



CENTERLINE 2500 Low Voltage Motor Control Centers and Switchgear Assemblies

Bulletin 2500



Allen-Bradley

by ROCKWELL AUTOMATION

Selection Guide

Original Instructions

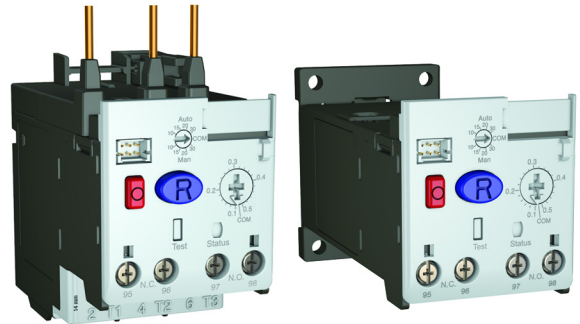
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What's New

CENTERLINE® 2500 Motor Control Centers (MCCs) Now Offer the Next Generation of Motor Overload Relays and Contactors

The Allen-Bradley® E100™ Electronic Motor Overload Relays represent the next generation of our basic-tier electronic overload relays. E100 overload relays more accurately measure motor current load and model motor temperature, which helps protect motors and avoid unplanned downtime due to motor failure. The E100 overload relay can also de-energize the motor to help minimize potential equipment damage due to overheating.



The E100-E overload relay is part of the Rockwell Automation integrated motor control system. It can mount directly to Bulletin 100-C IEC contactors up to 100 A. The basic E100 relay (Cat. No. 193-EE) offers Trip Class 10 and 20 with only manual reset. The advanced E100 relay (Cat. No. 193-IEF) now offers Trip Class 10, 15, 20, and 30 with manual or automatic reset.

Allen-Bradley 100-E IEC contactors are an average of 50% lighter in weight and an average of 25% narrower in width than previous contactors. Their size and weight reduction mean less panel space, power supply, and control transformer are needed. The universal electronic AC/DC coil offers significant energy savings and direct connection to PLCs for contactors above 100 A.



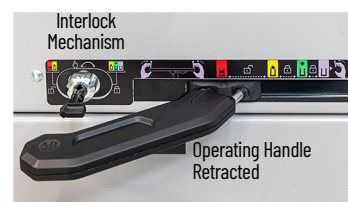
Increased Personnel Safety With SecureConnect™ Technology

Withdrawal units for the Centerline 2500 MCC are now available with SecureConnect. With the SecureConnect feature, you can remove a unit without opening its door, which increases personnel safety during servicing while decreasing production downtime. You can add SecureConnect to standard withdrawable units from two through 10 modules. SecureConnect units meet the requirements of IEC/TR 61641 in the Connected, Test, and Disconnected positions. The ability to remove the unit with the door closed is a specific requirement of IEC 61892, used by the oil and gas industry.

The Secure Connect operating handle is outside the unit door for movement to all operating positions without special tools. The handle can be retracted or extended, the latter to gain more mechanical leverage while operating the handle. A SecureConnect unit door also features an interlock mechanism for added safety via sequential interlocking and lockout functionality. The interlock mechanism involves both depression and 180° rotation.



A CENTERLINE 2500 MCC with Two- and Four-Module SecureConnect Units



Notes:

CENTERLINE 2500 Low Voltage Motor Control Centers

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 MCC provides 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 that are easily networked in the MCC.

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, mains, main-tie-mains, and transformers for an integrated, low voltage power package.

CENTERLINE 2500 MCCs feature:

- Withdrawable units or 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
- Fully metric design (hardware and exterior dimensions)
- Air circuit breaker mains and feeders available
- Standard safety features like arc-free zones, continuous bus bracing, and isolated unit power stab assemblies help protect employees and keep your process up and running.



IntelliCENTER® Technology

IntelliCENTER technology enhances the intelligence of the CENTERLINE 2500 MCC by using built-in networking to capture information used for predictive maintenance, process monitoring, and advanced diagnostics. 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 Software

The addition of IntelliCENTER Software provides the ultimate window into your MCC. The preconfigured software provides maintenance personnel with easy access to real-time critical CENTERLINE MCC configured information and process data for troubleshooting. The configurable graphic 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.

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.

For more information about IntelliCENTER software features, see [page 12](#).



ArcShield Technology

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 safety-focused, 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.

For more information about ArcShield, see [page 21](#).



- 1 For IP42 enclosures, a self-closing baffle near the top of the ArcShield unit is available to vent an arc flash away from personnel.
- 2 For IP42 enclosures, an available reinforced pressure relief system at the top of the ArcShield unit vents exhaust gases away from personnel.
- 3 Thicker doors with reinforced hinges and arc-containment door latches keep an ArcShield unit door latched during an arcing fault.
- 4 Additional structural bracing is used on both sides and for all door latches of an ArcShield unit.
- 5 A break-away pressure relief system at the top of the unit is a standard feature. No additional plenums are required.
- 6 If an ArcShield unit is an end column, then an insulating cover and extra side stiffener are provided to help prevent 'burn through' from an arcing fault.

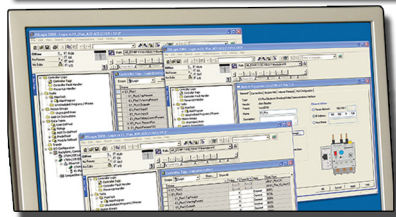
Selection Process

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

Standards	EN 60204-1:2006 + A1:2009 EN 61439-1:2011 EN 61439-2:2011	Safety of machinery – Electrical equipment of machines Low-voltage switchgear and controlgear assemblies Low-voltage switchgear and controlgear assemblies
EC Directives	2011/65/EU 2014/53/EU 2014/55/EU	RoHS Directive EMC Directive Low Voltage Directive
Certifications and Markings	ABS and ABS Shipboard CE Conformance Marked China Compulsory Certificate (CCC) DEKRA EAC NETE Seismic SI Approval	2500-C1015, 2500-C1016, and 2500-C1017 2500-C1008 and 2500-C1009 2500-C1010, 2500-C1011, 2500-C1012, 2500-C1013, 2500-C1014, 2500-C1015, 2500-C1016, and 2500-C1017 MCC-C1001 2500-C1024 MCC-C1011 2500-C1014

Step 1: Review MCC Technical Specifications

Determine what certifications, ratings, and other technical specifications are needed for your application. Step 1 starts on [page 9](#).



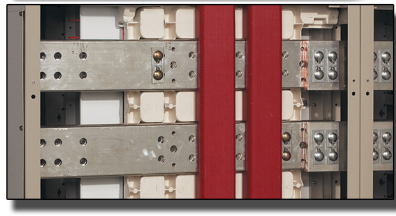
Step 2: Select Network Technology

Choose the level and type of networking technology, diagnostic, and HMI software tools. Step 2 starts on [page 11](#).



Step 3: Select Structure

Choose unit configuration, column width and depth, IP rating, and degree of separation. Step 3 starts on [page 15](#).



Step 4: Select Power Systems

Choose a 3- or 4-wire electrical system, horizontal and vertical power bus capacity, bus withstand and short circuit withstand rating. Step 4 starts on [page 23](#).



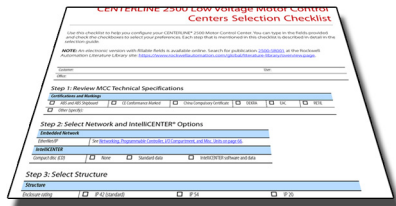
Step 5: Select Unit Designs

Choose unit size, style, and disconnect means. Step 5 starts on [page 27](#).



Step 6: Select Unit Types

Choose unit types from mains and feeders, starters, variable frequency drive, PLCs, and miscellaneous non-motor loads. Step 6 starts on [page 35](#).



Selection Checklist

Complete each corresponding part of the selection checklist as you work through each step. A completed checklist helps your local sales office better understand your needs. The summary checklist starts on [page 63](#).

Step 1: Review Technical Specifications

The following certifications (2500-CTOxx and MCC-CTOxx) can be found at the Rockwell Automation® Literature Library:
<https://www.rockwellautomation.com/site-selection.html>.

Standards	EN 60204-1:2006 + A1:2009 EN 61439-1:2011 EN 61439-2:2011 IEC/TR 61641, ED. 3.0 2014-9	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 Enclosed low-voltage switchgear and controlgear assemblies – guide for testing under conditions or arcing due to internal fault
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 RETIE Seismic SII Approval	2500-CT015 , 2500-CT016 , 2500-CT017 , 2500-CT023 , and 2500-CT025 2500-CT008 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-CT024 MCC-CT011 and MCC-CT012 2500-CT014
Rated Voltages	Rated Operating Voltage, U_e Rated Frequency, f_n Rated Insulation Voltage, U_i	Up to 690V, 3 Phase 50...60 Hz 1000V, 3 Phase
Rated Currents	Continuous Current Rating, I_e Short Circuit Peak Withstand, I_{pk} Short Time Withstand Rating, I_{cw} 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, U_{imp} Material Group (Overvoltage Category) Pollution Degree	6 kV, 8 kV, or 12 kV IIIa (175 <= CTI < 400) 3
Bus Material and Plating ⁽²⁾	Horizontal Power Bus Vertical Distribution Bus Protective Earth Conductor (PE)	Copper, tin plated Copper, tin plated Copper, unplated
Degrees of Protection	IEC 60529	IP20, IP42, or IP54
Forms of Separation	IEC 61439-1	Forms 2b, 3b, 4b Type 5, or 4b Type 7
Column Dimensions	Height, Width, Depth	See page 17
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 Gray paint (additional colors available as custom option)
Environment	Storage Temperature Operating (Ambient) Temperature Altitude	-25...+55 °C -5...+40 °C ⁽³⁾ 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) Standard plating; consult Rockwell Automation for plating options.

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

Notes:

Step 2: Network Technology

EtherNet/IP™ enhances integration, helps reduce your MCC set-up time, and increases the network speed. With EtherNet/IP, you can 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. Use of an EtherNet/IP network enables IntelliCENTER® Integration Assistant that automatically configures and populates your I/O tree and network configuration.

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 that vendors are not required to purchase hardware, software, or licensing rights to connect to a system.

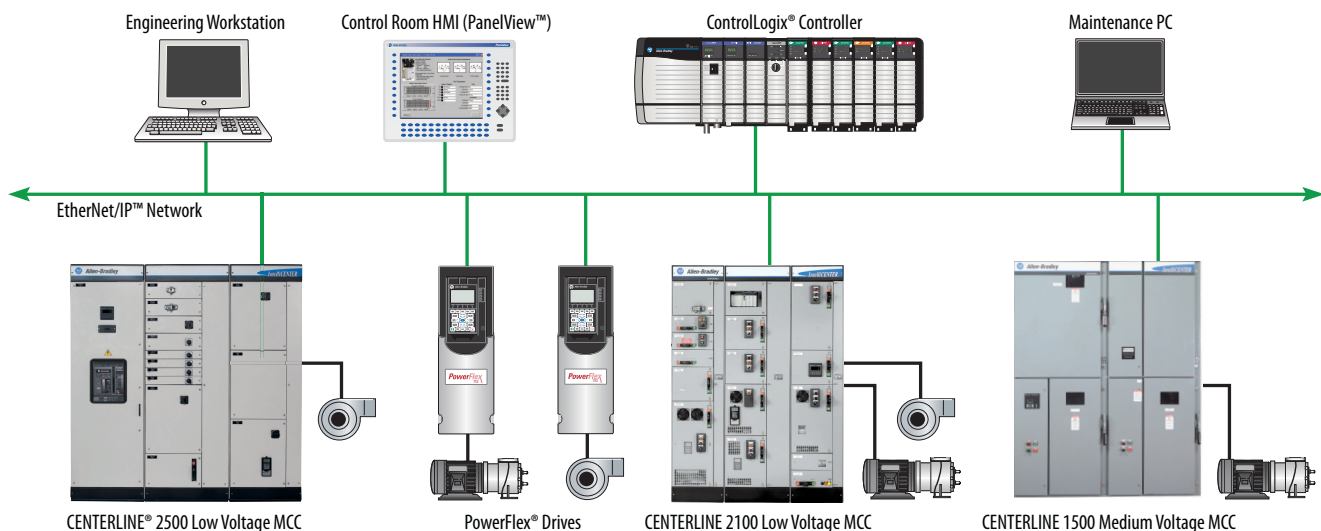
An EtherNet/IP system is qualified to communicate and perform under normal and adverse electrical environments. Its application can be plant-wide and over multiple disciplines through commercial off-the-shelf (COTS) products like Ethernet switches and devices.

An EtherNet/IP system has the following capabilities:

- Automatic Device Configuration (ADC) automatically downloads the IP address, firmware, and device parameter settings to a newly replaced device without user interaction.
- Switch-level linear or switch-level ring topologies provide network flexibility for any sized operation.
- Heavy traffic performance.
- Add or subtract nodes on-the-fly.
- Advanced network configuration, security, and diagnostics are provided by layer-2 managed Ethernet switches.
- The EtherNet/IP system in the MCC is designed to operate at 100 Mbaud.

For more information on how to configure MCCs with EtherNet/IP, refer to CENTERLINE 2500 motor control centers with EtherNet/IP Network, publication [2500-TD003](#).

Example of an EtherNet/IP Network



EtherNet/IP Components

Unit 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™ Electronic Overload Relay.
- 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.

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 close to high current motor leads. IntelliCENTER technology provides a robust network solution. All EtherNet/IP cables are routed through the control and network wireway, and 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.

IntelliCENTER Software Features

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 an EtherNet/IP network. The IntelliCENTER software can function as a standalone software package or as an ActiveX control in an HMI.

The IntelliCENTER software features:

- Integration Assistant - takes customized MCC information within the IntelliCENTER software and exports it to Studio 5000®, providing quick device integration and reducing programming time.
- IntelliCENTER Energy - energy monitoring and management with integration to FactoryTalk® EnergyMatrix™ software.
- Elevation View - an easy-to-identify, graphical representation of your entire MCC lineup.
- Monitor View - 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.
- Spreadsheet View - for sorting and editing data that seldom changes, including network address, device type and description, and nameplate data.
- Event Log View - a history of changes to equipment parameters, like trip settings, warnings, and faults.
- Documentation Management - access to the complete documentation for your MCC, including wiring diagrams, device manuals, and spare parts list.

IntelliCENTER Database

The IntelliCENTER software replicates the MCC lineup on a computer screen, complete with nameplates and indicators on each door to show status (on, off, warning, fault, communication failure). Graphical views of individual MCC units display device data so you can quickly view critical amperes, time-to-trip, trip cause, ground fault amperes, and on/off status. Each screen is pre-configured to show the parameters typically of greatest interest, and you can easily customize parameters. Many screens feature trending graphs and analog dials.

The IntelliCENTER software provides spare parts information, AutoCAD documentation, and event logging. The software also contains ActiveX controls. These controls provide key views of the software that can be displayed inside Human Machine Interfaces (HMIs) such as RSVIEW® software.

For EtherNet/IP networks, the configuration file can help in determining the installed firmware revision to properly configure the Studio 5000 environment Add-on Profile (AOP) that generates all tags for each EtherNet/IP device in the MCC.

Two datasets are available for IntelliCENTER software. Both must be ordered separately from the MCC unit.

Standard Dataset—The standard dataset is the second component of the IntelliCENTER software. The information arrives as a digital download, and contains data files specific to a particular MCC. This information includes unit nameplates, unit details, wiring diagrams, user manuals, spare parts, and other details.

Energy Dataset—The energy dataset includes all components of the standard dataset. Additionally, it includes the ability to use the features of IntelliCENTER Energy (version 4.0 and later) and the additional installation software needed.



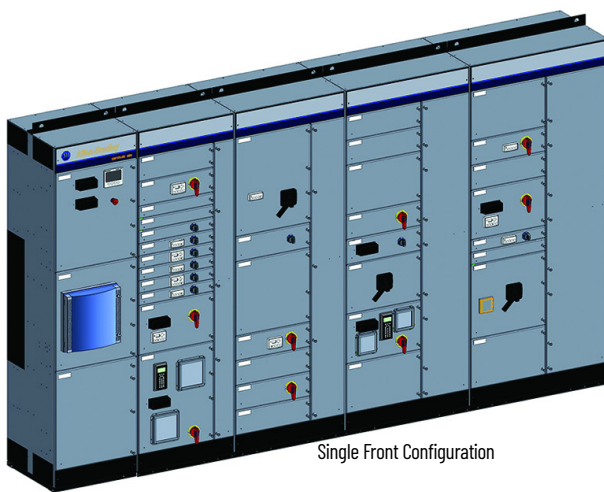
Notes:

Mounting Configurations

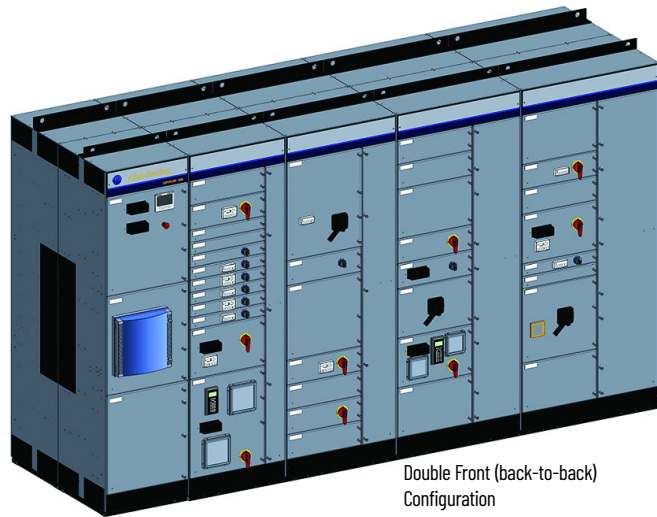
Choose from two mounting configurations, single front and double front (back-to-back).

Single front columns are joined and installed side by side.

Double front (back-to-back) columns are two separate columns that are 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.



Single Front Configuration



Double Front (back-to-back)
Configuration

Column Shipping Information

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 (back-to-back) column while two continuous, removable lifting angles are provided on each double front (back-to-back) shipping block.

Only double front (back-to-back) configurations of 600 mm deep columns are factory shipped. Double front (back-to-back) configurations are possible for 800 mm deep columns but they must be factory shipped as single front columns and then assembled on site.

Air Gap Requirements

Configurations with a ventilated bus require an air gap to the rear of the column. For further details, see [page 17](#).

Column Construction and Dimensions

Column Construction

The CENTERLINE® 2500 MCCs rigid design helps provide a longer life. Withdrawable units can still be installed and removed and doors close securely after years of dependable service.

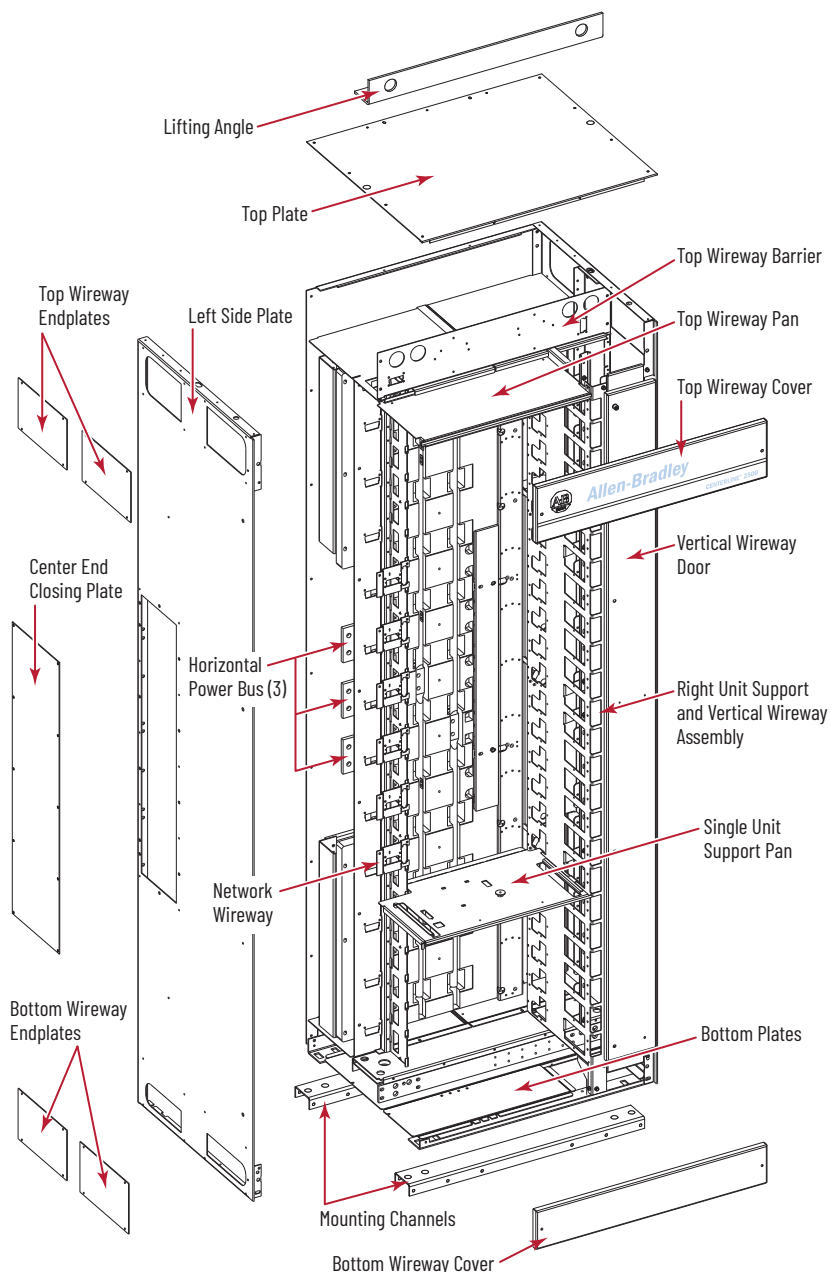
Fault containment is enhanced with two side sheets on every column to help prevent a fault from cascading throughout the structure and limiting equipment damage.

Unit size is described in terms of modules. Each module is approximately 80 mm high. Columns can accommodate 24 modules of varying combinations. For information about column depth and wireway widths, see [page 17](#).

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

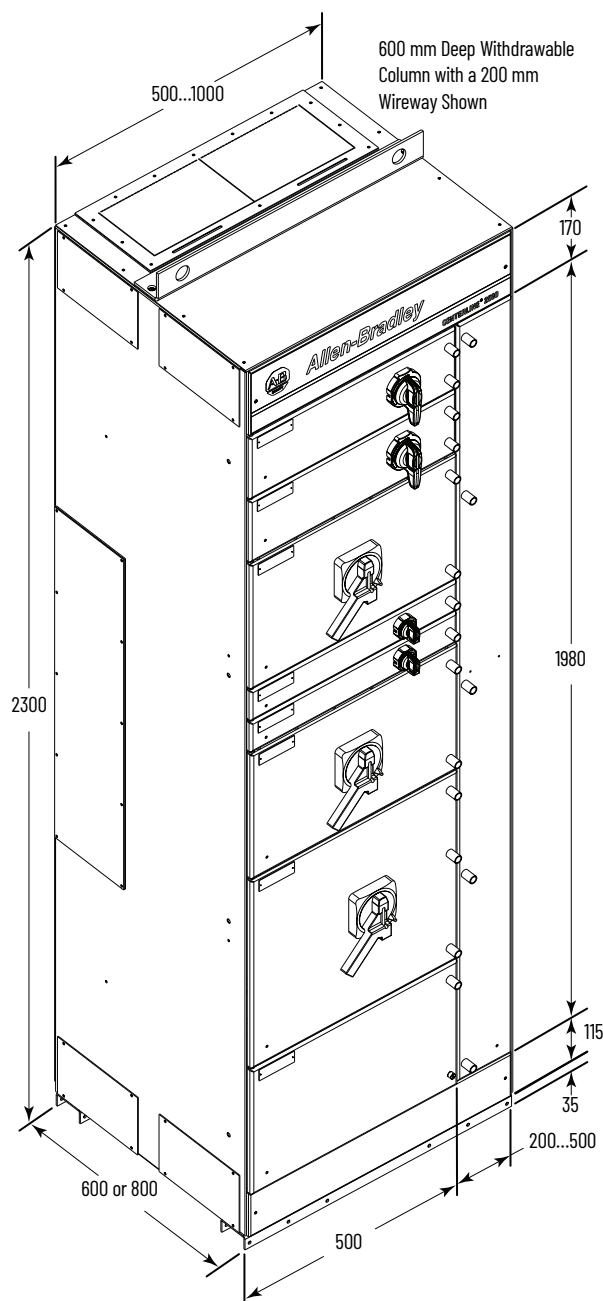
Typical Withdrawable Column

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



Column Dimensions

All dimensions are in mm.



Weight, kg

Column Width	Column Depth	
	600 ⁽¹⁾	800 ⁽¹⁾
600, 700	350	450
800	400	525
900	450	575
1000	500	650

(1) Weights that are shown are for an 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 an MCC unit shows the exact shipping weights.

Widths

Columns With Wireway ⁽¹⁾		
Fixed or Withdrawable Unit Width ⁽²⁾	Vertical Wireway Width ⁽³⁾	Total Column Width
500	200	700
	300	800
	400	900
	500	1000

Column Without Wireway ⁽¹⁾	
Fixed Unit Width ⁽⁴⁾	Total Column Width
500	500
600	600
700	700
800	800
900	900
1000	1000

- (1) Add 102 mm to overall width for external structural bracing of MCCs with ArcShield.
- (2) Available from 1...24 modules.
- (3) Recommended minimum wireway widths for the various forms of separation:
- For Form 3b, 300 mm wide
 - For Form 4b Type 5, 400 mm wide
 - For Form 4b Type 7, 500 mm wide
- (4) Applies to a full column (24 modules).

Height

Description	mm
Total height ⁽¹⁾	2300
Available unit height	1980
Top horizontal wireway	170
Bottom horizontal wireway	115
External mounting channel	35

Depth

Single Front	Double (Back-to-Back) Front
600	1200
800 ⁽²⁾	1600 ⁽²⁾

- (1) Add 70 mm for IP42 enclosures with the ArcShield™ pressure relief vent on top; see [page 7](#).
Add 75 mm for the lifting angles on top of MCC columns; see [page 15](#).
- (2) 4000 A bus requires a 100 mm air gap behind the column for single front configurations, and a 400 mm air gap behind the column for double front (back-to-back) configurations. In these instances, add the needed air gap to the overall depth.

Thickness, Nominal

Description	mm
Side plates (all depths)	2
Back plates (all widths)	2.5
Bottom mounting channel ⁽¹⁾	3.5
Top plate (all widths)	2
Bottom plates	2
Horizontal wireway covers	2

Description	mm
Wireway door	2
Doors (1...22 modules)	2
Doors ⁽²⁾	2.5
ArcShield 480V doors ⁽³⁾	2.5
ArcShield 480V doors ⁽²⁾	3

- (1) Front and rear
- (2) 1...22 modules
- (3) 24 modules

Degree of Protection (Enclosure Rating)

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 (Temperature and Altitude)

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% noncondensing 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 that exceed 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.

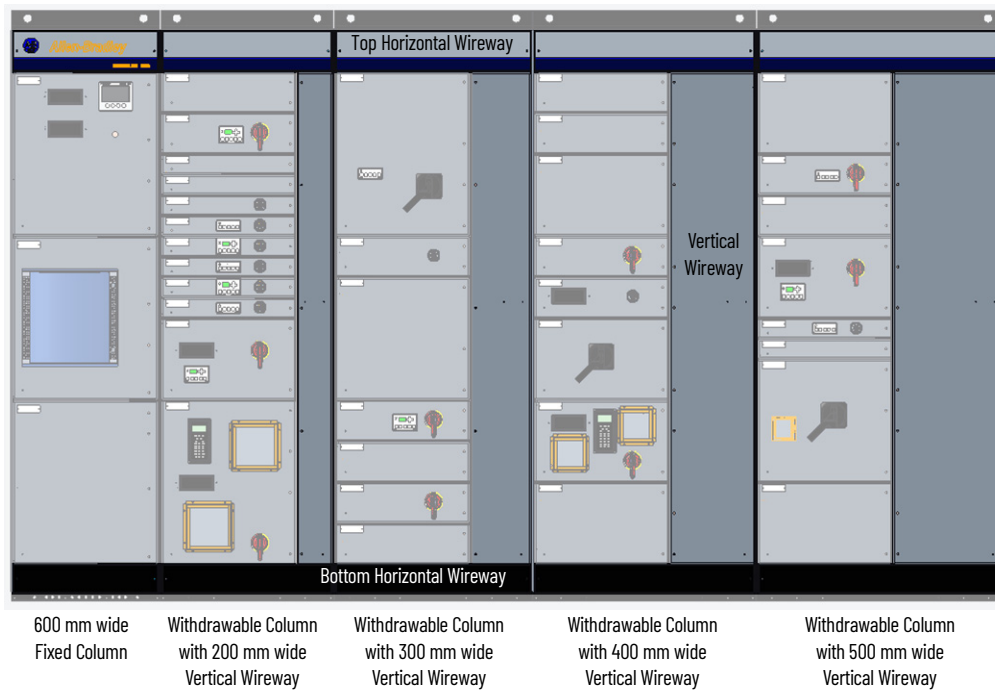
The standard exterior paint color is Pebble Gray (RAL 7032). Closing plates, channel supports, lifting angles, and horizontal wireway covers are painted Black Gray (RAL 7021). Additional paint colors are available as a custom option.

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 (back-to-back) 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 an 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 mm and 500 mm. Wider wireways are recommended for MCCs with higher bus ratings and higher unit density per section.

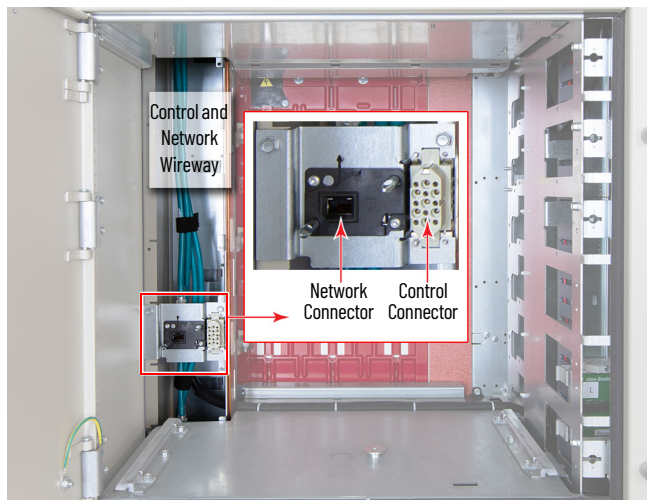
The vertical wireway is isolated from power bus and is independent of unit space. Vertical wireways are present in only columns with withdrawable units.

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.



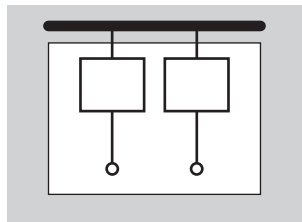
Forms of Separation

Internal isolation and separation exist between the following:

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

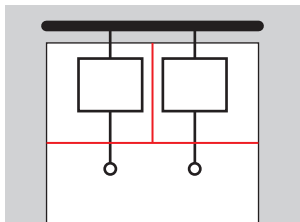
In addition, the vertical wireway for power wiring is separate from the vertical wireway for control and network wiring.

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.



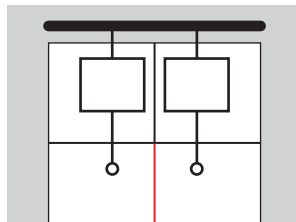
Form 2b:

- 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



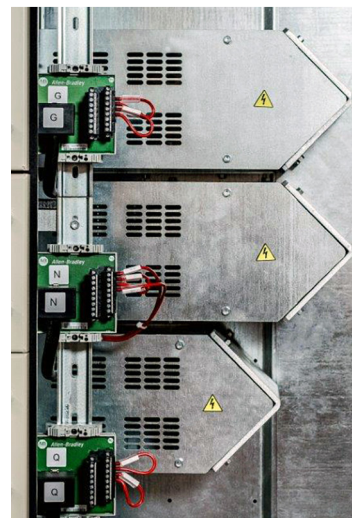
Form 4b

(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



Form 4b Type 5



Form 4b Type 7

ArcShield™ Technology

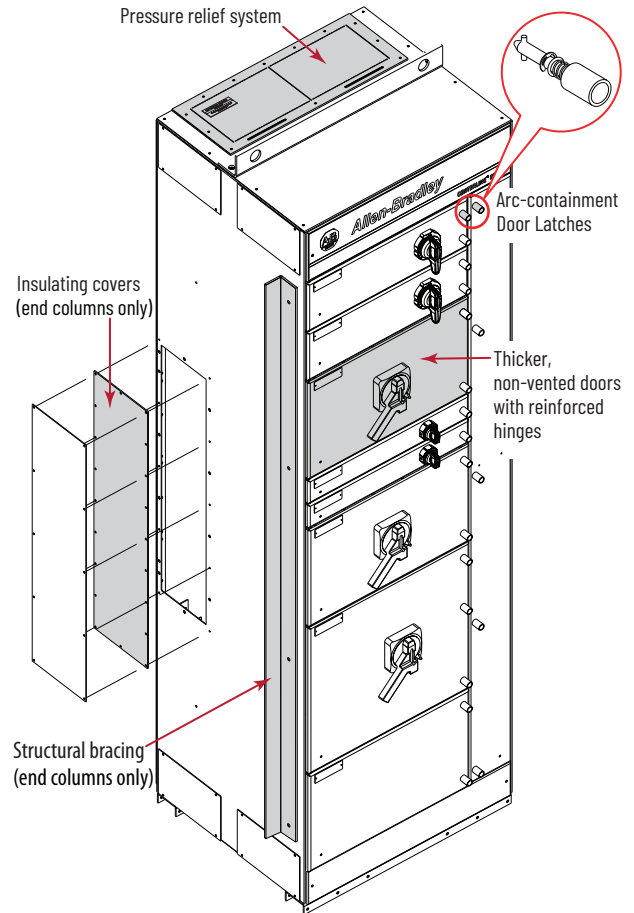
The CENTERLINE 2500 MCC with ArcShield offers better protection against harmful arc flash hazards and helps protect your personnel if an arc flash were to occur within an MCC. This protection can help increase facility uptime by minimizing the potential damage to equipment.

The CENTERLINE 2500 low voltage MCC with ArcShield was tested with third-party validation against the IEC/TR 61641 standard that defines tests under conditions of arcing due to internal fault. Comprehensive tests conducted under Edition 3.0, 2014-1 have passed the requirements for Class A (meets Criteria 1...5) for the main bus and unit line side, and Class C (meets Criteria 1...7) for all unit load side tests.

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

- Enclosures with specialized front ventilation to help 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 (on end columns only) that help prevent 'burn through' from arcing faults in the horizontal bus compartment
- Structural bracing (on end columns only) to withstand the high internal pressure of an arc blast

Optional optical and current sensing technologies are available for even more protection. For more details, contact your local Rockwell Automation sales office or Allen-Bradley distributor.



Notes:

Control and Incoming Power

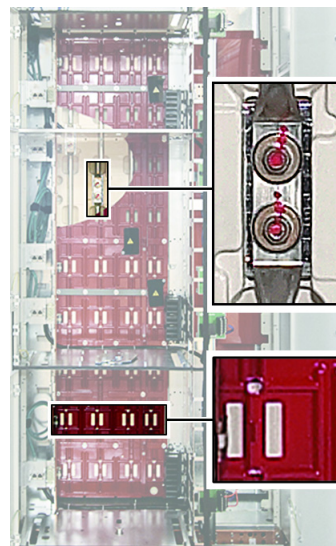
CENTERLINE® 2500 MCCs are suitable for use on three-phase, three-wire or four-wire, wye connected power systems, which are rated 690V or less (up to 480V for ArcShield), 50 Hz or 60 Hz. CENTERLINE 2500 MCCs can be used on three-wire or four-wire systems, with or without the optional neutral bus. The 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, and line-neutral or DC power supply. The control voltage can also be provided remotely from the MCC.

Power Bus System

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 help 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.



Vertical Bus Standard Features

Two-bolt Connection

- Vertical-to-horizontal power bus connection
- Minimizes the likelihood of 'hot spots'
- Requires no periodic maintenance

Automatic Shutters

- Open when a withdrawable unit is inserted; closed when unit is removed.
- Safely isolates vertical bus when a withdrawable unit is removed.

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 an 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.

Bus Rating	Busbar Quantity	Busbar Dimensions (mm)	Withstand Ratings ⁽¹⁾					
			I_{cw}	50 kA/1 s	50 kA/3 s	50 kA/3 s	80 kA/1 s	100 kA/1 s
			I_{pk}	110 kA	176 kA	220 kA	176 kA	220 kA
800 A	1	3 x 100	✓	—	—	—	—	—
1250 A	1	6 x 100	✓	✓	✓		✓	
1600 A	2	6 x 100	✓	✓	✓		✓	
2000 A	1	6 x 100	✓	✓	✓		✓	
	1	10 x 100	✓	✓	✓		✓	
2500 A	2	10 x 100	✓	✓	✓		✓	
3200 A	3	10 x 100 with 10 mm spacers	✓	✓	✓	✓	✓	✓
4000 A	4	10 x 100 with 10 mm spacers	✓	✓	✓	✓	✓	✓

(1) 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 that is rated for 600 A above and below the horizontal power bus for an effective 1200 A rating is available.

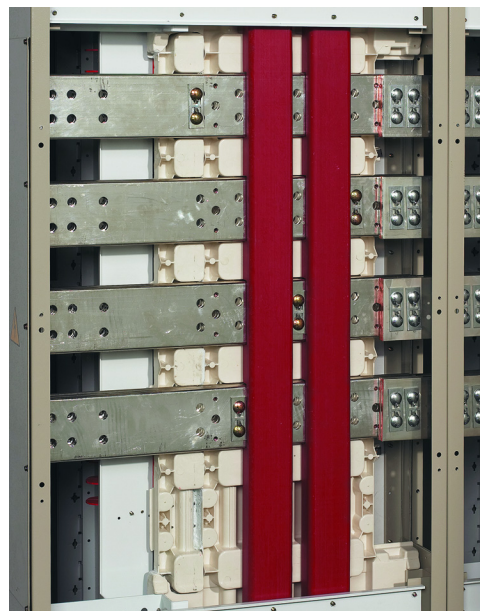
Neutral Bus

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.



Horizontal and neutral bus at back of MCC unit
(back plate of MCC unit removed)

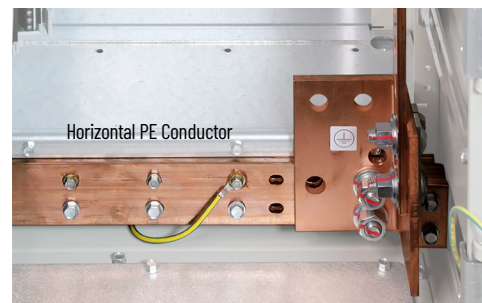
Protective Earth Conductor

The horizontal protective earth (PE) conductor and vertical PE conductor for withdrawable units form a complete internal protective earth circuit.

Horizontal PE Conductor

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

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

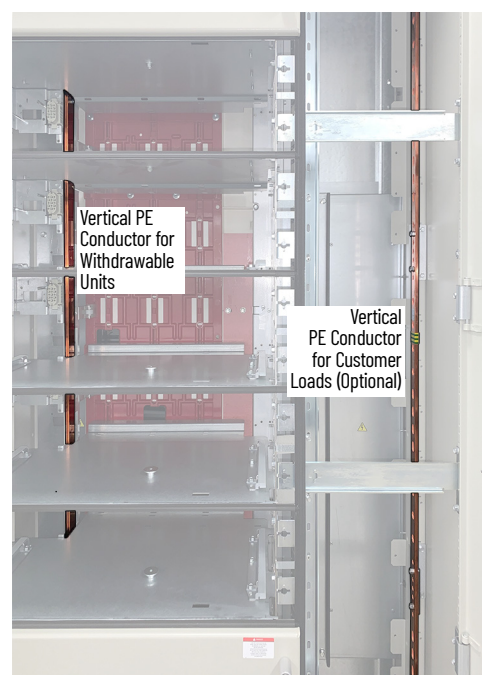


Vertical PE Conductor for Withdrawable Units

The vertical PE conductor for all withdrawable units is unplated copper, and is mechanically connected to the horizontal ground bus to form a complete internal ground system in each standard column. The vertical PE conductor, in combination with the unit PE contact, establishes a first make, last break operation of the PE connection with respect to the power connections. This connection keeps the withdrawable unit grounded continuously through the process of inserting or removing the unit.

Vertical PE Conductor for Customer Loads (Available as an Option)

The optional vertical PE conductor for customer loads is connected to the horizontal PE connector. This vertical PE conductor provides a termination point for the load ground cable adjacent to the unit. Without this option, the customer must connect to the horizontal PE conductor at the bottom of the column. The vertical PE conductor for customer loads can be unplated or tin-plated copper.



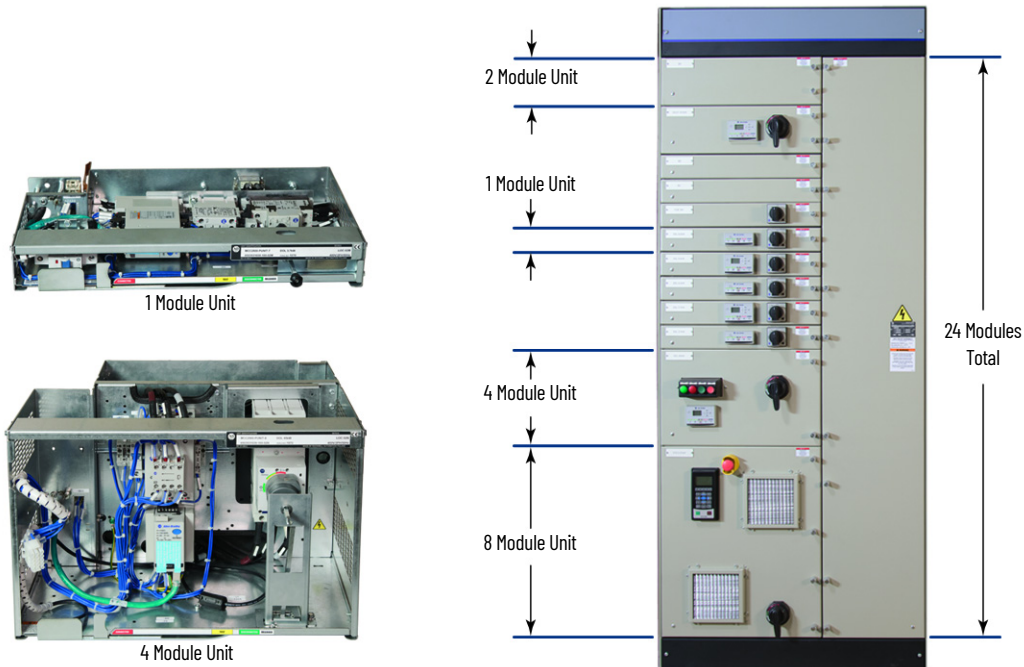
Notes:

Step 5: 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.



Unit Style

Units are available as either:

- **Standard withdrawable**—Units can be removed from the structure and have a maximum current rating of 225 A.
- **Withdrawable with SecureConnect™**—Units can be removed from the structure while the SecureConnect door remains closed, which increases personnel safety.
- **Fixed**—Units are permanently mounted to the frame of the motor control center. The vertical power bus provides power distribution both above and below the center-mounted horizontal bus, effectively doubling the capacity in each column.

Standard Withdrawable Units

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. You can specify top or bottom access. 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, Standard 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

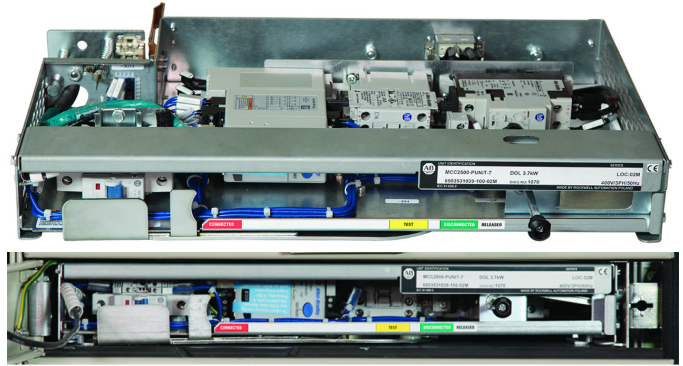
Withdrawable units have four operating positions: connected, test, disconnected, and released. See the following descriptions for additional information about the features of each position.

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, you 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.



Withdraw lever in the Connected position.



Withdraw lever in the Test position (and locked out).



Withdraw lever in the Disconnected position (and locked out).



Withdraw lever in the Released position (and locked out).

Standard Withdrawable Unit Operating Positions

Operating Position	Connection Present					Lockable Position
	Line	Load	Control	Network	PE	
Connected	✓	✓	✓	✓	✓	✓ ⁽¹⁾
Test	—	—	✓	✓	✓	✓
Disconnected	—	—	—	—	✓	✓
Released	Unit is removed from column; connections are not present.					✓

(1) Unit is lockable when door is closed.

Control and Network Connections

Control and network connections are made automatically for withdrawable units. A 15-pin connector plug, which is 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.

Withdrawable Units with SecureConnect

SecureConnect™ can be added to standard withdrawable units that are sized 2...10 modules. Withdrawable units with SecureConnect have the same four operating positions as standard withdrawable units. For information about the features of each operating position, see [Withdraw Lever on page 28](#).

Unlike standard withdrawable units, SecureConnect units have the handle on the outside of the door. Therefore, you can release the line, load, control, and network connections while the unit door is closed.

Blanking doors are available to replace a SecureConnect unit when that unit is removed temporarily from the MCC. For additional safety, SecureConnect units sized 6...10 modules include additional latches on the doors. For more information, see

Withdrawable units with SecureConnect have larger door latches. For more information, see [Door Latches on page 32](#).

Fixed Mount Units

Once installed in the column, fixed mount units cannot be moved or rearranged. 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 rating of the horizontal power bus determines the amount of current drawn by fixed mount units.

Unit Connections

Connection	Unit Type	
	Withdrawable ⁽¹⁾	Fixed
Load	✓	✓
Line	✓	✓
PE	✓	✓
Control	✓	✓
Network	✓	✓
Operating positions	- Connected - Test - Disconnected - Released	Fixed
Module sizes available	1...12	2...24

(1) Applies to standard withdrawable and withdrawable with SecureConnect.

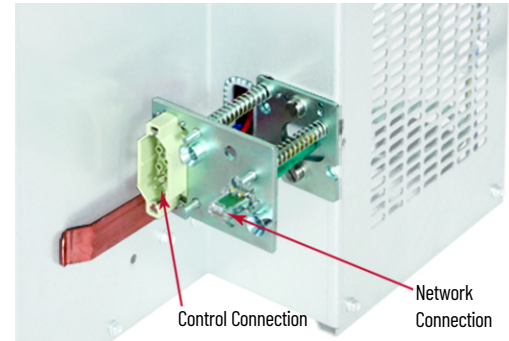
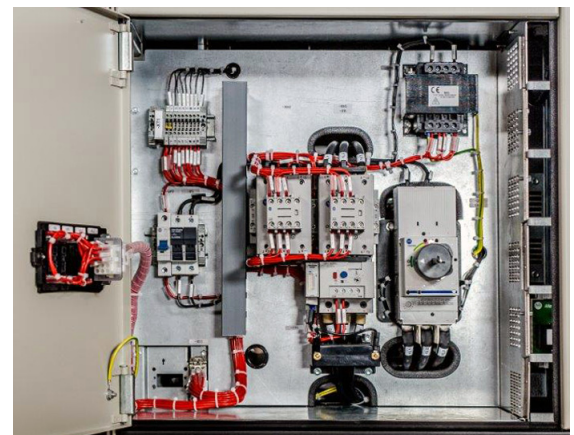
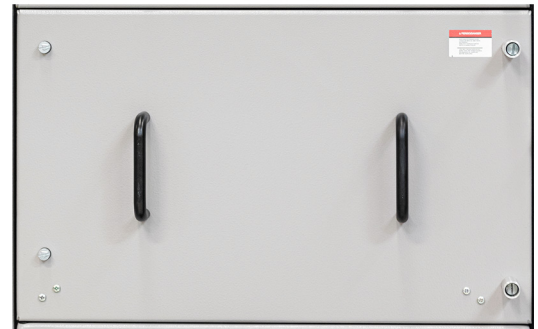


Photo Above: Four-module, SecureConnect Unit in the Test Position

Photo Below: Four-module Blanking Door As a Temporary Replacement



6 Module, Fixed Mount Unit

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 help 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.



Rotary handles are not shown to scale.

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

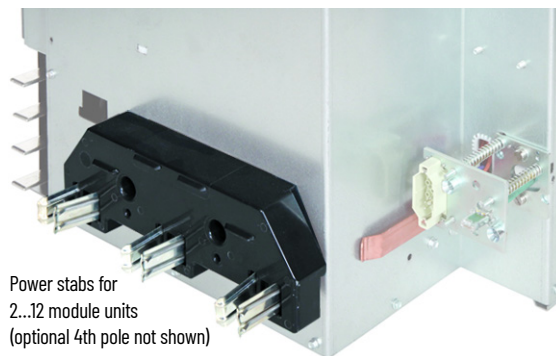
When specified, Bulletin 194R™ disconnect switches are provided. When specified, DIN or BS 88 fuses are supplied.

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.



Power stabs for 2...12 module units (optional 4th pole not shown)

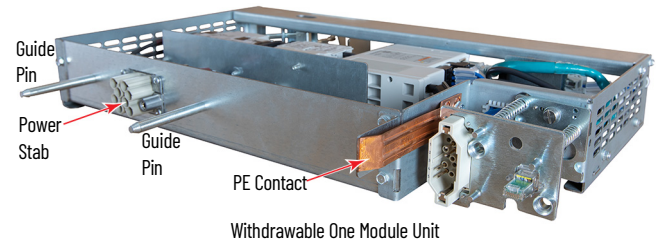
Unit plug-in power stabs are rated 225 A for 2...12 modules. The stabs are made of tin-plated copper for a low-resistance connection and are designed to tighten during heavy current surges.

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 that is connected to the vertical power bus. The two guide pins help to align the connector properly. 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.

Unit Doors

Standard fixed and standard withdrawable units: Doors are mounted to the column frame with heavy-duty hinges. The hinge pins are removable. Latches are quarter turn. Control stations for pilot devices and low profile external reset buttons for overload relays are often mounted to a fixed unit door.

For more information on pilot devices and control stations, see page [33](#).

ArcShield™ fixed and standard withdrawable units: Thicker doors are mounted to the column frame with heavy-duty hinges. The hinge pins are removable. The specialized latches are single-stage quarter turn, and are designed to contain the force of an arcing fault.

For more information on ArcShield units, see pages [7](#) and [21](#).

SecureConnect withdrawable units: Doors are mounted to the unit and are removed with the unit. The doors have heavy duty hinges connected to the unit for the option of opening a door without removing the unit from the column. Hinge pins are removable. The specialized arc-resistant latches have a deeper barrel with a two-stage quarter turn operation. A blanking door is also available to replace a SecureConnect unit door when it is temporarily removed from the MCC.

For more information on SecureConnect units, see pages [3](#) and [29](#).

For more information on the three available door latches, see page [32](#).

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.



ArcShield and SecureConnect Latches

Pressure relief latches are provided for ArcShield™ and SecureConnect™ units. These latches help protect personnel near an MCC if an arc fault occurs when structure doors are closed and latched. Pressure relief latches can be locked or released by rotating the latch ¼ turn.

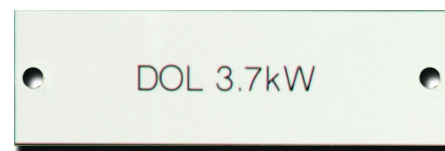


Unit Nameplates

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, 230V or 240V AC, or others as required.

Unit control power is normally supplied by one, 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.



Remote Indication

Various CENTERLINE components have remote or mobile indication that can be added to the front of an MCC unit panel.

Direct online (DOL) and direct online reversing (DOLR) starters have remote indication for the E100™ and E300™ electronic relays. E100 relays have two available remote indication displays with light-emitting diode (LED) status indicators, with one of the displays features a reset button. E300 relays have two available operator stations, control or diagnostic. Both operator stations have push buttons for motor control logic, and both can upload and download parameter configuration data from the base relay.

SMC™ Flex reduced-voltage or 'soft' starters have human interface modules (HIMs) that are available in hand-held and panel-mounted models. Both models have liquid crystal displays with either programming or full-numeric keypads.

PowerFlex® variable-frequency drives (VFDs) have HIMs that provide a communication interface to configure and monitor VFDs that are used in CENTERLINE 2500 MCCs. These HIMs have liquid crystal displays with full-numeric keypads.



E100 Remote Indication Display with Reset Button



E300 Diagnostic Station



A Panel-mounted HIM for SMC Flex



A Panel-mounted HIM for PowerFlex VFDs

Notes:

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. These units can use either air circuit breakers (ACBs) or molded case circuit breakers (MCCBs) as standard sections. Main lug configurations are also available as options.

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 ACBs or MCCBs as standard sections. Main lug configurations are also available. 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 38](#).

Main Incoming Cable Connections

Main ACB Unit Rating	Main Configuration	Cable Size (mm ²)	No. of Cables Per Phase
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

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

Circuit Breaker Frame Size	Module Size	I _{cw} , kA ⁽¹⁾	ACB Pole Qty.	Trip Unit Rating, A	Load I _{nc} , A ⁽²⁾						Column Width, mm		Column Depth, mm
					Frame-mounted Top Entry			Frame-mounted Bottom Entry			3 Pole	4 Pole	3 and 4 Pole
					Standard IP42 (ventilated)	ArcShield IP42 (ventilated)	Standard or ArcShield IP54	Standard IP42 (ventilated)	ArcShield IP42 (ventilated)	Standard or ArcShield IP54			
1	24	50	3, 4	800	800	800	800	800	800	800	500	600	600 or 800
				1000	1000	1000	1000	1000	1000	1000			
				1250	1250	1250	1216	1250	1250	1250			
				1600	1403	1336	1216	1423	1390	1376			
2		66, 85	3, 4	800	800	800	800	800	800	800	600	700	
				1000	1000	1000	1000	1000	1000	1000			
				1250	1250	1250	1250	1250	1250	1250			
				1600	1600	1600	1600	1600	1600	1600			
				2000	1899	1758	1713	1899	1758	1713			
				2500	2190	2064	1826	2222	2097	1926			
4		100	3, 4	2000	2000	2000	2000	2000	2000	2000	700	800	800
				2500	2500	2500	2500	2500	2500	2500			
		66, 85, 100	3, 4	3200	3006 ⁽³⁾	2645	2535	3200 ⁽³⁾	2936	2842			
				4000	3039 ⁽³⁾	—	—	3203 ⁽³⁾	—	—			

(1) At 690V, 1 second.

(2) Unless otherwise specified, values are valid for 50 Hz and 60 Hz.

(3) Include a 100 mm air gap behind the column for single front configurations and a 400 mm air gap behind the column for double front (back-to-back) configurations.

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

Amps	Load I_{nc} , A	Module Size	Column Width, mm	Column Depth, mm	Circuit Breaker Cat. No. ⁽¹⁾
300	240	10	700, 800, 900, 1000	600, 800	140G-K***-D30
400	320				140G-K***-D40
630	504				140G-M***-D63
800	610				140G-M***-D80
1000	800	14 ⁽¹⁾			140G-N***-E10
1200	936				140G-N***-E12

(1) ArcShield is not available with these breakers.

Main Lug Only Compartment

A Main Lug Only (MLO) compartment contains only a set of main mechanical lugs for the incoming MCC power. There is no main disconnect or main incoming protection within the MCC. The MCC protection is provided typically by an external device near the MCC.

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

Circuit Breaker Frame Size	Module Size	I _{cn} , kA ⁽¹⁾	ACB Pole Qty.	Trip Unit Rating, A	Load I _{ncr} , A						Column Width, mm		Column Depth, mm	
					Frame-mounted Values for 50 Hz			Frame-mounted Values for 60 Hz			3 Pole	4 Pole	3 and 4 Pole	
					Standard IP42 (ventilated)	ArcShield IP42 (ventilated)	Standard ArcShield IP54	Standard IP42 (ventilated)	ArcShield IP42 (ventilated)	Standard ArcShield IP54				
1	24	50	3, 4	800	800	800	800	800	800	500	600	600 or 800		
				1000	1000	1000	1000	1000	1000					
				1250	1250	1250	1243	1250	1250				1189	
				1600	1517	1432	1243	1441	1361				1189	
2		66, 85	3, 4	800	800	800	800	800	800	600	700			
				1000	1000	1000	1000	1000	1000				1000	
				1250	1250	1250	1250	1250	1250				1250	
				1600	1600	1600	1600	1600	1600				1600	
				2000	2000	2000	1856	2000	2000				1764	
				2500	2313	2181	1914	2197	2072				1818	
4		66, 85, 100	3, 4	3200	3200 ⁽²⁾	3061	2652	3200 ⁽²⁾	2908	2519	700		800	800
				4000	3566 ⁽²⁾	—	—	3388 ⁽²⁾	—	—				

(1) At 690V, 1 second.

(2) Include a 100 mm air gap behind the column for single front configurations and a 400 mm air gap behind the column for double front (back-to-back) configurations.

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

Feeders, ACB

Circuit Breaker Frame Size	Module Size	I _{cw} , kA ⁽¹⁾	ACB Pole Qty.	Trip Unit Rating, A	Busbar Rating in Line-up, max	Load I _{nc} , A ⁽²⁾						Column Width, mm		Column Depth, mm
						Frame-mounted Top Entry			Frame-mounted Bottom Entry			3 Pole	4 Pole	3 and 4 Pole
						Standard IP42 (ventilated)	ArcShield IP42 (ventilated)	Standard or ArcShield IP54	Standard IP42 (ventilated)	ArcShield IP42 (ventilated)	Standard or ArcShield IP54			
1	24	50	3, 4	800	1600 A, 2000 A, 2500 A, 3200 A, 4000 A ⁽³⁾	800	800	800	800	800	800	500	600	600 or 800
				1000		1000	1000	1000	1000	1000				
				1250		1250	1250	1129	1250	1250	1129			
				1600	2000 A, 2500 A, 3200 A, 4000 A ⁽³⁾	1327	1262	1129	1327	1262	1129			
2		66, 85	3, 4	800	1600 A, 2000 A, 2500 A, 3200 A, 4000 A ⁽³⁾	800	800	800	800	800	800	600	700	
				1000		1000	1000	1000	1000	1000	1000			
				1250		1250	1250	1250	1250	1250	1250			
				1600	2000 A, 2500 A, 3200 A, 4000 A ⁽³⁾	1600	1600	1600	1600	1600	1600			
				2000	3200 A, 4000 A ⁽³⁾	1899	1758	1713	1899	1758	1713			
				2500		2190	2064	1826	2222	2097	1926			
4		100	3, 4	2000	3200 A, 4000 A ⁽³⁾	2000	2000	2000	2000	2000	2000	700	800	800
				2500		2500	2500	2500	2500	2500	2500			

(1) At 690V, 1 second.

(2) Unless otherwise specified, values are valid for 50 Hz and 60 Hz.

(3) ArcShield is not available with the 4000 A rating.

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

Feeders, MCCB

Amps	Load I _{nc}	Module Size	Circuit Breaker Cat. No.	Trip
6.3	5.04	1 ⁽¹⁾	140MD8EB63	Adjustable Thermal/ Fixed Magnetic
10	8.00		140MD8EC10	
16	12.8		140MD8EC16	
20	16.0		140MF8EC20	
25	20.0		140MF8EC25	
32	25.0		140MF8EC32	
15	12	2	140GG*C3C15	Thermal/Magnetic Fixed
20	16		140GG*C3C20	
25	20		140GG*C3C25	
30	24		140GG*C3C30	
35	28		140GG*C3C35	
40	32		140GG*C3C40	
45	36		140GG*C3C45	
50	40		140GG*C3C50	
60	48		140GG*C3C60	
70	56		140GG*C3C70	
80	64		140GG*C3C80	
90	72		140GG*C3C90	
100	80		140GG*C3D10	
125	85		140GG*C3D12 ⁽²⁾	
90	72		140GJ*F3C90	Thermal/Magnetic Adjustable
100	80		140GJ*F3D10	
125	100		140GJ*F3D12	
150	120		140GJ*F3D15	
175	140		140GJ*F3D17	
200	160	4	140GJ*F3D20	
225	165		140GJ*F3D22	
300	240	4 ⁽³⁾	140GK*H3D30	LSI Electronic
400	327		140GK*H3D40	
630	504	10 ⁽³⁾	140GM*H3D63	
800	610		140GM*H3D80	
1000	800	14 ⁽³⁾⁽⁴⁾	140GN*H3E10	
1200	936		140GN*H3E12	
300	240	4 ⁽³⁾	140GK*I3D30	LSIG Electronic
400	327		140GK*I3D40	
630	504	10 ⁽³⁾	140GM*I3D63	
800	610		140GM*I3D80	
1000	800	14 ⁽³⁾⁽⁴⁾	140GN*I3E10	
1200	936		140GN*I3E12	

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

(2) Order 140GH*C3D12 for 96 A I_{nc}.

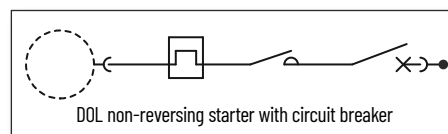
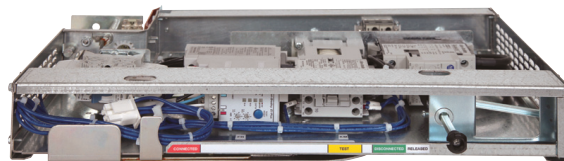
(3) Fixed mount style.

(4) ArcShield is not available with these breakers.

Starter Units

Direct-on-line Nonreversing (DOL) Starter Units

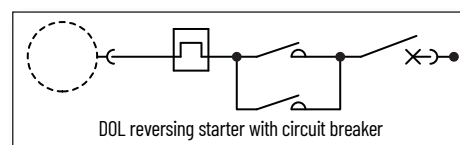
Direct-on-line nonreversing starter units are supplied with Allen-Bradley Bulletin 100-C or 100-E contactors and a circuit breaker disconnect or an optional fused disconnect. These units are available with an E100™ or E300™ Electronic Overload Relay, and available with or without an external reset button for the overload relay. Starter units are available in withdrawable, fixed, or frame-mounted styles.



Direct-on-line Reversing (DOLR) Starter Units

These combination DOLR starter units are supplied with Allen-Bradley Bulletin 100-E or 104-E 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 E100 or E300 Electronic Overload Relay, and available with or without an external reset button for the overload relay. DOLR starter units are available in withdrawable, fixed, or frame-mounted styles.



DOL and DOLR Starter Unit Options

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 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-E (DOL)/104-E (DOLR) IEC contactors features:

- Electronic coils
 - AC and DC
 - Optional PLC interface
 - Low power pickup 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 193-1E (DOL/DOLR)–E100 solid-state overload relays features:

- Self-powered
- Phase loss protection
- 5:1 wide adjustment range
- IEC and NEMA direct-mount power connections
- One N.O. and One N.C. isolated auxiliary contacts (B600 rated)
- Low energy consumption
- Ambient temperature compensation
- Visible trip indication
- Optional ground fault and jam protection
- Remote reset capability

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
- 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

DOL and DOLR Selection

DOL Nonreversing and DOLR Reversing Starter Units With 140M Series Circuit Breakers and E100 Motor Overload Relays

P kW, Approx	380V	400V	415V	440V	480V	Module Size ⁽¹⁾		140M Series Circuit Breaker Cat. No.	Contactor Cat. No.		E100 Motor Overload Relay Cat. No. ⁽²⁾				
						DOL	DOLR		DOL	DOLR					
0.06	✓					1	2	140M-C2N-B10	100-C16	104-C16	193-1EFAB				
0.09															
0.12															
0.18															
0.25															
0.37					✓			140M-C2N-B16							
	✓														
0.55	✓							2			140M-C2N-B25	100-C37	104-C37	193-1EFCB	
0.75															
1.1															
1.5															
2.2															
3														140M-D8N-C10	193-1EFDB
4															
5.5															
7.5															
9.2															
11						2	140M-D8N-C25	100-C37	104-C37	193-1EFED					

(1) Module size without control power transformer (CPT).

(2) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, refer to <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/circuit-and-load-protection/motor-protectors--low-voltage/overload-relays--solid-state/193-iec-e100-relays.html>.

DOL Nonreversing and DOLR Reversing Starter Units With 140MG Series Circuit Breakers and E100 Motor Overload Relays

P kW, Approx	380V	400V	415V	440V	480V	Module Size ⁽¹⁾		140MG Series Circuit Breaker Cat. No.		Contactor Cat. No.		E100 Motor Overload Relay Cat. No. ⁽²⁾			
						DOL	DOLR	140MG-G Options	140MG-H Options	DOL	DOLR				
0.06	✓					2	2	—	140MG-H8P-B30	100-C37	104-C37	193-1EFAB ⁽³⁾			
0.09															
0.12															
0.18															
0.25															
0.37					✓			140MG-G8P-B30	140MG-H8P-B70			140MG-H8P-B70	193-1EFCB ⁽³⁾		
	✓														
0.55	✓							140MG-G8P-B70						140MG-H8P-B70	193-1EFCB ⁽³⁾
0.75															
1.1	✓														
1.5															
2.2															

(1) Module size without control power transformer (CPT).

(2) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, refer to <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/circuit-and-load-protection/motor-protectors--low-voltage/overload-relays--solid-state/193-iec-e100-relays.html>.

(3) The E100 overload relay requires the cat. no. 193-1EPB DIN rail/panel adapter.

The DOL Nonreversing and DOLR Reversing Starter Units With 140MG Series Circuit Breakers and E100 Motor Overload Relays table continues on the next page.

DOL and DOLR Selection (continued)

DOL Nonreversing and DOLR Reversing Starter Units With 140MG Series Circuit Breakers and E100 Motor Overload Relays, continued

P kW, Approx	380V	400V	415V	440V	480V	Module Size ⁽¹⁾		140MG Series Circuit Breaker Cat. No.		Contactor Cat. No.		E100 Motor Overload Relay Cat. No. ⁽²⁾	
						DOL	DOLR	140MG-G and Other Options	140MG-H Options	DOL	DOLR		
3	✓					2	2	140MG-G8P-C15	140MG-H8P-C15	100-C37	104-C37	193-1EFED	
4								140MG-G8P-C50	140MG-H8P-C50				
5.5													
7.5													
9.2													
11													
15								140MG-G8P-C50	140MG-H8P-C50				
18.5	✓		100-C55	104-C55									
✓					140MG-G8P-C80	140MG-H8P-C80							
22					140MG-G8P-C50	140MG-H8P-C50	100-C37			104-C37			
	✓						100-C55			104-C55			
30	✓				4	4	140MG-G8P-D12			140MG-H8P-D12	100-C85	104-C85	193-1EFGE
✓							140MG-G8P-C80			140MG-H8P-C80	100-C55	104-C55	193-1EFFD
37	✓				4	4	140MG-G8P-C80	140MG-H8P-C80	100-C55	104-C55	193-1EFFD		
45	✓		6	6			140MG-G8P-D12	140MG-H8P-D12	100-C85	104-C85	193-1EFGE		
	✓				100-C97	104-C97							
55	✓		✓			8	10	140MG-J8P-D25		100-E205	104-E205	193-1EFKZ ⁽³⁾	
75	✓			✓									10 ⁽⁴⁾
90	✓		✓				8	10 ⁽⁴⁾	140MG-K8P-D40	100-E400	104-E400	193-1EFWZ ⁽³⁾	
110	✓			✓									10 ⁽⁴⁾
	✓				10 ⁽⁴⁾	12 ⁽⁴⁾	140MG-K8P-D40	100-E400	104-E400	193-1EFWZ ⁽³⁾			
132	✓		✓								24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80
150	✓			✓			10 ⁽⁴⁾	12 ⁽⁴⁾	140MG-K8P-D40	100-E400			104-E400
160	✓		✓						24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80	100-E580	104-E580
185	✓			✓			24 ⁽⁵⁾	24 ⁽⁵⁾			140MG-K8P-D40		
200	✓		✓						24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80	100-E580	104-E580
220	✓			✓			24 ⁽⁵⁾	24 ⁽⁵⁾			140MG-M8P-D80		
250	✓		✓						24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80	100-E580	104-E580
300	✓			✓			24 ⁽⁵⁾	24 ⁽⁵⁾			140MG-M8P-D80		
315	✓		✓						24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80	100-E580	104-E580

(1) Module size without control power transformer (CPT).

(2) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, refer to <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/circuit-and-load-protection/motor-protectors-low-voltage/overload-relays-solid-state/193-iec-e100-relays.html>.

(3) Includes an external current transformer.

(4) Fixed module style.

(5) Frame mounted style that is 600 mm wide.

For more information, see IEC Contactor Specifications Technical Data, publication [100-TD013](#); E100 Electronic Overload Relay Specifications Technical Data, publication [193-TD013](#), and Motor Protection Circuit Breaker and Motor Circuit Protector Specifications, publication [140M-TD002](#).

DOL and DOLR Selection (continued)

DOL Nonreversing and DOLR Reversing Starter Units With 140M Series Circuit Breakers and E300 Motor Overload Relays

P kW, Approx	380V	400V	415V	440V	480V	Module Size ⁽¹⁾		140M Series Circuit Breaker Cat. No.	Contactor Cat. No.		E300 Motor Overload Relay Cat. No. ⁽²⁾
						DOL	DOLR		DOL	DOLR	
0.18	✓					1	2	140M-C2N-B10	100-C16	104-C16	193-ESM-***-30A-C23
0.25								140M-C2N-B16			
0.37								140M-C2N-B25			
0.55								140M-D8N-B40			
0.75								140M-D8N-B63			
1.1								140M-D8N-C10			
1.5								140M-D8N-C16			
2.2											
3											
4											
5.5											
7.5											
9.2						2	140M-D8N-C25	100-C37	104-C37	193-ESM-***-30A-C55	
11											

(1) Module size without control power transformer (CPT).

(2) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, use the Product Configuration Assistant at <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/circuit-and-load-protection/motor-protectors--low-voltage/overload-relays--solid-state/193-iec-e300-relays.html>.

DOL Nonreversing and DOLR Reversing Starter Units With 140MG Series Circuit Breakers and E300 Motor Overload Relays

P kW, Approx	380V	400V	415V	440V	480V	Module Size ⁽¹⁾		140MG Series Circuit Breaker Cat. No.		Contactor Cat. No.		E300 Motor Overload Relay Cat. No. ⁽²⁾
						DOL	DOLR	140MG-G Options	140MG-H Options	DOL	DOLR	
0.18	✓					2	2	140MG-G8P-B30	140MG-H8P-B30	100-C37	104-C37	193-ESM-***-30A-C55
0.25												
0.37												
0.55												
0.75												
1.1												
1.5								140MG-G8P-B70	140MG-H8P-B70			
2.2												
3												
4												
5.5												
7.5						140MG-G8P-C15	140MG-H8P-C15					
9.2												
11												
15												
	140MG-G8P-C50	140MG-H8P-C50										
										193-ESM-***-60A-C55		

(1) Module size without control power transformer (CPT).

(2) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, use the Product Configuration Assistant at <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/circuit-and-load-protection/motor-protectors--low-voltage/overload-relays--solid-state/193-iec-e300-relays.html>.

The DOL Nonreversing and DOLR Reversing Starter Units With 140MG Series Circuit Breakers and E100 Motor Overload Relays table continues on the next page.

DOL and DOLR Selection (continued)

DOL Nonreversing and DOLR Reversing Starter Units With 140MG Series Circuit Breakers and E300 Motor Overload Relays, continued

P kW, Approx	380V	400V	415V	440V	480V	Module Size ⁽¹⁾		140MG Series Circuit Breaker Cat. No.		Contactor Cat. No.		E300 Motor Overload Relay Cat. No. ⁽²⁾
						DOL	DOLR	140MG-G and Other Options	140MG-H Options	DOL	DOLR	
18.5		✓				2	2	140MG-G8P-C50	140MG-H8P-C50	100-C37	104-C37	193-ESM-***-60A-C55
	✓							140MG-G8P-C80	140MG-H8P-C80	100-C55	104-C55	
22					✓	4	4	140MG-G8P-C50	140MG-H8P-C50	100-C37	104-C37	
	✓							140MG-G8P-C80	140MG-H8P-C80	100-C55	104-C55	
30		✓				4	4	140MG-G8P-D12	140MG-H8P-D12	100-C85	104-C85	193-ESM-***-100A-C97
	✓							140MG-G8P-C80	140MG-H8P-C80	100-C55	104-C55	193-ESM-***-60A-C55
37					✓	6	6	140MG-G8P-D12	140MG-H8P-D12	100-C85	104-C85	193-ESM-***-100A-C97
	✓										100-C97	
45					✓	8	10	140MG-J8P-D25		100-E205	104-E205	193-ESM-***-200A-E205
		✓										
55		✓				10 ⁽³⁾	12 ⁽³⁾	140MG-K8P-D40		100-E400	104-E400	
	✓											
75			✓			10 ⁽³⁾	12 ⁽³⁾	140MG-M8P-D80		100-E580	104-E580	193-ESM-***-30A-E3T ⁽⁴⁾ or 193-ESM-VIG-30A-CT ⁽⁴⁾
	✓											
90		✓				24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-K8P-D40		100-E400	104-E400	
	✓											
110					✓	10 ⁽³⁾	12 ⁽³⁾	140MG-M8P-D80		100-E580	104-E580	
	✓											
132					✓	24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-K8P-D40		100-E580	104-E580	
		✓										
150		✓				24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80		100-E580	104-E580	
	✓											
160				✓		24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80		100-E580	104-E580	
	✓											
185	✓					24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80		100-E580	104-E580	
200												
220												
250												
300					✓	24 ⁽⁵⁾	24 ⁽⁵⁾	140MG-M8P-D80		100-E580	104-E580	
315					✓							

(1) Module size without control power transformer (CPT).

(2) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, use the Product Configuration Assistant at <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/circuit-and-load-protection/motor-protectors--low-voltage/overload-relays--solid-state/193-iec-e300-relays.html>.

(3) Fixed module style.

(4) Includes an external current transformer.

(5) Frame mounted style that is 600 mm wide.

For more information, see IEC Contactor Specifications Technical Data, publication [100-TD013](#); E300/E200 Electronic Overload Relay Technical Data, publication [193-TD006](#), and Motor Protection Circuit Breaker and Motor Circuit Protector Specifications, publication [140M-TD002](#).

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:

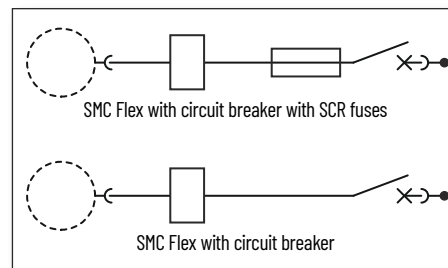
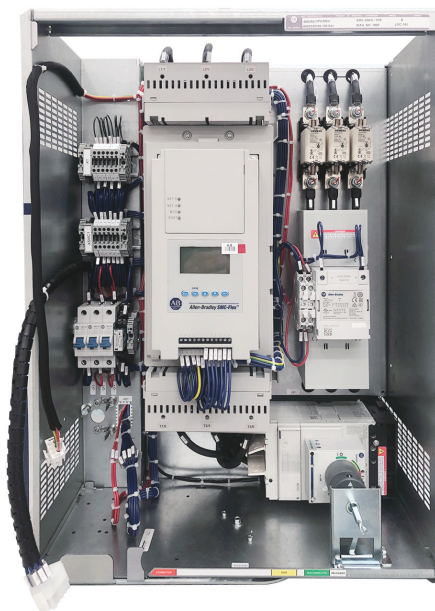
- Seven standard modes of operation: soft start, current limit start, dual ramp, full-voltage, linear speed acceleration, preset slow speed, and soft stop
- Optional modes of operation: pump control, smart motor braking, Accu-Stop™, and slow speed with braking
- Integral SCR bypass
- Electronic overload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

When do you specify an SMC starter 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 49](#).

For SMC Flex soft starter options, go to [page 50](#).



SMC Flex Soft Starter Units

Motor Rating (kW)	Module Size	For 380...400V			For 415...480V		
		Current In, A	Circuit Breaker Cat. No.	SMC Flex Cat. No. ⁽¹⁾	Current In, A	Circuit Breaker Cat. No.	SMC Flex Cat. No. ⁽¹⁾
0.37	8	0.7	140MC2NB16	150F5N**	0.6	140MC2NB16	150F5N**
0.55		1.1	140MC2NB25		0.9	140MC2NB25	
0.75		1.4			1.2		
1.1		2.1	140MD8NB40		1.8	140MD8NB40	
1.5		2.9	140MD8NB63		2.5		
2.2		4.2			3.6	140MD8NB63	
3		5.7	140MD8NC10	150F25N**	4.9	140MD8NC10	150F25N**
3.7		7.0			6.1		
4		7.6			6.6		
4.5		8.6	140MD8NC16		7.4		
5.5		10.5			9.0	140MD8NC16	
7.5		14.3	140MD8NC25		12.3		
9.2		17.5			15.1	140MD8NC25	
11		20.9			18.1		
0.37		0.7	140MG68PB30	150F5N**	0.6	140MG68PB30	150F5N**
0.55		1.1			0.9		
0.75		1.4			1.2		
1.1		2.1	140MG68PB70		1.8	140MG68PB70	
1.5		2.9			2.5		
2.2		4.2	140MG68PC15		3.6		
3		5.7		150F25N**	4.9	140MG68PC15	150F25N**
3.7		7.0			6.1		
4		7.6			6.6		
4.5		8.6			7.4		
5.5		10.5	140MG68PC30		9.0		
7.5		14.3			12.3	140MG68PC30	
9.2		17.5			15.1		
11		20.9	140MG68PC50		18.1		
15		28.5		150F43N**	24.6	140MG68PC50	150F43N**
18.5		35.2			30.4		
22		41.8	140MG68PD10		36.1	140MG68PD10	
30		57.0			49.3		
37		70.4		150F85N**	60.8		150F85N**
45		85.6			73.9		

(1) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, refer to <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/motor-control/soft-starters--low-voltage/smc-flex-smart-motor-controllers.html>.

The SMC Flex Soft Starter Units table continues on the next page.

SMC Flex Soft Starter Units (continued)

Motor Rating (kW)	Module Size	For 380...400V			For 415...480V		
		Current In, A	Circuit Breaker Cat. No.	SMC Flex Cat. No. ⁽¹⁾	Current In, A	Circuit Breaker Cat. No.	SMC Flex Cat. No. ⁽¹⁾
55	12 ⁽²⁾	104.6	140MGJ8PD20	150F108N**	90.3	140MGJ8PD20	150F108N**
75	24 ⁽³⁾	142.6		150F201N**	123.2		150F135N**
90		171.0	140MGJ8PD25		148.0	140MGJ8PD25	150F201N**
110		197.0		150F251N**	170.0		
132		236.0	140MGK8PD40		204.0	140MGK8PD40	150F251N**
150		268.0		150F317N**	232.0		150F317N**
160		286.0			247.0		
185		331.0	140MGM8PD60	150F361N**	286.0		150F361N**
200		358.0		150F480N**	309.0	140MGM8PD60	
220		394.0			340.0		

(1) Any asterisk indicates an incomplete catalog number. To complete catalog numbers, refer to <https://www.rockwellautomation.com/en-us/products/hardware/allen-bradley/motor-control/soft-starters--low-voltage/smc-flex-smart-motor-controllers.html>.

(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

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 various applications

For PowerFlex 523 drive unit selections, go to [page 51](#).

For PowerFlex 525 drive unit selections, go to [page 52](#).

For PowerFlex 523 and 525 drive unit options, go to [page 53](#).

For PowerFlex 753 drive units selections, go to [page 54](#).

For PowerFlex 755 drive units selections, go to [page 56](#).

For PowerFlex 753 and 755 drive unit options, go to [page 58](#).

For PowerFlex 755 drive units with MCC style cabinets, go to [page 59](#).

PowerFlex 523 Drive Unit Selection

PowerFlex 523-140M Circuit Breaker 380...480V Standard and ArcShield™, Normal Duty

P kW, Approx	No. of Modules ⁽¹⁾		Circuit Breaker		PowerFlex 523 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽²⁾	Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.37	2	4	140M-C2N-B25	—	25A-D1P4N104	A
0.75			140M-D8N-B40		25A-D2P3N104	
1.50			140M-D8N-B63		25A-D4P0N104	
2.20			140M-D8N-C10		25A-D6P0N104	

(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 and ArcShield, Normal Duty

P kW, Approx	No. of Modules ⁽¹⁾		Circuit Breaker		PowerFlex 523 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽²⁾	Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.37	2	4	140G-G6C3-C15	140G-HOC3-C15	25A-D1P4N104	A
0.75					25A-D2P3N104	
1.50					25A-D4PON104	
2.20					25A-D6PON104	
4.00	4	6	140G-G6C3-C30	140G-HOC3-C30	25A-D010N104	B
5.50					25A-D013N104	C
7.50	6	6	140G-G6C3-C50	140G-HOC3-C50	25A-D017N104	D
11.00					25A-D024N104	
15.00					25A-D030N104	
18.50	8	10	140G-G6C3-C70	140G-HOC3-C70	25A-D037N114	E
22.00					25A-D043N114	

(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 Drive Unit Selection

PowerFlex 525-140M Circuit Breaker 380...480V Standard and ArcShield, Normal Duty

P kW, Approx	No. of Modules ⁽¹⁾		Circuit Breaker		PowerFlex 525 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽²⁾	Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.37	2	4	140M-C2N-B25	—	25B-D1P4N104	A
0.75			140M-D8N-B40		25B-D2P3N104	
1.50			140M-D8N-B63		25B-D4PON104	
2.20			140M-D8N-C10		25B-D6PON104	

(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 and ArcShield, Normal Duty

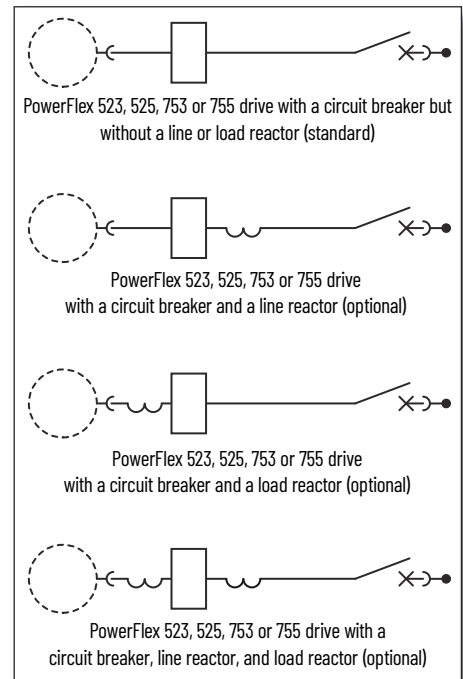
P kW, Approx	No. of Modules ⁽¹⁾		Circuit Breaker		PowerFlex 525 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽²⁾	Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.37	2	4	140G-G6C3-C15	140G-HOC3-C15	25B-D1P4N104	A
0.75					25B-D2P3N104	
1.50					25B-D4PON104	
2.20					25B-D6PON104	
4.00	4	6	140G-G6C3-C30	140G-HOC3-C30	25B-D010N104	B
5.50					25B-D013N104	C
7.50	6	6	140G-G6C3-C50	140G-HOC3-C50	25B-D017N104	D
11.00					25B-D024N104	
15.00					25B-D030N104	
18.50	8	10	140G-G6C3-C70	140G-HOC3-C70	25B-D037N114	E
22.00					25B-D043N114	

(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
- 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)
- EMC filters are optional
- Line or load reactors are optional



PowerFlex 753 Drive Unit Selection

PowerFlex 753-140G Circuit Breaker 380/400V IP42/54 Standard and ArcShield, Normal Duty

P kW, Approx	Module Size		Output Current, A	Circuit Breaker		PowerFlex 753 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽¹⁾		Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.75	8	8	2.1	140G-G6C3-C15	140G-HOC3-C15	20F11RC2P1JA0NNNNN	1
1.5			3.5			20F11RC3P5JA0NNNNN	
2.2			5			20F11RC5P0JA0NNNNN	
4			8.7			20F11RC8P7JA0NNNNN	
5.5			11.5	140G-G6C3-C30	140G-HOC3-C30	20F11RC011JA0NNNNN	
7.5			15.4			20F11RC015JA0NNNNN	
11			22	140G-G6C3-C50	140G-HOC3-C50	20F11NC022JA0NNNNN	2
15	10	10	30			20F11NC030JA0NNNNN	3
18.5			37	140G-G6C3-C70	140G-HOC3-C70	20F11NC037JA0NNNNN	
22		12	43			20F11NC043JA0NNNNN	
30	12	16 ⁽²⁾	60	140G-G6C3-D10	140G-HOC3-D10	20F11NC060JA0NNNNN	4
37			72	140G-G6C3-D12	140G-HOC3-D12	20F11NC072JA0NNNNN	
45	16 ⁽²⁾	24 ⁽²⁾⁽³⁾	85	140G-J6F3-D15	140G-JOF3-D15	20F11NC085JA0NNNNN	5
55			104			20F11NC104JA0NNNNN	
75	24 ⁽²⁾⁽⁴⁾	24 ⁽²⁾⁽⁴⁾	140	140G-J6F3-D20	140G-JOF3-D20	20F11ANC140JNONNNNN	6
90			170	140G-J6F3-D25	140G-JOF3-D25	20F11ANC170JNONNNNN	
110			205	140G-K6H3-D30	140G-KOH3-D30	20F11ANC205JNONNNNN	
132			260	140G-K6H3-D40	140G-KOH3-D40	20F11ANC260JNONNNNN	

(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 and ArcShield, Normal Duty

P kW, Approx	Module Size		Output Current, A	Circuit Breaker		PowerFlex 753 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽¹⁾		Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.75	8	8	2.1	140G-G6C3-C15	140G-HOC3-C15	20F11RD2P1AA0NNNNN	1
1.5			3.4			20F11RD3P4AA0NNNNN	
2.2			5			20F11RD5P0AA0NNNNN	
4			8			20F11RD8P0AA0NNNNN	
5.5			11	140G-G6C3-C30	140G-HOC3-C30	20F11RD011AA0NNNNN	
7.5			14			20F11RD014AA0NNNNN	
11			22	140G-G6C3-C50	140G-HOC3-C50	20F11ND022AA0NNNNN	2
15	10	10	27			20F11ND027AA0NNNNN	3
18.5			34	140G-G6C3-C70	140G-HOC3-C70	20F11ND034AA0NNNNN	
22		12	40			20F11ND040AA0NNNNN	
30	12	16 ⁽²⁾	52	140G-G6C3-D10	140G-HOC3-D10	20F11ND052AA0NNNNN	4
37			65	140G-G6C3-D12	140G-HOC3-D12	20F11ND065AA0NNNNN	
45	16 ⁽²⁾	24 ⁽²⁾⁽³⁾	77	140G-J6F3-D15	140G-JOF3-D15	20F11ND077AA0NNNNN	5
55			96			20F11ND096AA0NNNNN	
75	24 ⁽²⁾⁽⁴⁾	24 ⁽²⁾⁽⁴⁾	125	140G-J6F3-D20	140G-JOF3-D20	20F1AND125AN0NNNNN	6
90			156	140G-J6F3-D25	140G-JOF3-D25	20F1AND156AN0NNNNN	
110			186	140G-K6H3-D30	140G-KOH3-D30	20F1AND186AN0NNNNN	
132			248	140G-K6H3-D40	140G-KOH3-D40	20F1AND248AN0NNNNN	

(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 Drive Unit Selection

PowerFlex 755-140G Circuit Breaker 380/400V IP42/54 Standard and ArcShield, Normal Duty

P kW, Approx	Module Size		Output Current, A	Circuit Breaker		PowerFlex 755 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽¹⁾		Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.75	8	8	2.1	140G-G6C3-C15	140G-HOC3-C15	20G1RC2P1JA0NNNNN	1
1.5			3.5			20G1RC3P5JA0NNNNN	
2.2			5			20G1RC5P0JA0NNNNN	
4			8.7			20G1RC8P7JA0NNNNN	
5.5			11	140G-G6C3-C30	140G-HOC3-C30	20G1RC011JA0NNNNN	
7.5			15			20G1RC015JA0NNNNN	
11			22	140G-G6C3-C50	140G-HOC3-C50	20G1NC022JA0NNNNN	2
15	10	10	30			20G1NC030JA0NNNNN	3
18.5			37			20G1NC037JA0NNNNN	
22		12	43			20G1NC043JA0NNNNN	
30	12	16 ⁽²⁾	60	140G-G6C3-D10	140G-HOC3-D10	20G1NC060JA0NNNNN	4
37			72	140G-G6C3-D12	140G-HOC3-D12	20G1NC072JA0NNNNN	
45	16 ⁽²⁾	24 ⁽²⁾⁽³⁾	85	140G-J6F3-D15	140G-JOF3-D15	20G1NC085JA0NNNNN	5
55			104			20G1NC104JA0NNNNN	
75	24 ⁽²⁾⁽⁴⁾	24 ⁽²⁾⁽⁴⁾	140	140G-J6F3-D20	140G-JOF3-D20	20G1ANC140JN0NNNNN	6
90			170	140G-J6F3-D25	140G-JOF3-D25	20G1ANC170JN0NNNNN	
110			205	140G-K6H3-D30	140G-KOH3-D30	20G1ANC205JN0NNNNN	
132			260	140G-K6H3-D40	140G-KOH3-D40	20G1ANC260JN0NNNNN	

(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 and ArcShield, Normal Duty

P kW, Approx	Module Size		Output Current, A	Circuit Breaker		PowerFlex 755 Drive Cat. No.	Frame
	Without Reactor	With Reactors ⁽¹⁾		Low Breaking Capacity Cat. No.	Medium Breaking Capacity Cat. No.		
0.75	8	8	2.1	140G-G6C3-C15	140G-HOC3-C15	20G11RD2P1AAONNNNN	1
1.5			3.4			20G11RD3P4AAONNNNN	
2.2			5			20G11RD5P0AAONNNNN	
4			8			20G11RD8P0AAONNNNN	
5.5			11	140G-G6C3-C30	140G-HOC3-C30	20G11RD011AAONNNNN	
7.5			14			20G11RD014AAONNNNN	
11			22	140G-G6C3-C50	140G-HOC3-C50	20G11ND022AAONNNNN	2
15	10	10	27			20G11ND027AAONNNNN	3
18.5			34	140G-G6C3-C70	140G-HOC3-C70	20G11ND034AAONNNNN	
22		12	40			20G11ND040AAONNNNN	
30	12	16 ⁽²⁾	52	140G-G6C3-D10	140G-HOC3-D10	20G11ND052AAONNNNN	4
37			65	140G-G6C3-D12	140G-HOC3-D12	20G11ND065AAONNNNN	
45	16 ⁽²⁾	24 ⁽³⁾	77	140G-J6F3-D15	140G-J0F3-D15	20G11ND077AAONNNNN	5
55			96			20G11ND096AAONNNNN	
75	24 ⁽⁴⁾	24 ⁽⁴⁾	125	140G-J6F3-D20	140G-J0F3-D20	20G1AND125ANONNNNN	6
90			156	140G-J6F3-D25	140G-J0F3-D25	20G1AND156ANONNNNN	
110			186	140G-K6H3-D30	140G-K0H3-D30	20G1AND186ANONNNNN	
132			248	140G-K6H3-D40	140G-K0H3-D40	20G1AND248ANONNNNN	

(1) Line or load reactors are optional.

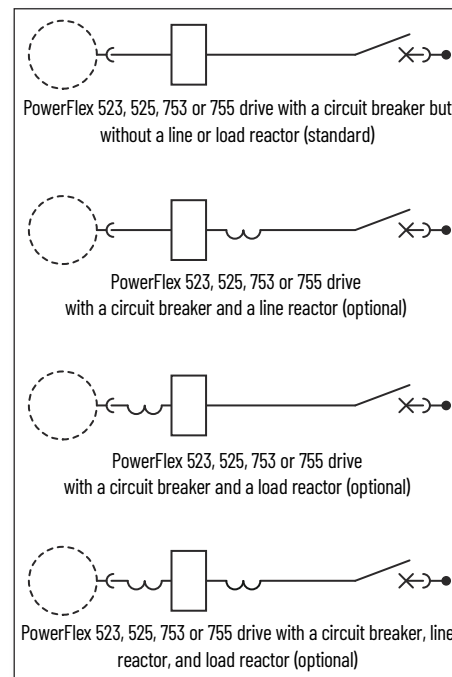
(2) Fixed units only.

(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
- 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
- Line or load reactors are optional



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; for more information, see PowerFlex 750-Series AC Drives Technical Data, publication [750-TD001](#).



Frame 8



Frame 9



Frame 10

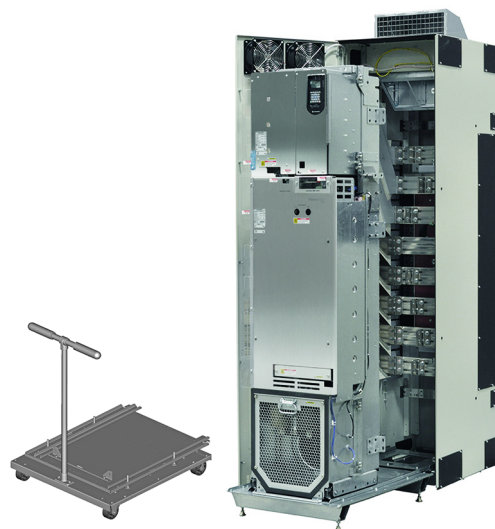
IP20, NEMA/UL Type 1 Drive

Includes DC link choke, integrated AC line fuses, and roll-out design. Exhaust hood on top of cabinets is optional.



IP20, NEMA/UL Type 1 Drive
(Frame 9 shown)

Includes DC link choke, integrated AC line fuses, and roll-out design, exhaust hood, and option bay for control/protection devices.



Roll-out Design
(Frame 8 shown)

- (1) A roll-out cart is required for Frame 8...10 drives, and Frame 9 and 10 drives with the optional bay chassis. The cart has an adjustable curb height of 0...182 mm and a curb offset/reach of 0...144 mm.

Network, PLC, and I/O Compartments

Available in semi-withdrawable and fixed mount unit styles.

Select a Managed Switch

Each EtherNet/IP network has one or two Stratix® 5700 switches that are 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.



Choose a Stratix® 5700 switch with Lite or Full firmware. Full firmware supports more virtual local area networks (VLANs), Quality of Service (QoS), IPv6, and more. For details on Full and Lite firmware supported features, see the Stratix 5700 Industrial Managed Ethernet Switch Product Profile, publication [ENET-PP005](#).

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 an EtherNet/IP network from an MCC. NetLinX technology can easily link networks, simplifying data transfer from the MCC's 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.

Unit Description	Module Size 1=80 mm
Ethernet to DeviceNet® bridge	2
Ethernet to PROFIBUS bridge	2
PROFIBUS to DeviceNet bridge	2
ControlNet® to DeviceNet bridge	2

EtherNet/IP Power Supply

An EtherNet/IP network in the MCC requires a power supply that provides 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 if there is a loss of main network supply. There is no loss of component function. When the main EtherNet/IP power recovers, there is automatic retransfer to the primary power supply.

Unit Description	Module Size 1=80 mm
Ethernet power supply	2
Redundant Ethernet power supply	4
Unit back-up Ethernet power supply	(1)

(1) Can add module space. Provided in unit, primarily for the electronic overloads in starter units.

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 and POINT I/O™ comprise a family of modular I/O products ideal for applications that require flexibility and low cost of ownership. The ability to mix standard and safe I/O provides even greater flexibility and opportunities for standardization, regardless of application requirements.

Since it can be used in local and remote I/O, FLEX I/O and POINT I/O further reduce engineering costs in design, installation, and application development.

FLEX I/O is a cost-effective, flexible, modular I/O system for distributed applications, offering all functions of larger rack-based I/O without the space requirements.

POINT I/O is the only IP20-rated modular I/O solution compliant with ODVA requirements for linear, star, and ring EtherNet/IP architectures. This compliance provides greater system reliability and availability to maximize your uptime and system performance.

For more information on I/O modules, visit the Rockwell Automation I/O Modules website, <https://ab.rockwellautomation.com/IQ>.



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.

Notes:

CENTERLINE 2500 Low Voltage Motor Control Centers Selection Checklist

Use this checklist to help you configure your CENTERLINE® 2500 Motor Control Center.



Each step that is mentioned in this checklist is described in detail in the CENTERLINE 2500 Low Voltage Motor Control Centers and Switchgear Assemblies Selection Guide, publication [2500-SG001](#), which is available at the Rockwell Automation Literature Library: <https://www.rockwellautomation.com/en-us/support/documentation/literature-library.html>.

Customer:

User:

Office:

Step 1: Review MCC Technical Specifications

Certifications and Markings

- ☐ ABS and ABS Shipboard ☐ CE Conformance Marked ☐ China Compulsory Certificate ☐ DEKRA ☐ EAC ☐ RETIE
- ☐ Other (specify):

Step 2: Select Network and IntelliCENTER® Options

Embedded Network

EtherNet/IP™ ☐ No ☐ Yes⁽¹⁾

IntelliCENTER

Compact disc (CD) ☐ None ☐ Standard data ☐ IntelliCENTER software and data

(1) For IntelliCENTER options, see [Networking, Programmable Controller, I/O Compartment, and Miscellaneous Units on page 68](#).

Step 3: Select Structure

Structure

Enclosure rating	☐ IP 42 (standard)	☐ IP 54	☐ IP 20
ArcShield™ (IEC/TR 61641)	☐ No (standard)	☐ Yes	
Forms of internal separation	☐ 3b (standard) ☐ 4b Type 5	☐ 2b ☐ 4b Type 7	
Mounting configuration	☐ Single front (standard)	☐ Double front (back-to-back)	☐ Add to existing
Vertical wireway width	☐ 200 mm (700 mm total column width) ☐ 400 mm (900 mm total column width)	☐ 300 mm (800 mm total column width) ☐ 500 mm (1000 mm total column width)	
Depth	☐ 600 mm (single front) ☐ 1200 mm (double or back-to-back front)	☐ 800 mm (single front) ☐ 1600 mm (double or back-to-back front)	
Ambient temperature, max	_____ °C		
Altitude	_____ meters		
External paint	☐ RAL7032 Pebble Gray (standard)	☐ Other (specify): ⁽¹⁾	
Internal paint	☐ Z275 galvanized steel (standard) ☐ Other (specify): ⁽¹⁾	☐ High visibility gloss white	

(1) To provide a more detailed description, use the Notes section that begins on [page 70](#).

Step 3: Select Structure (continued)

Structure	
Master Nameplate	☐ No ☐ Yes (up to five lines; 40 characters maximum per line) Line 1: _____ Line 2: _____ Line 3: _____ Line 4: _____ Line 5: _____
Options	☐ Space heater with thermostat ☐ Cable supports for vertical wireways ☐ Other (specify): ⁽¹⁾ _____

(1) To provide a more detailed description, use the Notes section that begins on [page 70](#).

Step 4: Select Power Systems

Incoming Power	
Line voltage	☐ 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
Bus	
Withstand/fault ratings	☐ 50 kA for 1 second ☐ 50 kA for 3 seconds ☐ 80 kA for 1 second ☐ 100 kA for 1 second
Horizontal power bus rating	☐ 800 A ☐ 1250 A ☐ 1600 A ☐ 2000 A ☐ 2500 A ☐ 3200 A ☐ 4000 A
Horizontal power bus material	☐ Copper, tin plated (standard) ☐ Copper, unplated
Neutral bus	☐ None (standard) ☐ Full rated ☐ Half rated
Vertical distribution bus rating	☐ 300 A (provides 600 A capacity) ☐ 600 A (provides 1200 A capacity)
Vertical distribution bus material	☐ Copper, tin plated (standard) ☐ Copper, unplated
Stab openings	NOTE: Automatic shutters are included as standard.
Protective Earth (PE)	
Horizontal PE location	☐ Bottom (standard)
Vertical PE conductor for withdrawable units	☐ Copper, unplated (standard) ☐ Copper, tin plated
Vertical PE conductor for customer load	☐ Copper, unplated ☐ Copper, tin plated

Step 5: Select Unit Designs

Unit Configuration-General			
Outgoing cable access	☐ Top	☐ Bottom	
Unit type	☐ Standard withdrawable ☐ Withdrawable with SecureConnect™		☐ Fixed mount
Nameplates (white with black lettering)	☐ Engraved acrylic (standard)		☐ Engraved phenolic
Unit Control Power			
Voltage	☐ 24V DC	☐ 110/115/120V AC	☐ 220/230/240V AC
Source	☐ Central control power transformer (standard) Individual control transformer: ☐ 75VA ☐ 150VA ☐ 250VA ☐ Other (specify): ⁽¹⁾		☐ Line to neutral ☐ Remote control power source
Control terminal blocks location	☐ Vertical wireway (standard)		☐ Top horizontal wireway

(1) To provide a more detailed description, use the Notes section that begins on [page 70](#).

IMPORTANT: For disconnect selections, see the Main Incoming, Feeder, DOL/DOLR, and Starter Unit sections in Section 6.

Step 6: Select Unit Types

Main Incoming Unit			
Ampere rating	_____ A		
Main incoming types	☐ Air circuit breaker (ACB) (standard)	☐ Molded case circuit breaker (MCCB) (standard)	☐ Main lug (MLO)
Main incoming locations	☐ Left ☐ Center ☐ Right Entry: ☐ Top ☐ Bottom Incoming configuration: ☐ Single main ☐ Dual main ☐ Main-tie-main		
Circuit breaker type	☐ 3-pole ☐ 4-pole Number of cables per phase: _____ Cable size: _____		
Main breaker accessories	☐ Shunt-trip ☐ Auxiliary contacts QTY: _____ ☐ Electrical charging device ☐ Closing release ☐ Shunt release ☐ Undervoltage release ☐ Motorized operation ☐ Thermography ☐ Precision metering %: _____ Communication: ☐ EtherNet/IP ☐ Other (specify): ⁽¹⁾		
Protection	☐ LSI (standard) ☐ LI ☐ LSIg ☐ DIP switch ☐ Digital touch screen ☐ Automatic transfer ☐ Generator sync ☐ Load-shedding (tie)		

(1) To provide a more detailed description, use the Notes section that begins on [page 70](#).

The Step 6 table continues on the next page.

Step 6: Select Unit Types (continued)

Feeder Unit ⁽¹⁾		
Types	☐ Air circuit breaker (ACB) (standard)	☐ Molded case circuit breaker (MCCB) (standard)
Disconnect means	☐ Circuit breaker, thermal magnetic (standard)	☐ Circuit breaker, electronic
	☐ Fused disconnect	
Fuse type:	☐ DIN	☐ BS88
Options	☐ Auxiliary contacts QTY: _____	☐ Electrical charging device
	☐ Shunt release	☐ Motorized operation
	☐ Precision metering %: _____	☐ Closing release
		☐ Thermography
DOL/DOLR Starter Units ⁽¹⁾		
Disconnect means	☐ Circuit breaker (standard)	☐ Fused disconnect
Fuse type:	☐ DIN	☐ BS88
Electronic overload relay type	☐ E100™	☐ E300™
Duty rating	☐ AC3 (standard)	☐ AC4
Protection	☐ Type 2 (standard)	☐ Type 1
DOL/DOLR Options and Accessories		
Pilot lights (light-emitting diode [LED])	☐ No (standard)	
	☐ Yes - If yes, text on legend plate:	
	☐ On	☐ Forward
	☐ Off	☐ Reverse
	☐ Fault	☐ Other (specify): ⁽²⁾
Push buttons	☐ No (standard)	
	☐ Yes - If yes, text on legend plate:	
	☐ On	☐ Off
	☐ Emergency	☐ Other (specify): ⁽²⁾
		☐ Reset
Selector switch	☐ No (standard)	☐ 2-position
		☐ 3-position
	Function: _____	
Reset	☐ Internal (standard)	☐ External-door mounted
E100 remote Indication display	☐ No (standard)	☐ Yes
	If yes, display type:	
	☐ Without reset button	☐ With reset button
E300 control stations	☐ No (standard)	☐ Yes
	If yes, station type:	
	☐ Control	☐ Diagnostic

(1) Supply a separate load list, which is on [page 69](#). For unique applications, copy this DOL/DOLR section to the Notes section on [page 70](#), and complete as needed.

(2) To provide a more detailed description, use the Notes section that begins on [page 70](#).

The DOL/DOLR Options and Accessories section, and the Step 6 table continue on the next page.

Step 6: Select Unit Types (continued)

DOL/DOLR Options and Accessories (continued)

Auxiliary contacts	Starter: ☐ Normally open QTY: _____ ☐ Normally closed QTY: _____ Circuit breaker: ☐ Normally open QTY: _____ ☐ Normally closed QTY: _____		
Misc. options	☐ Ground fault	☐ Voltage monitoring	☐ Other (specify): ⁽¹⁾

Soft Starter Units⁽²⁾

Types	☐ SMC™ Flex (standard)	☐ Other (specify): ⁽¹⁾
Connection	☐ Line	☐ Delta
Disconnecting means	☐ Circuit breaker (standard)	☐ Fused (rotary operator)

SMC Options and Accessories

Pilot lights (LED)	☐ No (standard) ☐ Yes - If yes, text on legend plate: ☐ On ☐ Forward ☐ Fault ☐ Off ☐ Reverse ☐ Other (specify):⁽²⁾		
Push buttons	☐ No (standard) ☐ Yes - If yes, text on legend plate: ☐ On ☐ Emergency ☐ Reset ☐ Off ☐ Other (specify):⁽²⁾		
Selector switch	☐ No (standard)	☐ 2-position	☐ 3-position
	Function: _____		
Human machine interface (HMI)	☐ No (standard)	☐ LCD display, full numeric keypad	☐ LCD display, programmer only
Starting mode	☐ No (standard)	☐ Pump control	☐ Braking control
Others ⁽²⁾			

(1) To provide a more detailed description, use the Notes section that begins on [page 70](#).

(2) Supply a separate load list, which is on [page 69](#). For unique applications, copy the Soft Starter Units section to the Notes section that begins on [page 70](#), and complete as needed.

The Step 6 table continues on the next page.

Step 6: Select Unit Types (continued)

PowerFlex® AC Variable Frequency Drive (VFD) Units ⁽¹⁾	
PowerFlex model	☐ 523 ☐ 525 ☐ 753 ☐ 755
Duty rating	☐ Normal ☐ Heavy
Ampere rating	A: _____
Kilowatt rating	kW: _____
Disconnecting means	☐ Circuit breaker (standard) ☐ Fused (rotary operator) Fuse type: _____ ☐ Fused not supplied
Handle operator	☐ Rotary operator (standard) ☐ Flange operator (2 module, min)
PowerFlex Unit Options and Accessories	
Pilot lights (LED)	☐ No (standard) ☐ Yes - If yes, text on legend plate: ☐ On ☐ Forward ☐ Fault ☐ Off ☐ Reverse ☐ Other (specify): ⁽²⁾
Push buttons	☐ No (standard) ☐ Yes - If yes, text on legend plate: ☐ On ☐ Emergency ☐ Reset ☐ Off ☐ Other (specify): ⁽²⁾
Selector switch	☐ None (standard) ☐ 2 position ☐ 3 position Function: _____
Human machine interface (HMI)	☐ LCD display, full numeric keypad ☐ LCD display, programmer only
Braking mode	☐ Pump control ☐ Braking control
Reactor type	☐ Line ☐ Load
EMC filter	☐ No (standard) ☐ Yes
Networking, Programmable Controller, I/O Compartment, and Miscellaneous Units	
EtherNet/IP managed switch	☐ Stratix® 5700 Full firmware ☐ Stratix 5700 Lite firmware
Network linking devices	☐ Ethernet to DeviceNet® device ☐ Ethernet to PROFIBUS device ☐ Other (specify): ⁽²⁾
EtherNet/IP power supply	☐ Primary (standard) ☐ Redundant ☐ Backup
I/O compartments	☐ FLEX™ I/O system ☐ POINT I/O™ system ☐ Other (specify): ⁽²⁾
Miscellaneous Units	
Programmable controllers	Number of slots: _____ Power supply: _____ Describe what you need: ⁽²⁾
Extra space for future units	Describe what you need: ⁽²⁾
Distribution panels	☐ 1 pole QTY: _____ ☐ 3 pole QTY: _____ ☐ 2 pole without residual current detection QTY: _____ ☐ 2 pole with residual current detection QTY: _____ List the circuit loads needed: ⁽²⁾

(1) Copy this section to the Notes section that begins on [page 70](#), and complete for each unit needed.

(2) To provide a more detailed description, use the Notes section that begins on [page 70](#).

The Step 6 table continues on the next page.

Notes

[illegible]

The Notes table continues on the next page.

The Notes table continues on the next page.

Notes (continued)

[illegible]

The Notes table continues on the next page.

Notes (continued)

[illegible]

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
CENTERLINE® 2500 Low Voltage Motor Control Centers Installation Instructions, publication 2500-IN001	Provides instructions to receive, handle, install, commission, maintain, remove, and store CENTERLINE 2500 motor control centers.
IEC Contactor Specifications Technical Data, publication 100-TD013	Provides technical specifications for the Bulletin Nos. 100 and 104 IEC contactors.
Molded Case Circuit Breakers Selection Guide, publication 140G-SG001	Provides an overview of molded case circuit breakers (MCCBs), and the various frame sizes of the Bulletin 140G breakers that Allen-Bradley offers.
Motor Protection Circuit Breaker and Motor Circuit Protector Specifications Technical Data, publication 140M-TD002	Provides technical specifications for motor protection circuit breakers, and the various frame sizes of the Bulletin 140M breakers that Allen-Bradley offers.
E300™/E200 Electronic Overload Relay Technical Data, publication 193-TD006	Provides technical specifications for the Allen-Bradley® E300 and E200 overload relays for motor control applications, and for the three modules of each relay.
E100 Electronic Overload Relay Specifications Technical Data, publication 193-TD013	Provides technical specifications for the Allen-Bradley E100 electronic overload relays for motor control applications.
PowerFlex® 750-series AC Drives Technical Data, publication 750-TD001	Provides technical specifications for the 750-series AC drives in various frame sizes, and in wall mount, floor mount, and roll out models.
ControlLogix® System Selection Guide, publication 1756-SG001	Provides an overview of the various 1756 Series ControlLogix systems, which provide discrete, drives, motion, process, and safety control.
Stratix® 5700 Industrial Ethernet Switch Profile, publication ENET-PP005	Provides an overview of the features and benefits of the Stratix 5700 industrial Ethernet switch.
EtherNet/IP™ Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines to install a Rockwell Automation® industrial system.
Product Certifications website, rok.auto/certifications .	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at [rok.auto/literature](#).

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	rok.auto/pcdc

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