

LISTEN.  
THINK.  
SOLVE.®

# Allen Bradley Motor Controls Centers

Advanced Intelligent Motor Control and Protection  
IAS/IES Chicago Technical Meeting

Adan Corral and Robert McDonough  
Senior Automation Specialist – Drives and MCCs  
Wesco-Englewood Electric

*September 20, 2023*



# AC Drives Considerations



PUBLIC

# Available Fault Current

- Drives have a limited fault current they can withstand.
- The larger the supply transformer - the greater the available fault current.
- A line reactor or isolation transformer can be used to reduce the available fault current.



Vs.

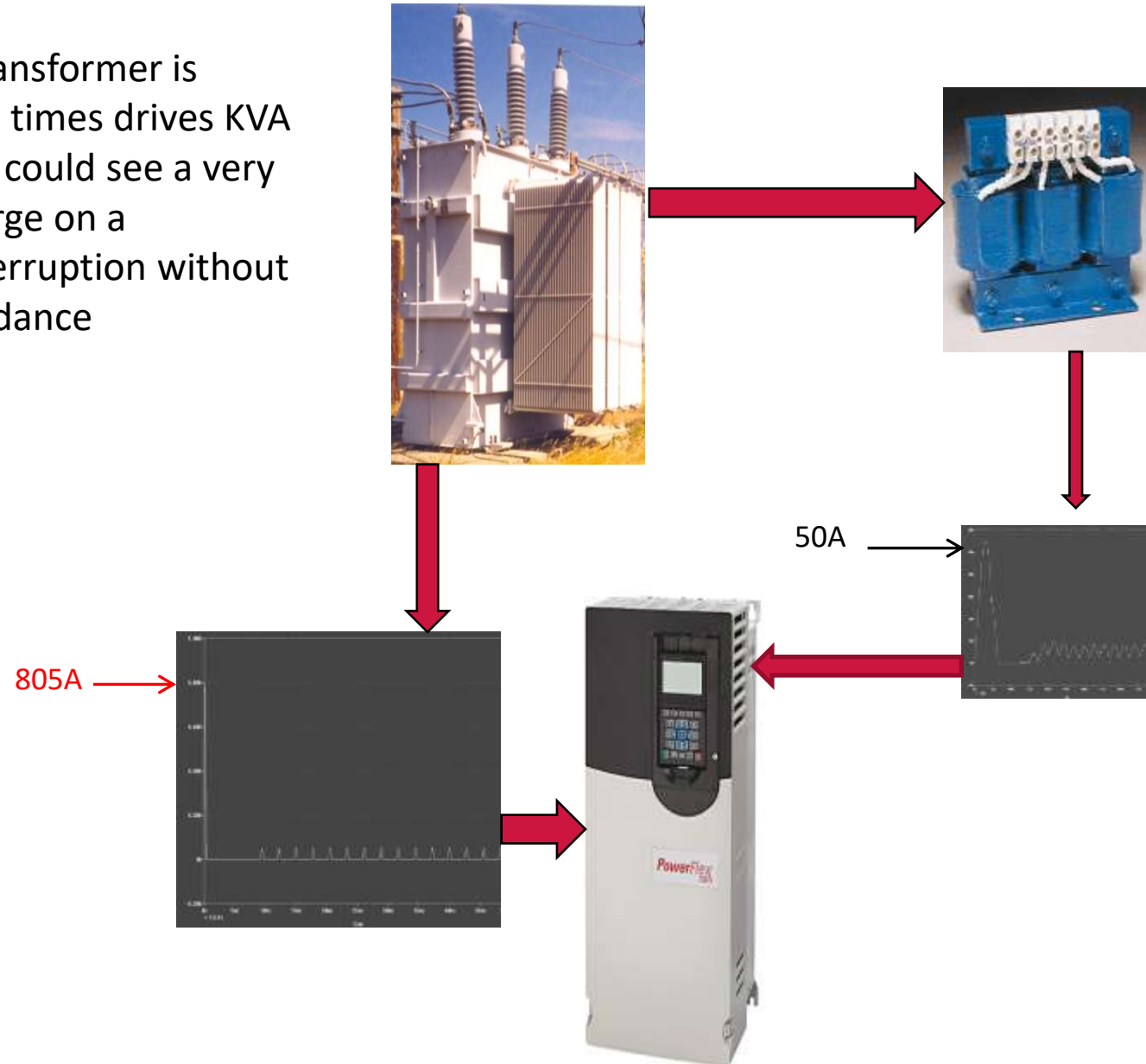


If your utility transformer is **greater than 10** times drives KVA rating the drive could see a very high current surge on a momentary interruption without adequate impedance



# Line Impedance and Available Fault Current

If your utility transformer is **greater than 10** times drives KVA rating the drive could see a very high current surge on a momentary interruption without adequate impedance



# Line Impedance Recommendations

Table 12 - AC Line Impedance Recommendations for PowerFlex 753/755 Drives (continued)

Drive	Drive Catalog Number	Volts	kW (Hp)	Max Supply kVA <sup>(1)</sup>	3% Line Reactor Open Style 1321-	Reactor Inductance (mH)	Reactor Current Rating (amps)
PowerFlex 753/755	20G_D5P0	480	2.2 (3)	500	3R4-B	6.5	4
	20G_D8P0	480	4.0 (5)	500	3R8-B	3	8
For PowerFlex 753, replace 20G with 20F.	20G_D011	480	5.5 (7.5)	750	3R12-B	2.5	12
	20G_D014	480	7.5 (10)	750	3R18-B	1.5	18
	20G_D022	480	11 (15)	750	3R25-B	1.2	25
	20G_D027	480	15 (20)	750	3R35-B	0.8	35
	20G_D034	480	18.5 (25)	1000	3R35-B	0.8	35
	20G_D040	480	22 (30)	1000	3R45-B	0.7	45
	20G_D052	480	30 (40)	1000	3R55-B	0.5	55
	20G_D065	480	37 (50)	1000	3R80-B	0.4	80
	20G_D077	480	45 (60)	1000	3R80-B	0.4	80
	20G_D096	480	55 (75)	1000	3R100-B	0.3	100
	20G_D125	480	75 (100)	1000	3R130-B	0.2	130
	20G_D140	480	75 (100)	1000	3R160-B	0.15	160
	20G_D156	480	90 (125)	1500	3R160-B	0.15	160
	20G_D186	480	110 (150)	1500	3R200-B	0.11	200
	20G_D248	480	150 (200)	2000	3RB320-B	0.075	320
	20G_D302	480	187(250)	2500	3RB320-B	0.075	320

Table 9 - AC Line Impedance Recommendations for PowerFlex 520-Series Drives

Drive	Drive Catalog Number <sup>(1)</sup>	Volts	kW (Hp)	Max Supply kVA <sup>(2)</sup>	3% Line Reactor Open Style 1321-	Reactor Inductance (mH)	Reactor Current Rating (amps)
	25BD1P4	480	0.4 (0.5)	15	3R2-B	20	2
	25BD2P3	480	0.75 (1.0)	30	3R4-C	9	4
	25BD4P0	480	1.5 (2.0)	50	3R4-B	6.5	4
	25BD6P0	480	2.2 (3.0)	75	3R8-C	5	8
	25BD010	480	3.7 (5.0)	100	3R8-B	3	8
	25BD013	480	5.5 (7.5)	120	3R12-B	2.5	12
	25BD017	480	7.5 (10.0)	150	3R18-B	1.5	18
	25BD024	480	11.0 (15.0)	200	3R25-B	1.2	25
	25BD030	480	15.0 (20.0)	200	3R35-B	0.8	35
	25BD037	480	18.5 (25.0)	500	3R45-B	0.7	45
	25BD043	480	22 (30.0)	500	3R45-B	0.7	45



# Understanding Load Requirements

<p>Normal Duty Applications</p> <p>Include all variable torque loads</p> <p>Include <u>some</u> constant torque loads</p> <p>May require limited overload current or a significant amount of overload current, but only for a short period of time</p>	<p>Heavy Duty Applications</p> <p>May require a significant amount of overload current for a significant period of time</p>
<p>Normal Duty Sizing can provide 110% overload for 60 seconds</p> <p>or</p> <p>150% overload for 3 seconds</p>	<p>Heavy Duty Sizing can provide 150% overload for 60 seconds</p> <p>or</p> <p>180% overload for 3 seconds</p>
<p>Variable Torque Loads</p> <p>Typically have no overload current requirements. (e.g. fans and pumps)</p>	<p>“Constant” Full Start Torque Loads</p> <p>Usually have overload current requirements, but not always the same amount of current or the same amount of time</p>
<p>Remember to make sure the motor FLC is less than or equal to the drive unit’s continuous current rating!</p>	



### 480 Volt AC and 650 Volt DC Input Protection Devices – Wall Mount Frames 1...7

Applied Rating <sup>(1)</sup>	Frame <sup>(2)</sup>	Cont. Output Amps	Drive Sized For Normal Duty			Drive Sized For Heavy Duty			Input Quantities		AC Input Protection Devices						
			Cat. No.	Output Overload Amps		Cat. No.	Output Overload Amps		Continuous AC Input		Dual-element Time-delay Fuse		Non-Time Delay Fuse		Circuit Breaker Max Size <sup>(5)</sup>	Circuit Breaker, Dual-element Time-delay Fuse	Motor Circuit Protector <sup>(7)</sup>
				(x = F or G)	1 Min		3 s	(x = F or G)	1 Min	3 s	kVA	Amps	Min <sup>(3)</sup>	Max <sup>(4)</sup>			

#### 480 Volt AC Input

0.5 Hp	1	1.1				20x...D2P1	2.3	3.2	0.7	0.9	2	3	2	3	15	3840	3
1.0 Hp	1	2.1	20x...D2P1	2.3	3.2	20x...D3P4	3.7	5.1	1.3	1.6	2	3	2	3	15	3840	3
2.0 Hp	1	3.4	20x...D3P4	3.7	5.1	20x...D5P0	5.5	7.5	2.2	2.6	6	6	6	6	15	3840	7
3.0 Hp	1	5	20x...D5P0	5.5	7.5	20x...D8P0	8.8	12.0	3.2	3.9	6	6	6	6	20	3840	7
5.0 Hp	1	8	20x...D8P0	8.8	12.0	20x...D011	12.1	16.5	5.7	6.9	10	15	10	15	30	3840	15
7.5 Hp	1	11	20x...D011	12.1	16.5	20x...D014	16.5	21.0	7.9	9.5	15	20	15	20	40	3840	15
10 Hp	1	14	20x...D014	15.4	21.0				10.4	12.5	20	25	20	25	50	3840	20
1.0 Hp	2	2.1	20x...D2P1	3.1	3.7	20x...D2P1	3.1	3.7	1.3	1.6	2	6	2	8	15	3840	3
2.0 Hp	2	3.4	20x...D3P4	5.1	6.1	20x...D3P4	5.1	6.1	2.2	2.6	4	7	4	12	15	3840	7
3.0 Hp	2	5	20x...D5P0	7.5	9.0	20x...D5P0	7.5	9.0	3.2	3.9	6	10	6	20	20	3840	7
5.0 Hp	2	8	20x...D8P0	12.0	14.4	20x...D8P0	12.0	14.4	5.7	6.9	10	17.5	10	30	30	3840	15
7.5 Hp	2	11	20x...D011	16.5	19.8	20x...D011	16.5	19.8	7.9	9.5	12	20	12	40	40	3840	15
		11				20x...D014	16.5	21.0	7.9	9.5	12	20	12	40	40	3840	15
10 Hp	2	14	20x...D014	15.4	21.0	20x...D022	21.0	33.0	11.4	12.5	20	30	20	55	50	3840	20
15 Hp	2	22	20x...D022	24.2	33.0	20x...D027 <sup>(3)</sup>	33.0	40.5	16.6	19.9	30	50	30	80	80	3840	30

Typically the Heavy Duty Drive is one HP size larger than a Normal Duty Drive





**Rockwell  
Automation**

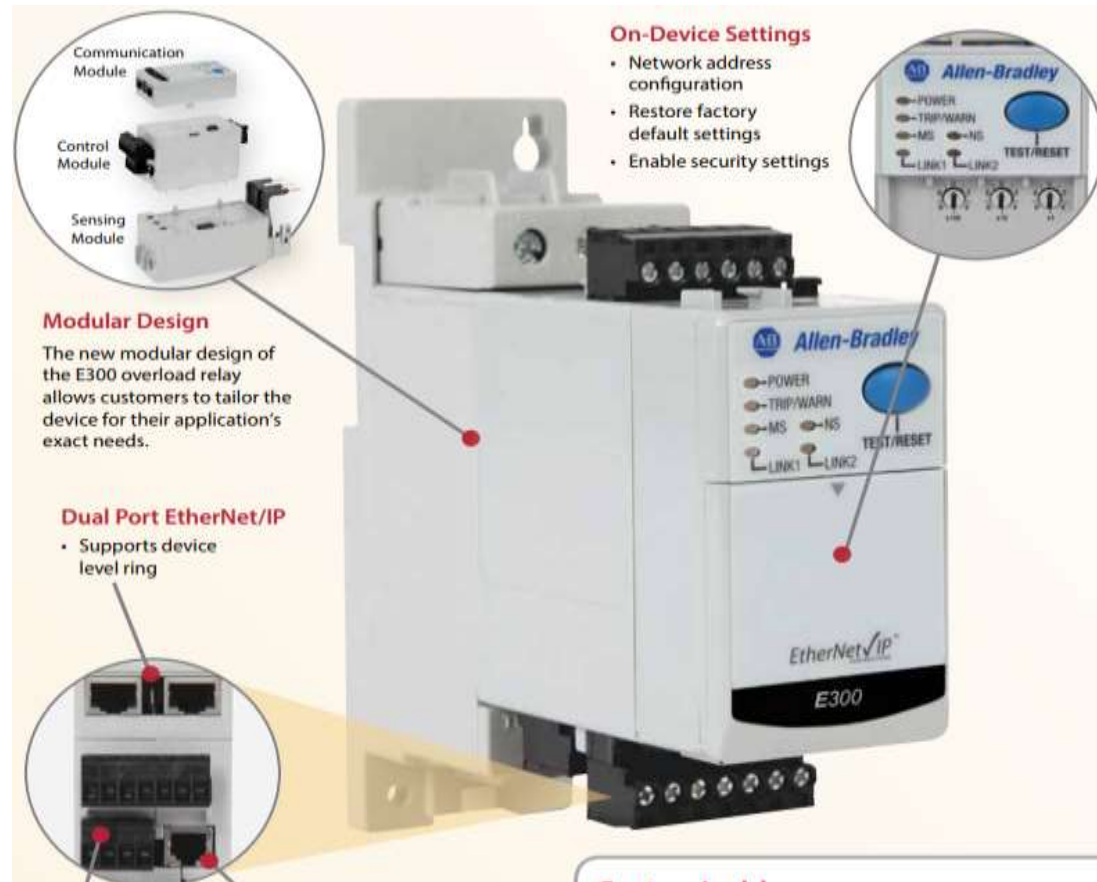
# E300 Electronic Overload



PUBLIC



# E300 Electronic Overload Features



## Module Specifications

### Communication Module

193-ECM*	<b>Features</b> <ul style="list-style-type: none"> <li>• EtherNet/IP</li> <li>• DeviceNet</li> </ul>
----------	--

### Control Module

193-EIO*	Control Voltage	I/O		I/O and Protection†	
		Inputs	Relay Outputs	Inputs	Relay Outputs
	110...120V AC 50/60 Hz	4	4	2	2
	220...240V AC 50/60 Hz	4	3	2	2
	24V DC	6	3	4	2

### Sensing Module

592/193-ESM*	<b>Sensing Options:</b> <ul style="list-style-type: none"> <li>• Voltage/Current/Ground Fault</li> <li>• Current/Ground Fault</li> <li>• Current</li> </ul>	<b>Current Range:</b> <ul style="list-style-type: none"> <li>• 0.5...30 A</li> <li>• 6...60 A</li> <li>• 10...100 A</li> <li>• 20...200 A</li> </ul>
--------------	---	--

# E300 Overview

## Top Section

- Ethernet
- DeviceNet
- Modbus

## Middle Section PLC

- Overload
- I/O Module
- PLC (DeviceLogix)
- 24VDC and 120V Control
- Zero Sequence CT input (option)
- PT Inputs (Medium Voltage)

## Bottom Section Sensing

- Current
- Current and Ground Fault Current
- Current, Ground Fault and Voltage
- NEMA Contactor Spade Connectors
- Terminal Block
- IEC Contactor Connectors



# Pilot Devices and Control Stations





**Rockwell  
Automation**

# Motor Control Center Basics



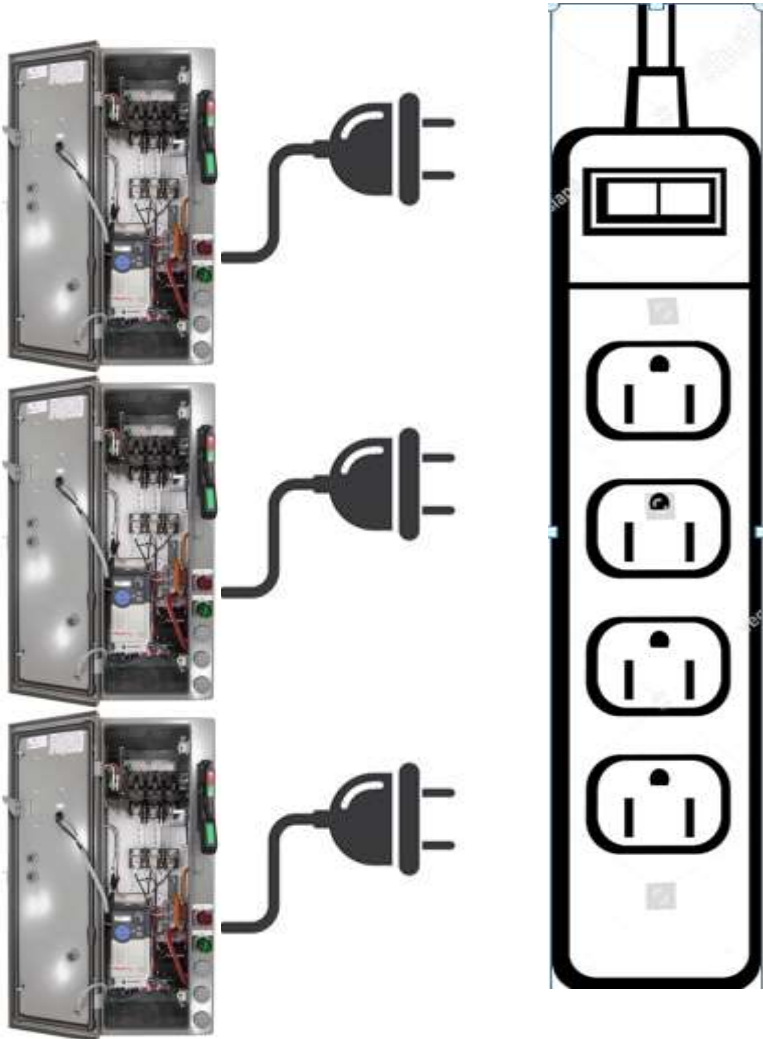
PUBLIC

# Motor Starter Basics

Example of Multiple Combination Starter each one is separate and each one has its own power feed.



# Motor Starter Basics

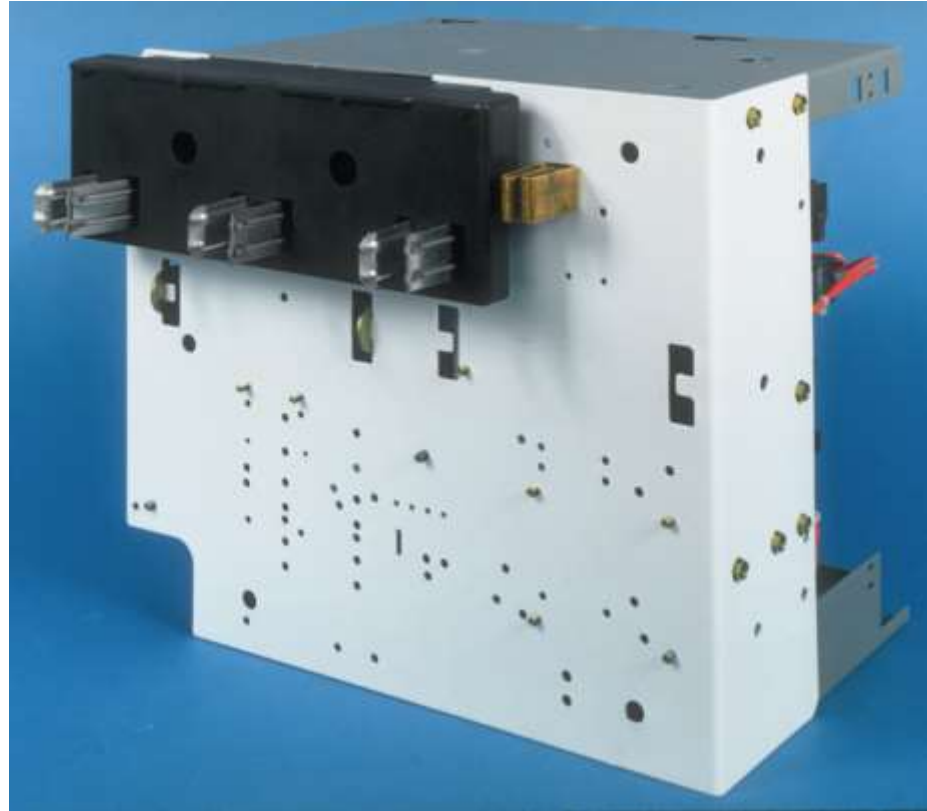
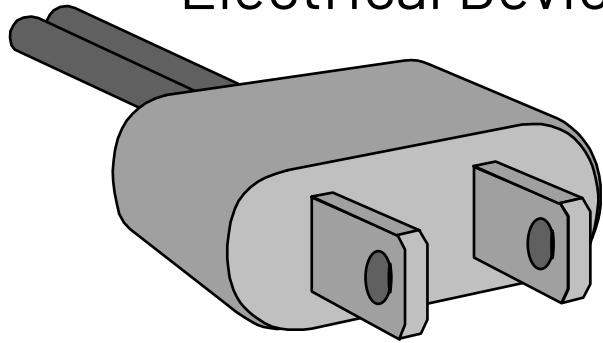


What if we could have one source of power that the motor starters could plug in to like a power strip?



# Motor Control Center Basics

Plug in an  
Electrical Device

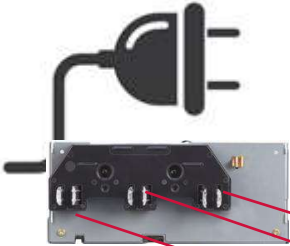


Plug in a MCC unit

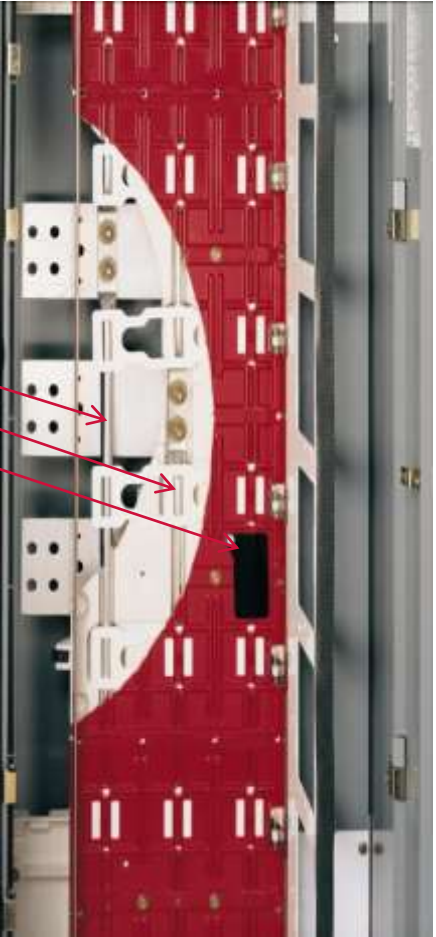
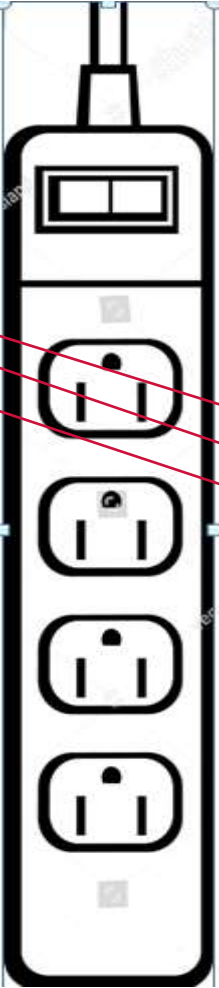


# Motor Control Center Basics

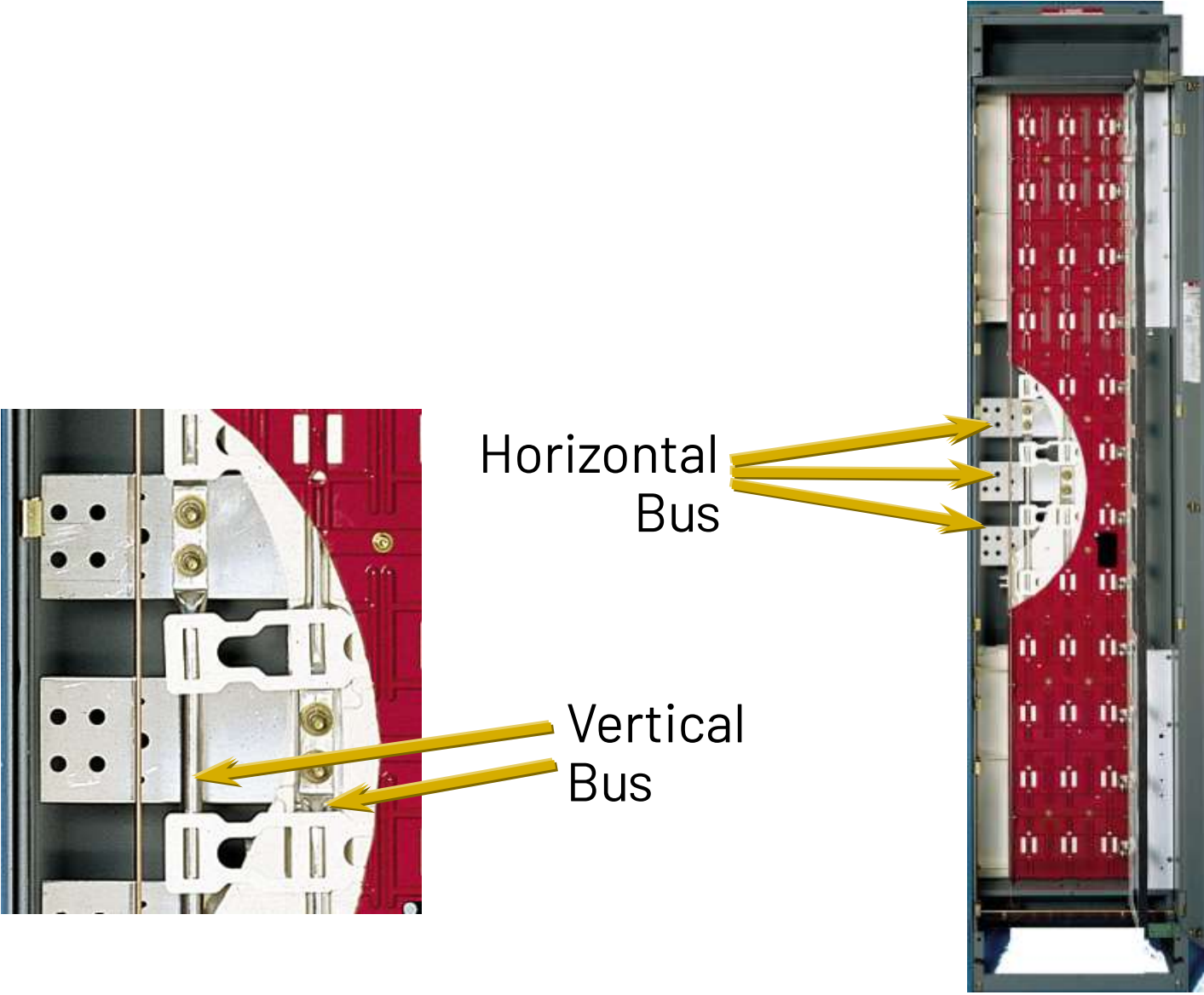
MCC Bucket



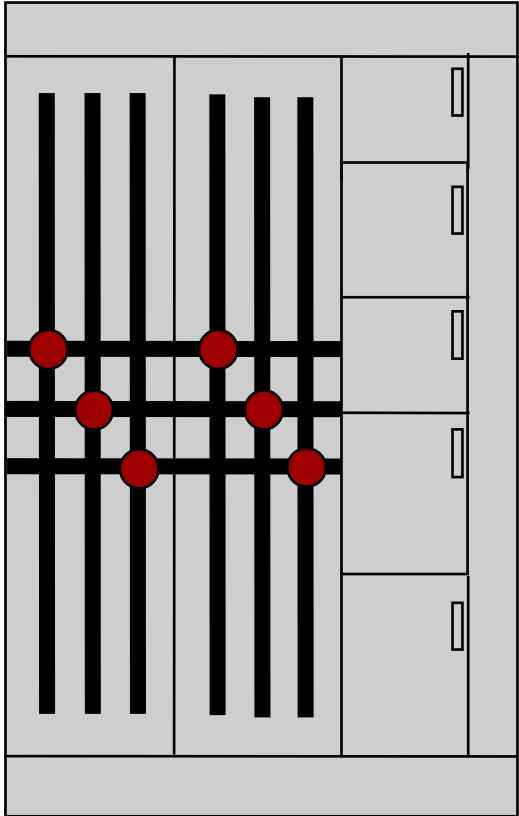
Stabs



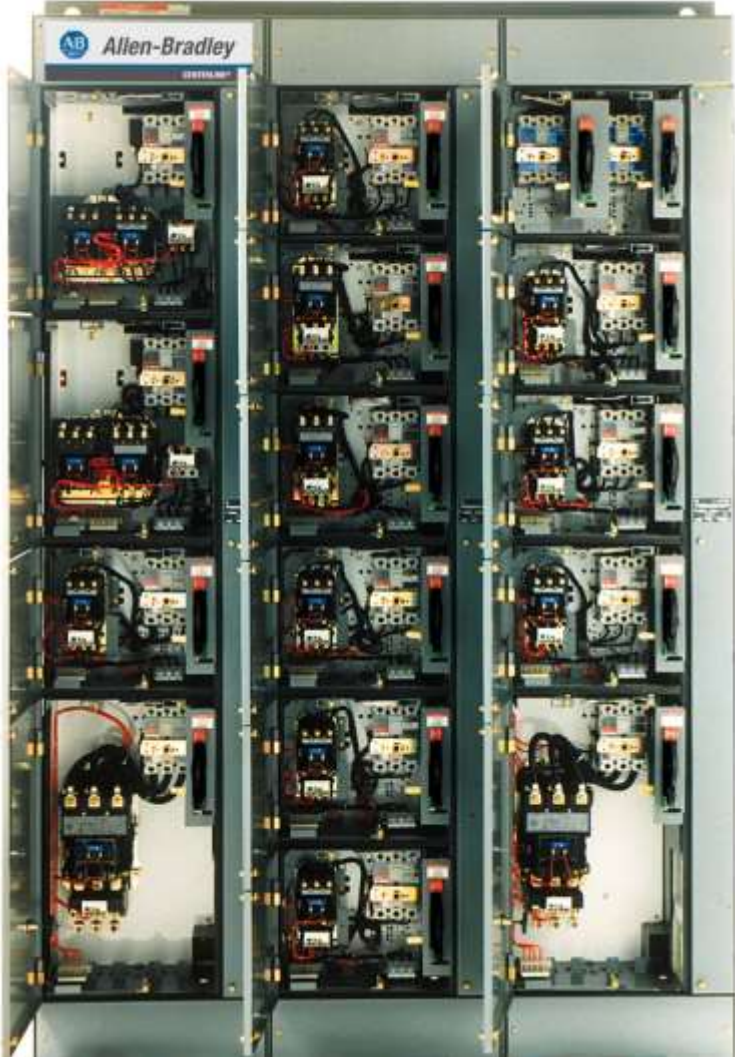




# Motor Control Center Basics



# Motor Control Center Basics

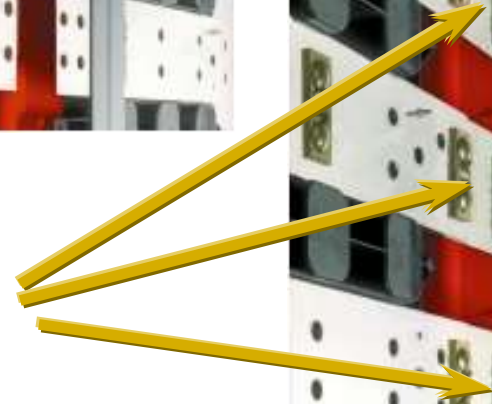


# MCC Power Distribution

Before Splicing



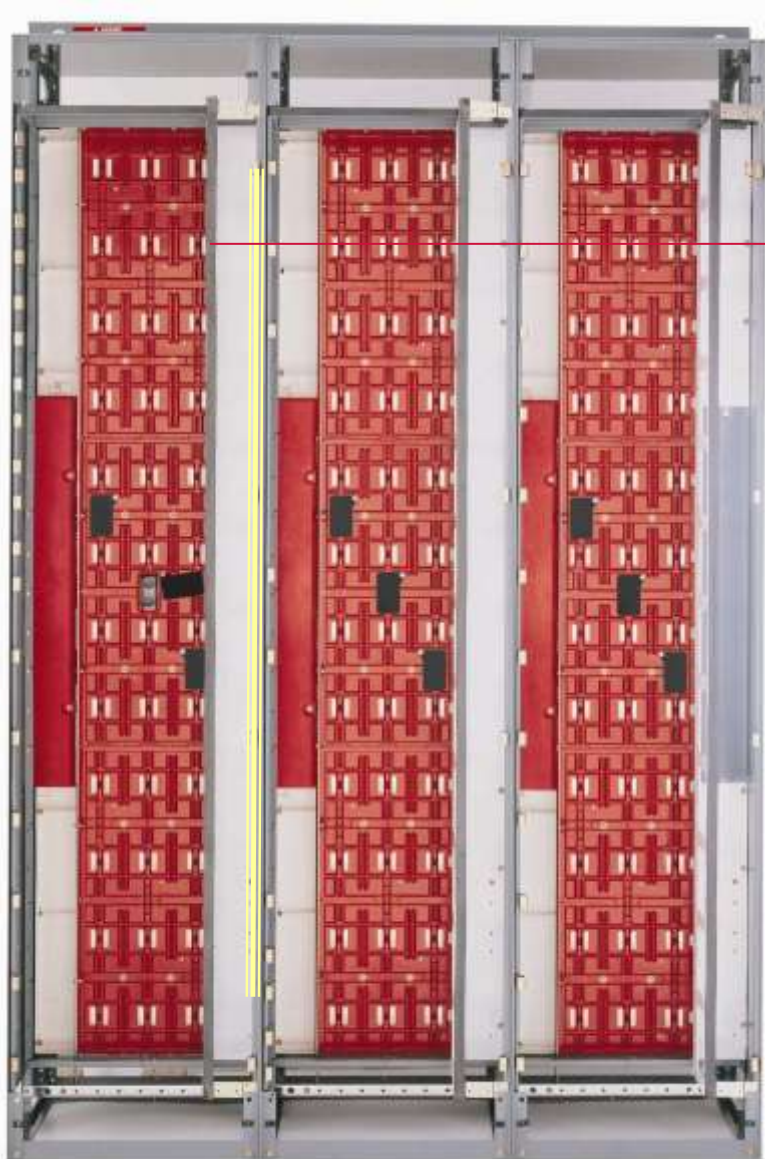
Splices



After Splicing



# MCC Power Distribution



Dedicated plug-in ground bus is part of a solid grounding system

- Helps assure units are securely grounded
- Provides first make, last break connection for plug-in unit ground connection
- Continuous horizontal ground bus
- Optional vertical ground bus with motor ground terminal



# MCC Power Distribution

## Horizontal Power Bus

### Rating

- 600 A; 800 A; 1200 A; 1600 A; 2000 A; 2500 A or 3000 A

### SCCR Withstand Rating

- 42 kA; 65 kA or 100 kA

### Material

- Aluminum Tin-plated; Copper Tin-plated or Copper Silver-plated

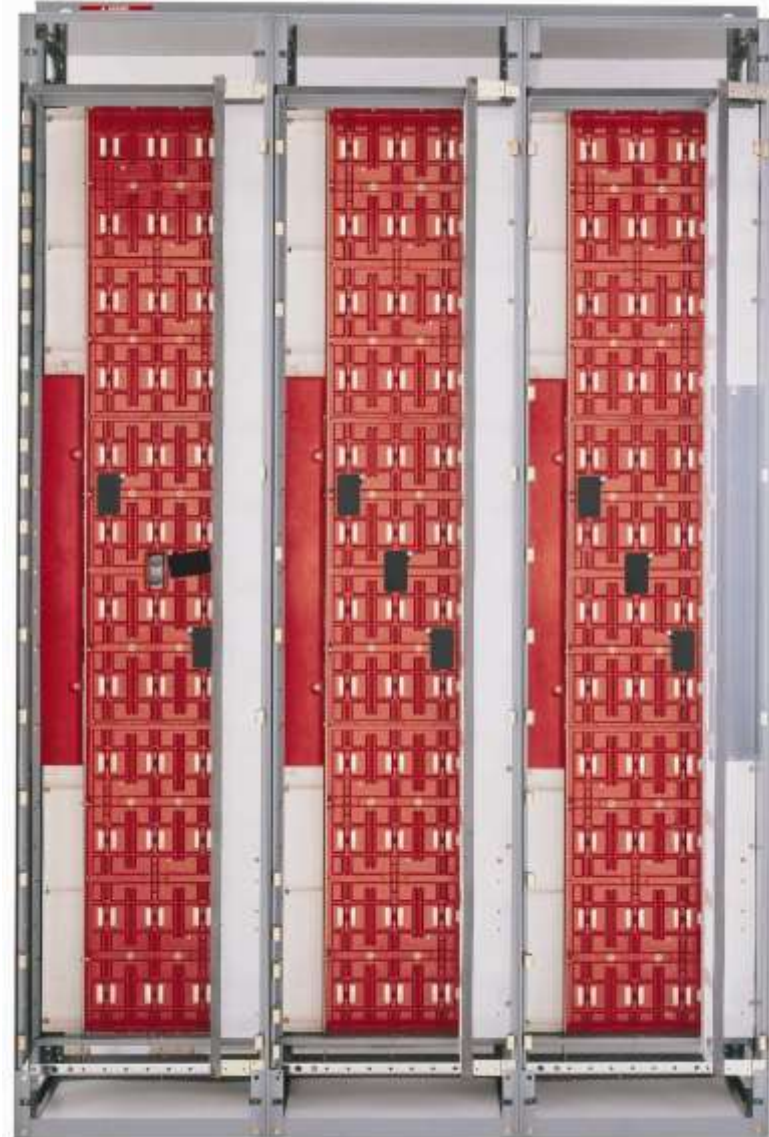
## Vertical Power Bus

### Rating

- 300 A (600 A effective) or 600 A (1200 A effective)

### Material

- Copper Tin-plated or Copper Silver-plated (matches horizontal power bus plating)

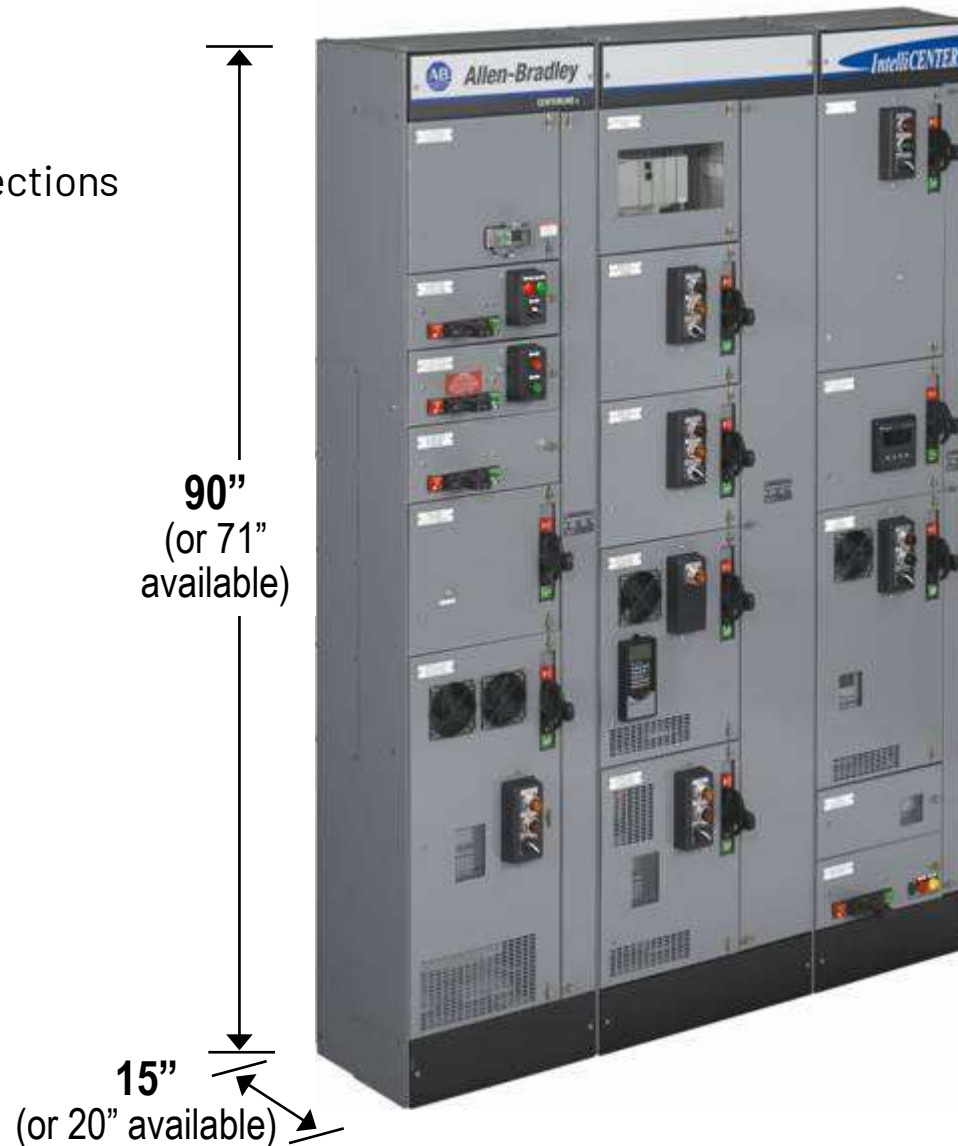


## Dimensions

- Section Height: 90" standard
- Sections Width: 20" standard; wider sections available
- Section Depth
  - 15" standard; 20" available
  - 30" or 40" for back-to-back
- Vertical Wireway
  - 4" standard; 9" available

## NEMA Enclosure Type

- 1 (IP20, IP30, IP40)
- 1G with gasketing around perimeter of unit doors (IP20, IP30, IP40)
- 12 (IP54)
- 3R non walk-in (IP44)
- 4 Stainless Steel, non walk-in (IP65)





# Unit Features

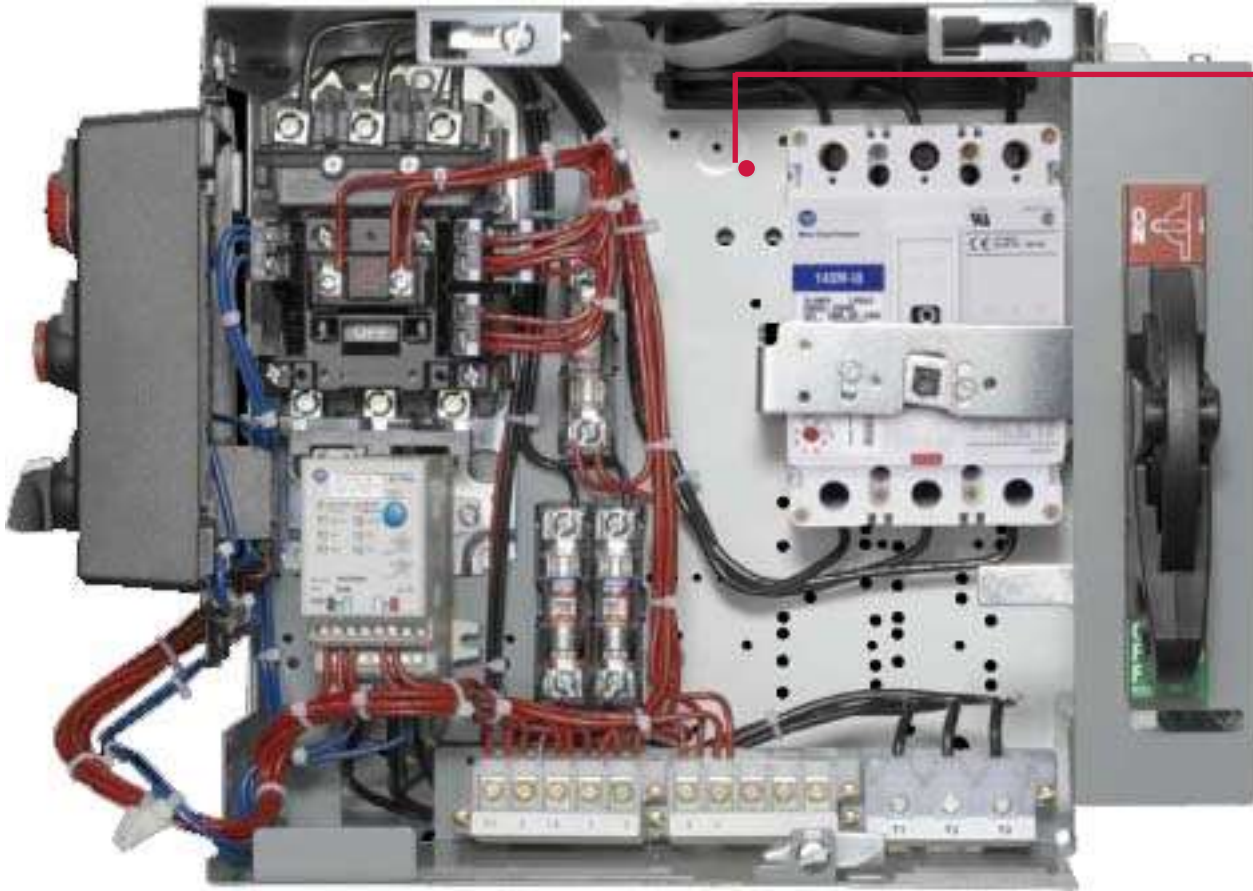


PUBLIC



# Unit Features

Superior fault containment helps minimize downtime



- Pull-apart terminal blocks & power terminal block
- Free-floating stabs self-align to bus

- Units have top and bottom plates
- Stab housing is designed to extinguish arcing faults by segregating three phases



**Dedicated ground stab is part of a solid grounding system**

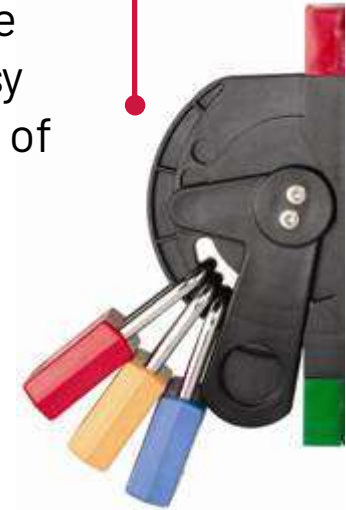


# Unit Features



## Rugged, flange-mounted handle

- Through the door handle for operating with door closed
- Accepts multiple padlocks for easy implementation of lockout/tag-out procedure



- Handle position easily identified when looking down the line-up
  - ON / OFF/ Tripped
- Unit cannot be inserted or withdrawn when the disconnect handle is ON



# Unit Features



**NEMA Starters**



**Space Saving NEMA Starters**



**Safety Components**



**Molded Case Circuit Breakers**



**Soft Starters**



**Overload Relays**



**AC Drives**



**Disconnect Switches**



# Engineered to increase industrial safety and mitigate risk

Industry-leading MCC is built with a foundation of standard design and materials that provide the first level of protection

- 1. Automatic shutters** – Immediately isolates and minimizes exposure to energized vertical power bus when unit is removed
- 2. Sheet metal thickness** – 10...16-gauge steel used for all structural components
- 3. Horizontal and vertical bus** – Reduces periodic maintenance and minimizes exposure to hazardous voltages
- 4. Structural isolation** – Help prevent faults from propagating to adjacent sections
- 5. Standard vertical power bus** – Effective 600 A capacity per section.
- 6. Unit isolation** – Limit equipment damage by helping prevent a fault from cascading throughout the enclosure
- 7. Interlocks** – Unit cannot be inserted or withdrawn when the disconnect handle is ON





**Rockwell  
Automation**

# Centerline 2100 Safety Features

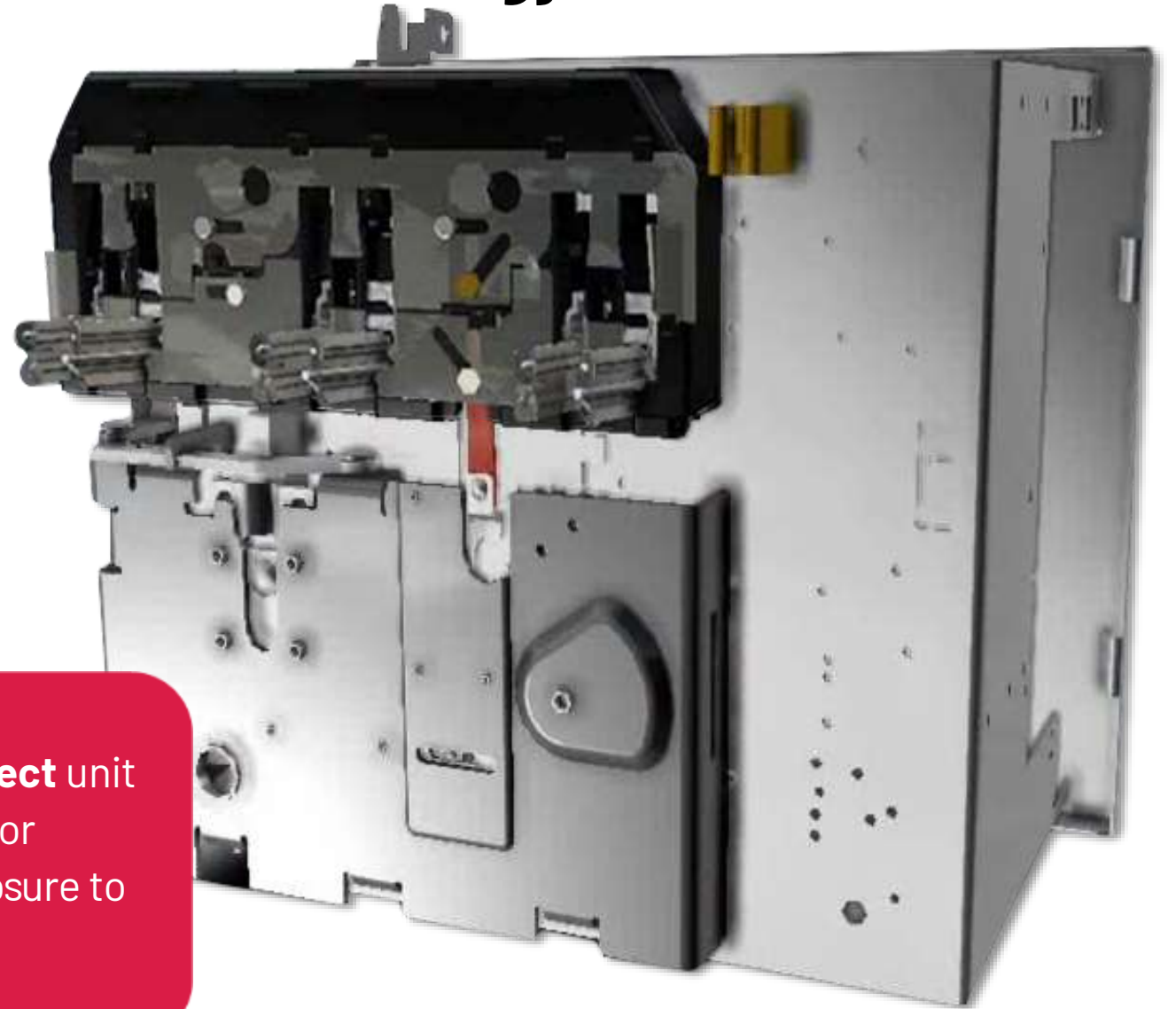


PUBLIC

# CENTERLINE 2100 SecureConnect™ technology



**Connect and disconnect** unit stabs with MCC unit door closed to prevent exposure to live electrical parts



# CENTERLINE 2100 SecureConnect™ technology user experience



CENTERLINE 2100 – 1.0 space factor unit with SecureConnect

## 1 Power Stabs and Stab Shutter Status Port

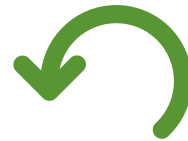
Multi-point validation system that helps confirm the unit is disconnected from the vertical power bus

## 2 Lockout Mechanism

Lockout mechanism can prevent the power stabs from being connected and the unit being placed back into service

## 3 SecureConnect Access Port

With the disconnect handle in the off position, use a standard 1/4" hex tool to...



Rotate a **quarter turn counter-clockwise** to disconnect stabs



Rotate a **quarter turn clockwise** to connect stabs



# SecureConnect™ technology Remote Operators

Wired Pendant Control (Std.)



Remote Operator Available as:  
Wired Only (Std.) or  
Wired & Wireless (Optional)



SecureConnect MCC Unit



Optional Status Indicator



Wireless Control





# CENTERLINE 2100 MCC with ArcShield helps reduce arc flash hazard



- Offers improved personnel protection against internal arcing faults when all doors and covers are closed and secured
- Provides Type 2 accessibility as defined by IEEE C37.20.7-2007
  - Helps protect personnel at front, sides and rear of enclosure from the effects of an internal arcing fault



# Arc Flash Rated (Arc Shield) Motor Control Centers

## Duration Limited

- *Designed to contain an arcing fault for up to 100ms in duration*
- Ventilated units are not allowed (e.g., 10HP or greater drives and soft starters)
- Allowable HBUS ratings: 600-3000A (up to 600V)
- Limited to 65kA SCCR
- It includes doors with spring latches
- Requires a top-plate pressure relief system

## Device Limited

- *Designed to contain an arcing fault for the time it takes a pre-tested main protective device to clear the fault*
- Ventilated units are allowed (with arc resistant baffles)
- Allowable HBUS Ratings: 600-3000 (up to 600V)
- Limited to 65kA SCCR
- Two spring latches per door
- No top-plate pressure relief system required



# CENTERLINE 2100 ArcShield design features

## Arc-resistant latches

Provide pressure relief  
Helps keep the door latched to the MCC during an arcing fault  
Two latches per door for Device Limited ArcShield MCCs  
All latches for Duration Rated ArcShield MCCs



## Pressure relief system

Vents and redirects arc blasts out the top and away from personnel  
Required for Duration Rated ArcShield MCCs only



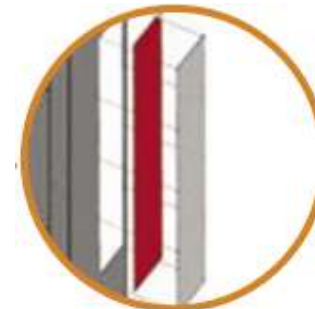
## Arc-resistant baffles

Vented units with arc-resistant baffles are available to allow for a wider range of MCC equipment  
Maintains Type 2 Accessibility  
Only allowed for Device Limited ArcShield MCCs



## Reinforced end plates

Adds an insulating covers on horizontal bus closing plates  
Helps prevent "burn through" which may result from arcing faults in the horizontal bus compartment



## Horizontal ground bus

Available at top of MCC, bottom of MCC or both for Device Limited ArcShield MCCs  
Required at top and bottom of MCC for Duration Rated ArcShield MCCs



# Additional Arc Flash Safety Options

## Maintenance Mode Selector Switch

- For MCC Feed by and Electronic Circuit breaker a maintenance mode selector switch can be installed
- Can be installed in the upstream switchgear or at the MCC
- Reduces the current setting of the short time (instantaneous ) trip setting of the main circuit breaker
- Meets the requirement of article 240.87 in the NEC Handbook as a method of reducing clearing time.



## Current Limiting Fuses

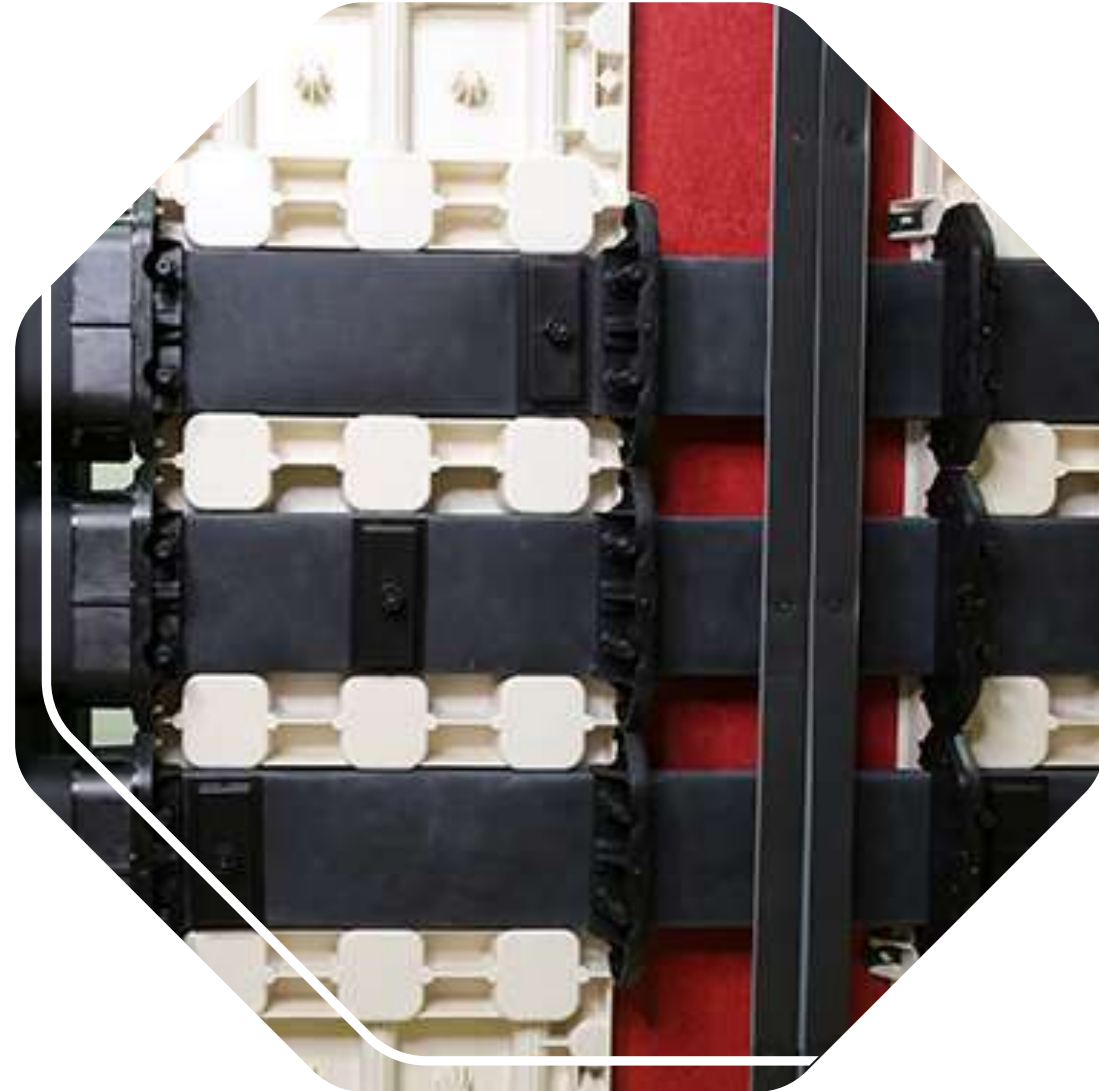
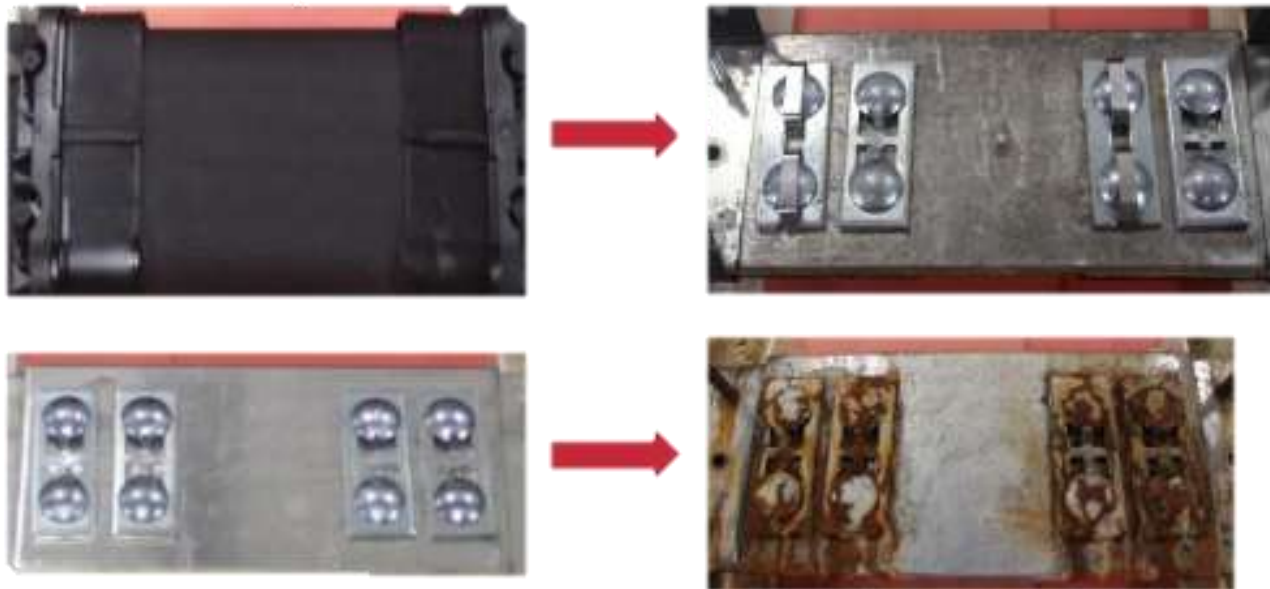
- Current Limit Fuses, e.g., Class J, clear fast enough to limit the let through current.
- Fuses can be supplied in the following
  - Main
  - Feeders
  - Starters
  - Drives
  - Soft-Starts



# CENTERLINE 2100 – Insulated Bus

Horizontal bus is insulated with a factory-installed polypropylene flame-retardant wrap

- Increases equipment longevity
- Help prevent an arc caused by foreign objects
- Help prevent propagation if an arc does occur
- Helps provide protection for the bus in facilities with air pollutants



# IntelliCENTER® technology

Intelligent MCC offering from Rockwell Automation

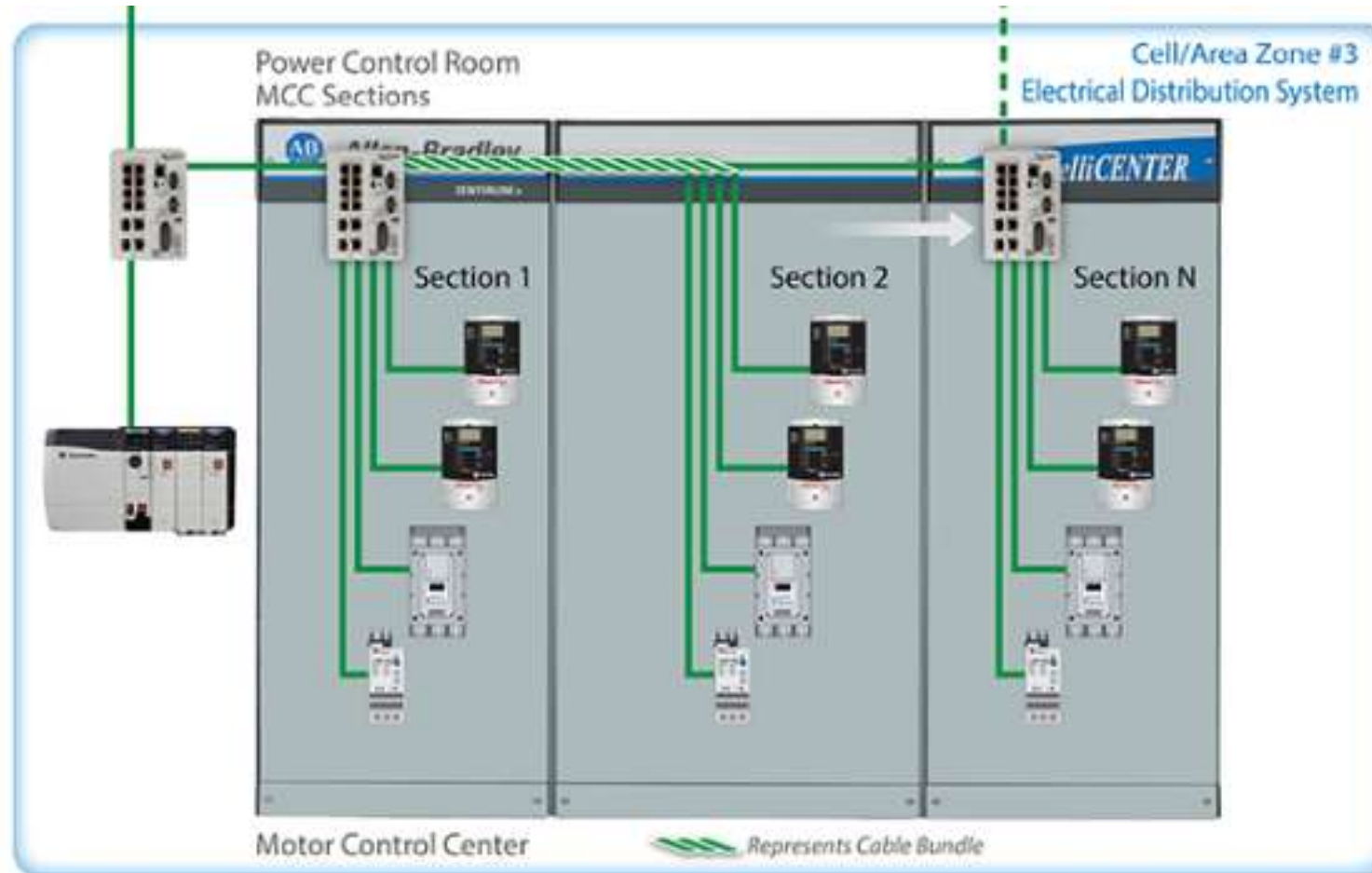
- Intelligent motor control connectivity
- Built-in EtherNet/IP network
  - Ethernet switch quantity and port capacity customized for your MCC
  - Multiple Ethernet connection and cable routing options
  - Exclusive Allen-Bradley® UL Listed, PLTC rated 600V Ethernet cabling
- IntelliCENTER® Software customized to your MCC

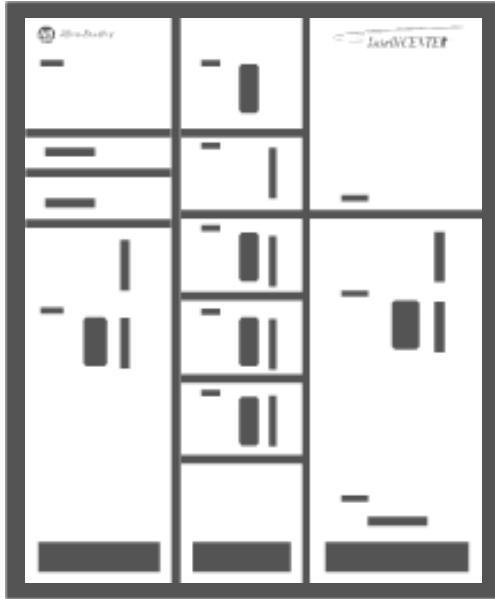


**Leverage IntelliCENTER® to enable and strengthen enterprise solutions**

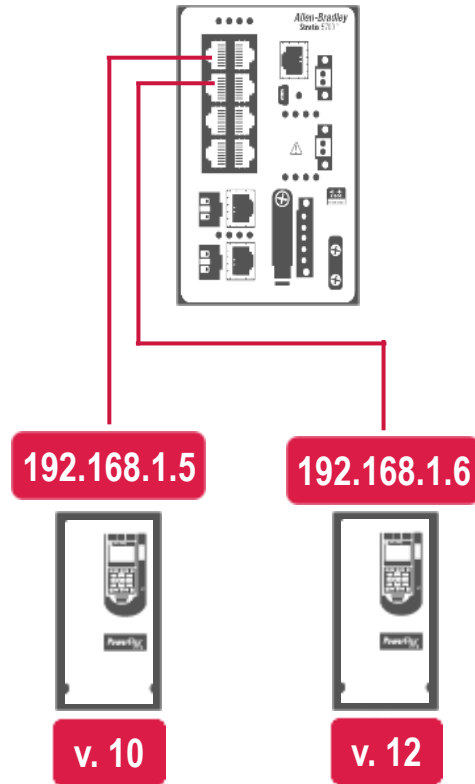


PUBLIC

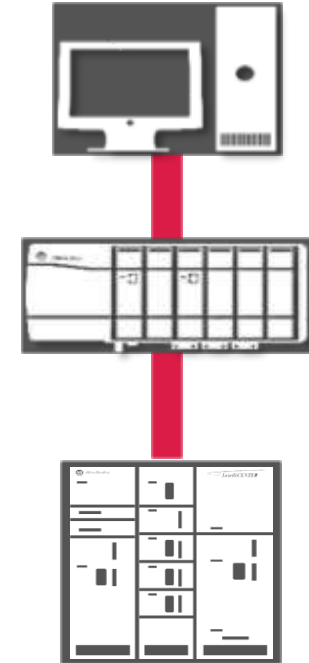




IntelliCENTER is assembled and validated



Firmware is normalized across like end-devices



Customers can get a jump start on their Control system design





# IntelliCENTER<sup>®</sup> software

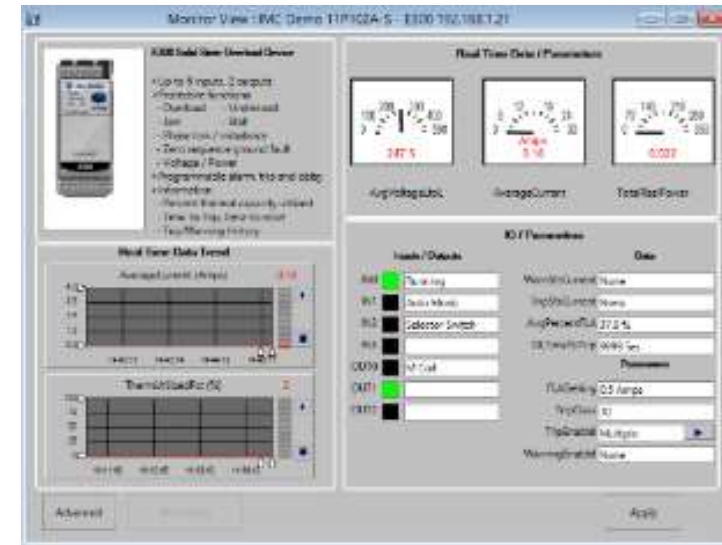
## System Level Dashboard

- Virtual view of the MCC
- Simple dashboard presentation
- Customer configurable



## Monitoring & Diagnostics

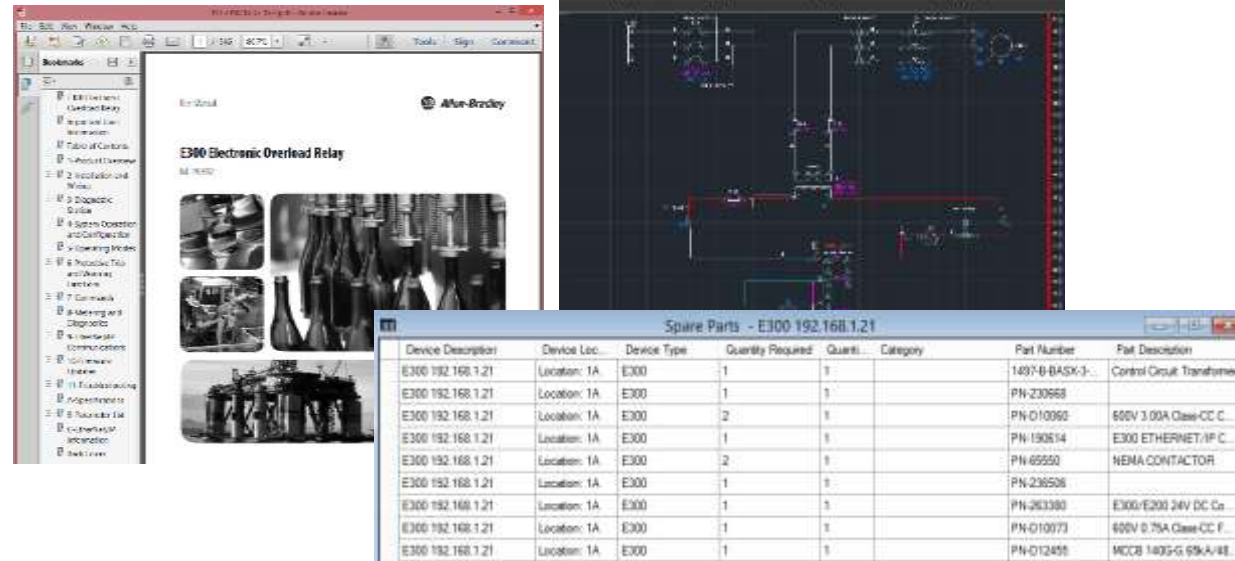
- Parameter access
- Device monitoring
- Remote diagnostic support
- Trending and event logging



# Asset Management

## Key Customer Documentation

- Manuals
- Unit Wiring Diagrams
- Spare Parts List

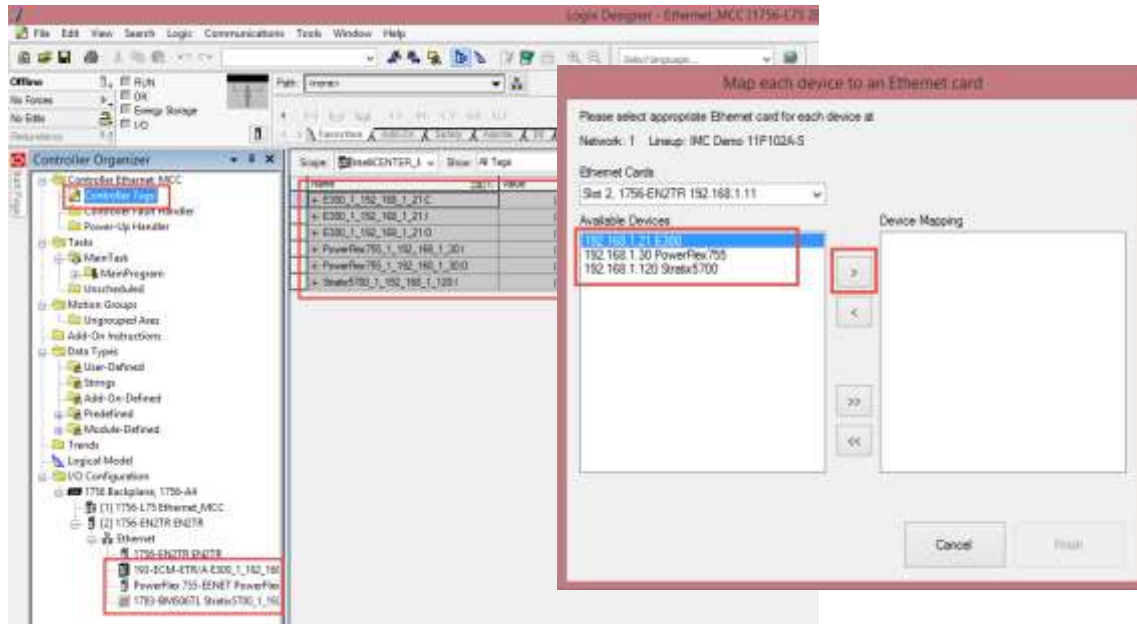


Device Description	Device Loc.	Device Type	Quantity Required	Quantity	Category	Part Number	Part Description
E300 192.168.1.21	Location: 1A	E300	1	1		1497-B-BASK-3-...	Control Circuit Transformer
E300 192.168.1.21	Location: 1A	E300	1	1		PN-230668	
E300 192.168.1.21	Location: 1A	E300	2	1		PN-010090	600V 3.00A Class-CC C...
E300 192.168.1.21	Location: 1A	E300	1	1		PN-190614	E300 ETHERNET/IP C...
E300 192.168.1.21	Location: 1A	E300	2	1		PN-65550	NEMA CONTACTOR
E300 192.168.1.21	Location: 1A	E300	1	1		PN-236506	
E300 192.168.1.21	Location: 1A	E300	1	1		PN-263380	E300/E200 24V DC Co...
E300 192.168.1.21	Location: 1A	E300	1	1		PN-010073	600V 0.75A Class-CC F...
E300 192.168.1.21	Location: 1A	E300	1	1		PN-012406	MCCB 140G-G 69kA/4E...



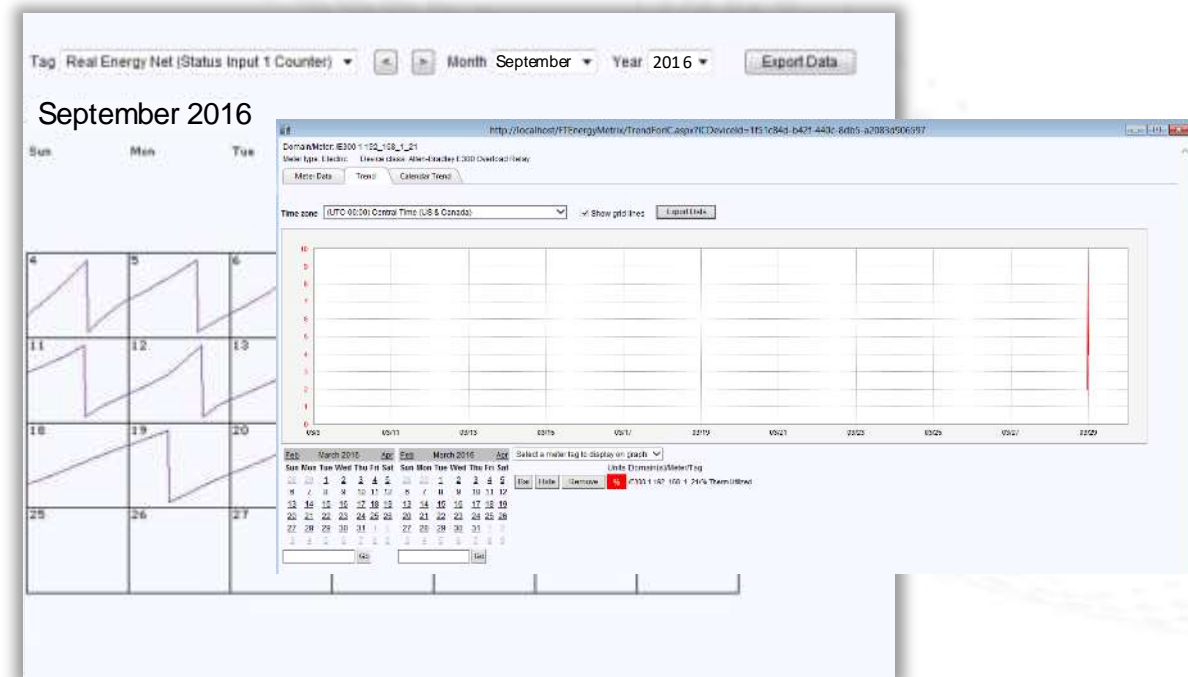
## Integration Assistant

Add the IMC devices to your Logix Program



## IntelliCENTER® Energy

Real time Energy usage of the intelligent motor control devices within your MCC



PUBLIC

# 2100 Centerline Specification Checklist

**Selection Checklist**

Original Instructions

**CENTERLINE 2100 Motor Control Centers**

Use this checklist to help you configure your CENTERLINE® 2100 Motor Control Center. You can type in the fields that are provided and check the checkboxes to select your preferences. For further details on each step, see the CENTERLINE 2100 Motor Control Centers Selection Guide, publication 2100-000003. When you have completed the form, click Submit at the end of the document and send the form to your local solution consultant.

Customer: \_\_\_\_\_ User: \_\_\_\_\_  
Prepared by: \_\_\_\_\_ Office: \_\_\_\_\_

**Step 1: Review MCC Technical Specifications and Certifications**

**Certifications**

UL  NEMA  ICS Specification No. \_\_\_\_\_  
 CSA (c-UL)  Service entrance  Other: \_\_\_\_\_

**Step 2: Select Network Technology**

**Network Technology**

Integrated Ethernet/IP™ network + preconfigured software

**IntelliCENTER™ Technology**  
(embedded network and preconfigured software)

Strux® 5700 switch mounting:  Unit-mounted switches  Horizontal wireway-mounted switches  
Ethernet cabling method:  Human-in (direct switch-to-device)  Vertical wireway adapters

Integrated DeviceNet™ network + preconfigured software

**IntelliCENTER™ Technology**  
(embedded network only)

Strux® 5700 switch mounting:  Unit-mounted switches  Horizontal wireway-mounted switches  
Ethernet cabling method:  Human-in (direct switch-to-device)  Vertical wireway adapters

Integrated DeviceNet network

**Rockwell Automation**

## CENTERLINE 2100 Motor Control Centers Selection Checklist

### Step 3: Select Structure

**Structure**

**NEMA/UL Enclosure Type**

Type 1  Type 1 with gasket  Type 1 with gasket and drip hood  
 Type 12  Type 3T non-walk-in  Bottom plates  
 Type 4 (stainless steel only)  12 in. pullbox  Other: \_\_\_\_\_

**Depth**

Front only  16 in. (203 mm)  20 in. (508 mm)  
 Back-to-back  30 in. (762 mm)  40 in. (1016 mm)

**Options**

Space heater with thermostat  Corner section  
 9 in. vertical wireway  External mounting channels  
 Master nameplate  Special paint (describe): \_\_\_\_\_  
 Other: \_\_\_\_\_

**ArchShield™**  Yes  No

### Step 4: Select Power Bus and Ground Bus System

**Bus**

**Power Bus Strapping**  
(longer or shorter symmetrical)

42 kA (std)  60 kA  800 kA  100 kA series coordinated

**Material**  Aluminum (600 & end 800 A only)  Copper

**Horizontal Power Bus**

**Rating**  600 A  800 A  1200 A  1600 A  2000 A  2500 A  3000 A

**Flating**  In  Silver copper bus only

**Insulation (up to 1600 A only)**  Yes  No

**Vertical Power Bus**

200 A (800 A effective)  600 A (1200 A effective)

**Horizontal ground bus**

1/4 in. x 1 in. (6.25 x 25 mm)  Top mounted  Top and bottom mounted  
 1/4 in. x 2 in. (6.25 x 50 mm)  Bottom mounted

**Ground Bus**

**Vertical ground bus**

Plug-in  Steel (standard) Copper  Copper  
 Load  Tin-plated copper

**Flating**  Unplated copper  Tin-plated copper

**IMPORTANT:** The vertical ground bus is unplated or tin-plated to match the horizontal ground bus.

**Neutral Bus**

Full rated  All sections  Main and adjacent 1, 2, 3 sections  
 Half rated  Main section only

Termination plate only, no bus (400 A and smaller main only)

Neutral loads:  No  Yes, Specify \_\_\_\_\_  Number of loads: \_\_\_\_\_

Vertical neutral bus (requires horizontal neutral bus and 9 in. vertical wireway)

**Rating:**  200 A  300 A  600 A

**Neutral Load Connection Options**  
(select one)

Neutral connection plate

**in horizontal wireway:**  Top  Bottom

**in section:**  All sections  Sections: \_\_\_\_\_

**Stab openings:**  Manual shutters  Automatic shutters  Protective caps

**Options:**  End isolating barriers (nylon barriers in vertical wireway to unit openings)  
 Other: \_\_\_\_\_



# Common Mistakes and Best Practices

## Common Mistakes

- Not including line reactor or output filtering
- Mixing up top and bottom fed
- Not being aware or confirming shipping splits
- Not being aware of the power system the MCC is going to be connected to
- Not being aware of the environment the MCC going to be placed in – people and cleanliness
- Wiring connections, e.g., over sized wire, lug connections for incoming wiring.
- Not specifying heavy duty drives for constant torque applications
- Not specifying the correct overload to measure voltage
- Including a neutral when it is not needed

## Best Practices

- Going through the MCC specification checklist.
- Making the incoming section its own shipping split
- Providing a Cable and Conduit Schedule when getting a MCC quoted
- Working with your favorite MCC provider to align the requirements of the project with the possible features of their MCC.
- Leverage typical drawings of MCC
- Place the larger loads towards the direction the cables will be exiting
- Place the larger starters and drive towards the bottom of the MCC to lower the center of gravity
- Inspect the MCC as soon as it arrives for damage – remove packing material
- Order MCC FOB destination

# Helpful Tools and Links

- Centerline 2100 Low Voltage MCC Selection Guide  
[https://literature.rockwellautomation.com/idc/groups/literature/documents/sq/2100-sg003\\_-en-p.pdf](https://literature.rockwellautomation.com/idc/groups/literature/documents/sq/2100-sg003_-en-p.pdf)
- Centerline 2100 Low Voltage MCC Program Guide  
[https://literature.rockwellautomation.com/idc/groups/literature/documents/ca/2100-ca004\\_-en-p.pdf](https://literature.rockwellautomation.com/idc/groups/literature/documents/ca/2100-ca004_-en-p.pdf)
- Centerline 2100 Speciation Checklist [https://literature.rockwellautomation.com/idc/groups/literature/documents/sq/2100-sg003\\_-en-p.pdf](https://literature.rockwellautomation.com/idc/groups/literature/documents/sq/2100-sg003_-en-p.pdf)
- Centerline 2100 Installation Manual [https://literature.rockwellautomation.com/idc/groups/literature/documents/in/2100-in012\\_-en-p.pdf](https://literature.rockwellautomation.com/idc/groups/literature/documents/in/2100-in012_-en-p.pdf)
- Centerline 2100 Joining Splicing Bus Connections  
[https://literature.rockwellautomation.com/idc/groups/literature/documents/in/2100-in010\\_-en-p.pdf](https://literature.rockwellautomation.com/idc/groups/literature/documents/in/2100-in010_-en-p.pdf)
- Wiring and Grounding Guidelines for Pulse Width Modulated Drives [https://literature.rockwellautomation.com/idc/groups/literature/documents/in/drives-in001\\_-en-p.pdf](https://literature.rockwellautomation.com/idc/groups/literature/documents/in/drives-in001_-en-p.pdf)
- Transcoil Harmonic Analysis Tool <https://www.transcoil.com/solution-center/>

# Contact Information

- **Adan Corral** Manager, LVMCC & MV Products [ACORRAL@eescodist.com](mailto:ACORRAL@eescodist.com) Cell 331-575-1027
- **Robert McDonough** Senior Specialist Industrial Automation [rmcdonough@eescodist.com](mailto:rmcdonough@eescodist.com) Cell 773-359-7217

If you would like us to come out and present a “Deep-Dive” on any of this material, please us know.



**Rockwell  
Automation**

Questions