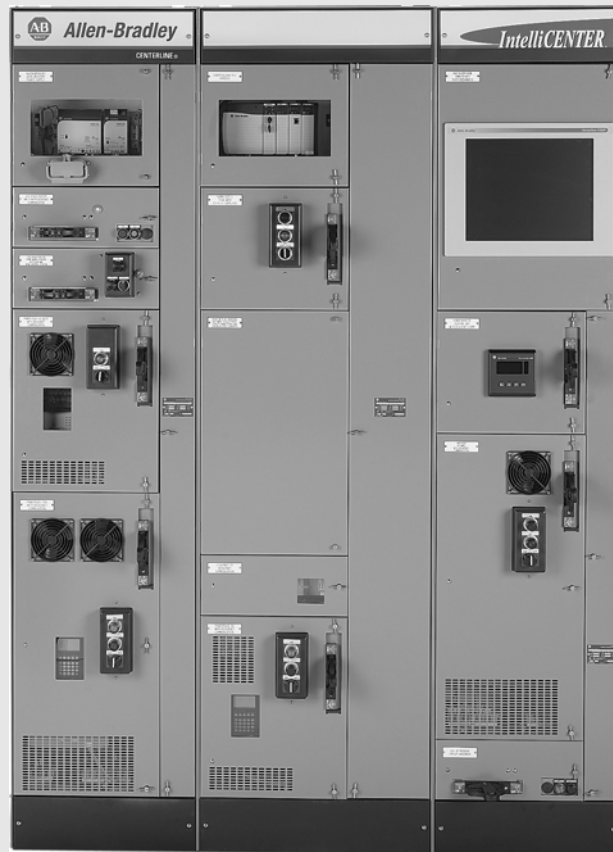


CENTERLINE 2100 Motor Control Centers with EtherNet/IP Network



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Reference Materials

For additional CENTERLINE 2100 Motor Control Center data and general information, refer to the following publications and websites.

Title	Publication	Available Online at ...
CENTERLINE 2100 Motor Control Centers Product Profile	2100-PP020	http://www.rockwellautomation.com/literature
Integrated Intelligence within an MCC—IntelliCENTER Product Profile	MCC-PP001	
IntelliCENTER Software User Manual	MCC-UM001	
Integrated, Intelligent Motor Control Centers White Paper	2100-WP001	
Joining and Splicing Vertical Sections Installation Instructions	2100-IN010	
EtherNet/IP Performance Application Solution	ENET-AP001	
EtherNet/IP Modules in Logix5000 Control Systems User Manual	ENET-UM001	
NetLinx Selection Guide	NETS-SG001	
Ethernet: Technology Enabler for Network Convergence White Paper	NETS-WP005	
IntelliCENTER Technology	Website	http://www.ab.com/intellicenter
Motor Control Centers (MCC)		http://www.ab.com/mcc
Electronic Publications		http://www.rockwellautomation.com/literature
EtherNet/IP Network (Allen-Bradley)		http://www.ab.com/networks
EtherNet/IP Capacity Tool		http://www.rockwellautomation.com/solutions/integratedarchitecture/resources3.html
Electronic Data Sheets (EDS) files		http://www.rockwellautomation.com/resources/eds/
EtherNet/IP Media Planning and Installation Manual		This manual is available from the Open DeviceNet Vendor Association (ODVA) at http://www.odva.org

Overview

This document describes cable system construction and components associated with an EtherNet/IP network that is factory installed in Bulletin 2100 CENTERLINE® and IntelliCENTER® motor control centers (MCCs).



ATTENTION: Before performing any service or maintenance activities on MCC sections, disconnect all power sources.

EtherNet/IP Network Overview

The EtherNet/IP network offers a full suite of control, configuration, and data collection services by layering the Common Industrial Protocol over the standard protocols used by the Internet (TCP/IP and UDP). The EtherNet/IP network uses TCP/IP for general messaging and information exchange services, and UDP/IP for I/O messaging services for control applications. This combination of well-accepted standards provides the functionality required to support both information data exchange as well as control applications.

Another key feature of the EtherNet/IP network is that it uses commercial, off-the-shelf Ethernet components and physical media. This provides a cost-effective plant floor solution by using a familiar and well-understood infrastructure.

The EtherNet/IP network is most often used in these types of configurations:

- As an economical solution for connecting many computers
- As the best choice when you want to connect many devices
- As the standard network for connectivity to enterprise systems
- As the least expensive HMI option when used with PanelView Plus terminals
- In a star topology when nodes are grouped closely together

EtherNet/IP Network in MCCs

The EtherNet/IP network integrates with current IT networks. This document details the applications of the EtherNet/IP network in MCCs, including cable system construction and common EtherNet/IP components.

System Architecture

When designing EtherNet/IP systems, it is necessary to consider the following factors:

- Connection count
- Cable type and lengths

Connection Count

The EtherNet/IP network can accommodate a vast number of nodes. The EtherNet/IP network does not have a specific maximum number of nodes like other fieldbus networks. The limit is based on the number of connections the EtherNet/IP scanner can make.

The number of connections used by each node varies. To estimate the number of connections a network would use, visit <http://www.rockwellautomation.com/solutions/integratedarchitecture/resources3.html> for our EtherNet/IP Capacity Tool.

Cable Length Limitations

The EtherNet/IP network uses fiber or copper twisted-pair wiring. The maximum length of copper twisted-pair wiring is 100 m between devices. There is no cumulative length for the entire network. Fiber cable length varies by design of the cable. Inside the MCC, all cables are copper twisted-pair.

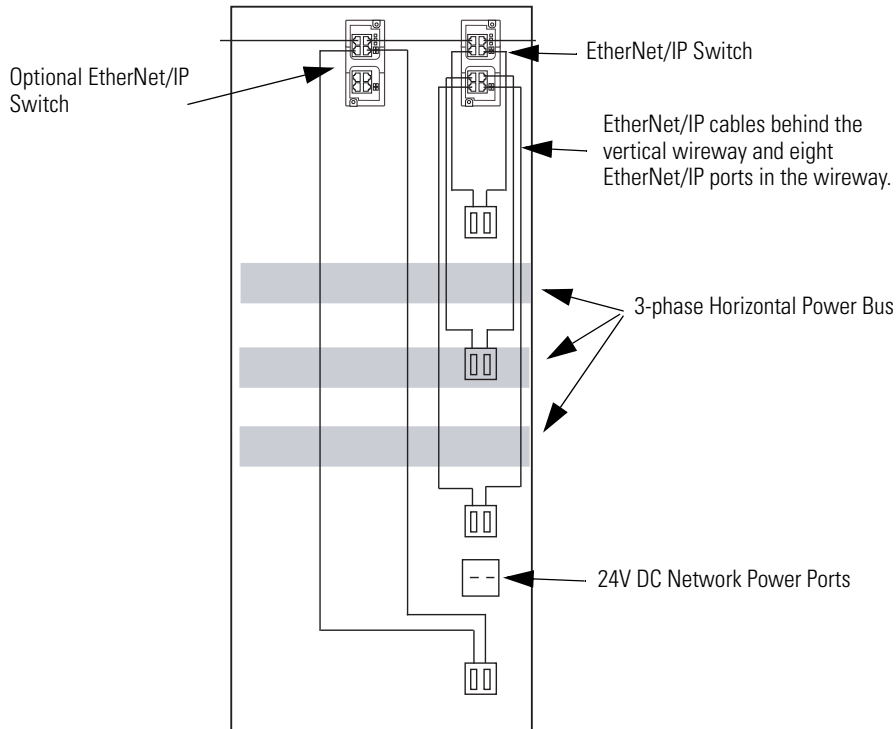
IMPORTANT The 100 m maximum length has to account for Ethernet cable inside the section. There is already up to three meters of cable from the Grace port on the power supply unit to the Ethernet switch. This cable length is added to the distance of the length between the Grace port and the externally connected device.

Cable Routing

Each EtherNet/IP section has one or two Stratix 6000 switches that are typically mounted in the top horizontal wireway. Certain requirements, such as, top mounted neutral plates or top mounted horizontal ground bus, would require the Stratix 6000 switch to be mounted in the bottom horizontal wireway. The number of switches depends on the number of units in the section. Cables connected to the switch are then routed to EtherNet/IP connections behind the vertical wireway.

In a standard 90 in. high MCC section, the vertical wireway has eight EtherNet/IP ports and four 24V DC network power ports. Units with communicating devices have an EtherNet/IP cable from the device, plugged into the ports. Units with devices that require 24V DC network power have a connection from the device, plugged into the power ports. Each EtherNet/IP port is independent, allowing any unit to be plugged in and removed without affecting adjacent units.

Figure 1. Typical Single MCC Section



MCC Cable Types



ATTENTION: Do not apply high voltage to any installed EtherNet/IP cable system or its connectors.

The CENTERLINE 2100 MCCs use a high voltage 600V Ethernet cable designed to perform above TIA 568-B.2 and ODVA Ethernet standards. These cables have the following features:

- Foil and braided shield, PVC, eight conductor (four pair)
- 600V PVC cable designed to support high voltage applications
- On-machine rated cable for use in a cable tray shared with high voltage power cables
- RJ45 insulation displacement connector available for field terminations
- Wide thermal operating range of -20...80 °C

Cable Specifications

Certifications	UL and cUL Listed
Outside diameter	0.32 ± 0.015 in. (8.13 ± 0.38 mm)
Operating temperature	-20...80 °C (-4...176 °F)
Cable rating	UL, cUL TYPE CMG; UL PLTC or UL AWM 2570 80C 600V, TIA 568B

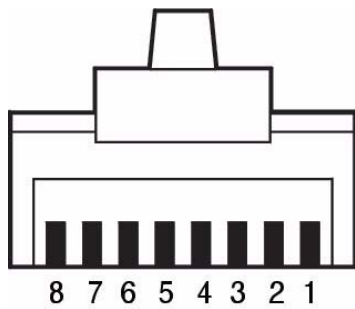


Figure 2. EtherNet/IP Cable Pin-out

1 - White/Orange	TxData +
2 - Orange	TxData -
3 - White/Green	Recv Data +
4 - Blue	Unused
5 - White/Blue	Unused
6 - Green	Recv Data -
7 - White/Brown	Unused
8 - Brown	Unused

Adding a Motor Control Center Unit to an EtherNet/IP System

Use this section to add Bulletin 2100 units to an EtherNet/IP MCC. Each EtherNet/IP component is factory wired within the unit and has a communication cable that plugs into the device on one end and generally into a vertical wireway EtherNet/IP port on the other end.

No. of Conductors	Jacket Material	Cable Type	Cable Rating	Cat. No. ⁽¹⁾
8	Teal 600V PVC	Foil and braided shield	(UL) CMX, CMR; c(UL) CMG; (UL) PLTC or AWM 2570 80 °C 600V; TIA-568-B	1585J-M8HBJM-2
	Red 600V PVC			1585J-M8EBJM-2

⁽¹⁾ Replace -2 (2 m) with -5 (5 m), or -10 (10 m) for additional standard cable lengths.

EtherNet/IP Power Supply

IMPORTANT Some EtherNet/IP devices require a 24V DC power source to operate. The power supply must meet NEC Class 1 requirements as outlined in Article 725.

Power supplies that do not satisfy both points listed above can result in damage to the Ethernet/IP signal and components, as well as failure to comply with NEC, local codes, and inspection.

A power supply unit that meets all EtherNet/IP requirements can be supplied with the MCC—catalog number 2100-EPS— (consult your local Rockwell Automation salesperson or Allen-Bradley distributor). It is available in three configurations: with circuit breaker or fusible disconnect and control transformer; or with no disconnecting means, requiring a separate 110...120V source. Redundant configurations are also available. A cable connects the output of the power supply to a 24V DC network power port in the back of the vertical wireway. The cable is already connected when the power supply unit ships installed in the MCC.

Connecting Power Supplies—Remote or in the MCC Line-up

Connecting power supplies according to these guidelines will minimize voltage drops in the EtherNet/IP system and ensure proper supply voltage to system devices. Refer to the Converged Plantwide Ethernet Design and Implementation Guide, [ENET-TD001](#), for detailed connecting instructions.

System Design Installation Checklist

When installing an EtherNet/IP MCC, use the following checklist before applying power to the network:

- Verify that the power supply for the system is 24V DC.
- All connections are inspected for loose wires, opens, and shorts.

EtherNet/IP Software Installation Checklist

The following general steps, along with references for more information, are provided to assist with the EtherNet/IP software installation process.

1. Install the communication card in your personal computer.
2. Load the Windows hardware drivers for the communication card.
3. Load RSLinx software.
4. Configure the RSLinx driver.
Within the RSWho function, make sure no unrecognized devices (the '?' symbols) appear for any devices. If an unrecognized device appears, load the electronic data sheet (EDS) file.
[Refer to How to Find Electronic Data Sheets \(EDS\) on page -8](#) for additional details.

IMPORTANT Do not leave the RSWho constantly browsing. Close the RSWho screen or disable Autobrowse.

5. Use the device web pages or RSLogix 5000 software to program and configure devices (for example, full load current and acceleration rate).
6. Write the PLC program.
7. If IntelliCENTER software is provided, load it per the IntelliCENTER Software User Guide, publication [MCC-UM001](#).

How to Find Electronic Data Sheets (EDS)

After installing IntelliCENTER software, an electronic data sheet (EDS) file must be registered for each unique device in the MCC. This section details how to perform that task.

Definition of EDS Files

EDS files are simple text files used by network configuration tools—such as RSNetWorx, RSLogix 5000, and IntelliCENTER software—to help identify products and easily commission them on a network. EDS files describe a product's device type, product revision, and configurable parameters on an EtherNet/IP network.

Necessary EDS Files

The IntelliCENTER data CD contains a directory (<cdrom>:\<order>\<item>\EDS) of EDS files necessary for the devices in your IntelliCENTER MCC. The EDS files are automatically registered by the installation program.

For EtherNet/IP MCCs, an 'EDS file' CD is provided. This CD contains EDS files for all EtherNet/IP products found in MCCs.

Installing EDS Files

The EDS files are installed with a program from Rockwell Software that is also on the IntelliCENTER data CD (in the same directory as the EDS files). This program is called 'RSHWare.exe'.

Follow these steps to install the EDS files.

1. Run the RSHWare.exe program.
2. Click Add/Remove.
3. Select Register an EDS file and click Next.
4. Select Register a directory of EDS files.
5. Browse to the EDS directory on the data CD.
6. Click Next.
The Installer will display the test results.
7. Click Next to continue.
The Installer will allow you to change the graphic image for each device.
8. Click Next to continue.
The Installer will display the final task summary.
9. Click Next to continue.
10. Click Finish when completed.

Finding EDS Files for Other Devices

EDS files can be obtained at <http://www.rockwellautomation.com/resources/eds/>.

Uploading EDS Files from the Device

RSNetWorx for EtherNet/IP software can also be used to upload an EDS file directly from the device. If an EDS file cannot be found by other methods, refer to the RSNetWorx help file for steps to upload an EDS file.

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Rockwell Automation, Rockwell Software, Allen-Bradley, CENTERLINE, CENTERLINE 2100, IntelliCENTER, NetLinx, Integrated Architecture, PanelView Plus, Stratix 6000, RSLinx, RSNetWorx, and RSNetWorx for EtherNet/IP are trademarks of Rockwell Automation, Inc.

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Publication 2100-TD031A-EN-P - March 2011