

IntelliCENTER Software
 IntelliCENTER Software provides significant reduction in troubleshooting time, allowing immediate issue identification, in many instances before equipment shuts down. Remote diagnostics reduces human interaction with the electrical equipment, improving safety for plant personnel. Early diagnostic and fast troubleshooting have significant, positive impact on overall system availability.

CIP - Simultaneously control, configure and collect
 The communication technology (Common Industrial Protocol) allows for simultaneous control, configuration and data collection. No resources are taken from the controllers and therefore no programming is required. The architecture provides concurrent support for real time control and strategies specifically targeted at predictive maintenance, asset performance management and overall equipment efficiency.

EtherNet/IP topology / resources
 Standard EtherNet/IP topology allows for any mix of star, tree, ring and linear configuration. Media choices include copper, fiber and IP-67. Any device can be accessed from any location in the system. There is no need to extend a second network to a remote I/O location to access Controllers and HMI servers. Real time control and information flow can be affectively managed throughout the manufacturing and IT enterprise.

CENTERLINE Motor Control Centers (MCCs)
 In a typical configuration, a CENTERLINE MCC network segment controls up to 45 motors. An individual ControlLogix controller can control up to 10 MCC network segments, each at a 32mS RPI, without disturbing the Critical System Attributes (CSA). See page 2 for details about typical MCC configurations and CSA.

Stratix 5700 Managed Switch:
 The EtherNet/IP Intelligent Motor Control (IMC) devices in each MCC section are connected to a Stratix 5700 switch located in either the horizontal wireway or in a frame-mount unit. Each switch can support IMC devices across multiple sections providing an optimized network layout and easy connection to an EtherNet/IP Scanner in ControlLogix or CompactLogix controllers. All switches are connected to each other in a linear topology and then follow a star topology to the IMC devices within the MCC. The Stratix 5700 allows for optimized EtherNet/IP bandwidth and auto-addressing of the IMC devices connected to it.

Premier Integration:
 PowerFlex drives can be directly connected to the Ethernet IP main backbone or I/O downlinks. In this configuration the drive's internal memory can be directly mapped into the ControlLogix controller memory (Premier Integration). In addition to reducing the software tools to just one, Premier Integration significantly reduces the time required to program and commission the system. Some configurations have shown 70% reduction in commissioning time.

EtherNet/IP Network
 IMC devices in the CENTERLINE MCC are connected through an EtherNet/IP network via a 600V, UL listed, PLTC rated Ethernet cable capable of 1 Gb/s. Ethernet connections are either made via ease-of-use EtherNet/IP network adapters that allow for quick maintenance or via direct, homerun connections. The combined linear and star topology allow for individualized unit maintenance from removal to re-insertion without disturbing the other IMC devices in the MCC. An optional switch-level ring topology can also be implemented to add network resiliency to the MCC architecture without impacting the maintainability of the MCC units. All IMC devices are tested at the factory and their IP Addresses and Subnet Masks are pre-configured to minimize commissioning time.

XM Machinery Protection & Condition Monitoring
 A complete motor control center includes machinery protection and condition monitoring. Allen Bradley XM modules are intelligent, distributed, DeviceNet based modules capable of meeting the stringent real time protection requirements of API 670 and providing critical condition monitoring information that detects problems such as unbalance, misalignment, defective bearings, and other problems early so that production is not impacted. EtherNet/IP communications is achieved via the XM-500 Ethernet Gateway Module. The XM-16x series provide cost effective protection and vibration trending information. The XM-12x series provide protection as well as the ability to automatically detect, alarm and diagnose many common motor problems in real time. This information is easily integrated into the overall control strategy, combining with information from drives and other devices to provide a comprehensive condition monitoring strategy.

PowerFlex Drives:
 Variable speed control is implemented with Allen-Bradley PowerFlex drives. Different product families are available in the PowerFlex portfolio depending on the requirements of each application (Vltz/Hertz, Slip Compensation, Sensorless vector, Vector Control w/ FORCE technology, Torque Regulation, Encoder or Encoderless Speed Control, Permanent magnet Motor Control).

E300 Full Voltage Starters
 Full Voltage Starters include Allen-Bradley E300 which provide digital communications and enough I/O to control standard or reversing starters. The E300 provides enhanced motor protection including:

- Thermal Overload
- Phase Loss
- Voltage Protection
- Power Protection (kW)
- Power Factor Protection (PF)

The E300 also provides motor diagnostic information including:

- Motor Current
- Motor Power (kW)
- Motor Demand (kW)
- Number of Starts
- Motor Energy Consumption (kWh)

SMC Reduced Voltage Starters
 Reduced Voltage Starters are implemented with Allen-Bradley Smart Motor Controllers (SMCs) which provide:

- Built-in Bypass/Run contactor
- Built-in Electronic Motor Overload Protection
- CT on each phase
- Multiple Modes of Operation (motor acceleration ramps)

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Critical System Attribute	Description
Display callup (paint time)	A noncached display is called up by operator and ready for operator use within 2 seconds
Display update	The display updates control information within 1 second.
Steady state alarm time	Steady state alarms occurring at 20 per second are timestamped within 1 second.
Alarm burst time	A burst of 1000 alarms are timestamped within 3 seconds.
Recovery	The system is operational within 5 minutes of the restoration of a system element failure or loss.
Data logging	The system supports local (HMI) data logging of 200 points once a second
Operator-initiated control	Operator-initiated actions are loaded into the controller and the feedback for the operator action is within 2 seconds.
Batch server: operator action time	An operator batch command has been acted on by the controller in 1 second.
Batch server: server action time	A server batch command has been acted on by the controller in 1 second.
Batch server: controller action time	Batch status events display on the operator workstation within 1 second

Bill of Material

CENTERLINE Motor Control Center with IntelliCENTER Technology:

2100: 10 vertical sections with approx. 4.5 units per Section (45 units total, plus condition monitoring modules, switches and power supply units)

2500: 6 columns with approx. 7.5 units per column (45 units total, plus condition monitoring modules, bridge and power supply units)

Qty	Description
15	Size 1 Full Voltage Non-Reversing (FVNR) Starters with E300 Electronic Overload Relays via 193-ECM-ETR
4	Size 2 FVNR Starters with E300 Electronic Overload Relay via 193-ECM-ETR
2	Size 3 FVNR Starters with E300 Electronic Overload Relay via 193-ECM-ETR
1	Size 4 FVNR Starters with E300 Electronic Overload Relay via 193-ECM-ETR
11	SMC-Flex Soft Starters with EtherNet/IP Communications
12	PowerFlex 750 Series Variable Frequency Drives with EtherNet/IP Communications
1	Ethernet/IP Power Supply
2-6	Stratix 5700 Managed Switch (Qty. dependant upon level of desired optimization)
3	XM160 Condition Monitoring Modules (See Note)
1	XM120 Condition Monitoring Modules (See Note)

CENTERLINE 1500 Medium Motor Control Center with IntelliCENTER Technology:

5 sections with one or two motor controller per section

Qty	Description
4	4000HP/6.9kV Full Voltage Non-Reversing Starters with E300 Electronic Overload Relay, IntelliVAC Plus Controller, and XM-120 Vibration Module
1	4000HP/6.9kV Full Voltage Non-Reversing Starters with 857 Motor Protector Relay, and IntelliVAC Plus Controller
2	7500HP/6.9kV

NOTE:

- For sleeve bearing motors with non-contact eddy current probe sensor pairs, we recommend two XM-120 modules per motor or one XM-162 module.
- For sleeve bearing motors that use case mounted velocity output sensors or for rolling element/anti-friction bearing motors, we recommend one XM-120 module per motor. One XM-160 can support up to three motors using only case mounted sensors.

About this Configuration:

Rockwell Automation's CENTERLINE family of MCCs provides a complete motor control solution for low and medium voltage systems. IntelliCENTER Technology allows users to maintain a globally consistent network architecture while selecting electrical equipment to meet local standards.

About the Motor Control Center:

CENTERLINE Motor Control Centers with IntelliCENTER Technology

Reduced Installation and Start-up Cost

Save up to 90% on wiring and installation time and material cost, while IntelliCENTER Technology's pre-wired and factory-validated network reduces start-up time.

Enhanced Personnel Safety

Use network access and preconfigured software to configure and troubleshoot devices without opening enclosure doors. This reduces personnel exposure to hazardous energy levels and the resultant need to "suit up" for routine maintenance.

Improved Management of Production Assets

IntelliCENTER Software includes all MCC documentation, such as wiring diagrams, user manuals, spare parts list, and user-added documents. IntelliCENTER Software also includes advanced features like an event log and data trending that can help you see how your equipment performance is changing over time, so you can take action before the equipment fails.

Improved Uptime

- IntelliCENTER Technology can help keep your facilities up and running with electronic documentation, remote diagnostics, predictive maintenance, and easy replacement of MCC units.
- New units can be added to the MCC and to the PLC program without shutting down the network scanner, providing the flexibility required for continuous processes where shutting down is not an option.

PowerFlex Drives

The Allen-Bradley® PowerFlex family of drives offers a broad range of control modes to fit virtually any motor control requirement. With the combination of features, options and packaging for application versatility, to helping meet safety requirements, ease programming and configuration the PowerFlex family has a solution to meet your application demands.

When you configure your CENTERLINE Motor Control Centers with PowerFlex drives you'll receive improved motor control performance and motor efficiency along with important information about your motors delivered to where it's most valuable--all equating to greater overall production efficiency and real bottom-line savings.

Most commonly used PowerFlex drives in CENTERLINE Motor Control Centers:

	PowerFlex 520 Series	PowerFlex 70	PowerFlex 700	PowerFlex 750 Series
Motor Control	• Volts per Hertz • Sensorless Vector Control • Open Loop Speed Regulation	• Volts per Hertz • Sensorless Vector Control • Vector Control w/FORCE™ Technology • Closed Loop Speed Regulation • Precise Torque Regulation	• Volts per Hertz • Vector Control w/FORCE™ Technology • Adjustable Voltage Control • Precise Torque & Speed Regulation	• Volts per Hertz • Sensorless Vector Control • Vector Control w/FORCE™ Technology with and without an encoder • Precise Torque & Speed Regulation • Indexer Positioning
Ratings 100-115V 1 Ph.	• 0.2...1.1 kW • 0.25...1.5 Hp • 1.6...6 A	• N/A	• N/A	• N/A
Ratings 200-240V	• 0.2...15 kW • 0.25...20 Hp • 1.6...62.1 A	• 0.37...18.5 kW • 0.5...25 Hp • 2.2...70 A	• 0.37...75 kW • 0.5...100 Hp • 2.2...260 A	• N/A
Ratings 400-480V	• 0.4...22 kW • .5...30 Hp • 1.4...30 A	• 0.37...37 kW • 0.5...50 Hp • 1.1...72 A	• 0.37...500 kW • 0.5...700 Hp • 1.1...875 A	• 0.75...250 kW (2.1...456 A) • 1...350 Hp (2.1...415 A)
Ratings 500-600V	• N/A	• 0.37...37 kW • 0.5...50 Hp • 0.9...52 A	• 0.75...132 kW • 1 - 150 Hp • 1.7...144 A	• 1...50 Hp (1.7...52 A)
Ratings 690V		• N/A	• 45...132 kW • 50...150 Hp • 1.7...144 A	• 10...300 Hp (12...289 A)
Integrated Safety	• No	• Safe Torque-Off SIL CL2, PLd, Cat 3	• No	• Safe Torque-Off SIL CL3, PLe, Cat 3 • Safe Speed Monitor SIL CL3, PLe, Cat 4