CENTERLINE 2500
Low Voltage Motor Control Centers and Switchgear Assemblies Selection Guide

Designed for Intelligence, Safety, and Reliability
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ArcShield™ Drives

At Rockwell Automation, we understand the importance of safety. The arc flash containment safety features available in the CENTERLINE® 2500 IEC Motor Control Centers (MCC) with ArcShield for starter and feeder units are now available in variable frequency drive (VFD) units. The full range of VFDs have been tested and certified to meet IEC/TR 61641 ed 3.0 2014-1 in compact unit designs (from 2 to 24 modules). This certification is available for both IP42 and IP54 enclosure ratings through a specialized baffle. Any unit fault does not threaten nearby personnel or damage adjacent units. VFD units with ArcShield protection remain compact, even with line and load reactors for overall footprint reduction.

For more details, see page 9 and page 45.

Mains/Feeders/Ties

The CENTERLINE 2500 IEC MCC main incoming, feeder, and tie units now have higher power ratings in a smaller footprint. This premier offering uses updated air circuit breakers with enhanced features. Units are available with or without Arc flash protection via ArcShield. Specialized venting designs provide IP42 and IP54 ratings with ArcShield. Market-leading metering and protection options include main-tie-main control, generator control, power monitoring, and remote operations. Communications with Ethernet IP or IEC 61850 are also available.

For more details on unit configurations, see page 33.

Fixed Units

Functional units are now available in a fixed configuration for all unit sizes (except the 1 module). Fixed units can be an economical alternative for applications that do not require the enhanced functionality that the withdrawable units offer. Previously, only fixed units larger than 12 modules were available. In fixed units, the line, load, PE, control, and network connections are wired directly to the components. Units are not interchangeable like a withdrawable unit.

For more details on this option, see page 28.
The Allen-Bradley® CENTERLINE 2500 Motor Control Center (MCC) from Rockwell Automation® uses the latest technology in motor control devices. The CENTERLINE 2500 MCC is designed and built for the demanding needs of global markets so it meets international standards.

**High Performance Motor Control Centers**

The CENTERLINE 2500 provides fully withdrawable or optional fixed units with the full range of IEC components, AC drives, soft starters, and other devices. The CENTERLINE 2500 MCC provides intelligent control with common communication protocols easily networked in the MCC.

Because the CENTERLINE 2500 MCC is designed to international standards, customers can rely on corporate standards and control schemes globally. You can also achieve a consistent integrated architecture standard and use uniform safety designs.

**Integrated Power Solution**

In addition to a complete line of motor control equipment, the CENTERLINE 2500 MCC also packages power distribution equipment. Your CENTERLINE 2500 MCC can include air circuit breakers, feeders, main-tie-mains, mains and transformers. This lets you have a totally integrated, low voltage power package.

**Features**

- Fully withdrawable units
  - Plug-in line, load, control, ground and network communications
  - Four position withdrawal mechanism with dedicated Test position
  - Easily removable without special tools
- Optional fixed units
- High unit density, up to 24 units per column
- Rotary handles
- Three or four wire power system capability
- Center-mounted, horizontal bus up to 4000 A
- Built-in EtherNet/IP with IntelliCENTER® technology
- Intelligent motor controls including electronic overload relays, AC drives, and soft starters
- Fully metric design (hardware and exterior dimensions)
- Air circuit breaker mains and feeders available
The CENTERLINE 2500 MCC is ideal for customers who want to leverage the same architecture, components, programming language, and networking regardless of where you do business, all while knowing you receive unparalleled support from a single-source provider.

With more intelligent components and more options than other motor control center manufacturers, you can get a complete power, control, and information solution. CENTERLINE 2500 MCCs are packaged to meet your local specifications and are built on a common platform.

**IntelliCENTER Technology**

Networked CENTERLINE MCCs enhance performance through system-wide communications, sharing diagnostic information for predictive maintenance, and initiating warnings before potential faults occur.

The CENTERLINE 2500 MCC delivers this by using IntelliCENTER Technology, a preconfigured and tested software solution that provides built-in networking. IntelliCENTER technology enhances the intelligence of an MCC by using built-in networking to capture information used for predictive maintenance, process monitoring, and advanced diagnostics.
**Intelligent Motor Controls**

CENTERLINE MCCs with IntelliCENTER technology combine intelligent motor control and protection devices to give you an inside look at your motor control application. IntelliCENTER technology can provide advanced networking and diagnostic capabilities with a built-in network, intelligent motor controls, and advanced monitoring software, all preconfigured and tested at the factory.

**Built-in Network**

CENTERLINE MCCs with IntelliCENTER technology offers EtherNet/IP as factory-validated and tested embedded systems. This reduces your MCC set-up time and increases the network speed, allowing you to quickly monitor, troubleshoot, and diagnose your MCC from anywhere.

**IntelliCENTER Software**

The addition of IntelliCENTER Software provides the ultimate window into your MCC. The software puts both real time diagnostics and MCC documentation at your fingertips to maximize MCC and related equipment performance. Graphical views of individual MCC units display device data, allowing you to quickly view critical status information.

**With its ‘plug-and-play’ setup,**

**IntelliCENTER Technology reduces installation time and minimizes facility downtime. It is able to quickly start delivering intelligent diagnostic and predictive failure information.**

**Daewoo Shipbuilding**

**Marine Engineering – South Korea**

**Integration Assistant**

With IntelliCENTER Integration Assistant, you can seamlessly integrate your IntelliCENTER MCCs into Studio 5000® programming software. This feature helps reduce programming time by automatically adding the CENTERLINE MCC devices to the Studio 5000 I/O tree.

**IntelliCENTER Energy**

IntelliCENTER Energy offers a preconfigured setup of FactoryTalk® EnergyMetrix™ software for intelligent motor control devices in the MCC, including variable speed drives, overload relays, and SMCs. With IntelliCENTER Energy, you can view energy consumption at the device level directly from IntelliCENTER software, making it easier to monitor and manage energy usage in the industrial facility.
Increase Uptime with Advanced Maintenance Tools
The preconfigured software provides maintenance personnel with easy access to critical CENTERLINE MCC configured information and process data for troubleshooting. The configurable views provide system status at a glance and help keep facilities running with electronic documentation, remote diagnostics, and predictive maintenance. IntelliCENTER software significantly reduces HMI programming time and PLC development time with automatic tag generation and even complete network configuration before the MCC is powered up.

Enhance Personnel Safety
Enhanced safety is realized with access to real-time data for remote monitoring, configuration and troubleshooting of intelligent motor control devices. IntelliCENTER software harnesses the power of the Integrated Architecture® system to allow you access to critical MCC information from anywhere in your facility. IntelliCENTER technology increases your access to information, minimizes maintenance and troubleshooting time with real-time motor control diagnostics and increases productivity with complete packaged and pre-engineered solutions for your most challenging applications.

“We receive an alarm in the main plant control room if amperage in one pump controller is too high, and we can go directly to the problem and fix it. In some instances, the system’s predictive monitoring in the MCCs helps us address over-amperage problems before faulting.”

Bob Moreno
City of Yuma, AZ – USA
Global and Regional Standards
The CENTERLINE 2500 MCC is designed to meet your entire operations’ needs so you can implement a consistent solution and supplier throughout your facilities, anywhere in the world. For a complete list of standards and certifications, see page 56.

Safety
The CENTERLINE 2500 MCC is designed to provide you with an improved safety offering. Standard safety features help protect employees and keep your process up and running.

- Rigid structural design with side sheets on all sections provide better isolation and continuous internal mounting angles, main bus and lifting angle
- Solid unit base plates help prevent a unit fault from cascading to other units within the column
- Arc-free zones provide you areas within your MCC where it is not possible to apply an ignition wire without destroying the insulation
- Continuous bus bracing provides a fully isolated vertical bus
- Automatic shutters immediately isolate vertical bus when unit is removed
- Unit interlock mechanism designed to make servicing safer
- Dedicated vertical wireway for customer connections
- Locking provisions provide additional safety in all four unit positions (connected, test, disconnected and withdrawn)
- Isolated unit power stab assembly
- Machine-torqued, two-bolt fastening system used for the vertical-to-horizontal bus connection

“The safety issue is one of the things that we are happiest with. The old system created hazardous troubleshooting conditions, with technicians having to test and probe and work around live wires within a confined panel space.”

Ronnie Sexton
Acme Brick – USA
ArcShield

The CENTERLINE 2500 MCC with ArcShield offers better protection against harmful arc flash hazards and helps protect your personnel if an arc flash were to occur within an MCC. This protection can help increase facility uptime by minimizing the potential damage to equipment.

Although operators and manufacturers of low voltage systems are becoming more experienced, there is still a risk of internal arc generation. To enhance the protection of personnel and equipment, Rockwell Automation tests the CENTERLINE 2500 MCCs to IEC/TR 61641 ed 3.0 2014-1, which is a standard for testing under conditions of arcing due to internal fault.

In combination with the standard safety features built into every CENTERLINE 2500 MCC, choosing ArcShield provides additional benefits, including:

- Pressure relief system designed to exhaust gases through the top of the enclosure, away from personnel
- Specialized arc baffles that provide ventilation while maintaining personnel protection
- Internal ventilation to protect personnel
- Arc containment latches and hinges on all doors capable of withstanding the high internal pressure generated by an arc blast
- Thicker doors with reinforced flanges
- Additional structural bracing on both sides of MCC
- Heavy duty ground stab on withdrawable units

With the addition of IntellICENTER technology, your personnel can remotely monitor and access data for troubleshooting, minimizing the need for entry in the arc flash boundary zone.

The CENTERLINE 2500 low voltage MCC with ArcShield was tested against the IEC/TR 61641 standard. It passed all tests at 480V with a rated frequency of 50/60 Hz, and arcing time of 300 ms and test current of 65 kA.
Selection Process

Use the following sections in this publication to select a CENTERLINE 2500 Motor Control Center.

Selection Checklist

Complete each corresponding part of the selection checklist as you work through the following steps. A completed checklist helps your local sales office better understand your needs.

The selection checklist starts on page 56.

NOTE: An electronic version with fillable fields is available online, 2500-SR001.

Step 1: Select Network Technology

Choose the level and type of networking technology, diagnostic, and HMI software tools.

Step 1 starts on page 11.

Step 2: Select Structure

Choose the IP rating you require, the width and depth of the column (size of wireways) and the degree of separation.

Step 2 starts on page 16.

Step 3: Select Power Systems

Choose 3 or 4 wire electrical system, horizontal and vertical power bus capacity, bus withstand and short circuit withstand rating.

Step 3 starts on page 23.

Step 4: Select Unit Designs

Choose unit size, style, and disconnect means.

Step 4 starts on page 26.

Step 5: Select Unit Types

Choose the type of units from mains and feeders, starters, variable frequency drive, PLCs, and miscellaneous non-motor loads.

Step 5 starts on page 33.
Step 1: Select Network Technology

Built-in Networking
- EtherNet/IP
- Media protected behind barriers
- Topology so you can add and remove devices without interrupting any other device on the network

Intelligent Motor Controls
- PowerFlex® 523, 525, 753, and 755 drives
- SMC™ Flex soft starters
- E300™ or E1 Plus™ Electronic Overload Relays

IntelliCENTER Software
- Distributed IO
- POINT I/O™/DSA
- Virtual MCC
- Status dashboards
- Energy monitoring and management
- Documentation management
- Spare parts information

Factory Configuration
- IP address network media validation
- IP address node configuration
- Communication check
- Network commissioning

IntelliCENTER technology improves the intelligence of your MCC with built-in networking to capture information used for predictive maintenance, process monitoring, and advanced diagnostics.
EtherNet/IP enables IntelliCENTER Integration Assistant that automatically configures and populates your I/O tree and network configuration.

Network
EtherNet/IP enhances integration, helps reduce your MCC set-up time, and increases the network speed. It also lets you quickly monitor, troubleshoot, and diagnose your MCC from anywhere. CENTERLINE MCCs provide robust motor control capabilities with access to the real-time data you need by using a network that communicates with your entire enterprise.

The cost and performance of a EtherNet/IP network makes them ideal for MCC applications. Open specifications and protocol, managed by the Open DeviceNet Vendor Association (ODVA), means vendors are not required to purchase hardware, software or licensing rights to connect to a system.
Example of EtherNet/IP Network

![EtherNet/IP Network Diagram]

**EtherNet/IP**

**Devices**

Each EtherNet/IP network has one or two Stratix® switches typically mounted in the top horizontal wireway in the standard configuration. Up to 16 EtherNet/IP ports can be provided in each control and network wireway. Cables connected to the switch are then routed to EtherNet/IP devices in the column.

Each EtherNet/IP component in an MCC unit is connected to the network through a port in the control and network wireway. Adding or removing units from the network does not interrupt the other units operating in the system. Network wireways are isolated from the power wire.

**Cabling**

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 cable design. All EtherNet/IP cabling is 600V rated, meaning separation from motor cables is not needed. The EtherNet/IP cabling system for IntelliCENTER technology has been extensively tested for noise immunity with network cables in close proximity to high current motor leads. IntelliCENTER technology provides a robust network solution.

All EtherNet/IP cables are routed through the control and network wireway as well as the top or bottom wireway of the MCC. All cables are routed behind barriers to isolate the cable from the unit space and wireways to help prevent accidental damage.

**System Performance**

The EtherNet/IP system in the MCC is designed to operate at 100 Mbaud.

An EtherNet/IP system is qualified to communicate and perform under normal and adverse electrical environments. Its application can be plant-wide and over multiple disciplines through commercial off-the-shelf (COTS) products like Ethernet switches and devices.
EtherNet/IP Components

Each unit can be provided with an EtherNet/IP component.
- Starter units can be provided with a solid-state overload relay, like the E300.
- AC drives can be provided with an EtherNet/IP communication module and/or an embedded option.
- Solid-state controllers can be provided with EtherNet/IP communication modules and, in some instances, an EtherNet/IP POINT I/O system.
- Feeder circuits can be provided with a EtherNet/IP POINT I/O system.

The EtherNet/IP system has the following capabilities:
- Automatic Device Configuration (ADC), which automatically downloads the IP address, firmware, and device parameter settings to a newly replaced device without user interaction. You can quickly replace a failed device without any tools or expertise, and ADC completely configures all aspects of the device in minutes.
- Switch-level linear or switch-level ring topologies provide network flexibility for any sized operation or business system.
- Heavy traffic performance.
- You can add or subtract nodes on-the-fly.
- Advanced network configuration, security, and diagnostics provided by layer-2 managed Ethernet switches.

For more information on MCCs with EtherNet/IP, refer to CENTERLINE 2500 Motor Control Centers with EtherNet/IP Network, publication 2500-TD003.

IntelliCENTER Software

The CENTERLINE 2500 MCC is available with preconfigured IntelliCENTER software. IntelliCENTER software is an intuitive software package that is customized to your MCC. The software is a monitoring and diagnostics tool capable of viewing, managing, and configuring multiple MCC line-ups. The IntelliCENTER software communication driver lets the software be installed and operated on EtherNet/IP. The IntelliCENTER software can function as a stand alone software package or as an ActiveX control in a HMI. The IntelliCENTER software displays the following views.

Elevation View

The Elevation View screen in IntelliCENTER is an easy-to-identify, graphical representation of your entire MCC lineup. The condition of each motor controller is quickly established with status light indicators. Customizable text provides instant identification of the motor, machine or process.
- Navigate immediately to units of concern by simply double clicking on them
- Re-arrange the view by using simple drag-and-drop
- Select units for which you want to see manuals, wiring diagrams, or spare parts
Monitor View

The Monitor View screen displays an overview of the intelligent motor control device being monitored, with configurable gauges, trend graphs, I/O status on the device and configurable data fields.

- Monitor parameters from the intelligent devices
- Use device awareness to predict potential faults
- Record and export up to 5000 data points with the real time data trend graph
- Change what parameters are displayed in the monitor view

Energy Monitoring and Management

IntelliCENTER software can be integrated with FactoryTalk EnergyMatrix software to monitor and manage energy consumption, putting critical energy information at your desktop. Integrating these two software provides an energy monitoring functionality exclusive to Rockwell Automation customers with improved productivity and lower energy costs as the net result.

Documentation Management

Documentation Management accesses the various manuals, diagrams, and other important MCC information.

Manuals and Wiring Diagrams

The IntelliCENTER Software data CD comes with the complete documentation for your MCC, including wiring diagrams and device manuals. Your manuals are quickly available when you need them most.

- Troubleshoot problems with the exact manuals for your MCC
- Trace out wiring and understand control circuits with wiring diagrams
- Add new documentation (procedures, engineering notes) associated with your MCC
- Substitute ‘as-built’ drawings with your ‘as-installed’ drawings

Spreadsheet View

This view is for sorting and editing data that seldom changes, including the following information:

- Node number (network address)
- Unit description
- Nameplate data
- Device type
Event Log View
The Event Log View screen keeps a history of changes to equipment parameters (trip settings, warnings, and faults). The software can create an ‘Auto Log’ or manually log these changes.

Spare Parts List
A spare parts list is provided for each unit to quickly identify replacement parts. The list includes each part’s number and description, which saves time when calling your authorized Allen-Bradley distributor.

Integration Assistant
IntelliCENTER software offers a Studio 5000® Integration Assistant for those users connecting their IntelliCENTER MCCs to a Rockwell Automation PLC like the ControlLogix® or CompactLogix™ processor. Integration Assistant takes customized MCC information within the IntelliCENTER software and exports it to Studio 5000, providing quick device integration and reducing programming time.

- Automatically builds and populates the Studio 5000 I/O tree with all intelligent motor control devices used in the MCC
- Automatically imports device configuration including auto-generated device tags from device add-on profiles (AOPs)
- Quickly transitions programming logic to control end devices and application

Factory Configuration
IntelliCENTER Technology can save you time because each MCC is pre-wired, and the network is pre-programmed and validated at the factory. Network devices are preconfigured with node addresses and communication rates, ready to communicate so you can configure device parameters (such as acceleration time and full load amps) via the network.

IntelliCENTER Database
The IntelliCENTER database contains all of your order-specific information. One IntelliCENTER database is needed for each MCC lineup or for individual units (when the unit is purchased separately). The database is installed on the computer or computers running the IntelliCENTER software. The database CD includes the IntelliCENTER data files, all of the electronic documentation, all of the up-to-date EDS files for the networked devices and the network configuration file as recorded during the final system test of the MCC. The EDS and configuration files are very useful for programming the control system, allowing the programmer to complete the project before the equipment is even energized.

When used with Studio 5000 and RSNetworx™ for DeviceNet software, the programmer can use the DeviceNet Tag Generator utility in Studio 5000 to instantly generate descriptive tags for every device in the MCC. For EtherNet/IP, the configuration file can help in determining the installed firmware revision to properly configure the Studio 5000 software Add-on-Profile (AOP) that generates all of the tags for each EtherNet/IP device in the MCC.
Step 2: Select Structure

Mounting Configurations
The MCC is available in two mounting configurations, single front and double front.
- Single front columns are joined and installed side-by-side.
- Double front columns are two separate columns joined at the rear with back plates removed. The two columns have separate power bus systems providing the same phasing for all units. The horizontal power bus is linked front to rear with a factory installed, U-shaped bus splice assembly.

Due to their size, some double front configurations must be shipped as single front columns and assembled on site. See ‘Column Shipping’ below for more information.

Configurations with a ventilated bus require an air gap to the rear of the column. For further details, see the Depth table on page 18.

Column Construction and Dimensions
The CENTERLINE 2500 MCC’s rigid design helps provide a longer life. Withdrawable units can still be installed and removed and doors close securely after years of dependable service.

Fault containment is enhanced with two side sheets on every column to help prevent a single fault from cascading throughout the structure and limiting equipment damage.

Unit size is described in terms of modules. Each module is approximately 80 mm high. Columns can accommodate 24 modules of varying combinations.

Columns are secured at the installation site by bolting together clearance holes in the mounting channels or welding together.

Column Shipping
A steel lifting angle is provided on each column while one continuous, removable lifting angle is provided on each single front shipping block. Two lifting angles are provided on each double front column while two continuous, removable lifting angles are provided on each double front shipping block.

Only double front configurations of 600 mm deep columns are factory shipped. Double front configurations are possible for 800 mm deep columns but they must be factory shipped as single front columns and then assembled on site.
Typical Withdrawable Column

(A typical fixed column does not have a vertical wireway)
Column Dimensions

All measurements are mm unless otherwise specified.

Widths

<table>
<thead>
<tr>
<th></th>
<th>Column With Wireway</th>
<th>Column Without Wireway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed or Withdrawable Unit Width</strong>&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td><strong>Vertical Wireway Width</strong>&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td><strong>Total Column Width</strong></td>
</tr>
<tr>
<td>500</td>
<td>200</td>
<td>700</td>
</tr>
<tr>
<td>300</td>
<td>800</td>
<td>1000</td>
</tr>
<tr>
<td>400</td>
<td>900</td>
<td>1300</td>
</tr>
<tr>
<td>500</td>
<td>1000</td>
<td>1500</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Available from 1…24 modules.
<sup>(2)</sup> Recommended minimum wireway widths for the various forms of separation:
  - For 3B, 300 mm wide
  - For 4B Type 5, 400 mm wide
  - For 4B Type 7, 500 mm wide

<sup>(3)</sup> Applies to a full column (24 modules).

Depth

<table>
<thead>
<tr>
<th></th>
<th>Single Front</th>
<th>Double Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>800&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>1600&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Single front IP42 configurations with a 3200 A or 4000 A bus require a 100 mm air gap behind the column. In these instances, the overall depth is 900 mm.
<sup>(2)</sup> Double front IP42 configurations with a 3200 A or 4000 A bus require a 400 mm air gap between the rear of the columns. In these instances, the overall depth is 2000 mm.

Thicknes, nominal

<table>
<thead>
<tr>
<th>Description</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side plates (all depths)</td>
<td>2</td>
</tr>
<tr>
<td>Back plates (all widths)</td>
<td>2.5</td>
</tr>
<tr>
<td>Bottom mounting channel&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>3.5</td>
</tr>
<tr>
<td>Top plates (all widths)</td>
<td>2</td>
</tr>
<tr>
<td>Bottom plates</td>
<td>2</td>
</tr>
<tr>
<td>Horizontal wireway covers</td>
<td>2</td>
</tr>
<tr>
<td>Wireway door</td>
<td>2</td>
</tr>
<tr>
<td>Doors (1…22 modules)</td>
<td>2</td>
</tr>
<tr>
<td>Doors&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>2.5</td>
</tr>
<tr>
<td>ArcShield 480V doors&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>2.5</td>
</tr>
<tr>
<td>ArcShield 480V doors&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>3</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Front and rear
<sup>(2)</sup> 1…22 modules
<sup>(3)</sup> 24 modules

Height

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total height</td>
<td>2300</td>
</tr>
<tr>
<td>Available unit height</td>
<td>1980</td>
</tr>
<tr>
<td>Top horizontal wireway</td>
<td>170</td>
</tr>
<tr>
<td>Bottom horizontal wireway</td>
<td>115</td>
</tr>
<tr>
<td>External mounting channel</td>
<td>35</td>
</tr>
</tbody>
</table>

Weight<sup>(3)</sup> (kg)

<table>
<thead>
<tr>
<th>Column Width</th>
<th>600 mm&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>800 mm&lt;sup&gt;(1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>600, 700</td>
<td>350</td>
<td>450</td>
</tr>
<tr>
<td>800</td>
<td>400</td>
<td>525</td>
</tr>
<tr>
<td>900</td>
<td>450</td>
<td>575</td>
</tr>
<tr>
<td>1000</td>
<td>500</td>
<td>650</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Weights shown are for a MCC column with six units. Many factors (number of units, horizontal power bus, wireway width, column depth, and shipment packaging) affect the actual weight. The packing slip shipped with a MCC unit shows the exact shipping weights.
Degree of Protection
In accordance with IEC 60529, structures are available with the following IP ratings.

- IP 20
- IP 42
- IP 54

Structure sheet metal has rounded edges and is tightly fitted with no visible air gaps.

Operating Environment
The MCC is intended for use in up to a pollution degree 3 environment.

The MCC is designed to operate in an ambient operating temperature range of -5…+40 °C up to 95% non-condensing humidity, with the average temperature in any 24 hour period not exceeding 35 °C.

The MCC is designed to operate at altitudes up to 1000 m without derating. For altitudes exceeding 1000 m, contact your Rockwell Automation representative for derating information.

Plating and Painting
The standard treatment for internal sheet metal parts on a Centerline 2500 MCC is Z275 galvanized metal plating. Remaining structural metal undergoes a multi-step cleaning, rinsing, powder coating, and baking process, which results in a thickness of 20 microns (µm) with superior adhesion and resistance to impact and salt spray. These processes are maintained and controlled by ISO 9001 quality standards.

The standard exterior paint color is Pebble Grey (RAL 7032). Closing plates, channel supports, lifting angles, and horizontal wireway covers are painted Black Grey (RAL 7021). Additional paint colors are available as a custom option.

Master Nameplates
When specified, the MCC master nameplate is available with up to five lines of engraving and is on the top horizontal wireway cover.

Wireways
Each MCC has horizontal, vertical, and control and network wireways for continuous dedicated wire and cable location.

Horizontal Wireways
Horizontal wireways are at the top and bottom of each MCC column. Horizontal wireways extend the full width and depth of the MCC. A barrier is present in the top horizontal wireway to provide a connection point for network receptacles. The top horizontal wireway is 170 mm high, while the bottom horizontal wireway is 115 mm high. Complete wireway access from front to rear is available for double-front configured MCC columns.

Horizontal wireways have removable front covers that are held in place by captive screws. Openings in the side plate of the column allow access to the top and bottom horizontal wireways between joined columns. Plates are provided to cover these openings for columns at the end of a MCC lineup.

Horizontal wireways are isolated from the power bus. Horizontal wireways for incoming line sections are reduced depth to maintain isolation from the incoming line area.

Vertical Wireway
The vertical wireway is on the right side of each column and extends 1980 mm, between the top and the bottom horizontal wireway. The vertical wireway is approximately 350 mm deep. Vertical wireways are available in widths of 200, 300, 400 and 500 mm. Wider wireways are recommended for MCCs with higher bus ratings and higher unit density per section.
Step 2: Select Structure

The vertical wireway is isolated from power bus and is independent of unit space. Vertical wireways are present in only columns with withdrawable units.

Each vertical wireway has a steel door with multiple door latches. Vertical wireway cable supports are available to help you keep your cable wireways organized.

**Control and Network Wireway**

A separate, dedicated wireway isolates control and optional network cables from power wiring.

The control and network wireway is on the left side of the column in the unit space. Control and network connections are made to withdrawable units through receptacles in this wireway.
Forms of Separation

Internal isolation and separation exists between the following:

- Individual units
- Units and wireways
- Units and the bus system
- Wireways and the bus system

In addition, the vertical wireway for power wiring is separate from the vertical wireway for control and network wiring.

Standard internal separation within the MCC is Form 3b. Form 4b is available via separate cable chambers in frame mounted and fixed units, and individual boxes for connections within vertical wireways.

Form 2b:
- Busbars are separated from functional units
- Functional units and terminals are not separated

Form 3b:
- Busbars are separated from functional units
- Functional units are separated from each other
- Terminals are separate from functional unit but not from each other

Form 4b (Types 5 and 7 available):
- Busbars are separated from functional units
- Functional units are separated from each other
- Terminals are separate from functional unit and also from each other
ArcShield Technology

CENTERLINE 2500 MCC with ArcShield reduces arc flash hazards and offers improved personnel and assembly protection against conditions due to internal arcing up to 480V, 65 kA, up to 300 ms.

CENTERLINE 2500 MCC with ArcShield is tested in multiple locations (such as individual units, bus compartment) and meets IEC/TR 61641 Edition 3.0, 2014-1, parts 1-7.

Besides the standard safety features built into every CENTERLINE 2500 MCC, choosing ArcShield provides the following additional benefits:

- **Enclosures with specialized front ventilation** to protect personnel in front of the MCC
- **Additional structural bracing** on both sides of MCC enclosure
- **Internal ventilation** that directs exhaust gases towards the top of the MCC enclosure and the pressure relief system
- A **pressure relief system** designed to exhaust gases through the top of the enclosure, away from personnel
- **Thicker doors with reinforced hinges** and **arc-containment door latches** that can withstand the high internal pressure of an arc blast and keep the door latched to the MCC during an arcing fault
- **Insulating covers on horizontal bus closing plates** help prevent 'burn through' from arcing faults in the horizontal bus compartment

Optional optical and current sensing technology are available for even more protection.

IntelliCENTER technology has remote maintenance and troubleshooting capabilities so personnel remain out of the arc flash boundary and safe from electrical and arc flash hazards. Personnel can perform the following procedures while keeping the unit door closed:

- Overload detection (monitor warning/trip)
- Change overload relay setting (FLA and Trip Class)
- Measure/monitor phase currents
- Measure baseline motor currents
- Ground fault detection (monitor warning/trip)
- Monitor motor thermistor
- Time to trip, time to reset
- Reset overload relay
- Event history
- Verify control power
- Verify starter operation

ArcShield certificates are available upon request.
Step 3: Select Power Systems

CENTERLINE 2500 MCCs are suitable for use on three-phase, three-wire or four-wire, wye connected power systems, rated 690V or less, 50 or 60 Hz. CENTERLINE 2500 MCCs can be used on three-wire or four-wire systems, with or without the optional neutral bus. The neutral bus can be half-rated or full-rated.

Control power options include DC or 50/60 Hz AC as required. Control voltage can be derived from the line supply through individual or central control transformers, as well as line-neutral or DC power supply. The control voltage can also be provided remotely from the MCC.

The MCC features the time-proven Allen-Bradley CENTERLINE power bus system. The horizontal power bus is mounted near the vertical center of the structure providing optimum heat dissipation, power distribution, and ease of maintenance and installation. It is mounted in recessed channels of the bus support to protect against accumulation of dust and tracking between phases. The horizontal power bus is also better isolated from wireways that can be accessed for wiring.

The power bus system is supported, braced and isolated by a bus support molded of high strength, non-tracking glass polyester material. The horizontal power bus is mounted on-edge in a vertical plane providing maximum strength against magnetic forces. Vertical power busbars are continuously braced and encapsulated by a polycarbonate molded bus cover isolating the vertical power bus from the other vertical phases and the horizontal power bus.

The vertical power bus provides power distribution both above and below the center-mounted horizontal bus, effectively doubling the capacity in each column. This feature also helps enable a virtually unrestricted unit arrangement.

Vertical and horizontal power bus is fastened together with a two-bolt assembly. This two-bolt connection helps minimize the likelihood of ‘hot spots.’ The factory-made vertical-to-horizontal power bus connection is tightened by a computerized torquing system.

Arc-free zone is part of a circuit within the assembly where it is not possible to apply an ignition wire without destroying the insulation material on conductors.

The CENTERLINE 2500 standard arc-free zones include:

- Vertical busbars are completely enclosed by the insulated bus support and cover
- Automatic shutters are supplied with standard product offering
- Automatic shutters open as withdrawable units are inserted and close when the unit is removed. This safety feature helps provide that the vertical bus is immediately isolated when a withdrawable unit is removed.
- Supply side of outgoing withdrawable units uses double-insulated cabling that meets IEC 61439-1 requirements.
- Insulated stab housing provides a separate, isolated pathway for each phase
Horizontal Power Bus

The standard horizontal power bus material is tin-plated copper.

<table>
<thead>
<tr>
<th>Bus Rating</th>
<th>Busbar Quantity</th>
<th>Busbar Dimensions (mm)</th>
<th>Withstand Ratings&lt;sup&gt;(2)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_{cw}$ 50 kA/1 s</td>
</tr>
<tr>
<td>800 A</td>
<td>1</td>
<td>3 x 100</td>
<td>110 kA</td>
</tr>
<tr>
<td>1250 A</td>
<td>1</td>
<td>6 x 100</td>
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</tr>
<tr>
<td>1600 A</td>
<td>2</td>
<td>6 x 100</td>
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</tr>
<tr>
<td>2000 A</td>
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<td>1</td>
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<td>✓</td>
</tr>
<tr>
<td>2500 A</td>
<td>2</td>
<td>10 x 100</td>
<td>✓</td>
</tr>
<tr>
<td>3200 A</td>
<td>3</td>
<td>10 x 100 with 10 mm spacers</td>
<td>✓</td>
</tr>
<tr>
<td>4000 A</td>
<td>4</td>
<td>10 x 100 with 10 mm spacers</td>
<td>✓</td>
</tr>
</tbody>
</table>

(1) All bus bracing systems are suitable for three-phase, three-wire or four-wire, wye connected power systems rated 690V or less, 50 or 60 Hz.
(2) Withstand ratings are for short circuit ($I_{cw}$) and short circuit peak ($I_{pk}$). Short circuit ratings are shown as maximum kA per seconds (’s’ in table column).

Vertical Distribution Bus

The tin-plated copper vertical distribution bus is cylindrical for optimum contact with the plug-in unit stabs.

The standard vertical distribution bus is rated for 300 A above and below the horizontal power bus for an effective 600 A rating. An optional vertical distribution bus rated for 600 A above and below the horizontal power bus for an effective 1200 A rating is available.

Neutral Bus

The optional horizontal neutral bus is provided across the full width of the MCC above or below the horizontal power bus.

The horizontal neutral bus is available with a full or half current rating, and matches the material and specifications of the horizontal power bus.

The vertical neutral bus is connected to the horizontal neutral bus, and provides a neutral connection for units throughout the column.

The neutral bus is braced the same way as the horizontal and vertical power bus.
Protective Earth Conductor

The horizontal protective earth conductor along with the vertical plug-in protective earth conductor form a complete internal protective earth circuit.

Horizontal Protective Earth Conductor

The horizontal protective earth (PE) conductor is either unplated copper or tin-plated copper (available upon request), and is in the bottom horizontal wireway. The horizontal PE is continuous for the width of the column and consists of one, two or three 6 x 50 mm conductors. The horizontal PE has 12 holes along the length of the conductor for termination of motor PE leads.

An optional unit load PE conductor is available in the vertical wireway. This provides ease of wiring to terminate motor PE leads. The vertical unit load PE conductor is connected to the horizontal PE conductor.

A pressure-type mechanical lug is mounted on the horizontal PE conductor in the incoming line section.

Vertical Plug-in Protective Earth Conductor

An unplated copper vertical plug-in PE conductor is provided in each standard column. An optional tin-plated copper vertical plug-in PE conductor is also available. The vertical plug-in PE conductor is connected to the horizontal PE conductor.

The vertical plug-in PE conductor in combination with the unit PE contact establishes a first make, last break operation of the PE connection with respect to power connections. This first make, last break connection assures the unit to be grounded continuously through the process of inserting or removing the unit.

Main Incoming Cable Connections

<table>
<thead>
<tr>
<th>Main ACB Unit Rating</th>
<th>Main Configuration</th>
<th>Cable Size (mm²)</th>
<th>Cable Lugs per Phase, Max</th>
</tr>
</thead>
</table>
| 800...1600 A         | • 600 mm and 800 mm deep  
• Top and bottom entry  
• 3-pole and 4-pole | 240               | 6              |
|                      |                    | 400               | 4              |
| 800...2500 A         | • 600 mm and 800 mm deep  
• Top and bottom entry  
• 3-pole and 4-pole | 240               | 9              |
|                      |                    | 400               | 8              |
| 2000...4000 A        | • 800 mm deep  
• Top and bottom entry  
• 3-pole and 4-pole | 240               | 14             |
|                      |                    | 630               | 8              |
Step 4: Select Unit Designs

All units feature solid bottom plates and unit support pans to minimize the propagation of a fault from one unit to other units within the column.

Unit Size

Unit size is described in modules. One module is approximately 80 mm high x 500 mm wide. Each MCC column can accommodate 24 modules.

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Module Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully withdrawable</td>
<td>1, 2, 4, 6, 8, 10, 12</td>
</tr>
<tr>
<td>Fixed mount</td>
<td>2…24</td>
</tr>
</tbody>
</table>

Unit Style

Units are available as either:

- **Fully withdrawable** - Units can be removed from the structure and have a maximum current rating of 225 A
- **Fixed** - Units are permanently mounted to the frame of the motor control center
Fully Withdrawable

Withdrawable units consist of the unit, solid unit support pan and unit door. Withdrawable units are held securely in the column when inserted and are designed with an interlock to help provide that units cannot be inserted or withdrawn when the disconnect means is in the ON/I position.

Tools are not required to insert or remove withdrawable units.

Withdrawable units are characterized by being able to release the line, load, control, network and protective earth (PE) connections by using the withdraw levers. Outgoing load and control connections are in the vertical wireway. There are no other connections that have to be made in the unit.

For added safety, the PE connection is made continuously whether the unit is in the connected, test or disconnected position.

Example of a One Module, Fully Withdrawable Unit

Withdrawable units use low friction alignment slides and a mechanical withdraw lever for easy unit inserting and removing. The withdraw lever features a locking mechanism that the user disengages to change positions. Physical detents are present to help confirm that the unit is secured in each position.

Withdraw Lever

Withdrawable units have four operating positions: connected, test, disconnected, and released. See the following descriptions for additional information about the features of each position.

Connected - Line, load, control, network, and PE connections are all engaged. Closing the unit door helps provide the withdraw lever is in the connected position. To engage the interlock or turn the disconnecting means to the ON/I position, the unit door must be fully closed.

Test - Control, network, and PE connections are engaged. Line and load connections are isolated. In this position, the user can verify control and network wiring. Units can be locked in this position with the withdraw lever.

Disconnected - An isolated position where the unit remains housed in the column and the PE connection is engaged, but no other connections are present. Units can be locked in the disconnected position with the withdraw lever.

Released - Withdrawable units can be removed from the columns to isolate them from connections. Released units can be locked with the withdraw lever to help protect against insertion.
### Step 4: Select Unit Designs

#### Fully Withdrawable Unit Operating Positions

<table>
<thead>
<tr>
<th>Operating Position</th>
<th>Connection Present</th>
<th>Lockable Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Line</td>
<td>Load</td>
</tr>
<tr>
<td>Connected</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Test</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Disconnected</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Withdrawn</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Unit is lockable when door is closed.

#### Fixed Mount Unit

Fixed mount units cannot be moved or rearranged once installed in the column. For units 12 module size and above, fixed unit design is standard. The line, load, PE, and control connections are wired directly to components. Network connections can be made through fixed or plug-in terminal blocks. The amount of current drawn by fixed units is determined by the rating of the horizontal power bus.

#### Unit Connections

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Fully Withdrawable</th>
<th>Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>Withdrawable</td>
<td>Fixed</td>
</tr>
<tr>
<td>Line</td>
<td>Withdrawable</td>
<td>Fixed</td>
</tr>
<tr>
<td>PE</td>
<td>Withdrawable</td>
<td>Fixed</td>
</tr>
<tr>
<td>Control</td>
<td>Withdrawable</td>
<td>Fixed</td>
</tr>
<tr>
<td>Network</td>
<td>Withdrawable</td>
<td>Disconnected</td>
</tr>
<tr>
<td>Operating positions</td>
<td>Connected, test, disconnected, released</td>
<td>Fixed</td>
</tr>
<tr>
<td>Module sizes available</td>
<td>1 to 12</td>
<td>2 to 24</td>
</tr>
</tbody>
</table>
Rotary Operating Handles
The operating handles are heavy-duty rotary handles, which are supplied to control the disconnecting means in each unit. When the unit door is closed, the handle is engaged with the disconnecting means.

The operating handle can be locked in the OFF/O position by using up to three shackle padlocks (each 8 mm diameter). The operating handle can be modified to enable locking in the ON/I position.

The unit operating handle is interlocked with the unit door to protect against opening the unit door unless the disconnect means is in the OFF/O position. An externally-operated defeat mechanism provides access to the unit without interrupting service. The operating handle is interlocked with the unit so the unit cannot be inserted or withdrawn with the operating handle in the ON/I position.

Unit Disconnect Means
The unit disconnect switch is available as either a circuit breaker disconnect or optional fused disconnect. Withstand ratings for combination starter units are based on the short circuit protective devices and components selected.

Circuit Breakers
Allen-Bradley circuit breakers are provided as the disconnecting means for units with a circuit breaker unit main switch. Bulletin 140MG motor circuit protectors are used for combination motor control units. Bulletin 140MG motor protection circuit breakers and Bulletin 140G molded case circuit breakers are used for feeder units.

Disconnect Switches
When specified, Bulletin 194R™ disconnect switches are provided. When specified, DIN or BS 88 fuses are supplied.
Stab Assembly

Power Stab Assembly for 2…12 Modules
The two-piece power stab housing is made of high strength, non-tracking glass polyester material and provides a separate, isolated pathway for each phase.

The power cable connection at the plug-in stab is made with a maintenance-free, crimp style connection. There is no exposed wiring at the back of the unit between the disconnecting means and the plug-in stabs.

Unit plug-in power stabs are rated 225 A for 2…12 modules. The stabs are made of tin-plated copper for a low-resistance connection and are designed to tighten during heavy current surges.

The free-floating and self-aligning unit plug-in power stabs are backed by stainless steel spring clips to provide and maintain a high pressure, four-point connection to the vertical power bus.

One Module Stab Assembly
The one module stab assembly consists of a receptacle for line and load connections that plugs into a subplate connected to the vertical power bus. The two guide pins help to properly align the connector. Because of the subplate connection, one module units must be installed in pairs.

One module unit stabs are rated at 32 A.

Neutral Stab Assembly
The neutral stab assembly can be supplied on withdrawable units for 4-wire systems. The neutral stab assembly has the same design and features as the power stab assembly, but is a separate piece.

Protective Earth (PE) Contact
An unplated copper PE contact is provided on withdrawable units. This contact establishes a connection with the PE circuit before other connections are made and is the last withdrawable connection to be disconnected.
Control and Network Connections

Control and network connections are made automatically for withdrawable units. A 15-pin connector plug, rated at 10 A, is used for control connections. Network connections are made through a separate connector. The control and network connectors use a spring-loaded mechanism to help with proper connection.

Unit Doors

Each unit is provided with a removable unit door, mounted on hinges with removable pins. Unit doors are held closed with ¼ turn latches.

The unit door is mounted to the structure so it is not necessary to remove a unit door when installing or removing units. The door can be closed with the unit removed to isolate the power bus. A unit door can be removed from any location on the MCC without disturbing other unit doors.

Control stations for pilot devices and low profile external reset buttons for overload relays are often mounted to the unit door. See ‘Pilot Devices’ on page 32 for more information.

Door Latches

There are two types of door latches available. The standard CENTERLINE 2500 MCCs have quarter-turn door latches. If you select an MCC with ArcShield, the MCC has arc containment door latches.

Door Latches (Standard)

Door latches are provided on unit and vertical wireway doors to hold the door closed and isolate personnel from the column. Door latches can be locked or released by rotating the latch ¼ turn. An arrow on the door latch head indicates the position of the latch.

Arc Containment Latch

Optional arc containment latches are available. Arc containment latches help protect personnel near an MCC if an arc fault occurs when structure doors are closed and latched. Arc containment latches can be locked or released by rotating the latch ¼ turn. See page 9 for an example of an arc containment latch.

Unit Nameplates

Unit nameplates are available and can accommodate three or four lines of engraving.

- Engraved acrylic nameplates – white with black lettering
- Engraved phenolic nameplates – white with black lettering

Nameplates are secured with two stainless steel, self-tapping screws.
Control Power
Unit control power is specified as 24V DC, or 110, 115, 120, 220, 230 or 240V AC, or others as required.

Unit control power is normally supplied by a single, central-control power transformer unit within each MCC lineup so the test function of withdrawable units can work most effectively. The central control source operates at line voltage with an option for common control fusing.

Individual control circuit transformers, mounted in each unit, are available as options. One leg of the secondary side of the control circuit transformer is fused while the other leg is connected to PE. Primary protection is then provided by primary fusing. This optional control power source does not support the test position.

Control Wire
Control wire is stranded copper and rated at 105 °C. Wire markers are sleeve type; heat shrink is optional.

Power Wire
The power wire is stranded copper and rated at 145 °C. The power wire is sized to meet the current rating of the unit, with a minimum size of 6 mm².

Pilot Devices
Pilot devices are housed in a door-mounted control station. Each control station can accommodate up to four 22 mm devices. Depending on door size and application requirements, more than four pilot devices can be mounted in a door.

Control stations are equipped with a quick connect plug for ease in connecting and disconnecting control wiring.

The control station is easily removed with captive screws. If a control station is removed, closing plates are available to cover the unit door opening and provide isolation.

E300 Door-mounted Control Stations
One operator station can be added to the E300 expansion bus to be used as a user interface device. The operator stations provide E300 status indicators and function keys for motor control. The operator stations also support CopyCat, so the user can upload and download E300 configuration parameters.
Step 5: Select Unit Types

Columns can be populated with several different types of units such as mains, feeders, direct on line starters and contactors, soft starters, AC drives, and PLCs.

Mains

Main incoming units permit customer connection to incoming power, and the main breaker provides the necessary protection to the main power bus of the MCC. These units can use either air circuit breakers (ACBs) or molded case circuit breakers (MCCBs). The breakers can be 3 pole or 4 pole with top or bottom customer cable access. Main incoming units are typically placed on the left, center, or right side of the MCC. Numerous options are available for both ACBs and MCCBs to meet the needs of the most demanding applications.

Main Air Circuit Breaker (ACB) Units

Air circuit breaker mains are available in 400…4000 A configurations. Main incoming units that use an ACB provide a withdrawable main breaker for ease of service. These units are front accessible with shutters for added safety when removed. All mains with ACBs are 24 modules in size, with three dedicated compartments; metering, breaker, and incoming termination. Single main and dual main incoming configurations are available. For applications that require tie sections (main-tie-main), see page 36.

Main ACB Options

- Metering
- Electrical charging device
- Closing release
- Shunt release
- Undervoltage release
- Key and padlocking
- Additional auxiliary signaling contacts
- Locking cradle shutters
- Thermography
### Mains, ACB

<table>
<thead>
<tr>
<th>Circuit Breaker Frame Size</th>
<th>Module Size</th>
<th>Trip Unit Rating, A</th>
<th>Load ( I_{\text{op}} ), A</th>
<th>Column Width, mm</th>
<th>Column Depth, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IP42</td>
<td>3 Pole</td>
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<td></td>
<td>4000</td>
<td>3203</td>
<td>3039</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Main ACB Protection Modules

All main ACBs are equipped with DIP switch interfaces or optional touch screen interfaces. A wide array of features and options are available, which include the following:

- Earth fault
- Residual current
- Power factor
- Harmonics
- Synchrocheck
- Zone selectivity
- Automatic transfers
- Load shedding
- Network communications

For more details, contact your local Rockwell Automation sales office or Allen-Bradley distributor.

### Main Molded Case Circuit Breaker (MCCB) Units

Main MCCB units are available up to 1200 A configurations. Main incoming units use a molded case circuit breaker with thermal magnetic or electronic trip. These units are smaller than the ACBs, and MCCBs can be placed in a withdrawable column with other functional units (such as fixed mounted, front accessible). Single main and dual main incoming configurations are available.
MCCB Options

- Metering
- Motorized operation
- Closing release
- Shunt trip
- Undervoltage release
- Auxiliary contacts
- Thermography

Mains, MCCB

<table>
<thead>
<tr>
<th>Amps</th>
<th>Load I_{in}, A</th>
<th>Module Size</th>
<th>Column Width, mm</th>
<th>Column Depth, mm</th>
<th>Circuit Breaker Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>240</td>
<td>10</td>
<td>700, 800, 900, 1000</td>
<td>600, 800</td>
<td>140G-K***-D30</td>
</tr>
<tr>
<td>400</td>
<td>320</td>
<td>140G-K***-D40</td>
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<tr>
<td>630</td>
<td>504</td>
<td>140G-M***-D63</td>
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Main Incoming Fusible Disconnect

Mains with fusible disconnects are available as options.

Ties

Tie configurations can be combined with adjacent mains for applications that have more stringent power requirements. Ties can provide an alternate power means or load shedding functionality if available power is reduced or lost. A typical configuration with an ACB tie can be a main-tie-main (M-T-M), where there is separate bus (‘A’ bus and ‘B’ bus) within the MCC. Embedded, microprocessor-based control is available for M-T-M switching and generator control with synchronization.

Ties ACB Options

- Metering
- Electrical charging device
- Closing release
- Shunt release
- Undervoltage release
- Key and padlocking
- Additional auxiliary signaling contacts
- Locking cradle shutters
- Thermography
Ties, ACB

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Feeders

Numerous feeder options are available for power distribution from within your switchgear or MCC application. For larger power demands, the air circuit breaker (ACB) is commonly used. The ACB available range is from 400 A through 4000 A. Smaller power applications often use a molded case circuit breaker (MCCB). The standard range for the MCCBs is 6.3 A through 1200 A. All feeders can be provided as 3 pole or 4 pole.

Feeders Air Circuit Breaker (ACB) Units

Feeder incoming units that use an air circuit breaker provide a withdrawable feeder breaker for ease of service. These units are front accessible with shutters for added safety when removed. All feeders with ACBs are 24 modules in size. All ACBs include a microprocessor-based trip unit.

Feeder ACB Options

- Metering
- Motorized operation
- Electrical charging device
- Closing release
- Shunt release
- Undervoltage release
- Key and padlocking
- Additional auxiliary signaling contacts
- Locking cradle shutters
### Feeder, ACB

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(1) Fixed mount style.

### Feeder Molded Case Circuit Breaker (MCCB) Units

Feeder MCCB units are placed within the withdrawable column with other functional units, which provides flexibility to place the units where they best suit your needs. MCCB feeders are withdrawable up to 225 A. Units larger than 225 A are fixed mount.

### Feeder MCCB Options

- Auxiliary contact for circuit breaker
- Shunt trip coil for circuit breaker
- Alarm contact for circuit breaker
- Minimum voltage coil (undervoltage) for circuit breaker
- Combination auxiliary contact and alarm contact for circuit breaker
- Metering
## Step 5: Select Unit Types

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(1) If unit requires individual control transformer, then one module must increase to two modules.

(2) Fixed mount style.

(3) Order 140GJ*C3D12 for 96 A $I_{nc}$. 
Starter Units

Direct On Line Non-reversing (DOL) Starter Units
Direct on line non-reversing starter units are supplied with Allen-Bradley Bulletin 100-C or 100-D contactors and a circuit breaker disconnect or an optional fused disconnect. These units are available with an E300 or E1 Plus overload relay, and available with or without an external reset button for the overload relay. Starter units are available in withdrawal or fixed styles.

Direct On Line Reversing (DOLR) Starter Units
These combination DOLR starter units are supplied with Allen-Bradley Bulletin 104-C or 104-D contactors and a circuit breaker disconnect or an optional fused disconnect. The starters are mechanically and electrically interlocked to avoid both contactors being closed simultaneously.

These units are available with an E300 or E1 Plus overload relay, and available with or without an external reset button for the overload relay. DOLR starter units are available in withdrawal or fixed styles.

Bulletin 100-C (DOL)/104-C (DOLR) IEC contactors features:
- AC and DC coil control
- Common accessories for all contactor sizes
- Front and side mounting of auxiliary contacts
- Electronic and pneumatic timing modules
- Space-saving coil-mounted control modules
- Reversible coil terminations (line or load side)
- All devices can be attached to 35 mm DIN mounting rail
- Environmentally friendly materials

Bulletin 100-D (DOL)/104-D (DOLR) IEC contactors features:
- Electronic and conventional coils
  - AC and DC
  - Integrated PLC interface
  - Low power pick-up and hold-in
  - Wide voltage ranges
- Complete range of accessories
- Environmentally friendly
- Compact dimensions

Bulletin 193 (DOL/DOLR) – E300 electronic overload relays features:
- Three modules: sensing, control, and communications
- Intelligent motor control (EtherNet/IP enabled)
- Integrated I/O
- Adjustable trip class 5…30
- Programmable trip and warning settings
- True RMS current/voltage sensing (50/60 Hz)
- Optional ground fault

Bulletin 193-EE (DOL/DOLR) – E1 Plus solid-state overload relays features:
- Self-powered
- Phase loss protection
- Wide adjustment range (5:1)
Step 5: Select Unit Types

- Over-molded power connections
- 1 N.O. and 1 N.C. isolated auxiliary contacts (B600 rated)
- Low energy consumption (150 mW)
- Ambient temperature compensation
- Visible trip indication
- Optional EtherNet/IP side mount module
- Optional ground fault

DOL and DOLR Starter Unit Options

- Auxiliary contact for contactors
- Auxiliary contact for circuit breaker
- Surge suppressor
- Control circuit transformer
- Push buttons
- Pilot lights
  - Status indicator
  - Status indicator, push-to-test
- Selector switch
  - Two-position
  - Three-position
- Ethernet/IP POINT I/O system

DOL Non-reversing and DOLR Reversing Starter Units (with 140M circuit breakers)

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(2) If unit requires individual control transformer, then one module must increase to two modules.
### DOL Non-reversing and DOLR Reversing Starter Units (with 140MG circuit breakers)

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(2) Fixed mount style.
**Soft Starter Units**

Soft starters, referred to as reduced voltage solid-state units, contain a microprocessor-controlled motor controller, control circuit transformer and either a fusible or circuit breaker disconnect. SMC Flex soft starter units are available for CENTERLINE 2500 MCCs in withdrawable or fixed styles.

SMC Flex soft starters features:

- Seven standard modes of operation: soft start, current limit start, dual ramp, full voltage, linear speed acceleration, preset slow speed and soft stop
- Optional modes of operation: pump control, smart motor braking, Accu-Stop™, and slow speed with braking
- Integral SCR bypass
- Electronic overload protection with selectable overload trip class
- Full metering and diagnostics
- DPI communication

When do you specify an SMC rather than a drive?

- When a cost effective starter is required
- When no speed control is needed
- For simple acceleration and deceleration
- For lower starting torque requirements
- When the motor is generously sized for the load
- For standard starting and stopping maneuvers
- When dynamic braking is not required
- When the starter is not used to hold the rotor in place at zero speed

For SMC Flex soft starter unit selection, go to page 43.

For SMC Flex soft starter options, go to page 44.
**SMC Flex Soft Starter Units**

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<tr>
<th>Motor Rating (kW)</th>
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<th>For 380…400V</th>
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SMC Flex Soft Starter Units (continued)

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(2) Fixed mount style.

(3) 600 mm wide column.

SMC Flex Soft Starter Unit Options

- Auxiliary contact for circuit breaker
- Control circuit transformer
- Push buttons
- Pilot lights
  - Status indicator
  - Status indicator, push-to-test
- Selector switch
  - Two-position
  - Three-position
- EtherNet/IP POINT I/O system
- EtherNet/IP communication module, mounted internal to solid-state starter
- Isolation contactor
- Auxiliary contact for contactors
- Human interface module
  - Blank cover, no functionality, door mounted in bezel
  - LCD display, full numeric keypad, door mounted in bezel
  - LCD display, programmer only, door mounted in bezel
- Pump control, provides pump start and stop
- Braking control, provides smart motor braking, Accu-Stop, and slow speed with braking
Variable Frequency Drive (VFD) Units

PowerFlex Variable Frequency AC Drives
The combination variable frequency AC drive units, for use in the CENTERLINE 2500 Motor Control Centers, contain a variable frequency AC drive and either a fusible or circuit breaker disconnect. PowerFlex VFD units are available in withdrawal or fixed styles.

Available standard models include:
- PowerFlex 523
- PowerFlex 525
- PowerFlex 753
- PowerFlex 755

PowerFlex drive features include:
- Isolated logic and power
- A three-phase, pulse width modulated (PWM) adjustable frequency output and voltage output for exceptional control of motor speed and torque
- Access to mode programming, providing precise and repeatedly accurate setup, control and operation, and adaptability to handle a variety of applications

For PowerFlex 523 drive unit selections, go to page 46.
For PowerFlex 525 drive unit selections, go to page 47.
For PowerFlex 523 and 525 drive unit options, go to page 48.
For PowerFlex 753 drive units selections, go to page 49.
For PowerFlex 755 drive units selections, go to page 51.
For PowerFlex 753 and 755 drive unit options, go to page 53.
For PowerFlex 755 drive units with MCC style cabinets, go to page 54.
### PowerFlex 523 – 140M Circuit Breaker 380…480V Standard & Arcshield – Normal Duty

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(1) Adding an EMC filter can increase module size. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for sizing.
(2) Line or load reactors are optional.

### PowerFlex 523 – 140G Circuit Breaker 380…480V Standard & Arcshield – Normal Duty

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(1) Adding an EMC filter can increase module size. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for sizing.
(2) Line or load reactors are optional.
## PowerFlex 525 – 140M Circuit Breaker 380...480V Standard & Arcshield – Normal Duty

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(1) Adding an EMC filter can increase module size. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for sizing.

(2) Line or load reactors are optional.

## PowerFlex 525 – 140G Circuit Breaker 380...480V Standard & Arcshield – Normal Duty

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(1) Adding an EMC filter can increase module size. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for sizing.

(2) Line or load reactors are optional.
PowerFlex 523 and 525 Drive Unit Options

- Auxiliary contact for circuit breaker
- Control circuit transformer
- Push buttons
- Pilot lights
  - Status indicator
  - Status indicator, push-to-test
- Selector switch
  - Two-position
  - Three-position
- EtherNet/IP POINT I/O system
- ControlNet, EtherNet/IP and PROFIBUS DP communication module, mounted internal to drive
- Isolation contactor
- Auxiliary contact for contactors
- Human interface module
  - Blank cover, no functionality, door mounted in bezel
  - LCD display, full numeric keypad, door mounted in bezel
  - LCD display, programmer only, door mounted in bezel
- I/O control interface type
  - 24V DC sink or source control (via DIP switch setting)
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(1) Line or load reactors are optional.
(2) Fixed units only.
(3) Columns are 600 mm deep by 600 mm wide.
(4) Columns are 800 mm deep by 800 mm wide.
### PowerFlex 753 - 140G Circuit Breaker 440/460/480V IP42/54 Standard & Arcshield - Normal Duty

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(1) Line or load reactors are optional.
(2) Fixed units only.
(3) Columns are 600 mm deep by 600 mm wide.
(4) Columns are 800 mm deep by 800 mm wide.
## PowerFlex 755 – 140G Circuit Breaker 380/400V IP42/54 Standard & Arcshield – Normal Duty

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</table>

1. Line or load reactors are optional.
2. Fixed units only.
3. Columns are 600 mm deep by 600 mm wide.
4. Columns are 800 mm deep by 800 mm wide.
### PowerFlex 755 – 140G Circuit Breaker 440/460/480V IP42/54 Standard & Arcshield – Normal Duty

<table>
<thead>
<tr>
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<td>20G11AND248A00NNNNN</td>
</tr>
</tbody>
</table>

(1) Line or load reactors are optional.
(2) Fixed units only.
(3) Columns are 600 mm deep by 600 mm wide.
(4) Columns are 800 mm deep by 800 mm wide.
PowerFlex 753 and 755 Drive Unit Options

- Auxiliary contact for circuit breaker
- Control circuit transformer
- Push buttons
- Pilot lights
  - Status indicator
  - Status indicator, push-to-test
- Selector switch
  - Two-position
  - Three-position
- EtherNet/IP POINT I/O system
- ControlNet communication module, mounted internal to drive
- EtherNet/IP communication module, mounted internal to drive
- Isolation contactor
- Auxiliary contact for contactors
- Human interface module
  - Blank cover, no functionality, door mounted in bezel
  - LCD display, full numeric keypad, door mounted in bezel
  - LCD display, programmer only, door mounted in bezel
- I/O control interface type
  - 24V DC control voltage interface with vector control
  - 120V AC control voltage interface with vector control
  - 24V DC control voltage interface with sensorless vector control
  - 120V AC control voltage interface with sensorless vector control
PowerFlex 755 VFD with 2500 MCC Style Cabinets, Frames 8…10

PowerFlex 755 drives can also be ordered in an MCC cabinet featuring a roll-out design(1). These cabinets are available in bus sizes of 1200, 2000, or 3000 A.

These PowerFlex frame sizes have the following advantages:

- Reduce footprint at least 30%, which reduces needed floor space and heat generated
- Reduce installation time, especially to pull expensive power wire
- Reduce components from system design

Several drive options are available; see PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001, for more information.

(1) A roll-out cart is required for Frame 8…10 drives, and Frame 9 and 10 drives with the option bay chassis. The cart has an adjustable curb height of 0…182 mm and curb offset/reach of 0…114 mm.
**Network, PLC, and I/O Compartments**

Available in semi-withdrawable and fixed mount unit styles.

**EtherNet/IP Scanner Modules**

An EtherNet/IP network in the MCC requires an EtherNet/IP scanner module that meets EtherNet/IP requirements. The scanner module can be in the MCC or mounted remotely.

**Network Linking Devices**

With network linking devices and NetLinx technology, CENTERLINE 2500 MCC customers can connect to different communication networks. Network linking devices can connect directly to a DeviceNet or EtherNet/IP network from an MCC. NetLinx technology can easily link networks, simplifying data transfer from the MCC’s DeviceNet network to a controller’s EtherNet/IP network.

Adding an Ethernet to DeviceNet bridge lets you connect your new EtherNet/IP MCC to existing DeviceNet MCC lineups.

**EtherNet/IP Power Supply**

An EtherNet/IP network in the MCC requires a power supply providing 24V DC. A quality power supply is essential to reliable system operation. To help system integrity and reliability, an Allen-Bradley 8-amp power supply unit is recommended. This power supply is supplied with a buffer for enhanced ride-through performance. A redundant power supply is also available for added reliability.

The EtherNet/IP back-up power supply is available for unit-level back-up. It seamlessly transfers network power in case of a loss of main network supply. There is no loss of component function. When the main EtherNet/IP power recovers, there is automatic re-transfer to the primary power supply.

**Programmable Controllers**

The Logix architecture provides a wide range of (input, output and communication) modules to span many applications, from high-speed digital to process control. The Logix architecture uses producer-consumer technology so input information and output status can be shared among multiple Logix controllers.

For more information, see the ControlLogix System Selection Guide, publication 1756-SG001.

**I/O Compartments**

FLEX™ I/O is a cost-effective, flexible, modular I/O system for distributed applications, offering all the functions of larger rack-based I/O without the space requirements. This, along with outstanding reliability, is why we have sold over 5 million modules.

**Distribution Panels**

Distribution panels are used for non-motor loads. They provide convenient packaging in one location, for your distribution needs. One, two, and three pole circuits are available. The distribution panel is a fixed-mount module.
## Selection Checklist

### Review MCC Technical Specifications

The following certifications (2500-CT0xx) can be found at the Rockwell Automation Literature Library: [https://www.rockwellautomation.com/en_NA/literature-library/overview.page](https://www.rockwellautomation.com/en_NA/literature-library/overview.page).

EN 61439-1:2011  
EN 61439-2:2011 | Safety of machinery - Electrical equipment of machines; Part 1: General requirements  
Low-voltage switchgear and controlgear assemblies; Part 1: General requirements  
Low-voltage switchgear and controlgear assemblies; Part 2: Power switchgear and controlgear assemblies |
|---|---|---|
| EC Directives | 2011/65/EU  
2014/30/EU  
2014/35/EU | RoHS Directive  
EMC Directive  
Low Voltage Directive |
| Certifications and Markings | ABS and ABS Shipboard  
CE Conformance Marked  
China Compulsory Certificate (CCC)  
DEKRA  
EAC  
SIL Approval | 2500-CT015, 2500-CT016, and 2500-CT017  
2500-CT009 and 2500-CT009  
2500-CT010, 2500-CT011, 2500-CT012, 2500-CT013, and 2500-CT022  
2500-CT018, 2500-CT019, 2500-CT020, and 2500-CT021  
MCC-CT001  
2500-CT014 |
| Rated Voltages | Rated Operating Voltage, Ue  
Rated Frequency, fn  
Rated Insulation Voltage, Ui | Up to 690 V, 3 Phase  
50…60 Hz  
1000 V, 3 Phase |
| Rated Currents | Continuous Current Rating, Ie  
Short Circuit Peak Withstand, Ipk  
Short Time Withstand Rating, Icw  
Neutral (N) | Horizontal bus - up to 4000 A; vertical bus - up to 1200 A per column(1)  
Horizontal bus up to 210 kA  
Horizontal bus up to 100 kA for 1 second  
Full or half-rated |
| Creepage Distances and Clearances | Rated Impulse Withstand Voltage, Uimp  
Material Group (Overvoltage Category)  
Pollution Degree | 6, 8, or 12 kV  
llia (175 ≤ CTI < 400)  
3 |
| Bus Material and Plating | Horizontal Power Bus  
Vertical Distribution Bus  
Protective Earth Conductor (PE) | Copper (optional tin plating)  
Copper with tin plating  
Copper (optional tin plating) |
| Degrees of Protection | IEC 60529 | IP20, IP42 or IP54 |
| Forms of Separation | IEC 61439-1 | Forms 2b, 3b or 4b |
| Column Dimensions | Height, Width, Depth | See page 18 |
| Units | Module Size (approx)  
Modules per Column (max)  
Withdrawable Unit Sizes | 80 mm high x 500 mm wide = 1 module  
24 of varied unit combinations  
1, 2, 4, 6, 8, 10, 12 modules |
| Structural Surface Treatments | Interior  
Exterior | Z275 galvanized metal (painted interior available as custom option)  
RAL 7032 Pebble Grey Paint (additional colors available as custom option) |
| Environment | Storage Temperature  
Operating (Ambient) Temperature  
Altitude | -25…+55 °C  
-5…+40 °C(2) with up to 95% noncondensing humidity  
Up to 1000 m without derating; derating over 1000 m |

(1) Up to 600 A top and bottom, effective 1200 A per column.

(2) The average temperature over a 24-hour period must not exceed 35 °C.
Selection Checklist

Use this checklist to help you configure your CENTERLINE® 2500 Motor Control Center. You can type in the fields provided and check the checkboxes to select your preferences.


<table>
<thead>
<tr>
<th>Customer</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Certifications and Markings**

- ☐ ABS and ABS Shipboard
- ☐ CE
- ☐ CCC
- ☐ EAC
- ☐ Other (specify)

**Incoming Power**

- ☐ 380V
- ☐ 400/415V
- ☐ 440/460/480V
- ☐ 525/575V
- ☐ 690V

**Frequency**

- ☐ 50 Hz
- ☐ 60 Hz

**System power**

- ☐ Delta
- ☐ Grounded Delta
- ☐ Grounded Wye
- ☐ Grounded Wye with impedance

**Available fault current**

- ☐ kA

**Control Power**

- ☐ 24V DC
- ☐ 110/115/120V AC
- ☐ 220/230/240V AC

**Source**

- ☐ Central control power transformer (standard)
- ☐ Line to neutral
- ☐ Remote control power source

**Control Terminal Blocks Location**

- ☐ Vertical wireway (standard)
- ☐ Top horizontal wireway

**Structure**

- ☐ IP 42 (standard)
- ☐ IP 54
- ☐ IP 20

- ☐ No (standard)
- ☐ Yes

- ☐ 3B (standard)
- ☐ 4B Type 5
- ☐ 4B Type 7

- ☐ Front (standard)
- ☐ Double front
- ☐ Add to existing

**Depth**

- ☐ 600 mm
- ☐ 800 mm

**Wireway width**

- ☐ 200 mm vertical wireway (700 mm wide column)
- ☐ 300 mm vertical wireway (800 mm wide column)
- ☐ 400 mm vertical wireway (900 mm wide column)
- ☐ 500 mm vertical wireway (1000 mm wide column)

**External paint**

- ☐ RAL7032 Pebble Gray (standard)
- ☐ Other (specify)

**Internal paint**

- ☐ Z275 galvanized steel (standard)
- ☐ High visibility gloss white (optional)
- ☐ Other (specify)

**Ambient temperature**

- °C maximum
- Altitude: meters

**Misc. Options**

- ☐ Space heater with thermostat
- ☐ Cable supports
- ☐ Other (specify)

**Bus**

- ☐ 50 kA for 1 second
- ☐ 50 kA for 3 seconds
- ☐ 80 kA for 1 second
- ☐ 100 kA for 1 second

**Horizontal power bus**

- ☐ 800 A
- ☐ 1250 A
- ☐ 1600 A
- ☐ 2000 A
- ☐ 2500 A
- ☐ 3200 A
- ☐ 4000 A

**Material**

- ☐ Copper, tin plated (standard)
- ☐ Copper, unplated

**Neutral bus**

- ☐ None (standard)
- ☐ Full rated
- ☐ Half rated

**Vertical distribution bus**

- ☐ 300 A (provides 600 A capacity)
- ☐ 600 A (provides 1200 A capacity)

**Material**

- ☐ Copper, tin plated (standard)
- ☐ Copper, unplated

**Protective earth (PE)**

**Horizontal PE**

- Location: ☐ Bottom (standard)

**Material**

- ☐ Copper, tin plated (standard)
- ☐ Copper, unplated

**Unit PE**

- Material: ☐ Copper, unplated (standard)
- ☐ Copper, tin plated

**Wireway PE**

- Material: ☐ No (standard)
- ☐ Copper, unplated
- ☐ Copper, tin plated

**Stab openings**

- ☐ Automatic shutters (included as standard)
### IntelligCENTER®

**Embedded system**
- [ ] EtherNet/IP
- For EtherNet/IP, select one of the following managed switches:
  - [ ] StratiX 5700
  - [ ] StratiX 5700 Lite

**Software**
- [ ] None (standard)
- [ ] Only Standard Data CD(1) QTY: ______
- [ ] Only Energy Data CD(1) QTY: ______
- [ ] IntelligCENTER software and Standard Data CD(1)(2) Data CD QTY: _____
- [ ] IntelligCENTER software and Energy Data CD(1)(2) Data CD QTY: _____

**Other Network Options**
- [ ] Ethernet-to-DeviceNet linking device
- [ ] Ethernet-to-Profi bus linking device

---

### Main Incoming Unit

**Ampere rating:** A

**Main incoming type:**
- [ ] Air circuit breaker (ACB)
- [ ] Molded case circuit breaker (MCCB)
- [ ] Main lug (MLO)

**Main incoming location:**
- [ ] Left
- [ ] Center
- [ ] Right
- [ ] Top
- [ ] Bottom

**Main incoming configuration:**
- [ ] Single main
- [ ] Dual main
- [ ] Main tie main

**Number of cables per phase:** __________

**Cable size:** __________

**Main breaker accessories:**
- [ ] Shunt trip
- [ ] Auxiliary contacts QTY: ______
- [ ] Other (specify): __________
- [ ] Electrical charging device
- [ ] Closing release
- [ ] Shunt release
- [ ] Undervoltage release

**Protection:**
- [ ] LSI (standard)
- [ ] LI
- [ ] LSIG
- [ ] DIP switch
- [ ] Digital touch screen

**Automatic transfer**

**Generator sync**

**Load shedding (tie)**

**Metering:**
- [ ] Precision %

**Communications:**
- [ ] EtherNet/IP
- [ ] Other (specify): __________

---

### Unit Configuration – General

**Outgoing cable access:**
- [ ] Top
- [ ] Bottom

**Unit type:**
- [ ] Withdrawable (standard)
- [ ] Fixed

**Nameplates(3):**
- [ ] Engraved acrylic (standard)
- [ ] Engraved phenolic

### Feeder Units

- [ ] Circuit breaker, thermal magnetic (standard)
- [ ] Circuit breaker, electronic
- [ ] Fused disconnects

### DOL/DOLR Starter Units(4)

**Disconnecting means:**
- [ ] Circuit breaker (standard)
- [ ] Fused (rotary operator only)

**Overload type:**
- [ ] E300™
- [ ] E1 Plus™

**Duty rating:**
- [ ] AC3 (standard)
- [ ] AC4

**Protection:**
- [ ] Type 2 (standard)
- [ ] Type 1

---

### DOL/DOLR Options and Accessories

**Pilot lights (LED):**
- [ ] No (standard)
- [ ] Yes QTY: ______
- [ ] On
- [ ] Off
- [ ] Fault
- [ ] Forward
- [ ] Reverse
- [ ] Other (specify): __________

**Push buttons:**
- [ ] No (standard)
- [ ] Yes QTY: ______
- [ ] On
- [ ] Off
- [ ] Reset
- [ ] Emergency
- [ ] Other (specify): __________

**Selector switch:**
- [ ] None
- [ ] 2-position
- [ ] 3-position

**Function:**

**Reset:**
- [ ] Internal (standard)
- [ ] External – door mounted

**E300 control stations:**
- [ ] No (standard)
- [ ] Yes QTY: ______

**If yes, station type:**
- [ ] Control
- [ ] Diagnostic

**Auxiliary contacts**
- [ ] Normally open QTY: ______
- [ ] Normally closed QTY: ______

**Misc. options:**
- [ ] Ground fault
- [ ] Voltage monitoring
- [ ] Other (specify): __________

---

(1) You must purchase a copy of the Standard or Energy Data CD for each MCC lineup connected to the IntelligCENTER software.

(2) You must purchase a copy of IntelligCENTER software for each personal computer or HMI used to communicate with a MCC lineup. Personal computers or HMIs cannot share copies of IntelligCENTER software but the IntelligCENTER software can access multiple MCC lineups.

(3) Black letters on white.

(4) Please supply a separate motor list. Copy this DOL/DOLR section and complete as needed for unique applications.
Additional requirements (describe; if additional space is needed, use the Notes section that starts on page 61):

Others (describe; if additional space is needed, use the Notes section that starts on page 61):

<table>
<thead>
<tr>
<th>Notes (if additional space is needed, use the Notes section that starts on page 61)</th>
</tr>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Soft Starter Units (1)</th>
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<tbody>
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<td>Unit type:</td>
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<tr>
<td>Connection:</td>
</tr>
<tr>
<td>Disconnecting means:</td>
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</table>

<table>
<thead>
<tr>
<th>SMC Options and Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot lights (LED):</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Push buttons:</td>
</tr>
<tr>
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</tr>
<tr>
<td>Selector switch:</td>
</tr>
<tr>
<td>Human-machine interface (HMI):</td>
</tr>
<tr>
<td>Starting mode:</td>
</tr>
</tbody>
</table>

Others (describe; if additional space is needed, use the Notes section that starts on page 32):

---

(1) Please supply a separate motor list. For unique applications, copy the Soft Starter Units section and complete as needed.
## PowerFlex® AC Variable Frequency Drive (VFD) Units

<table>
<thead>
<tr>
<th>PowerFlex® AC Variable Frequency Drive (VFD) Units</th>
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<tbody>
<tr>
<td>Unit type:</td>
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<tr>
<td>□ PowerFlex 523</td>
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<tr>
<td>□ PowerFlex 525</td>
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<tr>
<td>□ PowerFlex 753</td>
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<tr>
<td>□ PowerFlex 755</td>
<td></td>
</tr>
<tr>
<td>Rating:</td>
<td></td>
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<tr>
<td>□ Normal duty (standard)</td>
<td></td>
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<tr>
<td>□ Heavy duty</td>
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<tr>
<td>Disconnecting means:</td>
<td></td>
</tr>
<tr>
<td>□ Circuit breaker (standard)</td>
<td></td>
</tr>
<tr>
<td>□ Fused (rotary operator)</td>
<td></td>
</tr>
</tbody>
</table>

### VFD Options and Accessories

- **Pilot lights (LED)**
  - □ No (standard)
  - □ Yes QTY: _____

- **Text on legend plate**:  
  - □ On
  - □ Off
  - □ Fault
  - □ Forward
  - □ Reverse
  - □ Other (specify):

- **Push buttons**
  - □ No (standard)
  - □ Yes QTY: _____

- **Text on legend plate**:  
  - □ On
  - □ Off
  - □ Reset
  - □ Emergency
  - □ Other (specify):  

- **Selector switch**:  
  - □ No (standard)
  - □ 2-position
  - □ 3-position
  - □ Function:

- **Human-machine interface (HMI)**
  - □ No (standard)
  - □ LCD display, full numeric keypad
  - □ LCD display, programmer only

- **Reactor type**:  
  - □ No (standard)
  - □ Line
  - □ Load

- **EMC filter**:  
  - □ No (standard)
  - □ Yes

**Others** (describe, if additional space is needed, use the Notes section that starts on page 61):

### EtherNet/IP Power Supply Unit

<table>
<thead>
<tr>
<th>EtherNet/IP Power Supply Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
</tr>
<tr>
<td>□ Primary (standard)</td>
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<tr>
<td>□ Redundant</td>
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<tr>
<td>□ Back-up</td>
</tr>
<tr>
<td>□ User-supplied external</td>
</tr>
</tbody>
</table>

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(1) Copy this section and complete for each unit needed.
Miscellaneous Units

☐ Programmable controllers
  Number of slots: _____
  Power supply: __________________
  Describe what you need (if additional space is needed, use the Notes section that starts on page 61)

☐ Distribution panel
  1-pole QTY: _____
  2-pole QTY w/o residual current detection: _____
  2-pole QTY with residual current detection: _____
  3-pole QTY: _____
  List circuit loads (if additional space is needed, use the Notes section that starts on page 61)

☐ Extra space for future units
  Describe what you need (if additional space is needed, use the Notes section that starts on page 61)

Load List

<table>
<thead>
<tr>
<th>Unit Type (for example, DOL, DOLR, SMC, VFD, heater, etc.)</th>
<th>Unit ID</th>
<th>Rating</th>
<th>Misc. Note</th>
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</thead>
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</tbody>
</table>

Notes

(1) Copy this section and complete for each unit needed.