1) or (Stopping and Running1) or (Fault_Stop and Running 1) 0 = Other state	0, 0, 1
8 0x08	Running 2	Get Member	1 = (Enabled and Run2) or (Stopping and Running2) or (Fault_Stop and Running 2) 0 = Other state	0, 0, 1

Control Supervisor Object Class (41), Instance Attributes (1), Cont'd

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
9 0x09	Read	Get_Attribute_Single	1 = Ready or Enabled or Stopping 0 = Other state	0, 0, 1
10 0x0A	Faulted	Get_Attribute_Single	1 = Fault Occurred (latched) 0 = No Faults present	0, 0, 1
11 0x0B	Warning	Get_Attribute_Single	1 = Warning (not latched) 0 = No Warnings present (If warnings are not supported, this attribute should always be 0)	0, 0, 1
12 0x0C	FaultRst	Get_Attribute_Single, Set_Attribute_Single	0-1 = Fault Reset 0 = No action	0, 0, 1
13 0x0D	FaultCode	Get_Attribute_Single	If in Faulted state, FaultCode indicates the Fault that caused the transition to Faulted state. If multiple faults occurred simultaneously, the vendor chooses which to report, and the rest are lost. If not in Faulted state, FaultCode indi-dates the fault that caused the last transition to the Faulted state. Power-up state of fault code is vendor specific. Fault codes for drives are different that fault codes for starters. See appropriate device profile for fault codes.	0, 0, 77
14 0x0E	Warning Code	Get_Attribute_Single	Code word indicating warning present. If multi-ple warnings are present, the lowest code value is displayed. Note that fault codes for drives and servos are different than fault codes for starters. See appropriate device profile for fault codes.	0, 0, 77
15 0x0F	CtrlFromNet	Get_Attribute_Single	Status of Run/Stop control source. 0 = Control is local 1 = Control is from network	0, 0, 1
16 0x010	DNFaultMode	Get_Attribute_Single, Set_Attribute_Single	Action on loss of DeviceNet 0 = Fault + Stop 1 - Ignore (Warning Optional) 2 = Lock ACM (Lockable ACM only) 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.	0, 0, 1
100 0x64	ControlVoltage	Get_Attribute_Single	Volts RMS	0, 0, 225
101 0x65	Local Signals	Get_Attribute_Single	Indicates the status of the P and 3 inputs on the starter; Bit1 = P Signal, Bit2 = 3 Signal	0, 0, 7
102 0x66	Hertz	Get_Attribute_Single	Indicates the frequenecy of the control power to the starter	0, 0, 255
103 0x67	Lock Command	Get_Attribute_Single, Set_Attribute_Single	Indicates if a Lockable ACM was commanded to Lock/Unlock	0, 0, 1
104 0x68	Lock Enabled	Get_Attribute_Single	Indicates if the Lockable ACM is Locked/Unlocked	0, 0, 1
105 0x69	Hand	Get_Attribute_Single	Indicates if the Lockable ACM is in Hand mode	0, 0, 1

Control Supervisor Object Class (41), Instance Attributes (1), Cont'd

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
106 0x6A	Off	Get_Attribute_Single	Indicates if the Lockable ACM is in Off mode	0, 0, 1
107 0x6B	Remote	Get_Attribute_Single	Indicates if the Lockable ACM is in Remote Mode	0, 0, 1
108 0x6C	Manual Override	Get_Attribute_Single	Indicates if the Lockable ACM is in Manual Override Mode	0, 0, 1

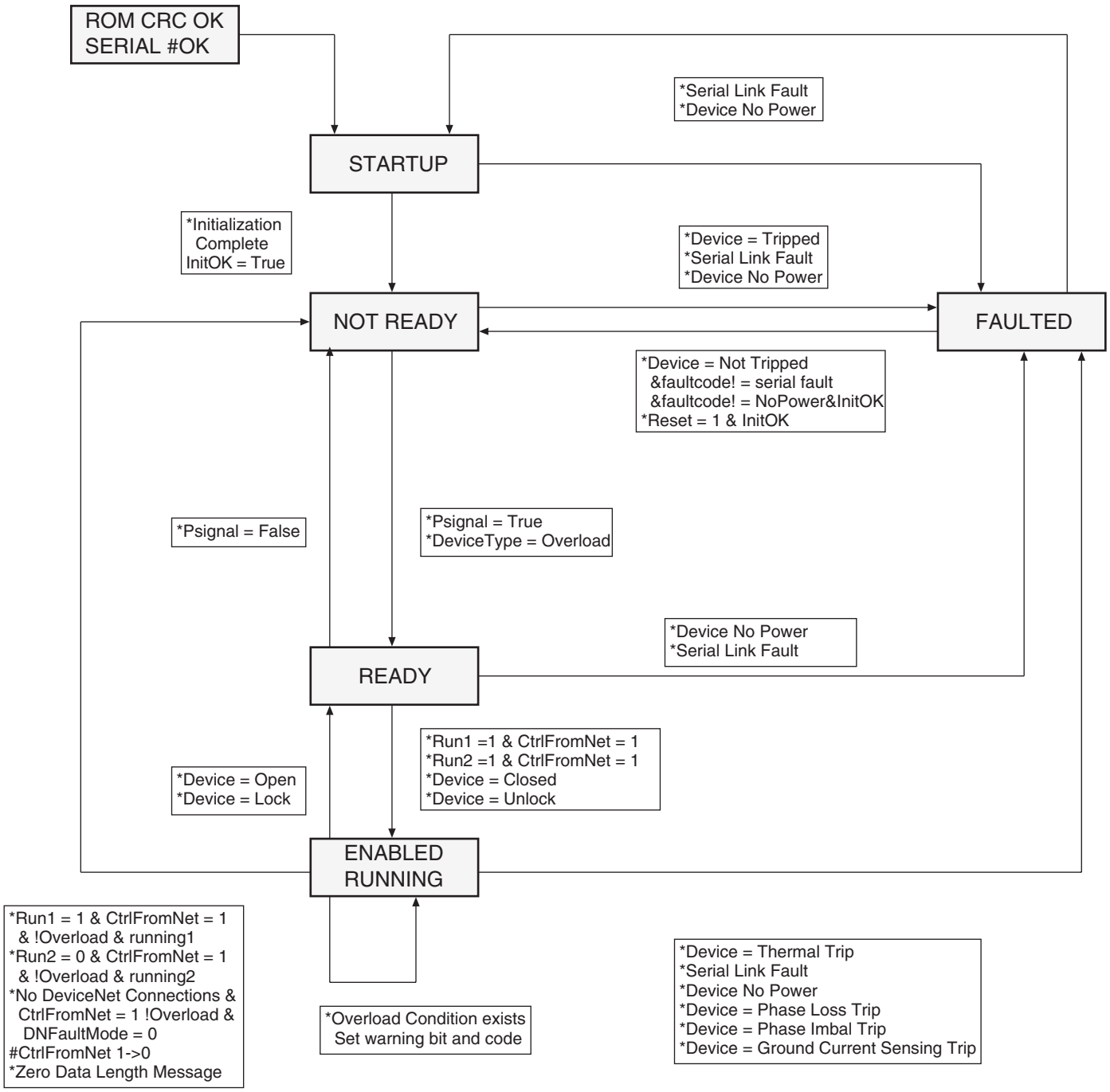
Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0Ehex	No	Yes	Get_Attribute_Single
10hex	No	Yes	Set_Attribute_Single
47hex	Yes	No	Get_Member

BEHAVIOR

State Transition Diagram

The following Status Transition Diagram provides a graphical description of the states and state transitions that are reflected in attribute 6.



Run/Stop Event Matrix

If attribute 15 CtrlFromNet is equal to 1, the events run and Stop are triggered by a combination of the Run1 and Run2 attributes as shown in the following table.

Run1	Run2	Trigger Event	Run Type ATL	Run Type F/R	Run Type F/S
0	0	Stop	N/A	N/A	N/A
1	0	Run	Run1	Run/Fwd	RunSlow
0	1	Run	N/A	Run/Rev	RunFast
1	1	No Change	N/A	N/A	N/A

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0A	Yes	No	Get_Member
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

OVERLOAD OBJECT

Overload Object Class (44), Class Attributes (0)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
1 0x01	Revision	Get_Attribute_Single	Revision of this object. NOTE: All class definitions are required to include this attribute. If the value is 01, then this attribute is optional in implementation. Otherwise, this attribute is required.	1, 1, 1
2 0x02	Max Instance	Get_Attribute_Single	Maximum instance number of an object currently created in this class level of the device	1, 1, 1
176 0xB0	Class Name	Get_Attribute_Single		“Overload”, 'Overload”, “Overload”
180 0xB4	Class Attribute List	CH_Get_Member	Each element describes a class attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	{0x08, {0x01, 0x02, 0x03, 0x04, 0x05, 0x29, 0x2C, 0x08}} {0x08, {0x01, 0x02, 0x03, 0x04, 0x05, 0x29, 0x2C, 0x08}} {0x08, {0x01, 0x02, 0x03, 0x04, 0x05, 0x29, 0x2C, 0x08}}
186 0xBA	Instance Attribute List		Each element describes an instance attribute. The Array’s elements are structs as described in the semantics section. Invididual elements are accessed using the Get Member service	N/A, N/A, N/A

Overload Object Class (44), Instance Attributes (1)

Attribute Number	Attribute Name	Services	Description	Default, Minimum, Maximum Value
3 0x03	TripFLCSet	Get_Attribute_Single	Overload Full Load Current Setting Units: 100ma / 2CurrentScale where CurrentScale is attribute 12	0, -32768, 32767
4 0x04	Trip Class	Get_Attribute_Single	Trip Class Setting 0 to 200	10, 0, 201
5 0x05	AvgCurrent	Get_Attribute_Single	Average of the three phase current. Units: 100ma / 2CurrentScale where CurrentScale is attribute 12	0, 0, 32767
6 0x06	%PhImbal	Get_Attribute_Single	% Phase Imbalance	0, 0, 100
7 0x07	% Thermal Capacity	Get_Attribute_Single	% Thermal Capacity	0, 0, 100
8 0x08	CurrentL1	Get_Attribute_Single	Actual motor phase current L1 Units: 100ma / 2CurrentScale where Current/Scale is attribute 12	0, 0, 32767
9 0x09	CurrentL2	Get_Attribute_Single	Actual motor phase current L2 Units: 100ma / 2CurrentScale where Current/Scale is attribute 12	0, 0, 32767
10 0x0A	CurrentL3	Get_Attribute_Single	Actual motor phase current L3 Units: 100ma / 2CurrentScale where Current/Scale is attribute 12	0, 0, 32767
12 0x0C	CurrentScale	Get_Attribute_Single	Current scaling factor. Scaling is accomplished as follows: Scaled Current = (Attribute 8 * 100ma)/2 $^{\text{Current Scale}}$ Size 1/L = 9 Size 1/2 = 6 Size 3/4 = 0 Size 5/6 = 0	0, 0, 127
100 0x64	AutoManual Reset	Get_Attribute_Single	0 = Manual Reset 1 = Auto Reset	0, 0, 1
101 0x65	Phase Imbalance Enable	Get_Attribute_Single	0 = Disable 1 = Enable	0, 0, 1
102 0x66	Phase Loss Enable	Get_Attribute_Single	0 = Disable 1 = Enable	0, 0, 1
103 0x67	Ground Current Sensing Enable	Get_Attribute_Single	0 = Disable 1 = Enable	0, 0, 1
104 0x68	Thermal Enable	Get_Attribute_Single	0 = Disable 1 = Enable	0, 0, 1

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single

Vendor Specific Services

Service Code	Implemented for:		Service Name
	Class	Instance	
47hex	Yes	No	CH_Get_Member

APPENDIX B

Fault Codes and Warning Codes	
No Fault	0
Thermal Overload	21
Phase Loss	22
Phase Imbalance	26
Ground Current-Sensing Fault	27
Memory Fault	62
Hardware Link Fault	63
No Device Power	64
Invalid Device Version	65
Miscellaneous Device Trip	70
Incomplete Sequence	77

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