



# **DeviceNet™ CENTERLINE® Motor Control Centers**

## **1.0 General**

The motor control center (MCC) shall have DeviceNet cabling integrated throughout the vertical sections.

Each Motor Starter, AC Drive, and Soft Starter in the MCC shall be supplied with a means to communicate via DeviceNet, and have the capability of monitoring at least 2 input points.

All units shall be interwired and tested as a NEMA Class II MCC.

## **2.0 DeviceNet Cable**

Per the National Electrical Code [article 300-3(c)(1)] and the Canadian Electrical Code (Rule 12-904) the DeviceNet cable shall have an insulating rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure or raceway, i.e. no special separation, barriers, or internal conduit is required for the DeviceNet conductors.

The DeviceNet cable used for the trunk line shall be flat cable rated 8 amperes, 600V, Class 1.

The DeviceNet cable used for the droplines to connect DeviceNet units shall be round cable rated at 8 amperes, 600 V, Class 1.

## **3.0 DeviceNet Cable Layout**

A DeviceNet trunkline shall be routed through the MCC line-up, behind barriers that isolate the trunkline from the unit space and wireways to prevent accidental mechanical damage during MCC installation.

Six DeviceNet ports shall be provided in the rear of each vertical wireway to simplify installation, relocation, and addition of plug-in MCC units.

The DeviceNet component within each plug-in unit shall be connected to one of the six DeviceNet ports in the vertical wireway with cable outlined above in Section 2.0, DeviceNet Cable.

The addition or removal of a unit from the DeviceNet system shall not interrupt the operation of other units within the system.

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## 4.0 Power Supplies

The MCC manufacturer shall check the user's design to ensure adequate power supplies have been specified to conform with DeviceNet requirements. The power supply shall provide 24Vdc for the DeviceNet system and be rated no less than 8.0 amperes.

## 5.0 Scanner Modules

The MCC manufacturer shall check the user's design to ensure adequate DeviceNet scanner modules have been specified to conform with DeviceNet requirements.

As an alternative to a traditional DeviceNet scanner module, linking devices can be used to link different communication networks to the MCC DeviceNet system (such as linking ControlNet to DeviceNet).

## 6.0 DeviceNet System Performance

The DeviceNet system shall be designed to operate at 500k Baud to maximize the system performance, unless precluded by the cumulative length of the trunk and drop lines. To achieve best performance, 250 k baud shall be the minimum communication rate.

The DeviceNet system is to be qualified to communicate and perform under normal and adverse MCC electrical environments (e.g., contactor electrical operation, contactor jogging duty, and unit short circuit fault).

## 7.0 DeviceNet Units

## 7.1 Motor Starter Units

Each motor starter shall have an electronic overload relay with the following features:

- On-board DeviceNet communication
- LEDs for status indication
- Test/Reset button
- Adjustable trip class (5 to 30)
- General purpose I/O (minimum 2I/1O, optional 4I/2O), rated for 110-120Vac or 24Vdc as specified on drawing
- Protective functions with programmable trip level, warning level, time delay and inhibit window:
  - Thermal overload
  - Underload
  - Jam
  - Current imbalance
  - Stall
  - Phase loss
  - Zero sequence ground fault sensitive to 1.0 amp (optional feature)
  - PTC thermistor input (optional feature)
- Current Monitoring Functions:
  - Phase current
  - Average current
  - Full load current
  - Current imbalance percent
  - Percent thermal capacity utilized
  - Ground fault current (optional feature)
- Diagnostic Information:
  - Device status
  - Warning status
  - Time to reset
  - Trip status
  - Time to overload trip
  - History of last five trips

### 7.1.1 Alternative for Non-Critical Motor Starter Applications

The motor starter may be controlled over DeviceNet via a DeviceNet I/O module containing at least four inputs and two outputs. The inputs of the DeviceNet I/O module shall be rated for 110 - 120Vac or 24Vdc as specified on drawings. The module shall be prewired to the motor starter auxiliary

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contact, disconnect auxiliary contact, overload relay auxiliary contact, and Hand-Off-Auto selector switch where applicable.

## **7.2 Variable Frequency AC Drives and Solid-State Controllers**

Each variable frequency AC drive unit and solid-state controller unit shall have a DeviceNet communication module to communicate the status over DeviceNet.

## **7.3 Feeder Disconnects**

Where required, fusible disconnect and circuit breaker feeder circuits shall have a DeviceNet I/O Module containing at least two inputs and one output. The inputs of the DeviceNet I/O module shall be rated for 110 - 120Vac or 24Vdc as specified on drawings.

## **8.0 Programming of Parameters**

The DeviceNet MAC ID number (node address) shall be programmed into each unit per the drawings. All other parameters may be left at the factory default setting.

The DeviceNet System components shall be pre-configured to operate at the appropriate baud rate.

## **9.0 Software**

The DeviceNet MCC shall be provided with pre-configured software. The software shall be capable of viewing multiple MCC line-ups. The software communication driver shall allow the software to be installed and operated on

Ethernet, ControlNet, or DeviceNet. The software shall be capable of displaying the following:

- Elevation View
  - Dynamically configured based on reading data from devices in MCC line-up
  - Sizeable view to allow ease of viewing multiple MCC line-ups
  - Unit nameplate information
  - Unit status indicators (ready, running, warning, fault, no communication)
- Unit Monitor View
  - Pre-configured for a specific unit
  - Real time monitoring via analog dials and trending
  - Data configurable for customized monitoring
  - Modifying device parameters
- Spreadsheet View
  - User configurable for customized monitoring
  - Sorting and cascading functions
  - Custom user fields
- Event Log
  - Track history of MCC unit
  - Automatic logging of trips, alarms, and changes
  - Manual entry of events
- Documentation
  - Front elevation drawings
  - One-line drawings
  - Unit wiring diagrams
  - User manuals
  - Spare parts lists

## 10.0 Testing

The interwired DeviceNet MCC shall be powered up, configured, and tested in an ISO9001 facility to ensure each unit communicates properly prior to shipment.

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**[www.rockwellautomation.com](http://www.rockwellautomation.com)**

**Corporate Headquarters**

Rockwell Automation, 777 East Wisconsin Avenue, Suite 1400, Milwaukee, WI, 53202-5302 USA, Tel: (1) 414.212.5200, Fax: (1) 414.212.5201

**Headquarters for Allen-Bradley Products, Rockwell Software Products and Global Manufacturing Solutions**

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation SA/NV, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

**Headquarters for Dodge and Reliance Electric Products**

Americas: Rockwell Automation, 6040 Ponders Court, Greenville, SC 29615-4617 USA, Tel: (1) 864.297.4800, Fax: (1) 864.281.2433

Europe/Middle East/Africa: Rockwell Automation, Brühlstraße 22, D-74834 Elztal-Dallau, Germany, Tel: (49) 6261 9410, Fax: (49) 6261 17741

Asia Pacific: Rockwell Automation, 55 Newton Road, #11-01/02 Revenue House, Singapore 307987, Tel: (65) 6356-9077, Fax: (65) 6356-9011

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