Intelligent Technologies

DeviceNet Starter Network Adapter Product (D77B-DSNAP)

Installation and User Manual
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Cover Photo: IT. D77B-DSNAP
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Product Overview

Description

Cutler-Hammer Intelligent Technologies (IT) D77B-DSNAP (DeviceNet Starter Network Adapter Product) by Eaton Corporation is the result of a substantive engineering and marketing effort, involving extensive customer input. This product has greatly increased functionality of the IT Electromechanical Starter with the addition of enhanced features. This front-mount device is a single DeviceNet node providing control and monitoring of an IT Electromechanical Starter application.

The D77B-DSNAP provides a communication interface to the following IT Electromechanical Starters.

Table 1: D77B-DSNAP Electromechanical Starter Connectivity Table

<table>
<thead>
<tr>
<th>IEC E101, FVNR E501, FVR</th>
<th>NEMA N101, FVNR N501, FVR</th>
<th>Frame Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>00</td>
<td>45 mm</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>54 mm</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>76 mm</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>105 mm</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>140 mm</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: D77B-DSNAP S751 Connectivity Table

<table>
<thead>
<tr>
<th>S751 Soft Start</th>
<th>All</th>
</tr>
</thead>
</table>

This manual specifically addresses the DeviceNet Starter Network Adapter Product (D77B-DSNAP). The D77B-DSNAP provides connectivity to DeviceNet supporting Group 2 slave, I/O poll and explicit messaging.

For further information on the IT family of devices, visit our Web site at: www.cutler-hammer.eaton.com/it

Notice

The D77B-DSNAP can only be applied with the IT family of starters.
Features and Benefits

The IT. D77B-DSNAP includes the following significant features:

- Communication to DeviceNet consuming one DeviceNet MAC ID
- Control of non-reversing and reversing IT. Starters and S751 Soft Start
- Monitoring of non-reversing and reversing IT. Starters and S751 Soft Start
- Easy direct mounting to the front of IT. Starters and S751 Soft Start
- Optional ground fault detector
- No special software application required for normal setup. MAC ID and baud rate are set with DIP switches
- Warning levels that are user-settable
Safety

The following safety statements relate to the installation, setup and operation of the Eaton’s Cutler-Hammer IT. D77B-DSNAP and Starter.

Notice

Make sure you read and understand the installation procedures in this manual before you attempt to set up or operate the equipment.

⚠️ WARNING

This instruction manual should be used for proper installation, setup and operation of the IT. D77B-DSNAP. Improperly installing and maintaining this product can result in serious personal injury or property damage. Before attempting installation, setup or operation, read and understand this entire manual.

⚠️ WARNING

Hazardous voltage can cause electric shock and burns. Always disconnect power before proceeding with any work on this product.

⚠️ WARNING

Only apply 24V DC to the Terminal Adapter power terminals. Use of any other voltage may result in personal injury, property damage and damage to the IT. D77B-DSNAP.

⚠️ WARNING

To provide continued protection against fire or shock hazard, the complete IT. D77B-DSNAP must be replaced if it becomes inoperative.

Environmental Ratings

The following environmental ratings apply to the D77B-DSNAP.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation/</td>
<td>Temperature</td>
<td>-50°C to 80°C [-58°F to 176°F]</td>
</tr>
<tr>
<td>Storage</td>
<td>Humidity</td>
<td>5 – 95% non-condensing</td>
</tr>
<tr>
<td>Operating</td>
<td>Temperature</td>
<td>0°C to 60°C [32°F to 140°F]</td>
</tr>
<tr>
<td></td>
<td>Humidity</td>
<td>5 – 95% non-condensing</td>
</tr>
<tr>
<td></td>
<td>Altitude</td>
<td>Above 2000 meters [6600 feet] consult factory</td>
</tr>
<tr>
<td></td>
<td>Shock (IEC 68-2-27)</td>
<td>15G in any direction for 11 milliseconds</td>
</tr>
<tr>
<td></td>
<td>Vibration (IEC 68-2-6)</td>
<td>5 – 150 Hz, 5G, 0.7 mm maximum peak-to-peak</td>
</tr>
</tbody>
</table>
Intelligent Technologies (IT) D77B-DSNAP

Approvals/Certifications

The following approvals and certifications apply to the D77B-DSNAP.

Table 4: Approvals/Certifications

<table>
<thead>
<tr>
<th>Standard</th>
<th>Approval/Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency Certifications</td>
<td>UL 508</td>
</tr>
<tr>
<td></td>
<td>CE (Low Voltage Directive)</td>
</tr>
<tr>
<td></td>
<td>CSA C22.2 No. 14</td>
</tr>
<tr>
<td></td>
<td>ODVA Group 2 slave no UCMM</td>
</tr>
<tr>
<td>Radiated and Conducted Emissions</td>
<td>EN 5011 Class A</td>
</tr>
<tr>
<td><strong>Electrical/EMC</strong></td>
<td></td>
</tr>
<tr>
<td>ESD Immunity (IEC 61000-4-2)</td>
<td>±8 kV air, ±4 kV contact</td>
</tr>
<tr>
<td>Radiated Immunity (IEC 61000-4-3)</td>
<td>10 V/m 80 – 1000 MHz, 80% amplitude modulation @ 1 kHz</td>
</tr>
<tr>
<td>Fast Transient (IEC 61000-4-4)</td>
<td>±2 kV supply and control</td>
</tr>
<tr>
<td></td>
<td>±1 kV communications</td>
</tr>
<tr>
<td>Surge (IEC 61000-4-5)</td>
<td>±1 kV line-to-line</td>
</tr>
<tr>
<td></td>
<td>±2 kV line-to-ground</td>
</tr>
<tr>
<td>RF Conducted (IEC 61000-4-6)</td>
<td>10V, 0.15 – 80 MHz</td>
</tr>
<tr>
<td>Magnetic Field (IEC 61000-4-8)</td>
<td>30 A/m, 50 Hz</td>
</tr>
<tr>
<td>Voltage Dips (IEC 61000-4-11)</td>
<td>30% dip @ 10 ms</td>
</tr>
<tr>
<td></td>
<td>60% dip @ 100 ms</td>
</tr>
<tr>
<td></td>
<td>&gt;95% interrupt @ 5 ms</td>
</tr>
<tr>
<td>Protection Degree (IEC 60947-1)</td>
<td>IP20</td>
</tr>
</tbody>
</table>

Catalog Numbering System

The D77B-DSNAP can be ordered as an assembly or as individual components. The assembly includes all components for normal operation.

Table 5: Catalog Numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNAP Jumper to terminal adapter</td>
<td>D77B-RJJ1</td>
</tr>
<tr>
<td>D77B-DSNAP Assembly of terminal adapter, jumper and D77B-DSNAP</td>
<td>D77B-DSNAP-X1</td>
</tr>
<tr>
<td>D77B-DSNAP Assembly of terminal adapter, jumper, D77B-DSNAP and second contactor sensor</td>
<td>D77B-DSNAP-X2</td>
</tr>
<tr>
<td>DeviceNet Start Network Adapter Product</td>
<td>D77B-DSNAP</td>
</tr>
<tr>
<td>SNAP Terminal Adapter for FVR and FVNR starters and S751 Soft Start</td>
<td>D77B-TC8</td>
</tr>
<tr>
<td>Second contactor sensor for FVR starters and contactors</td>
<td>D77B-A2</td>
</tr>
<tr>
<td>Ground Fault Detector for 45 mm and 54 mm frame starters</td>
<td>D77B-GF1</td>
</tr>
<tr>
<td>Ground Fault Detector for 76 mm and 105 mm starters</td>
<td>D77B-GF2</td>
</tr>
<tr>
<td>Ground Fault Detector for 140 mm starters</td>
<td>D77B-GF3</td>
</tr>
</tbody>
</table>
Physical Features

Physical Description

Figure 1 illustrates the front and back of the IT D77B-DSNAP and its various features.

Dimensions

Figure 2 illustrates the dimensions of the IT D77B-DSNAP.
Power Source

The IT. D77B-DSNAP is designed for use with 24V DC power. The D77B-DSNAP uses power from two sources, the DeviceNet subnet and the Eaton’s Cutler-Hammer IT. Starter. This allows the D77B-DSNAP to indicate to the user that the IT. Starter does not have 24V DC power, signaling a fault or an E-Stop.

Power for DeviceNet communication CPU comes from DeviceNet, as illustrated in Table 6. Some power is required from the starter for communication to be present between the IT. Starters and the D77B-DSNAP.

The power for the IT. Starter must be connected to the Starter Terminal Adapter.

**Table 6: Power Requirements**

<table>
<thead>
<tr>
<th>Current Source</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeviceNet</td>
<td>90 mA</td>
</tr>
<tr>
<td>IT. Starter</td>
<td>Less than 1 mA</td>
</tr>
</tbody>
</table>

When a power supply is chosen for the starter(s), size it for the load of the starter(s) and the D77B-DSNAP using the appropriate IT. contactor and starter user manual.

The power for Eaton’s Cutler-Hammer IT. Starter must be connected to the IT. Starter terminal, as illustrated in Figure 3.

![Figure 3: Starter Terminal Adapter Connection](image)

**CAUTION**

Only apply 24V DC to the D77B-DSNAP. Use of any other voltage may result in personal injury, property damage and damage to the D77B-DSNAP.
Installation

Mount the D77B-DSNAP to the Starter

The IT. D77B-DSNAP is designed to be installed in the auxiliary contact locations of the IT. family of starters. On all starters, one or more auxiliaries can be used along with the D77B-DSNAP. The following table lists starters and indicates the number of available auxiliary locations for each.

Table 7: Starter Size/Available Auxiliary Locations on Mounted D77B-DSNAP

<table>
<thead>
<tr>
<th>Starter Frame Size (mm)</th>
<th>Number of Available Auxiliary Locations with Center Mounted D77B-DSNAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>1 single Auxiliary</td>
</tr>
<tr>
<td>54</td>
<td>1 single or 1 dual Auxiliary</td>
</tr>
<tr>
<td>76</td>
<td>2 single or 2 dual Auxiliary</td>
</tr>
<tr>
<td>105</td>
<td>2 single or 2 dual Auxiliary</td>
</tr>
<tr>
<td>140</td>
<td>2 single or 2 dual Auxiliary</td>
</tr>
</tbody>
</table>
Use the following steps and illustration in Figure 4 to mount the D77B-DSNAP:

1. Align and insert both the D77B-DSNAP feet into the auxiliary starter contact mounting slots on the starter, as illustrated in Figure 4.

**Recommendation:** Use the middle auxiliary contact mounting slot on the starter contact block when mounting the D77B-DSNAP.

2. Slide the D77B-DSNAP down until a “click” is heard. This ensures that the D77B-DSNAP is mounted securely to the starter.

![Figure 4: D77B-DSNAP Alignment and Mounting](image)

Use the following steps and illustration in Figure 5 to remove the D77B-DSNAP:

1. Press the push tab protruding from the D77B-DSNAP front, Figure 1 on Page 5.
2. Slide the D77B-DSNAP up.
3. Pull the D77B-DSNAP away from the starter contact block.

![Figure 5: D77B-DSNAP Removal](image)
Connect the Starter Terminal Adapter to the Starter

Loosen the screws on the removable terminal block of the starter and insert the Starter Terminal Adapter into the removable terminal block. Tighten the screws on the terminal block (4.5 in-lb or 0.5 Nm) securing the Starter Terminal Adapter into the removable terminal block. Install the removable terminal block into the starter.

![Figure 6: Connecting Starter Terminal Adapter](image)

Insert one end of the Starter Adapter Jumper (Catalog Number D77B-RJJ1) into J1 on the Starter Terminal Adapter and the other end into or on the D77B-DSNAP.

![Figure 7: Jumper Installation](image)
Connect the D77B-DSNAP to DeviceNet

Connect the DeviceNet cable to the 5-position DeviceNet Connector located at the top of the D77B-DSNAP.

- The 5-position DeviceNet Connector has screws for positive retention that need to be loosened to remove the terminal block.
- The D77B-DSNAP will work with thick and thin media.
- The DeviceNet cable is color-coded and matches the colors on the DeviceNet connector.
- Use only one wire per terminal.
- Tighten the screws to 0.5 Nm (4.5 lb-in).

For further information on DeviceNet wiring practices and power considerations, refer to the *DeviceNet Installation Planning Guide*, Publication Number SA-370.

**Table 8: DeviceNet Connection**

<table>
<thead>
<tr>
<th>Connector Legend</th>
<th>DeviceNet Wire</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>V+</td>
<td>Red</td>
<td>+24V DC</td>
</tr>
<tr>
<td>CH</td>
<td>White</td>
<td>CAN High</td>
</tr>
<tr>
<td>D</td>
<td>Shield</td>
<td>Shield</td>
</tr>
<tr>
<td>CL</td>
<td>Blue</td>
<td>CAN Low</td>
</tr>
<tr>
<td>V-</td>
<td>Black</td>
<td>Signal Common</td>
</tr>
</tbody>
</table>
Set the DeviceNet MAC ID and Baud Rate

The MAC ID and baud can only be set using the DIP switches on the front of the D77B-DSNAP. A software tool (such as CH Studio) can view the settings for the D77B-DSNAP MAC ID and baud rate, but cannot be used to modify them.

Refer to the following instructions, figure and table when setting the MAC ID and baud rate.

- Moving a DIP switch to the right is ON and moving the switch to the left is OFF. The MAC ID is in binary with the major units numbered to the right of the switch on the side label. Adding up the major units set to ON determines the MAC ID of the D77B-DSNAP.

**Example:** To set the MAC ID to 25, start from the top (or 32) and set the switches to OFF, ON, OFF, OFF, ON (16+8+1=25).

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

Most significant bit to be at top or left end of switch block.

---

**Figure 8: DIP Switch Setting Example**

**Table 9: Baud Rate Configuration Switches**

<table>
<thead>
<tr>
<th>B1</th>
<th>B0</th>
<th>Baud</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>125K</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>250K</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>500K</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>
Operation

This section provides details about the following features and functions of D77B-DSNAP operation:

- “Out of box” operation
- Quick Start
- Typical application
- Enhanced features
- DeviceNet input/output assemblies
- DeviceNet Status LED
- Functional Description

“Out of Box” Operation

**Note:** Before applying power to the D77B-DSNAP for the first time, make sure it is properly mounted on the starter and that all connections are made (DeviceNet, terminal adapter and auxiliary connector).

When the D77B-DSNAP is properly installed, and has a properly set baud and MAC ID, per the “Installation” section on Page 11, the following tables in the Quick Start section indicate the information to expect for I/O assemblies on DeviceNet.

Quick Start

This part of the section provides the information necessary to install and operate the D77B-DSNAP on a Full Voltage Non-reversing (FVNR) \textit{IT.} Starter, Full Voltage Reversing (FVR) \textit{IT.} Starter and an S751 Soft Start motor controller. Detailed information is available in Appendix A for setup of enhanced parameters and extended Input and Output data (assemblies).

**FVNR Motor Controller**

First, follow the instructions on how to mount the D77B-DSNAP as outlined in Mount the D77B-DSNAP to the Starter on Page 7.

Second, follow the instruction on how to connect the Starter Terminal Adapter to the starter as outlined in Connect the Starter Terminal Adapter to the Starter on Page 9.
Third, follow the instructions on how to set the MAC ID and Baud Rate as outlined in Set the DeviceNet MAC ID and Baud Rate on Page 11.

Fourth, follow the instructions on how to wire the D77B-DSNAP to DeviceNet as outlined in Connect the D77B-DSNAP to DeviceNet on Page 10.

The D77B-DSNAP will auto configure to the FVNR IT. Starter when the D77B-DSNAP and the IT. Starter are first powered (together). After the auto configuration is complete, the D77B-DSNAP is “married” to that specific size, type and overload range of IT. Starter. Any attempt to install an already “married” D77B-DSNAP onto another IT. Starter without first performing a reset (Appendix A, Page 30) will result in the D77B-DSNAP entering a recoverable fault state (flashing red MS/NS LED); the D77B-DSNAP will not operate the IT. Starter.

**Default Input Assembly**

The out of box input assembly (data mapped to the input registers within the system controller) is the following:

**Table 10: Input Assembly for Non-reversing Starter (E101, N101)**

| Assembly 105 (0x69) – Input (Producing) – D77B-DSNAP Abbreviated Motor Starter 1 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **Byte**        | **Bit 7**       | **Bit 6**       | **Bit 5**       | **Bit 4**       | **Bit 3**       | **Bit 2**       | **Bit 1**       | **Bit 0**       |
| 0               | At Reference    | Reserved        | CtrlFrom Net    | Ready           | Reserved        | Running1        | Warning         | Fault           |
| 1               | % Thermal Capacity |
| 2               | % FLA           |
| 3               | Fault Code (Low byte only) |
Default Output Assembly

The out of box output assembly (data mapped to the output registers within the system controller) is the following:

**Table 11: Output Assembly for Non-reversing Starter (E101, N101) and S751 Soft Start**

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>FaultReset</td>
<td>Reserved</td>
<td>Run1</td>
</tr>
</tbody>
</table>

**FVR Motor Controller**

First, follow the instructions on how to mount the D77B-DSNAP as outlined in Mount the D77B-DNSAP to the Starter on Page 7.

**Note:** The 45 mm and 54 mm frame IT. Starters will require the user to depress the cross over cover locking tab while installing the D77B-DNSAP. Simply depress the tab while inserting the D77B-DSNAP feet into the slot on the IT. Starter to ease installation.

Second, follow the instruction on how to connect the Starter Terminal Adapter to the starter as outlined in Connect the Starter Terminal Adapter to the Starter on Page 9.

Third, the secondary contactor sensor (D77B-A2) needs to be installed. Install the secondary contactor sensor on the second contactor just as you would install an auxiliary (align the feet and slide towards the bottom). Using a screwdriver, pry up the connector access breakout (Figure 1, Page 5) and remove the breakout. Insert the green connector that is connected via a wire to the second contactor sensor into the breakout making sure to take notice of the alignment tabs for proper orientation.

![Figure 10: D77B-DSNAP-X2 on FVR IT. Starter](image)
Fourth, follow the instructions on how to set the MAC ID and Baud Rate as outlined in **Set the DeviceNet MAC ID and Baud Rate** on Page 11.

Fifth, follow the instructions on how to wire the D77B-DSNAP to DeviceNet as outlined in **Connect the D77B-DSNAP to DeviceNet** on Page 10.

The D77B-DSNAP will auto configure to the FVR *IT*. Starter when the D77B-DSNAP and the *IT*. Starter are first powered (together). It is important that the second contactor sensor is installed on the second contactor and that the green connector is installed into the breakout. If this is not performed, the auto configuration will set the D77B-DSNAP up for an FRNR *IT*. Starter. After the auto configuration is complete, the D77B-DSNAP is “married” to that specific size, type and overload range of *IT*. Starter. Any attempt to install an already “married” D77B-DSNAP onto another *IT*. Starter without first performing a reset (Appendix A, Page 30) will result in the D77B-DSNAP entering a recoverable fault state (flashing red MS/NS LED); the D77B-DSNAP will not operate the *IT*. Starter.

**Default Input Assembly**

The out of box input assembly (data mapped to the input registers within the system controller) is the following:

<table>
<thead>
<tr>
<th>Assembly 106 (0x6A) – Input (Producing) – D77B-DSNAP Abbreviated Motor Starter 2</th>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFrom Net</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warning</td>
<td>Fault</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Fault Code (Low byte only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Default Output Assembly**

The out of box output assembly (data mapped to the output registers within the system controller) is the following:

<table>
<thead>
<tr>
<th>Instance 5: Extended Motor Starter</th>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>FaultReset</td>
<td>Run2</td>
<td>Run1</td>
</tr>
</tbody>
</table>

**S751 Motor Controller**

First, follow the instructions on how to mount the D77B-DSNAP as outlined in **Mount the D77B-DNSAP to the Starter** on Page 7 (mounts in the same position as an FVNR starter).

Second, follow the instruction on how to connect the Starter Terminal Adapter to the starter as outlined in **Connect the Starter Terminal Adapter to the Starter** on Page 9.
Third, follow the instructions on how to set the MAC ID and Baud Rate as outlined in **Set the DeviceNet MAC ID and Baud Rate** on **Page 11**.

Fourth, follow the instructions on how to wire the D77B-DSNAP to DeviceNet as outlined in **Connect the D77B-DSNAP to DeviceNet** on **Page 10**.

The D77B-DSNAP will auto configure to the S751 Starter when the D77B-DSNAP and the **IT.** Starter are first powered (together). After the auto configuration is complete, the D77B-DSNAP is “married” to that specific size, and overload range of S751. Any attempt to install an already “married” D77B-DSNAP onto another S751 without first performing a reset (Appendix, **Page 30**) will result in the D77B-DSNAP entering a recoverable fault state (flashing red MS/NS LED); the D77B-DSNAP will not operate the **IT.** Starter.

**Default Input Assembly**

The out of box input assembly (data mapped to the input registers within the system controller) is the following:

**Table 14: Input Assembly for S751 Soft Start**

<table>
<thead>
<tr>
<th>Assembly 105 (0x69) – Input (Producing) – D77B-DSNAP Abbreviated Motor Starter 1</th>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CtrlFrom Net</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ready</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault Code (Low byte only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Default Output Assembly

The out of box output assembly (data mapped to the output registers within the system controller) is the following:

Table 15: Output Assembly for S751 Soft Start

<table>
<thead>
<tr>
<th>Instance 5: Extended Motor Starter</th>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>FaultReset</td>
<td>Run2</td>
<td>Run1</td>
<td></td>
</tr>
</tbody>
</table>

Safe State Behavior

The safe state behavior of the D77B-DSNAP is factory set to Fault and Stop. Refer to Page 35, Table 33 Control Supervisor Object (0x29) Instance 0x01 (16 Dec.) for more information. Safe State is defined as the state in which the D77B-DSNAP will place the motor controller when a communication loss is detected. The D77B-DSNAP will be in a safe state when the unit is powered but does not have a valid I/O connection established.

WARNING

If the Safe State value is set to Run1 or Run2, any time the D77B-DSNAP is powered and does not have a valid I/O connection, the motor controller will be commanded to the Safe State value. This includes first powering up the DeviceNet system (D77B-DSNAP) and not having the controller on-line.

Input and Output Assemblies

An I/O assembly is an ordered collection of data that the system controller exchanges with the D77B-DSNAP for monitoring and control. The input assembly is the data that is sent from the D77B-DSNAP to the system controller for monitoring of the D77B-DSNAP. The output assembly is the data that is sent from the system controller to the D77B-DSNAP for control of the D77B-DSNAP.

The D77B-DSNAP offers a variety of input and output assemblies, as indicated in the following table. The tables in this part of the section provide data definitions and details on these assemblies.

Table 16: Allowable DeviceNet I/O Assemblies

<table>
<thead>
<tr>
<th>Motor Controller</th>
<th>Allowable Input Assemblies</th>
<th>Allowable Output Assemblies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-reversing (E101, N101)</td>
<td>52, 53, 102, 105*, 108, 114</td>
<td>3*</td>
</tr>
<tr>
<td>Reversing (E501, N501)</td>
<td>52, 53, 54, 102, 103, 105, 105*, 108, 109, 114</td>
<td>5*</td>
</tr>
<tr>
<td>Soft Start (S751)</td>
<td>52, 53, 60, 102, 105*, 108, 114</td>
<td>3*</td>
</tr>
</tbody>
</table>

* Indicates the default

Use a DeviceNet configuration tool to select the assemblies of the D77B-DSNAP. The CH Studio configuration tool provides the means to configure the assemblies quickly and easily, as described in the “Configuration” section of this manual. When using a generic DeviceNet tool, use the tables within this section to set up the assemblies. An EDS is available on Eaton’s Cutler-Hammer Web site (www.cutler-hammer.eaton.com/it).

Refer to Appendix A on Page 39 for all input and output assembly information.
**Input Assembly Data Definition**

Use the following tables when setting up the D77B-DSNAP input assemblies.

**Table 17: Input Assembly Data Definitions**

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault/Trip</td>
<td>The motor controller is faulted or tripped</td>
</tr>
<tr>
<td>Warning</td>
<td>The motor controller has a warning of an impending trip</td>
</tr>
<tr>
<td>Running 1</td>
<td>Primary contactor is being commanded to run</td>
</tr>
<tr>
<td>Running 2</td>
<td>Secondary contactor is being commanded to run</td>
</tr>
<tr>
<td>Ready</td>
<td>The motor controller is configured and communicating with starter</td>
</tr>
<tr>
<td>CtrlFrom Net</td>
<td>The motor controller is controlled from DeviceNet</td>
</tr>
<tr>
<td>At Reference</td>
<td>This states that the motor controller is in the state that it is commanded to be in, or that the S751 is in bypass. For FVR applications, a D77B-AC2 is required for this bit to be active while in reverse.</td>
</tr>
<tr>
<td>% Thermal Capacity</td>
<td>% thermal capacity of the motor from 0 to 100%</td>
</tr>
<tr>
<td>Average Current</td>
<td>Average RMS current of the motor</td>
</tr>
<tr>
<td>% FLA</td>
<td>The ratio of the running current divided by the FLA setting on the overload</td>
</tr>
<tr>
<td>Fault Codes and</td>
<td>Code for the fault of the motor controller. Valid fault and warning codes are:</td>
</tr>
</tbody>
</table>
| Warning Codes      | 0 = No Fault  
|                    | 10 = Test  
|                    | 20 = Current Trip  
|                    | 21 = Thermal Overload  
|                    | 22 = Phase Loss  
|                    | 26 = Phase Imbalance  
|                    | 27 = Ground Fault  
|                    | 41 = Control Undervoltage  
|                    | 62 = Memory Fault  
|                    | 63 = Hardware Link Fault (Not Communicating with Starter)  
|                    | 64 = No Device Power  
|                    | 71 = Fail to Close Primary Contactor  
|                    | 72 = Fail to Open Primary Contactor  
|                    | 101 = Invalid Attached Device Version  
|                    | 102 = SCR Over Temperature  
|                    | 103 = Watchdog  
|                    | 104 = SNAP Protocol Failure to Connect  
|                    | 105 = SNAP Protocol Fault  
|                    | 106 = Temperature Sensor Fault  
|                    | 171 = Fail to Close Second Contactor  
|                    | 172 = Fail to Open Second Contactor  
|                    | 173 = Invalid Action Attempted                                                                                                             |

**Output Assembly Data Definition**

Use the following table when setting up the D77B-DSNAP output assemblies.

**Table 18: Output Assembly Data Definitions**

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run 1</td>
<td>Energize the primary contactor/Soft Starter</td>
</tr>
<tr>
<td>Run 2</td>
<td>Energize the secondary contactor</td>
</tr>
<tr>
<td>Fault Reset</td>
<td>Reset the fault</td>
</tr>
</tbody>
</table>
Typical Application

The following figure illustrates a typical D77B-DSNAP application, where a single D77B-DSNAP is connected to a single motor controller and where the motor controllers are distributed throughout the DeviceNet subnet. The subnet is then being controlled by a PC or PLC, which scans the D77B-DSNAP for control and monitoring information.

Figure 12: Typical D77B-DSNAP Application

**Note:** Such an application typically has more devices on DeviceNet than are shown in this illustration, such as drives, I/O and user interface units.

Features

Table 19: Standard Protective Features

<table>
<thead>
<tr>
<th>Trip</th>
<th>Definition</th>
</tr>
</thead>
</table>
| Phase Current Unbalance/Phase Loss | A phase current unbalance trip will occur if one or two of the line currents are 40 – 60% or less of the remaining line(s) for longer than 10 seconds.  
A phase loss trip will occur with a load current of at least 75% of the minimum FLA if one of the two input line voltages is lost, with the line current going to zero for longer than 10 seconds. |
| Thermal Overload            | While the motor is running and depending on the FLA and trip class settings, when the FLA is exceeded for a period of time (depending on the trip class setting), a thermal overload trip will occur. For more information on this feature, see the *Contactor and Starter User Manual* (Publication No. 49400). |

**Note:** The threshold values for Thermal Overload and Phase Current Unbalance can not be modified.
Table 20: Enhanced Features

<table>
<thead>
<tr>
<th>Fault</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Fault</td>
<td>With the addition of a Ground Fault module, the D77B-DSNAP will trip when the module detects a ground fault. The level of the trip is adjusted on the Ground Fault Module. The Ground Fault Module is connected to the D77B-DSNAP through the Auxiliary opening on the front of the D77B-DSNAP.</td>
</tr>
<tr>
<td>Underload Warning</td>
<td>While the motor is running, a warning will be activated when the current falls below a user-settable % of overload's FLA pot setting.</td>
</tr>
<tr>
<td>Current Threshold - Warning</td>
<td>While the motor is running, a warning will be activated when the current rises above a user-settable % of overload's FLA pot setting.</td>
</tr>
<tr>
<td>SCR Over Temperature</td>
<td>To protect the SCRs from premature damage, a temperature sensor monitors the SCR temperature. If the monitored temperature is too high, the S751 will trip on SCR overtemperature.</td>
</tr>
<tr>
<td>Contactor Dropout</td>
<td>The contactor dropped out when it was commanded to be energized.</td>
</tr>
</tbody>
</table>

DeviceNet Status LED

The combined module status/network status (MS/NS) LED is located on the lower right of the D77B-DSNAP as pictured in Figure 1: D77B-DSNAP Features.

The following table describes the state of the MS/NS LED.

Table 21: Combined MS/NS LED

<table>
<thead>
<tr>
<th>State</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-existent</td>
<td>OFF</td>
</tr>
<tr>
<td>Standby</td>
<td>Flashing Green</td>
</tr>
<tr>
<td>Operational</td>
<td>Not connected: Flashing Green</td>
</tr>
<tr>
<td>Operational</td>
<td>Connected: Green</td>
</tr>
<tr>
<td>Recoverable Fault</td>
<td>Flashing Red</td>
</tr>
<tr>
<td>Unrecoverable Fault</td>
<td>Red</td>
</tr>
<tr>
<td>Initializing</td>
<td>Red/Green Flash</td>
</tr>
</tbody>
</table>
## Functional Description

### Table 22: Truth Table

<table>
<thead>
<tr>
<th>Old State</th>
<th>Fieldbus Inputs</th>
<th>Event</th>
<th>New State</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAULTED</td>
<td>– – 1</td>
<td>RESET</td>
<td>OFF</td>
<td>FAULT = 0</td>
</tr>
<tr>
<td>OFF</td>
<td>0 0 –</td>
<td>NONE</td>
<td>OFF</td>
<td>NONE</td>
</tr>
<tr>
<td>OFF</td>
<td>1 0 –</td>
<td>RUN 1</td>
<td>RUNNING 1</td>
<td>RUNNING 1 = 1</td>
</tr>
<tr>
<td>OFF</td>
<td>0 1 –</td>
<td>RUN 2</td>
<td>RUNNING 2</td>
<td>RUNNING 2 = 1</td>
</tr>
<tr>
<td>OFF</td>
<td>1 1 –</td>
<td>RUN 1/RUN 2</td>
<td>OFF</td>
<td>NONE</td>
</tr>
<tr>
<td>RUNNING 1</td>
<td>1 1 –</td>
<td>RUN 2</td>
<td>RUNNING 1</td>
<td>NONE</td>
</tr>
<tr>
<td>RUNNING 2</td>
<td>1 1 –</td>
<td>RUN 1</td>
<td>RUNNING 2</td>
<td>NONE</td>
</tr>
<tr>
<td>RUNNING 1</td>
<td>1 0 –</td>
<td>FAULT</td>
<td>FAULTED</td>
<td>RUNNING 1 = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FAULT = 1</td>
</tr>
<tr>
<td>RUNNING 2</td>
<td>0 1 –</td>
<td>FAULT</td>
<td>FAULTED</td>
<td>RUNNING 2 = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FAULT = 1</td>
</tr>
<tr>
<td>RUNNING 1</td>
<td>1 0 –</td>
<td>WARNING</td>
<td>RUNNING 1</td>
<td>WARNING = 1</td>
</tr>
<tr>
<td>RUNNING 2</td>
<td>0 1 –</td>
<td>WARNING</td>
<td>RUNNING 2</td>
<td>WARNING = 1</td>
</tr>
</tbody>
</table>

- = state not important

1 = state true (energized)

0 = state false (de-energized)

WARNING = any warning in Table 17
Configuration

The only configuration that is necessary for normal operation of the D77B-DSNAP is setting the MAC ID and baud rate, as described in the “Installation” section, Page 11. However, the D77B-DSNAP offers a variety of enhanced features. When these features are required, use the CH Studio software suite or a generic DeviceNet tool to perform the configuration.

This section includes the following configuration procedures, and related instructions and information:

- Using CH Studio
  - View D77B-DSNAP General Properties
  - Configure Enhanced Features
  - Monitor the D77B-DSNAP Status
  - Change the I/O Assemblies
- Using a generic DeviceNet tool

Using CH Studio

The CH Studio software application is designed for programming and configuring industrial automation systems. The application simplifies the monitoring and configuration of entire networks as well as the enhanced features of individual IT. communicating devices within those networks.

CH Studio takes advantage of the Windows graphical interface to present a suite of tools that is easy to learn and efficient to use, while meeting the requirements for developing complex network configurations.

CH Studio performs the following configuration functions for DeviceNet networks:

- Discover network devices
- Display device properties
- Monitor and configure network devices
- Save existing network configurations
- Configure networks off-line
- Configure devices off-line
**General Properties**

The general properties of the D77B-DSNAP are located in the General Tab of the Property Pages for the device. The general properties include the firmware version, serial number, status and much more.
Configuring Enhanced Features

The enhanced features of the D77B-DSNAP are configured using the Property Window and the Property Pages. A complete list of all the features and settable attributes are available in the Property Window.
Monitor the D77B-DSNAP

The running values of the D77B-DSNAP (current, thermal capacity and 24V DC control voltage) can be monitored from the Monitor Tab of the Property Pages. Switching to the Status Tab, all operational status can be monitored.
Change the I/O Assemblies of the D77B-DSNAP

All of the I/O assemblies are viewable and settable from the I/O Info Tab of the Property Pages. The assembly can be changed by simply selecting on the new assembly and pressing Apply in the lower right of the page. After the new assembly is chosen, a representation of the data format and structure for the new I/O assembly is created.
Using a Generic DeviceNet Tool

When configuring the D77B-DSNAP with a DeviceNet management tool other than CH Studio, refer to the tables in Appendix A: Supported DeviceNet Objects for the definitions of individual attributes. In addition, an Electronic Data Sheet (EDS) file is available at the Web site www.cutler-hammer.eaton.com/it for use with tools that can use an EDS file.

Follow these steps to configure a D77B-DSNAP through a generic DeviceNet tool:
1. Search for EDS and download the D77B-DSNAP EDS file from the Cutler-Hammer Web site:
   www.cutler-hammer.eaton.com/it

   Note: There are multiple EDS files for the D77B-DSNAP, depending on whether it is used with an FVR, FVNR or S751 configuration.
2. Open/start the tool.
3. Load the EDS file into the tool.
4. Go on-line and connect to the D77B-DSNAP you wish to configure.
5. Open the EDS for the D77B-DSNAP and edit the attributes. For a full list of attributes and definitions, see Appendix A: Supported DeviceNet Objects.
6. Send the changed attributes to the D77B-DSNAP.
7. Close the tool.

Autoconfiguring the D77B-DSNAP for the Starter

1. Verify the D77B-RJJ1 is installed between J1 on the D77B-DSNAP and J1 on the Starter Terminal Adapter.
2. Connect the “out-of-box” D77B-DSNAP to a powered DeviceNet network.
3. Apply power to the starter terminal adapter, the MS/NS LED should change from blinking red to blinking green.
4. If possible verify that the configuration has occurred by reading the device type from the Identity Object (instance 1 attribute 2)
   0x000C — Configuration has not occurred
   0x0016 — Starter
   0x0017 — S751 Soft Start

   Note: It can take as long as 15 seconds for the autoconfiguration to be performed on an S751 and 7 seconds for an IT Starter.

   Note: The autoconfiguration is a one-time event. To autoconfigure the D77B-DSNAP for another motor controller, an out-of-box reset must be performed. Using a DeviceNet configuration tool, perform a reset to the Identity Object, instance 1 data = 1.
## Troubleshooting and Maintenance

### Renewal Parts

The following table lists the renewal parts for the *IT. D77B-DSNAP*.

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNAP Jumper to terminal adapter</td>
<td>D77B-RJJ1</td>
</tr>
<tr>
<td>D77B-DSNAP Assembly of terminal adapter, jumper and D77B-DSNAP</td>
<td>D77B-DSNAP-X1</td>
</tr>
<tr>
<td>D77B-DSNAP Assembly of terminal adapter, jumper, D77B-DSNAP and second</td>
<td>D77B-DSNAP-X2</td>
</tr>
<tr>
<td>contactor sensor</td>
<td></td>
</tr>
<tr>
<td>DeviceNet Start Network Adapter Product</td>
<td>D77B-DSNAP</td>
</tr>
<tr>
<td>SNAP Terminal Adapter for FVR and FVNR starters and S751 Soft Start</td>
<td>D77B-TC8</td>
</tr>
<tr>
<td>Second contactor sensor for FVR starters and contactors</td>
<td>D77B-A2</td>
</tr>
<tr>
<td>Ground Fault Detector for 45 mm and 54 mm frame starters</td>
<td>D77B-GF1</td>
</tr>
<tr>
<td>Ground Fault Detector for 76 mm and 105 mm starters</td>
<td>D77B-GF2</td>
</tr>
<tr>
<td>Ground Fault Detector for 140 mm starters</td>
<td>D77B-GF3</td>
</tr>
</tbody>
</table>
### Troubleshooting

**Table 24: Troubleshooting**

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS/NS LED flashing red after power-up</td>
<td>D77B-DSNAP is not communicating to the IT. Starter</td>
<td>Check the D77B-RJJ1 jumper between the D77B-DSNAP and the D77B-TC8 terminal adapter. Also check that the terminal adapter is properly secured and plugged into the IT. Starter.</td>
</tr>
<tr>
<td></td>
<td>The D77B-DSNAP was configured or “married” to another IT. Starter</td>
<td>Perform a reset (Appendix A Page 30) to re-marry the D77B-DSNAP to the IT. Starter.</td>
</tr>
<tr>
<td></td>
<td>The D77B-DSNAP is powered but the IT. Starter is not</td>
<td>Power the IT. Starter.</td>
</tr>
<tr>
<td>The MS/NS LED starts flashing green and then turns to a flashing red after power-up</td>
<td>D77B-DSNAP is not communicating to the IT. Starter</td>
<td>Check the D77B-RJJ1 jumper between the D77B-DSNAP and the D77B-TC8 terminal adapter. Also check that the terminal adapter is properly secured and plugged into the IT. Starter.</td>
</tr>
<tr>
<td><strong>IT.</strong> Starter will not energize</td>
<td><strong>IT.</strong> Starter is not powered</td>
<td>Verify that the IT. Starter has 24V DC on the + and - of the terminal block, the Power LED should be green on the D77B-TC8 terminal adapter.</td>
</tr>
<tr>
<td></td>
<td><strong>IT.</strong> Starter may be tripped</td>
<td>Reset the trip.</td>
</tr>
<tr>
<td></td>
<td>Improper bit set in output assembly</td>
<td>Check the output assembly data position and verify with the control logic.</td>
</tr>
<tr>
<td>Second Contactor will not energize</td>
<td>During the “marriage” the wrong configuration was detected</td>
<td>Verify that the product code (Table 27 instance 3) is 0x1102 (4354 dec.). If the product code is not correct, verify that the second contact sensor is installed and wired, that the IT. Starter is powered and perform a Reset to Out of Box (Appendix A, Page 30).</td>
</tr>
<tr>
<td></td>
<td>Improper bit set in output assembly</td>
<td>Check the output assembly data position and verify with the control logic.</td>
</tr>
<tr>
<td></td>
<td>Mechanical interlock is jammed</td>
<td>Only one contactor can be energized at a time.</td>
</tr>
<tr>
<td></td>
<td>The primary contactor is already energized</td>
<td></td>
</tr>
<tr>
<td>A “failed to close” fault is generated when the second contactor is energized</td>
<td>The wiring between the D77B-A2 and the D77B-DSNAP is faulty.</td>
<td>Verify all connections on the D77B-A2 and the D77B-DSNAP. Verify that the D77B-A2 is properly connected to the second contactor.</td>
</tr>
</tbody>
</table>
Appendix A: Supported DeviceNet Objects

DeviceNet Objects

Table 25: Supported Objects

<table>
<thead>
<tr>
<th>Object</th>
<th>Object ID</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity</td>
<td>0x01</td>
<td>Page 31</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>0x03</td>
<td>Page 31</td>
</tr>
<tr>
<td>DeviceNet Connection</td>
<td>0x05</td>
<td>Page 32</td>
</tr>
<tr>
<td>Discrete Input Point</td>
<td>0x08</td>
<td>Page 33</td>
</tr>
<tr>
<td>Motor Data</td>
<td>0x28</td>
<td>Page 34</td>
</tr>
<tr>
<td>Motor Control Supervisor</td>
<td>0x29</td>
<td>Page 35</td>
</tr>
<tr>
<td>Overload</td>
<td>0x2C</td>
<td>Page 37</td>
</tr>
<tr>
<td>Soft Start</td>
<td>0x2D</td>
<td>Page 38</td>
</tr>
<tr>
<td>Supported DeviceNet I/O Assemblies</td>
<td></td>
<td>Page 39</td>
</tr>
</tbody>
</table>

Table 26: DeviceNet Object Common Services

<table>
<thead>
<tr>
<th>Service Code</th>
<th>Service Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0E</td>
<td>Get_Attribute_Single</td>
</tr>
<tr>
<td>0x10</td>
<td>Set_Attribute_Single</td>
</tr>
<tr>
<td>0x17</td>
<td>Nop</td>
</tr>
<tr>
<td>0x18</td>
<td>Get_Member</td>
</tr>
<tr>
<td>0x4B</td>
<td>Allocate_Master/Slave_Connection_Set</td>
</tr>
<tr>
<td>0x4C</td>
<td>Release_Master/Slave_Connection_Set</td>
</tr>
<tr>
<td>0x05</td>
<td>Reset</td>
</tr>
</tbody>
</table>

Reset to Out of Box

Service = Reset (0x05)
Class = Identity (0x01)
Instance = 0x01
Data = 01
### Table 27: Identity Object 0x01

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>Get</td>
<td>UINT</td>
<td>Vendor Id</td>
<td>68 [0x44] = Cutler-Hammer</td>
</tr>
<tr>
<td>02</td>
<td>Get</td>
<td>UINT</td>
<td>Device Type</td>
<td>12 [0x0C] = Communication Adapter 22 [0x16] = Motor Starter 23 [0x17] = Soft Starter</td>
</tr>
<tr>
<td>03</td>
<td>Get</td>
<td>UINT</td>
<td>Product Code</td>
<td>4353 [0x1101] DSNAP, FVNR or S751 4354 [0x1102] DSNAP, FVR or two speed</td>
</tr>
<tr>
<td>04</td>
<td>Get</td>
<td>ARRAY</td>
<td>Revision</td>
<td>Byte 0 = Major Revision Byte 1 = Minor Revision</td>
</tr>
<tr>
<td>06</td>
<td>Get</td>
<td>UDI NT</td>
<td>Serial Number</td>
<td>Serial Number of D77B-DSNAP</td>
</tr>
<tr>
<td>09</td>
<td>Get</td>
<td>UINT</td>
<td>Configuration Consistency Value</td>
<td>CRC on configuration values</td>
</tr>
<tr>
<td>176</td>
<td>Set</td>
<td>SHORT STRING</td>
<td>User Label or Tag Name</td>
<td>A user established ASCII string of 16 characters or less</td>
</tr>
<tr>
<td>177</td>
<td>Get</td>
<td>USINT</td>
<td>Fault Value</td>
<td>Same as Attribute 13 of the Control Supervisor (0x29) Object — Instance 1</td>
</tr>
</tbody>
</table>

**Instance 2 (Overload)/Instance 3 (S751)**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Get</td>
<td>UINT</td>
<td>Product Code</td>
<td>XY 11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X (Motor Controller)</td>
<td>Y (Frame Size)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 = IT. Starter</td>
<td>1 = 27 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 = S751</td>
<td>2 = 45 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 = 54 mm</td>
<td>4 = 76 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 = 76 mm</td>
<td>5 = 105 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 = 105 mm</td>
<td>6 = 140 mm</td>
</tr>
<tr>
<td>04</td>
<td>Get</td>
<td>ARRAY</td>
<td>Revision</td>
<td>Byte 0 = Major Revision Byte 1 = Minor Revision</td>
</tr>
<tr>
<td>06</td>
<td>Get</td>
<td>UDI NT</td>
<td>Serial Number</td>
<td>Serial Number of connected device</td>
</tr>
</tbody>
</table>

### Table 28: DeviceNet Object 0x03 — Instance 1

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Get</td>
<td>USINT</td>
<td>MAC ID</td>
<td>0 – 63</td>
</tr>
<tr>
<td>2</td>
<td>Get</td>
<td>USINT</td>
<td>Baud Rate</td>
<td>0 = 125K 1 = 250K 2 = 500K</td>
</tr>
<tr>
<td>3</td>
<td>Get</td>
<td>BOOL</td>
<td>BOI</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Get</td>
<td>USINT</td>
<td>Bus Off Counter</td>
<td>0 – 255</td>
</tr>
<tr>
<td>8</td>
<td>Get</td>
<td>USINT</td>
<td>MAC ID Switch</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Get</td>
<td>USINT</td>
<td>Baud Rate Switch</td>
<td></td>
</tr>
</tbody>
</table>
### Table 29: Connection Object 0x05 — Instance 1 (Explicit Connection)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Get</td>
<td>USINT</td>
<td>State</td>
<td>0 = nonexistent&lt;br&gt;1 = configured&lt;br&gt;3 = established&lt;br&gt;4 = timed out</td>
</tr>
<tr>
<td>2</td>
<td>Get</td>
<td>USINT</td>
<td>Instance Type</td>
<td>0 = Explicit</td>
</tr>
<tr>
<td>3</td>
<td>Get</td>
<td>BYTE</td>
<td>Transport Class Trigger</td>
<td>131 [0x83]</td>
</tr>
<tr>
<td>4</td>
<td>Get</td>
<td>UINT</td>
<td>Produced Connection Id</td>
<td>10[MAC ID]011</td>
</tr>
<tr>
<td>5</td>
<td>Get</td>
<td>UINT</td>
<td>Consumed Connection Id</td>
<td>10[MAC ID]100</td>
</tr>
<tr>
<td>6</td>
<td>Get</td>
<td>BYTE</td>
<td>Initial Comm Characteristics</td>
<td>33 [0x21]</td>
</tr>
<tr>
<td>7</td>
<td>Get</td>
<td>UINT</td>
<td>Produced Connection Size</td>
<td>37</td>
</tr>
<tr>
<td>8</td>
<td>Get</td>
<td>UINT</td>
<td>Consumed Connection Size</td>
<td>37</td>
</tr>
<tr>
<td>9</td>
<td>Get/Set</td>
<td>UINT</td>
<td>Expected Packet Rate</td>
<td>Timer Resolution of 10 mSec.</td>
</tr>
<tr>
<td>12</td>
<td>Get</td>
<td>USINT</td>
<td>Watchdog Timeout Action</td>
<td>1 = Auto Delete</td>
</tr>
</tbody>
</table>

### Table 30: Connection Object 0x05 — Instance 2 (I/O Message)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Get</td>
<td>USINT</td>
<td>State</td>
<td>0 = nonexistent&lt;br&gt;1 = configured&lt;br&gt;3 = established&lt;br&gt;4 = timed out</td>
</tr>
<tr>
<td>2</td>
<td>Get</td>
<td>USINT</td>
<td>Instance Type</td>
<td>1 = I/O Message</td>
</tr>
<tr>
<td>3</td>
<td>Get</td>
<td>BYTE</td>
<td>Transport Class Trigger</td>
<td>131 [0x83]</td>
</tr>
<tr>
<td>4</td>
<td>Get</td>
<td>UINT</td>
<td>Produced Connection Id</td>
<td>01111[MAC ID]</td>
</tr>
<tr>
<td>5</td>
<td>Get</td>
<td>UINT</td>
<td>Consumed Connection Id</td>
<td>10[MAC ID]101</td>
</tr>
<tr>
<td>6</td>
<td>Get</td>
<td>BYTE</td>
<td>Initial Comm Characteristics</td>
<td>1 [0x01]</td>
</tr>
<tr>
<td>7</td>
<td>Get</td>
<td>UINT</td>
<td>Produced Connection Size</td>
<td>1 – 7</td>
</tr>
<tr>
<td>8</td>
<td>Get</td>
<td>UINT</td>
<td>Consumed Connection Size</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Get</td>
<td>UINT</td>
<td>Expected Packet Rate</td>
<td>Timer Resolution of 10 mSec.</td>
</tr>
<tr>
<td>12</td>
<td>Get</td>
<td>USINT</td>
<td>Watchdog Timeout Action</td>
<td>1 = Auto Delete</td>
</tr>
<tr>
<td>14</td>
<td>Get/Set</td>
<td>EPATH</td>
<td>Produced Connection Path</td>
<td>20 04 24 XX 30 03&lt;br&gt;XX = Instance</td>
</tr>
<tr>
<td>16</td>
<td>Get/Set</td>
<td>EPATH</td>
<td>Consumed Connection Path</td>
<td>20 04 24 XX 30 03&lt;br&gt;XX = Instance</td>
</tr>
<tr>
<td>100</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Production ID (Input Assembly)</td>
<td>See DeviceNet I/O Assemblies, Page 39</td>
</tr>
<tr>
<td>101</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Consumption ID (Output Assembly)</td>
<td>See DeviceNet I/O Assemblies, Page 39</td>
</tr>
</tbody>
</table>
### Table 31: Discrete Input Object 0x08

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance 1 (Primary Contact Block Detect)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Get</td>
<td>BOOL</td>
<td>Data</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = On</td>
</tr>
<tr>
<td>Instance 2 (Secondary Contact Block Detect)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Get</td>
<td>BOOL</td>
<td>Data</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = On</td>
</tr>
<tr>
<td>Instance 3 (Ground Fault Detect)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Get</td>
<td>BOOL</td>
<td>Data</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = On</td>
</tr>
</tbody>
</table>
Table 32: Motor Data Object 0x28 — Instance 1

<table>
<thead>
<tr>
<th>Attr ID</th>
<th>Access Rule</th>
<th>DeviceNet Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
</table>
| 03      | Set         | USINT              | MotorType          | 0 = Non-standard motor  
3 = PM Synchronous Motor  
6 = Wound Rotor Induction Motor  
7 = Squirrel Cage Induction Motor |
| 04      | Set         | SHORT STRING       | CatNumber          | Manufacturer’s Motor Catalog Number (Nameplate number) 32 characters max |
| 05      | Set         | SHORT STRING       | Manufacturer       | Manufacturer’s Name 32 characters max                                |
| 06      | Set         | UINT               | RatedCurrent       | Rated Stator Current  
Units: [100mA]                                                        |
| 07      | Set         | UINT               | RatedVoltage       | Rated Base Voltage  
Units: [V]                                                            |
| 08      | Set         | UDINT              | RatedPower         | Rated Power at Rated Freq  
Units: [W]                                                            |
| 09      | Set         | UINT               | RatedFreq          | Rated Electrical Frequency  
Units: [Hz]                                                           |
| 10      | Set         | UINT               | RatedTemp          | Rated Winding Temperature  
Units: [degrees C]                                                    |
| 11      | Set         | UINT               | MaxSpeed           | Maximum allowed motor speed  
Units: [RPM]                                                          |
| 12      | Set         | UINT               | PoleCount          | Number of poles in the motor                                      |
| 13      | Set         | UDINT              | TorqConstant       | Motor torque constant  
Units: [0.001 x Nm/A]                                                 |
| 14      | Set         | UDINT              | Inertia            | Rotor Inertia  
Units: [10^-6 x kg.m^2]                                               |
| 15      | Set         | UINT               | BaseSpeed          | Nominal speed at rated frequency from nameplate  
Units: [RPM]                                                        |
| 19      | Set         | USINT              | ServiceFactor      | Units: [%]  
Range: 0 .. 255                                                       |

**Note:** Attribute ID’s 06 – 19 only available when attribute ID 03 is 3, 6 or 7.
### Table 33: Control Supervisor Object 0x29 — Instance 1

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Set</td>
<td>BOOL</td>
<td>Run 1</td>
<td>0 = False</td>
</tr>
<tr>
<td>4</td>
<td>Set</td>
<td>BOOL</td>
<td>Run 2</td>
<td>0 = False</td>
</tr>
<tr>
<td>5</td>
<td>Set</td>
<td>BOOL</td>
<td>Net Control</td>
<td>0 = Local Control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Network Control</td>
</tr>
<tr>
<td>7</td>
<td>Get</td>
<td>BOOL</td>
<td>Running 1</td>
<td>0 = Other State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Enabled and Run 1</td>
</tr>
<tr>
<td>8</td>
<td>Get</td>
<td>BOOL</td>
<td>Running 2</td>
<td>0 = Other State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Enabled and Run 2</td>
</tr>
<tr>
<td>9</td>
<td>Get</td>
<td>BOOL</td>
<td>Ready</td>
<td>0 = Other State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Ready or Enabled or Stopping</td>
</tr>
<tr>
<td>10</td>
<td>Get</td>
<td>BOOL</td>
<td>Faulted</td>
<td>0 = No Faults</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Fault Occurred</td>
</tr>
<tr>
<td>11</td>
<td>Get</td>
<td>BOOL</td>
<td>Warning</td>
<td>0 = No Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Warning</td>
</tr>
<tr>
<td>12</td>
<td>Set</td>
<td>BOOL</td>
<td>Fault Reset</td>
<td>0 &gt; 1 = Fault Reset</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = No Action</td>
</tr>
<tr>
<td>13</td>
<td>Get</td>
<td>UINT</td>
<td>Fault Code</td>
<td>0 = No Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 = Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 = Current Trip</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21 = Thermal Overload</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22 = Phase Loss</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26 = Phase Imbalance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>27 = Ground Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41 = Control Undervoltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>62 = Memory Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>63 = Hardware Link Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>64 = No Device Power</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>71 = Fail to Close Primary Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72 = Fail to Open Primary Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>101 = Invalid Attached Device Version</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>102 = SCR Overt Temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>103 = Watchdog</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>104 = SNAP Protocol Failure to Connect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>105 = SNAP Protocol fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>106 = Temperature Sensor Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>171 = Fail to Close Second Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>172 = Fail to Open Second Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>173 = Invalid Action Attempted</td>
</tr>
<tr>
<td>14</td>
<td>Get</td>
<td>UINT</td>
<td>Warning Code</td>
<td>0 = No Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29 = Underload</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41 = Control Undervoltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>71 = Fail to Close Primary Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72 = Fail to Open Primary Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>104 = SNAP Protocol Failure to Connect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>171 = Fail to Close Second Contactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>172 = Fail to Open Second Contactor</td>
</tr>
</tbody>
</table>
Table 32: Control Supervisor Object 0x29 — Instance 1 (Continued)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Set</td>
<td>USINT</td>
<td>DeviceNet Fault Mode</td>
<td>0 = Fault + Stop</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See Warning)</td>
<td>1 = Hold Last State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Run 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Run 2</td>
</tr>
<tr>
<td>22</td>
<td>Get/Set</td>
<td>UDWORD</td>
<td>Cycle Count</td>
<td>Number of times the motor has been started</td>
</tr>
<tr>
<td>101</td>
<td>Get</td>
<td>DWORD</td>
<td>Local Signals</td>
<td>Byte0 (Consuming Assemble Data)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 0 = Run1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 1 = Run2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 3 = Fault Reset</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 5 = Control From Net</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Byte1 (N/A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Byte2 (Motor Control Status)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 1 = Run2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 2 = Reset</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 3 = Permissive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 4 = Ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 5 = Net Control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 6 = Disconnect Handle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bit 7 = At Reference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Byte3 (N/A)</td>
</tr>
<tr>
<td>110</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Number of Contactors</td>
<td>1 = 1 Contactor (FVNR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 2 Contactor (FVR)</td>
</tr>
<tr>
<td>111</td>
<td>Get/Set</td>
<td>BOOL</td>
<td>Communication Valid</td>
<td>0 = Starter Communication Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Valid Starter Communication</td>
</tr>
<tr>
<td>114</td>
<td>Get/Set</td>
<td>BOOL</td>
<td>Net Select</td>
<td>0 = Control is Local</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Control is From Network</td>
</tr>
<tr>
<td>115</td>
<td>Get/Set</td>
<td>BOOL</td>
<td>CB Sensor</td>
<td>0 = Disable Crossbar Sensor detect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Enable Crossbar Sensor detect</td>
</tr>
</tbody>
</table>

**WARNING**

If the DeviceNet Fault Mode value is set to Run1 or Run2, any time the D77B-DSNAP is powered and does not have a valid I/O connection, the motor controller will be commanded to the DeviceNet Fault Mode value. This includes first powering up the DeviceNet system (D77B-DSNAP) and not having the controller on-line.
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Get</td>
<td>INT</td>
<td>Trip Class Setting</td>
<td>Setting of the overloads FLA attribute ( = (\text{INT})*(0.1 \text{ Amps})/2^\text{CS} )</td>
</tr>
<tr>
<td>4</td>
<td>Get</td>
<td>USINT</td>
<td>Trip Class</td>
<td>0 – 200</td>
</tr>
<tr>
<td>5</td>
<td>Get</td>
<td>INT</td>
<td>Average of 3 Phase Current</td>
<td>Average Current of 3 Phase (RMS) ( = (\text{INT})*(0.1 \text{ Amps})/2^\text{CS} )</td>
</tr>
<tr>
<td>7</td>
<td>Get</td>
<td>USINT</td>
<td>%Thermal Capacity</td>
<td>0 – 100%</td>
</tr>
<tr>
<td>12</td>
<td>Get</td>
<td>SINT</td>
<td>Current Scale (CS)</td>
<td>Current Scaling Factor ( \text{Scaled Current} = (\text{INT})*(0.1 \text{ Amps})/2^\text{CS} )</td>
</tr>
<tr>
<td>103</td>
<td>Get/Set</td>
<td>BOOL</td>
<td>Ground Fault Enable</td>
<td>0 = Disabled (default) ( ) 1 = Enabled ( )</td>
</tr>
<tr>
<td>105</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Ground Fault Time</td>
<td>Length of time the ground fault must be true for a trip ( 0 – 255 \text{ seconds} ) ( \text{default = 1 second} )</td>
</tr>
<tr>
<td>106</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Ground Fault Delay</td>
<td>Length of time to delay tripping on a ground fault from motor controller start ( 0 – 255 \text{ seconds} ) ( \text{default = seconds} )</td>
</tr>
<tr>
<td>107</td>
<td>Get</td>
<td>BOOL</td>
<td>Ground Fault</td>
<td>0 = No ground fault ( ) 1 = Ground fault ( )</td>
</tr>
<tr>
<td>108</td>
<td>Get</td>
<td>BOOL</td>
<td>Current Threshold Enable</td>
<td>0 = Disabled (default) ( ) 1 = Enabled ( )</td>
</tr>
<tr>
<td>109</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Current Threshold Percent</td>
<td>% of FLA setting to set current threshold ( 0 – 255% )</td>
</tr>
<tr>
<td>110</td>
<td>Get</td>
<td>BOOL</td>
<td>Current Threshold Warning</td>
<td>0 = No Warning (default) ( ) 1 = Warning ( )</td>
</tr>
<tr>
<td>111</td>
<td>Get/Set</td>
<td>BOOL</td>
<td>Underload Enable</td>
<td>0 = Disabled (default) ( ) 1 = Enabled ( )</td>
</tr>
<tr>
<td>112</td>
<td>Get/Set</td>
<td>USINT</td>
<td>Underload Percent</td>
<td>% of FLA setting to set underload ( 0 – 255% )</td>
</tr>
<tr>
<td>113</td>
<td>Get</td>
<td>BOOL</td>
<td>Underload Warning</td>
<td>0 = No Warning (default) ( ) 1 = Warning ( )</td>
</tr>
<tr>
<td>114</td>
<td>Get</td>
<td>UINT</td>
<td>Starter 24V DC Value</td>
<td>Value of 24V DC connected to the starter ( 235 = 23.5 \text{V DC} )</td>
</tr>
<tr>
<td>115</td>
<td>Get</td>
<td>BYTE</td>
<td>Overload Status Bits</td>
<td>0 = Current Trip ( ) 1 = Phase Loss ( ) 2 = Phase Imbalance ( ) 3 = Receiving Run1 ( ) 4 = Receiving Run2 ( ) 5 = Ground Fault ( ) 6 = Test ( ) 7 = Thermal Overload ( )</td>
</tr>
<tr>
<td>116</td>
<td>Get</td>
<td>BOOL</td>
<td>Impending Trip Warning</td>
<td>0 = current &lt; 115% FLA ( ) 1 = current &gt; 115% FLA ( )</td>
</tr>
<tr>
<td>117</td>
<td>Get</td>
<td>USINT</td>
<td>%FLA</td>
<td>% Running Current divided by the FLA setting on the overload ( 0 – 255% )</td>
</tr>
<tr>
<td>121</td>
<td>Get</td>
<td>UDINT</td>
<td>Max FLA</td>
<td>Amps 256</td>
</tr>
</tbody>
</table>
### Table 35: Soft Start Object 0x2D — Instance 1

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Access</th>
<th>Data Type</th>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Get</td>
<td>BOOL</td>
<td>AtReference</td>
<td>Starting/stopping output voltage reference status 0 = Not At Reference 1 = Output At Voltage Reference</td>
</tr>
<tr>
<td>4</td>
<td>Get</td>
<td>USINT</td>
<td>StartMode</td>
<td>1 = Voltage Ramp No Current Limit The DSNAP will always return the value 1 when accessing this attribute.</td>
</tr>
<tr>
<td>5</td>
<td>Get</td>
<td>USINT</td>
<td>StopMode</td>
<td>1 = Ramp Down The DSNAP will always return the value 1 when accessing this attribute.</td>
</tr>
<tr>
<td>7</td>
<td>Get</td>
<td>UINT</td>
<td>RampTime1</td>
<td>Tenths of Seconds</td>
</tr>
<tr>
<td>16</td>
<td>Get</td>
<td>UINT</td>
<td>DecelTime</td>
<td>Tenths of Seconds</td>
</tr>
<tr>
<td>100</td>
<td>Get</td>
<td>USINT</td>
<td>Start Torque</td>
<td>Starting Torque Pot reading</td>
</tr>
<tr>
<td>101</td>
<td>Get</td>
<td>WORD</td>
<td>Status Bits</td>
<td>Status bits</td>
</tr>
</tbody>
</table>
DeviceNet I/O Assemblies

The changing of the I/O assemblies from the default to other assemblies using CHStudio is performed in a graphical user environment. When using a generic DeviceNet Management tool that accepts EDS files, the EDS file will aid in simply choosing the I/O assemblies that are allowed and available.

Table 36: Allowable DeviceNet I/O Assemblies

<table>
<thead>
<tr>
<th>Motor Controller</th>
<th>Allowable Input Assemblies (Dec.)</th>
<th>Allowable Output Assemblies (Dec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-reversing (E101, N010)</td>
<td>52, 53, 102, 105*, 108, 114</td>
<td>3*</td>
</tr>
<tr>
<td>Reversing (E501, N501)</td>
<td>52, 53, 54, 102, 103, 105, 106*, 108, 109, 114</td>
<td>5*</td>
</tr>
<tr>
<td>S751 Soft Start</td>
<td>52, 53, 60, 102, 105*, 108, 114</td>
<td>3*</td>
</tr>
</tbody>
</table>

*Indicates the default

For users that have a generic DeviceNet Management tool that does not accept EDS files, follow the simple example below to aid in changing I/O assemblies using explicit messaging.

To read what the current Input assembly is, perform an explicit message of the following:

Table 37: Reading Current Input Assembly

<table>
<thead>
<tr>
<th>Service</th>
<th>Class (HEX)</th>
<th>Instance (HEX)</th>
<th>Attribute (HEX)</th>
<th>Data (HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Single</td>
<td>0x05</td>
<td>0x02</td>
<td>0x64 (Production ID) (100 Dec.)</td>
<td>0x34 (34 = Basic Motor Starter)</td>
</tr>
</tbody>
</table>

To set the Input assembly, perform an explicit message of the following:

Table 38: Setting Input Assembly

<table>
<thead>
<tr>
<th>Service</th>
<th>Class (HEX)</th>
<th>Instance (HEX)</th>
<th>Attribute (HEX)</th>
<th>Data (HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Single</td>
<td>0x05</td>
<td>0x02</td>
<td>0x64 (Production ID) (100 Dec.)</td>
<td>0xXX (XX = the input assembly in HEX. Example: 0x69 is D77B-DSNAP Abbreviated Motor Starter 1)</td>
</tr>
</tbody>
</table>

To read what the current Output assembly is, perform an explicit message of the following:

Table 39: Reading Current Output Assembly

<table>
<thead>
<tr>
<th>Service</th>
<th>Class (HEX)</th>
<th>Instance (HEX)</th>
<th>Attribute (HEX)</th>
<th>Data (HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Single</td>
<td>0x05</td>
<td>0x02</td>
<td>0x65 (Consumption ID) (101 Dec.)</td>
<td>0x03 (3 = Basic Motor Starter)</td>
</tr>
</tbody>
</table>

To set the Output assembly, perform an explicit message of the following:

Table 40: Setting Output Assembly

<table>
<thead>
<tr>
<th>Service</th>
<th>Class (HEX)</th>
<th>Instance (HEX)</th>
<th>Attribute (HEX)</th>
<th>Data (HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Single</td>
<td>0x05</td>
<td>0x02</td>
<td>0x65 (Consumption ID) (101 Dec.)</td>
<td>0xXX (XX = the output assembly in HEX. Example: 0x05 (5 Dec.) is Extended Motor Starter )</td>
</tr>
</tbody>
</table>
**DeviceNet Input Assemblies**

**Table 41: Assembly 52 (0x34) — Basic Motor Starter**

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Running1</td>
<td>Reserved</td>
<td>Fault</td>
</tr>
</tbody>
</table>

**Table 42: Assembly 53 (0x35) — Extended Motor Starter 1**

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved</td>
<td>Reserved</td>
<td>CtrlFromNet</td>
<td>Ready</td>
<td>Reserved</td>
<td>Running1</td>
<td>Warning</td>
<td>Fault</td>
</tr>
</tbody>
</table>

**Table 43: Assembly 54 (0x36) — Extended Motor Starter 2**

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved</td>
<td>Reserved</td>
<td>CtrlFromNet</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warning</td>
<td>Fault</td>
</tr>
</tbody>
</table>

**Table 44: Assembly 60 (0x3C) — Basic Soft Start Input**

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFromNet</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average Current (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Average Current (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 45: Assembly 102 (0x66) — D77B-DSNAP Motor Starter**

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFromNet</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average Current (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Average Current (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 46: Assembly 103 (0x67) — D77B-DSNAP Extended Motor Starter**

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFromNet</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average Current (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Average Current (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 47: Assembly 105 (0x69) — D77B-DSNAP Abbreviated Motor Starter 1

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFrom Net</td>
<td>Ready</td>
<td>Reserved</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Fault Code (Low byte only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 48: Assembly 106 (0x6A) — D77B-DSNAP Abbreviated Motor Starter 2

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFrom Net</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>% FLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Last Fault Code (Low byte only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 49: Assembly 108 (0x6C) — D77B-DSNAP Motor Starter with Fault Code

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFrom Net</td>
<td>Ready</td>
<td>Reserved</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average Current (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Average Current (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Last Fault Code (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Last Fault Code (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 50: Assembly 109 (0x6D) — D77B-DSNAP Expanded Motor Starter with Fault Code

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>CtrlFrom Net</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warn</td>
<td>Fault</td>
</tr>
<tr>
<td>1</td>
<td>% Thermal Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average Current (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Average Current (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Last Fault Code (Low byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Last Fault Code (High byte)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 51: Assembly 114 (0x72) — D77B-DSNAP Complete Status Assembly

<table>
<thead>
<tr>
<th>Byte</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At Reference</td>
<td>Reserved</td>
<td>Ctrl From Net</td>
<td>Ready</td>
<td>Running2</td>
<td>Running1</td>
<td>Warning</td>
<td>Fault</td>
</tr>
</tbody>
</table>
### Table 52: Input Definitions

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault/Trip</td>
<td>The motor controller is faulted or tripped</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>A “Faulted” M.C. may still respond to a Run1 or Run2 command</td>
</tr>
<tr>
<td>Warning</td>
<td>The motor controller has a warning of an impending trip</td>
</tr>
<tr>
<td>Running 1</td>
<td>Primary contactor is being commanded to run</td>
</tr>
<tr>
<td>Running 2</td>
<td>Secondary contactor is being commanded to run</td>
</tr>
<tr>
<td>Ready</td>
<td>The motor controller is configured and communicating with starter</td>
</tr>
<tr>
<td>CtrlFrom Net</td>
<td>The motor controller is controlled from DeviceNet</td>
</tr>
<tr>
<td>At Reference</td>
<td>This states that the motor controller is in the state that it is commanded to be in, or that the S751 is in bypass. For FVR applications, a D77B-AC2 is required for this bit to be active while in reverse.</td>
</tr>
<tr>
<td>% Thermal Capacity</td>
<td>% thermal capacity of the motor from 0 to 100%</td>
</tr>
<tr>
<td>Average Current</td>
<td>Average RMS current of the motor</td>
</tr>
<tr>
<td>% FLA</td>
<td>The ratio of the running current divided by the FLA setting on the overload</td>
</tr>
<tr>
<td>Fault Codes and Warning Codes</td>
<td>Code for the fault of the motor controller. Valid fault and warning codes are:</td>
</tr>
<tr>
<td></td>
<td>0 = No Fault</td>
</tr>
<tr>
<td></td>
<td>10 = Test</td>
</tr>
<tr>
<td></td>
<td>20 = Current Trip</td>
</tr>
<tr>
<td></td>
<td>21 = Thermal Overload</td>
</tr>
<tr>
<td></td>
<td>22 = Phase Loss</td>
</tr>
<tr>
<td></td>
<td>26 = Phase Imbalance</td>
</tr>
<tr>
<td></td>
<td>27 = Ground Fault</td>
</tr>
<tr>
<td></td>
<td>41 = Control Undervoltage</td>
</tr>
<tr>
<td></td>
<td>62 = Memory Fault</td>
</tr>
<tr>
<td></td>
<td>63 = Hardware Link Fault</td>
</tr>
<tr>
<td></td>
<td>64 = No Device Power</td>
</tr>
<tr>
<td></td>
<td>71 = Fail to Close Primary Contactor</td>
</tr>
<tr>
<td></td>
<td>72 = Fail to Open Primary Contactor</td>
</tr>
<tr>
<td></td>
<td>101 = Invalid Attached Device Version</td>
</tr>
<tr>
<td></td>
<td>102 = SCR Over Temperature</td>
</tr>
<tr>
<td></td>
<td>103 = Watchdog</td>
</tr>
<tr>
<td></td>
<td>104 = SNAP Protocol Failure to Connect</td>
</tr>
<tr>
<td></td>
<td>105 = SNAP Protocol Fault</td>
</tr>
<tr>
<td></td>
<td>106 = Temperature Sensor Fault</td>
</tr>
<tr>
<td></td>
<td>171 = Fail to Close Second Contactor</td>
</tr>
<tr>
<td></td>
<td>172 = Fail to Open Second Contactor</td>
</tr>
<tr>
<td></td>
<td>173 = Invalid Action Attempted</td>
</tr>
</tbody>
</table>

### DeviceNet Output Assemblies

#### Table 53: Assembly 3 (0x03) — Basic Motor Starter

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Fault Reset</td>
<td>Reserved</td>
<td>Run 1</td>
</tr>
</tbody>
</table>

#### Table 54: Assembly 5 (0x05) — Extended Motor Starter

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Fault Reset</td>
<td>Run2</td>
<td>Run1</td>
</tr>
</tbody>
</table>

#### Table 55: Output Definitions

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run 1</td>
<td>Energize the primary contactor</td>
</tr>
<tr>
<td>Run 2</td>
<td>Energize the secondary contactor</td>
</tr>
<tr>
<td>Fault Reset</td>
<td>Reset the fault</td>
</tr>
</tbody>
</table>
### IT. Publications and Support

Table 56: IT. Publications

<table>
<thead>
<tr>
<th>Publication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN05002001E</td>
<td>IT. D77A I/O Module Products Installation and Users Manual</td>
</tr>
<tr>
<td>MN05001002E</td>
<td>IT. QCPort System Install and Planning Guide</td>
</tr>
<tr>
<td>MN05001001E</td>
<td>IT. QCPort Starter Network Adapter Product (QSNAP) Installation and Users Manual</td>
</tr>
<tr>
<td>MN05004001E</td>
<td>IT. DeviceNet Starter Network Adapter Product (D77B-DSNAP) Installation and Users Manual</td>
</tr>
<tr>
<td>MN05004002E</td>
<td>IT. DeviceNet Adapter Installation and User Manual</td>
</tr>
<tr>
<td>MN03403002E</td>
<td>IEC Contactor and Starter User Manual</td>
</tr>
<tr>
<td>MN03305001E</td>
<td>NEMA Contactor and Starter User Manual</td>
</tr>
</tbody>
</table>

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