

DESCRIPTIVE BULLETIN

ReliaGear™ LV MCC

Motor control center



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ReliaGear™ LV MCC

The next level in motor control centers

The ReliaGear LV MCC motor control center provides a safe, smart, and sustainable means to protect and control motors. ReliaGear LV MCC features SACE® Tmax® XT breaker technology, UMC 100.3 motor protection relays and the ACS580 family of variable frequency drives (VFDs).

ReliaGear LV MCC's 3200 A main bus and ability to plug in up to 600 A feeders and size 5 starter selections, provides customers with more flexibility to move, exchange and replace units.

The ReliaGear LV MCC product line features both standard and arc flash mitigation (AFM) units. The AFM units are designed to help reduce the likelihood of exposure to electrical shock and the potential of internal arcing faults from occurring during maintenance.

Combining more than 70 years of GE Industrial Solutions MCC experience with ABB's cutting-edge, digital technology in ACS580 VFD's and SACE® Tmax® XT circuit breakers, ReliaGear LV MCC offers the best of both worlds.

ABB's flagship motor control center, built around safety, was created to meet customer needs for a wide range of applications for motor protection and operation. ReliaGear LV MCC's full range of starter options includes standard full voltage reversing and non-reversing starter options, as well as other starting methods such as two-speed, reduced voltage, softstarters and Variable Frequency drives (VFD).

ReliaGear LV MCC leads the industry in both size and features offered for VFDs inside motor control centers. ABB's ACS580 drives are available up to 500 HP and can be configured for many applications and control schemes including bypass, isolation, and passive and active filtering to meet IEEE 519 requirements for mitigating harmonics.

ABB meets all motor starting requirements, without the need to mount starters on a wall which can increase maintenance costs and miss out on type testing and safety features available when packaging starting needs inside a UL 845 motor control center.



Overview

Customer feedback started ABB on the journey to build a simpler, more compact motor control center. ReliaGear LV MCC brings more advanced protection and controls to the portfolio, enhancing quality and reliability.

Key design features

The ReliaGear LV MCC design offers the following advantages:

- High density - customers can add more buckets and feeders because of compact unit design
- Ample wireway space - ReliaGear LV MCC's unique design allows for more wiring space despite its increased density
- Simple design translates into greater flexibility, easier installation, and fewer stocked parts

ReliaGear LV MCC is built and designed for simplicity and durability. ABB understands that footprint is important and expensive for customers to build and maintain. ReliaGear LV MCC units are built with high density in mind, while also maintaining flexibility of interchangeable units and ability to change the plug size in space with removable shelves and quick ship starter units.

ReliaGear LV MCC was built with customers in mind by providing ample wiring and bending space and front accessible terminal boards for easy installation and start-up. Care was also taken in the design to allow clean access to most components in order to replace and maintain the equipment for many decades to come.

Safe, Smart and Sustainable features



SAFE

- **Arc flash mitigation (AFM)**

The AFM unit incorporates a retractable stab mechanism which allows for closed-door racking of the unit. This feature, described in IEEE 1683, helps provide added protection to electrical personnel from the dangers of an arc flash occurrence. Visual indicators offer personnel quick and easy indication of stab and shutter status

- **Integrated surge protection device (SPD)**

SPD components ensure the smoothing of spikes and inherent noise in utility/generator power flowing through the motor control center

- **Reinforced door latches**

ABB has also designed a unit door latch that is 21 times stronger than other latch designs, making this one of the strongest on the market. This latch offers added protection, safety and security to operators



SUSTAINABLE

- **Seismic rated**

ReliaGear LV MCC is seismic (non-OSHPD) rated in accordance with Section 1705.13.3 of the CBC 2019/ IBC 2018 and tested in accordance with 2015-ICC-ES AC156 Standards. ReliaGear LV MCC complies with seismic requirements per IEEE-693-2003 and ASCE7-16

- **Plug-in starters to size 5**

Customers can plug starters up to Size 5, allowing easy installation and removal

- **Plug-in feeder circuit breakers up to 600 A**

A large selection of plug-in feeders, provides customers with increased flexibility to quickly rearrange buckets

- **Reinforced handle mechanism**

ReliaGear LV MCC has a newly designed handle mechanism that is built to work with SACE® Tmax® XT breakers. This handle is more robust than previously designed handles, increasing durability of these handles during the life of the MCC



SMART

- **Variable frequency drives (VFD):**

The ACS580 VFD's are compatible with a wide range of fieldbus protocols. The drive comes with Modbus RTU fieldbus interface as standard. Fieldbus communication reduces wiring costs when compared to traditional hardwired input/output connections

- **Fieldbus adapters**

- DeviceNet™
- PROFIBUS DP
- CANopen®
- Modbus RTU
- ControlNet
- EtherCAT®
- POWERLINK
- EtherNet/IP™, Modbus TCP, PROFINET IO
- Two port EtherNet/IP™, Modbus TCP, PROFINET IO

- **Motor Protection Relays: ABB's UMC 100.3**

ABB's Universal Motor protection relay, the UMC 100.3, is the premier choice in motor protection. The relay is compact and modular with all of the features available in the industry, including a plethora of native communication choices including native Ethernet. The relay has many optional features that can be purchased with the MCC or added later as a snap on module. Features include advanced monitoring and control, waveform capture, Analog and digital I/O modules, and additional protective relay features

These relays are also suitable for industrial and process applications requiring varying levels of diagnostics and control and for critical applications requiring remote monitoring

- **SACE® Tmax® XT Circuit Breakers**

MM200 and MM300 are another option for motor protection needs that are available in ReliaGear LV MCC. MM300 functionality such as auto restart, wave form capture, and flex logic provides high-end capability to meet customers demand. Both MM200 and MM300 relays offer multiple choices for control panel, graphical display, or hand held programmer.

SACE® Tmax® XT feeder circuit breakers allow customers an option for Ekip and Ekip touch trip units which bring protective features, metering and communications to larger circuit breaker feeders

- **PSTx Softstarters**

PSTx softstarters are available up to 500HP and feature built-in Modbus and Anybus modules that support all major communication protocols. PSTx softstarters reduce the mechanical stress on motor applications, helping to increase system uptime

General specifications

Standards and guidelines		UL 845 IEEE 1683			
Wiring		NEMA class (I, II), type (A, BD, BT, C)			
Enclosures		Standard construction: NEMA Types 1, 1G, 2, 3R and UL Enclosure Type 12			
Seismic rating		CBC 2019/ IBC 2018			
Dimensions	Sections	Main bus rating	W	H	D
		600 A–1200 A	20" or 24"	90"	13" or 20"
		1600 A–2500 A	20" or 24"	90"	22"
		2500 A (without fans) - 3200 A	36"	95"	30"
	Horizontal wireway	12" top, 6" bottom (12" bottom optional)			
Bus system	Main horizontal bus: 2500 (without fans) - 3200 A	1.5" with 36"			
	Main horizontal bus: 600 A-2500 A	4" with 20" and 8" with 24"			
	Main bus bracing	65 kAIC or 100 kAIC			
	Vertical bus	300 A–600 A, 850 A with main bus ≥1000A			
	Ground bus	300A (0.25" x 1") or 600A (0.25" x 2")			
	Neutral bus	100% rated up to 1200 A, 50% rated 1600 A and above			
Branch circuit protection	Molded case circuit breakers				
Construction	<ul style="list-style-type: none">• Positive guidance for plug-in unit stabs• Tool-less unit insertion and removal• Lift-out unit shelves• Directly connected power stabs and unit disconnect• Plug-in construction in circuit breaker starter units Size 1-5, circuit breaker feeders ≤600A• Compartment doors: flange-formed pan type, section mounted, with removable hinge pins• Operating handles: direct drive, mechanically interlocked with door, ON-TRIP-OFF position indicators, provision for padlocking in the OFF position• Terminal blocks: split type on combination starter units with Type B or C wiring units up to Size 5 removable without disconnection or control leads from terminal blocks				
	Arc flash mitigation units: <ul style="list-style-type: none">• Retractable stabs• Vertical bus isolation shutters actuated by the position of the stabs• Visual indicators to display stab and shutter status• Safety interlocks to prevent opening unit door while unit is energized• IP20 options• Safety features to help prevent insertion of the bucket into the unit with the stabs extended• Safety features to help prevent the insertion of the unit with the breaker in the ON position				
Communications provisions	Modbus RTU, DeviceNet, Profibus, Modbus TCP/IP, Ethernet IP - available network data: <ul style="list-style-type: none">• Metering (average phase in amps, control voltage, motor runtime)• Starter status and configuration notification (run, overload, ground fault, phase imbalance, commanded trip, class setting)• Information (voltage, internal failure, motor load warning) remote control (ON, OFF, TRIP, RESET)				
Parts	Renewal parts for the ReliaGear LV MCC control center, and previous designs including E9000, 7700 Line and 8000 Line are available through your sales representative				

Codes and standards

Motor control centers are manufactured to NEMA standard ICS 18 and are eligible to receive the Underwriters Laboratories listing mark under standard UL 845, a tri-national standard including UL/cUL/CSA Canada C22.2 No.254-05. Vertical sections and units which have been listed with UL will bear the UL/cUL listing mark.

The cUL mark indicates the product has been tested to meet Canadian Standards by the UL organization, in this case CSA C22.2 No. 254-05, which is comparable and valid as CSA certification.

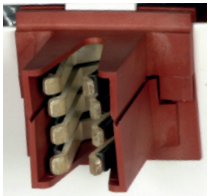
Safe, smart and sustainable

ReliaGear LV MCC was designed to leverage the superior technology available in ABB components such as breakers, relays, contactors, softstarters, automatic transfer switches and VFDs. ReliaGear LV MCC is a world class smart MCC with technology customers can rely on and trust to last. Smart components, coupled with a thoughtful design, built around safety and sustainability, put ReliaGear LV MCC in a league of its own.



Vertical bus insulation and isolation

Higher amperage means customers can now place more buckets in a single section. The 850 A vertical bus also provides flexibility to add buckets as a facility's needs grow. The polyester-reinforced sandwich bus insulates the vertical bus to help prevent the spread of faults and small stab openings provide effective isolation. Optional automatic shutter barrier covers the vertical bus stab area when plug-in units are removed.



Plug-in stabs

Assure positive contact with the vertical bus while two-step engagement and a positive guidance system ease installation and removal. Plug-in stabs are rated 250 A and 600 A.



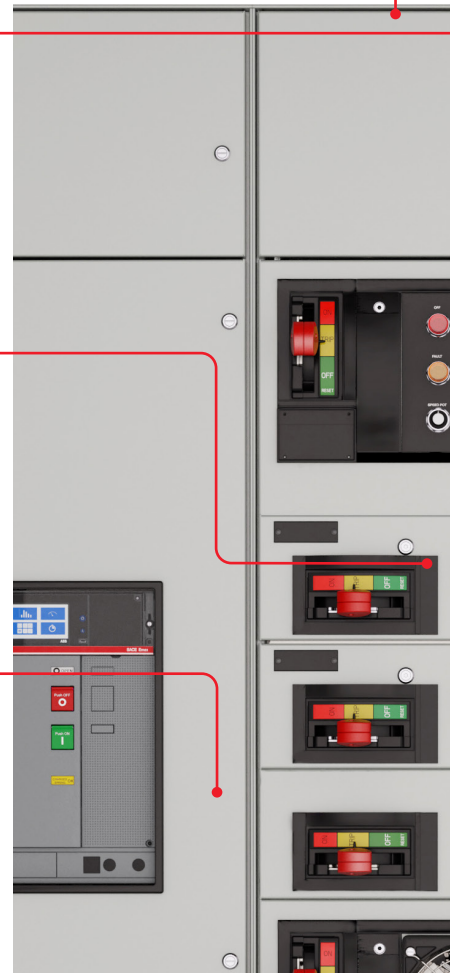
Optional unit ground bus stabs

Vertical copper ground bus allows direct grounding of unit saddles to the equipment ground bus. A unit ground bus stab engages the vertical ground bus before the unit power stabs engage the vertical bus. A load ground lug is available for customer cable grounding. Termination points are located at the rear of the bucket, next to starter.



Lasting protection from the environment

A paint finish is applied to all un-plated steel parts. The powder coating process passes 1000 hours (ASTM117B) salt spray test and provides lasting protection.



Isolated wire troughs and smooth-edged wireways

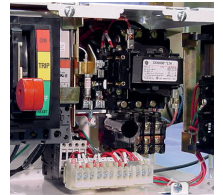
All case-side wireways feature a 1/2" roll-formed lip to reduce damage to wire insulation. In separate doors make wiring and inspection easy bus maintenance tests.

**Oversized nameplates**

Durable engraved labels identify units at a glance. Standard size is 2" x 3".

**Compact unit sizes**

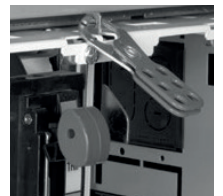
6" feeder units up to 125A and plug-in starters allow quick and easy insertion and removal of buckets. Compact and interchangeable NEMA size 1 and 2 FVNR starters in 12" high units make field modifications simple.

**Handles**

Lift-up handles allow fast, full access to fused switches and circuit breakers. Horizontal handles to minimize space requirements for 6" and 12" feeder breakers and 6" starters. Unmistakable label indicators provide clear indication of ON-TRIP-OFF status. Handles can also be locked in the OFF. This handle was redesigned to be stronger than previous handle designs.

**Safe maintenance**

Plug-in units to 600 A units can be withdrawn to a disconnected position and padlocked for maintenance tests.

**Door latch**

The newly designed door latch is 21 times stronger than other door latches.



Arc flash mitigation (AFM) unit features



Retractable stabs

The retractable stab mechanism allows for closed-door racking of the unit, helping to provide added protection to the electrical personnel from the dangers of an arc flash occurrence.



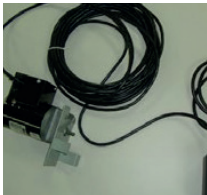
Vertical bus isolation shutter

As the AFM units are racked in or out, a vertical bus isolation shutter is automatically engaged to prevent incidental contact with energized parts.



AFM Safety interlock

The safety interlock prevents user from taking the unit out when stab is extended or, inserting the unit into the bus when stab is extended.



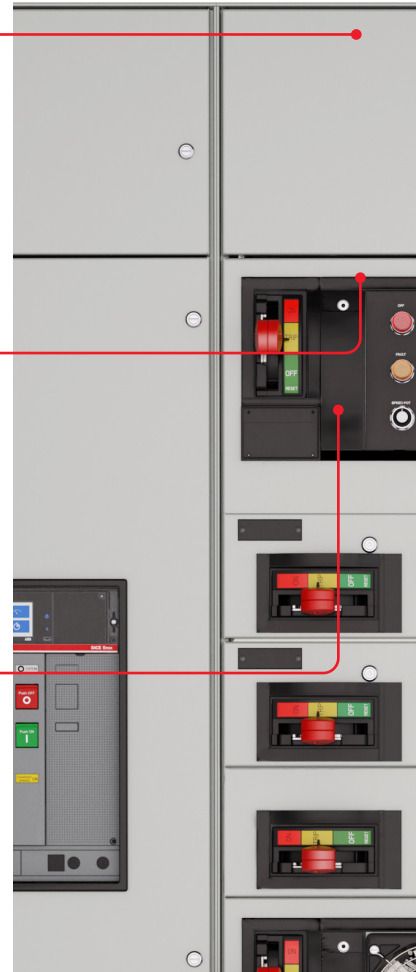
SmartRack LV remote racking device

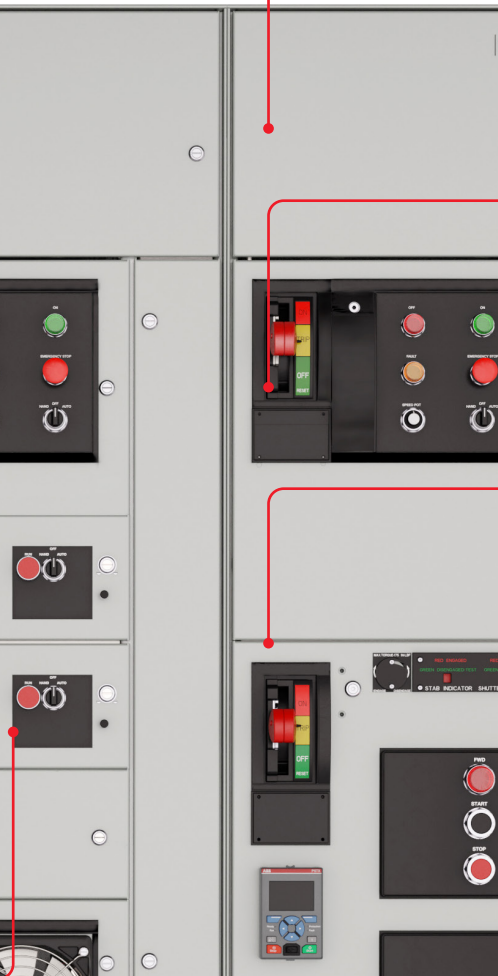
This electrically operated remote racking device allows maintenance personnel to be up to 40 feet away from an Arc Flash Mitigation (AFM) unit during the racking operation, beyond the arc flash boundary and is easily installed without extra tools.



AFM visual indicators/AFM racking screw

The visual indicators on the front of the units provide personnel with a clear view of the status of the stab and vertical bus isolation shutter. The racking screw and disconnect interlock prevents the user from racking the stab in/out of the unit with the disconnect in the "ON" position.





Lifting eyes provided on top of each shipping split for convenience when moving the MCC by crane.



The UMC100.3 relay is available with remote display for easy monitoring and set up.



Push button bracket with swing out panel is connected to the unit, not the door, allowing the unit to be removed from the section without the need to remove control wiring.



Units stab into vertical bus sandwiched inside red isolation barriers.



Components, accessories, and service

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01
300-Line starter

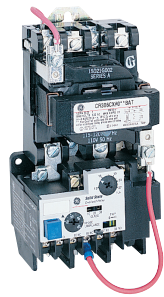
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02
A3 pilot device

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03
SACE® Tmax® XT
circuit breaker

Motor starters and protection

At the core of the ReliaGear LV MCC are motor starters – nonreversing, reversing, two speed, and combination forms in NEMA sizes 1-5. They incorporate all of the most requested features and benefits, including:

- Fast contact inspection via tool-less contactor disassembly and highly visible contacts
- Fast coil change and contact replacement
- Overload relays with adjustable trip current or various optional solid-state overload relays: CR324, CR324X, as well as UMC 100.3, MM200, and MM300 smart overload relay options
- Molded coils that are impervious to moisture, dirt and oil
- Wedge-shaped contacts for positive make with minimum bounce
- Weld-resistant, cool-operating, long-lived contact tips on all 300-line motor starters



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01

Pilot devices

30mm pilot devices – which come in every conceivable form – deliver the high-class appearance and reliable operation that industrial customers demand and provide an ideal interface with the motor control center.

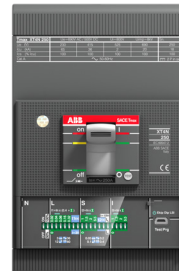


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02

Circuit protection

The scope of circuit protection offered in ReliaGear LV MCC motor control centers is broad enough to meet every need.

SACE® Tmax® XT, motor circuit protectors, high-pressure contact switches, and the rugged and reliable Power Break II insulated case breakers (featuring the EntelliGuard TU trip unit), offer the specific protection the system requires.



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03

PSTX softstarters

PSTX advanced range softstarters provide next-level functionality for motor control in normal duty applications. Available in ReliaGear LV MCC up to 500HP, PSTX softstarters offer the most advanced features and protections in a single enclosure.

PSTX softstarters offer a range of advanced functions including:

- In-line and inside-delta connection
- Graphical display with 17 languages for easy setup and operation
- Built-in bypass for energy saving and easy installation
- Analog output for measurement of current, voltage, power factor etc.
- Complete motor protection
- Built-in Modbus RTU communication
- Support for all major communication protocols
- Easy operation, adjustment, and maintenance
- Pump control, job, and tachometer control
- Isolation and bypass option (external)
- Plug-in units to 100HP at 460V
- Plug-in units to 50HP at 460V with external bypass in NEMA 1 enclosure
- 600V ratings up to 500HP

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04
PSTx Softstarter

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05
ACS580 variable
frequency drive

—
06
Integrated surge
protection service (SPD)



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04

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05

ACS580 variable frequency drives

Customers can control the VFD from a host of custom configurations including door mounted keypad, other local control, or remote control the VFD from the facility management system. Standard control schemes are available or as specified by customers. The ACS580 drive includes built-in DC choke which provides a minimum 3% equivalent impedance.

Variable torque drives

AC drives are ideal for variable torque loads such as fans, pumps and compressors. ACS580 general purpose drives simplify processes and motor control with effortless process automation, making it the best choice for a wide range of applications and easy to comprehensively manage a plant. ACS580 general purpose drives are part of the ABB all-compatible drives portfolio, sharing the same architecture and user interfaces for easy usability.

They are also plug-in ready to control compressors, conveyors, mixers, pumps, centrifuges, fans and many other variable and constant torque applications in different industries.

- Easy to select, install and use
- All essential features built into the drive for minimized number of external components
- Many built-in control functions for simplified automation and process control
- Straightforward settings menu and assistants for fast commissioning

- Energy efficiency features for optimal energy use
- Connect to any automation system or use stand-alone
- Wide availability and support
- Designed for reliability and consistent high quality

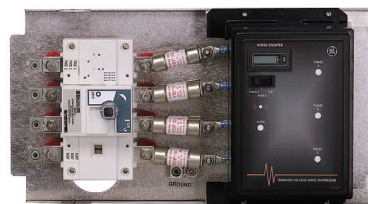
Constant torque drives

These drives offer flexibility across a range of constant torque applications. They employ process control systems that make any task simple and profitable, and they can be configured to operate in a flux vector control mode.

Integrated surge protection device (SPD)

SPD components ensure the smoothing of spikes and inherent noise in utility/generator power flowing through your control center. The integrated features minimize wire connections and offer greatly improved clamping characteristics.

Engineered for reliability, flexibility and long life in the most extreme surge environments, the SPD maintains its true maximum surge current rating unlimited by fusing. This superior design has been proven successful in third-party tests.



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06

Much more

In addition to still more components – relays, contactors, electronic control modules, voltage monitors – ReliaGear LV MCC motor control centers are available with a variety of other products and equipment.

These Include:

- Operator and metering panels
- Relay panels
- Lighting and distribution panelboards
- Distribution transformers
- High resistance grounding

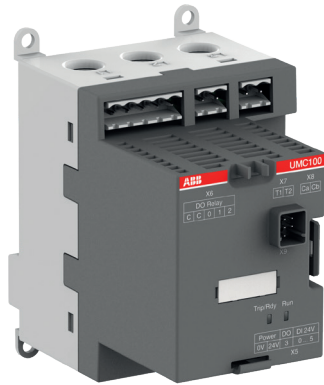
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07
UMC 100.3 motor
control relay

UMC 100.3, universal motor control relay motor protection

- The UMC 100.3 provides comprehensive motor protection
- Overload protection for single- and three-phase AC motors according to EN/IEC 60947-4-1
- Rated motor currents from 0.24 to 63 A with integrated measuring system in a single version
- Rated motor currents up to 850 A with external current transformer CT4L / CT5L
- Selectable tripping classes 5E, 10E, 20E, 30E or 40E
- Locked rotor protection
- Phase failure, asymmetry and sequence protection
- Under-/overcurrent protection
- Thermistor motor protection
- Ground fault detection (internal or external)
- Limitation of motor starts per time
- Motor protection independent from bus communication

In combination with voltage module VI150/
VI155-FBP.0

- Undervoltage/overvoltage protection
- Power supervision
- Power factor supervision (cos ϕ)
- Voltage-based detection of phase failure, asymmetry and sequence



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07

Motor control

- Integration of the most important motor control functions as ready, easily parameterizable blocks
- Direct, reversing, star-delta starters
- Pole changing Dahlander / Actuator mode
- Inching / jog mode
- Adjustable restart strategy (load shedding)

Extended motor control

- Freely programmable for special, application-specific control functions
- Simple adaptation to specified control functions
- Comprehensive library
- Blocks for logic, counters, timing
- Access to all I/Os and internal signals

Service data

- Counter for motor operating and standstill hours
- Number of starts
- Number of overload trips
- EnergyDiagnostic data
- Comprehensive and detailed error messages and warnings
- Log for previous 16 errors
- Plain text display on the control panel

Open communication

The UMC 100.3 is a basic device that can use various communication methods; the communication protocol is selected by plugging on the right fieldbus communication interface or connecting an Ethernet communication interface.

Control stations and operation modes

- Individual and flexible configuration
- Remote operation via DCS or PLC
- Local control via pushbuttons
- Local control via operations panel UMC100-PAN
- Force local via input signal

Motor status/communication

Quick and comprehensive access to all data via control station, fieldbus, Ethernet and/or laptop.

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08
UMC100.3 Accessories

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09
MM200 and MM300
Motor Management
Relays with Interfaces

Operating data

- Motor status
- Motor current
- Thermal load
- Maximum starting current
- Run-up time
- Time to trip
- Remaining cool down time

Operating data with voltage module VI150/ VI155-FBP.0

- Phase voltages
- Active power
- Apparent power
- Power factor
- Energy



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08

Multilin MM200 and MM300 motor management relays

The MM200 and MM300 provide the latest technology in motor protection and control found in high-end protection relays.



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09

Available features include:

- Comprehensive motor protection
- Motor performance data metering
- Advanced automation capabilities for customized protection and integrated process control
- Advanced FlexLogic to reduce requirements for local PLCs
- Powerful communications including Modbus RTU, Modbus TCP, Profibus, and DeviceNet protocols for easy integration into manufacturing systems
- Motor diagnostic information, including sequence-of-event records and waveform capture to provide reports for troubleshooting and to improve uptime
- Small form factor and remote display options designed to fit in MCC buckets, door jack, control panel, graphical display, or hand held programmer available

The MM200 and MM300 are a standard offering and can be networked to communicate diagnostic and process information to remote computers to help speed maintenance, reduce downtime, and increase productivity. Optional snap-in steel wireway barriers enhance isolation of low-voltage signal wiring between units.

World-class customer service

ABB's knowledgeable staff offers an ever-expanding array of customer service tools such as:

- Empower quotation program, which quickly generates layout and pricing information
- Automated Requisition Engineering software, which reduces the time needed for project drawing approval
- Toll-free product resolution number for service after it arrives
- Pre-engineered plug-in replacement units with discrete Fastrac catalog numbers available from the factory

Product information: 1-800-431-7867

Industrial services: 1-888-434-7378 (US)
1-540-378-3280 (Int'l)



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