

Enclosures for hazardous areas
EBMX clamped enclosures

CROUSE-HINDS
SERIES

Smart EBMX

NEMA 7 classified enclosures
with Power Defense circuit breakers and Power Xpert
C445 intelligent motor management relays

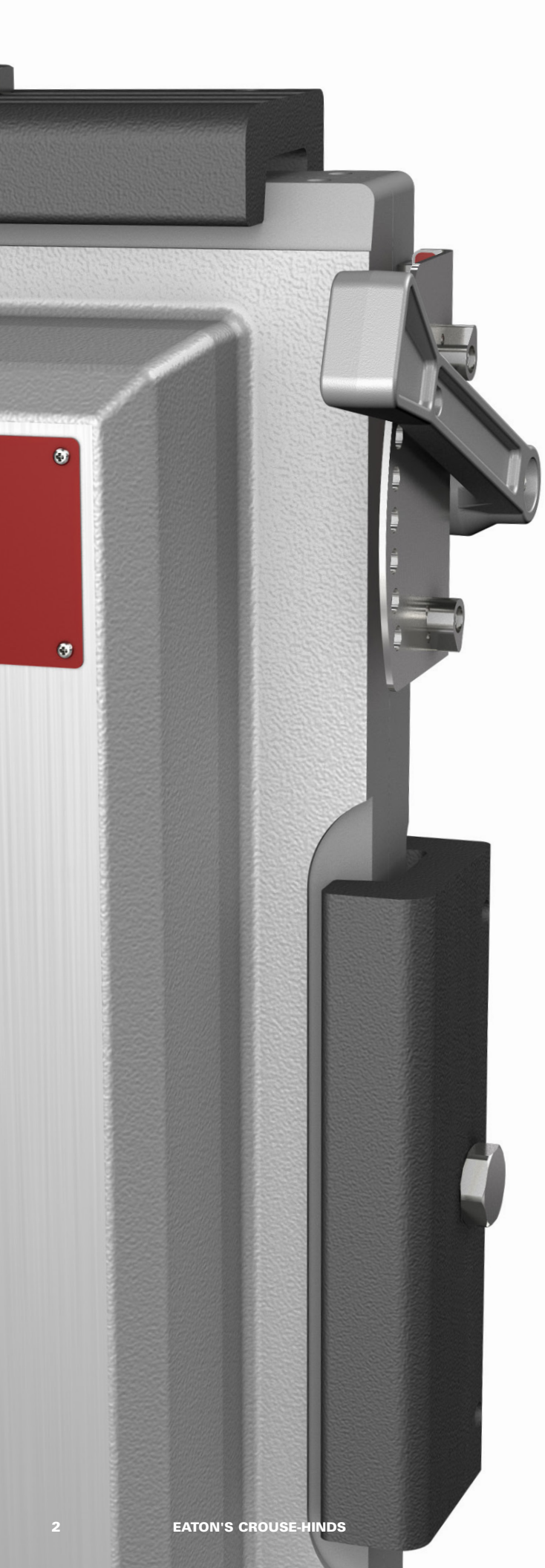


SAFER. FASTER. SMARTER.
Motor starters, breakers & combo starters



EATON

Powering Business Worldwide



Clamped EBMX: NEMA 7 classified enclosures

Safer. Faster.

Easy access, lower risk and less downtime.

Creative thinking and reliable solutions. That's what you need in the world's most demanding environments, and that's what Eaton's Crouse-Hinds delivers with its new **clamped EBMX explosionproof enclosures**.

The only clamped enclosure for hazardous areas.

Smarter.

Now available with
with Power Defense circuit breakers and Power Xpert C445 intelligent motor management relays

With Smart EBMX you are getting the latest protection technology, engineered for the future:

Industry 4.0 features such as built-in communications, advanced energy metering and algorithms that notify you when your circuit breaker needs maintenance, as well as zone selective interlocking technology that clears faults quickly and locally, preventing propagation into your system. Arc flash reduction options help protect your people with the fastest tripping speed technology, not to mention Eaton's best-in-class support and service. You are freeing yourself and your customers from concerns and gaining the sort of assurance that allows your people to move and plan with confidence. That's why Smart EBMX with Power defense is your best offense.



C445 Motor management intelligence relays offer industry-leading protection, diagnostics and energy usage analytics. Advanced motor management, extensive communications, superior diagnostics, integrated logic, ground fault detection and protection make Smart EBMX with C445 option ideal for critical motor applications where uptime is key

Why EBMX?

Save time and money. Reduce safety risk for personnel, maintenance costs and downtime activities.



Environmental ratings

- NEMA 3R, 4X*, 7BCD, 9EFG

Certifications and compliances

- NEC & CEC
 - Class I, Divisions 1 and 2, Groups B, C and D
 - Class II, Groups E, F and G
 - Class III
 - Class I, Zones 1 and 2
- UL Standards
 - UL1203 Explosionproof and Dust-ignition-proof Electrical Equipment for Use in Hazardous (Classified) Locations
 - UL2062 High AIC Ratings for Groups C and D
- cUL to CSA C22.2 No. 30
- UL/cUL certified for -50°C to +60°C
- SASO Certificate of Conformity

Standard materials

- Body and cover – copper-free aluminum
- Clamp – anodized copper free aluminum
- External hardware – stainless steel
- Internal parts – galvanized steel

* Enclosures with PB23, RR2 and RR3 options are rated NEMA 3R. All other options maintain NEMA 4X rating.

Extended temperature range:

- -50°C to +60°C certified enclosure temperature rating

Reduced risk:

- No missing, stripped, broken or improperly torqued bolts



Simplified alignment:

- Side operated handles for visual confirmation of proper operator alignment while cover is open

The only clamped solution



Save time and money

- Simple clamp cover design opens in seconds
- Reduces installation and maintenance costs

Error-proof installation

- All surface clamps apply even pressure across the flame path
- No chance of missing bolts

Multi-use and highly customizable

- Designed for use as starter, combo starter, disconnect switch or breaker
- 65kAIC at 480V certified enclosure rating
- Up to 6 cover operators
- Factory wired
- Thermal magnetic and electronic trip breakers
- Bi-metallic and electronic overload starters

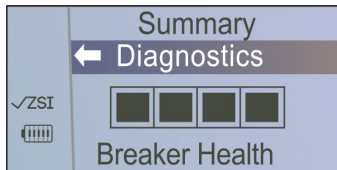
Patented safety

- 11 patents associated with all-clamp technology

Power Defense circuit breakers



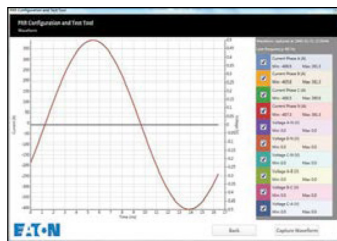
The smart EBMX with Power Defense circuit breakers feature the Power Xpert Release (PXR) electronic trip units, offering premium protection and communication features allowing you to use fewer components and a simplified design while keeping your system connected, your equipment and employees protected, and your customers informed.



Breaker health:

Industry-first algorithm that provides real-time evaluation of breaker condition by tracking and analyzing diagnostic details including breaker operations, short-circuit fault levels, operational time, internal temperature and overloads

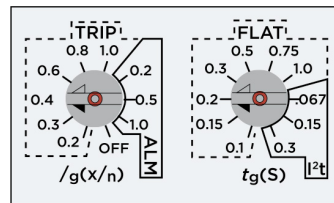
- Monitors and communicates breaker health status, enabling predictive maintenance to avoid costly, unscheduled downtime
- Communicates circuit breaker status at customer determined levels to prompt for breaker maintenance or inspection



Metering capability:

Power Defense breakers have an embedded ability to accurately measure energy consumption with no additional meters or equipment, delivering critical data about your power distribution system and energy use in your facility

- Current and voltage metering accurate to 0.5% of reading
- Power and energy metering accurate to 1% of reading
- Voltage metering internal to trip unit with no need for external modules
- Load alarm at two programmable levels between 50% to 120%



Ground fault protection:

The customer will have option to buy Smart EBMX with ground fault protection.

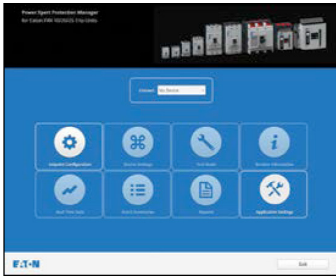
- Ground fault trip units combine trip, alarm, and OFF in every unit, with programmable relays for alarm or pre-alarm functionality
- An OFF setting also provides flexibility in testing, and troubleshooting



Zone selective interlocking (ZSI):

- ZSI option standard on Smart EBMX Power Defense breakers
- Designed to reduce thermal and mechanical stress on distribution equipment and arc flash incident energy released during phase or ground faults by enabling the breaker closest to the fault to override customer defined delay settings while communicating with upstream and downstream breakers

Power Xpert Protection Manager (PXPM) software:



The Power Xpert Protection Manager (PXPM) interface allows for simple trip unit set up and programming, realtime reporting of power and energy metering, as well as the ability to check critical performance metrics, to meet your application needs while decreasing maintenance and in-field testing time.

The testing features and functionality, which can be run through a personal computer, offers savings through labor hour reduction and avoiding the need for expensive proprietary computer, offers savings through labor hour reduction and avoiding the need for expensive proprietary testing kits.

Ultimate control and data are at your fingertips:

- Set point Configuration: Allows direct-to-trip unit or offline set up, including duplication of settings between units
- Control Mode: Capture waveforms, reset TU or set the date/time
- Test Mode: Run secondary injection and create test reports
- Real-Time Data: Provides information regarding all status and metered data direction from the trip unit
- Event Summaries: Stores up to 200 events, detailed information on the most recent (10) trip and (10) alarm events, and time adjustments to the real-time clock
- Reports: Allows for the formatting and printing of real time data and of performed secondary injection tests

Advanced motor protection:

Power Defense breakers also include additional application specific motor protection features. These features may be set to trip the breaker, alarm (indication via programmable relays), or disabled.

Over Voltage

- Pickup Level: 180 to 720 V
- Trip Time: 1 to 300 seconds

Under Voltage

- Pickup Level: 60 to 670 V
- Trip Time: 1 to 300 seconds

Voltage Unbalance (between phase-to-phase readings)

- Pickup Level: 5% to 25% difference
- Trip Time: 1 to 300 seconds

Phase Rotation

- Configuration: ABC or CBA sequence
- Time: Fixed at 200 ms

Reverse Power

- Pickup Level: 1–65,500 kW
- Trip Time: 1 to 300 seconds

Total Harmonic Distortion

- Line-to-line and line-to-neutral voltage
- Each phase and neutral current
- 1st through 29th at 60 Hz/ 1st through 35th at 50 Hz



Arcflash reduction maintenance system (ARMS):



Power Defense breakers (PD5 through PD8) comes with an optional ArcFlash Reduction Maintenance System. ARMS helps protect workers by reducing dangerous and potential arc flash incident energy levels, and enabling workers to activate this system from a safe distance without altering critical

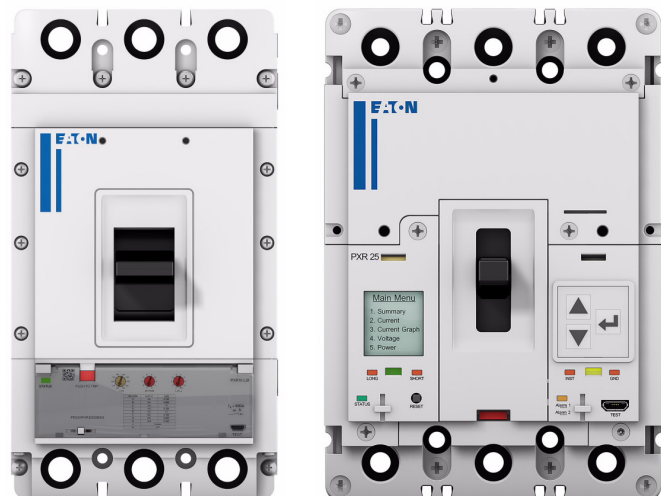
protection settings of the breaker. Work locations downstream of a circuit breaker with an Arcflash Reduction Maintenance System unit can have a significantly lower incident energy level.

Versatile communications options:



Connect to your network or the cloud with built-in Modbus RTU communication capability. Generate the data to help optimize your facility's performance.

Additional communications protocols, including Modbus TCP, webpage interface and PROFIBUS, available via Eaton's Communications Adapter Modules (CAM). Multiple communications options enables easy connection to PLC building management systems, SCADA and cloud-based systems.



Power Xpert C445

intelligent motor management relays



Base control module:

The core of the C445 system, the base control module contains all of the protection, monitoring and control algorithms in addition to on-board I/O. An interchangeable communication card slot allows for various communications with a single base unit.



Measurement module:

The pass-through design measurement module samples current, voltage, power and energy data consumed by the electric motor and continuously passes it electronically to the base control module via a cable connection.

The Smart EBMX with C445 Motor management intelligence relay offers industry-leading protection, diagnostics and energy usage analytics. Advanced motor management, extensive communications, superior diagnostics, integrated logic, ground fault detection and protection make Smart EBMX with C445 option ideal for critical motor applications where uptime is key

Features:

- Configurable load and motor system coverage using advanced monitoring and protection algorithms
- Multiple predefined operating modes
- Power Xpert in Control configuration and monitoring software tool
- Integrated logic engine with expandable digital I/O, analog I/O, thermocouple input (contact factory if needed)
- Built-in ground fault detection.
- On-board I/O
- 4 digital inputs: 120 VAC or 24 VDC
- 3 relay outputs: 2NO, 1NO/NC
- Communication options
 - Modbus TCP
 - Modbus RTU
 - PROFIBUS
- Real-time clock (RTC), backup non-volatile memory, and positive temperature coefficient (PTC) options

Benefits:

- Advanced diagnostics allow for quick and accurate identification of the root cause of a fault in line, load and motor conditions
- Voltage loss restart functionality allows for automatic recovery in the event of under voltage conditions without the need for user intervention
- Pre-programmed operation modes support fast, easy, error-free installation for the majority of applications
- Fully programmable trip and alarm thresholds and time delays
- Extensive current, voltage, power and system operating data coupled with real-time clock enhances user understanding of their application
- Multiple embedded fieldbus options allow integration of a wide range of industrial networks without additional modules or supply power
- Ground fault monitoring— the measurement module can be configured to determine residual, pulse detection

Advanced protection education

Motor-based protections

Definition	Source	Result	Power Xpert C445 protection
Thermal Overload A condition in which current draw to a motor exceeds 115% of the full load amperage rating over a period of time for an inductive motor.	An increase in the load or torque that is being driven by the motor. A low voltage supply to the motor would cause the current to go high to maintain the power needed. A poor power factor would cause above normal current draw.	Increase in current draw. Current leads to heat and insulation breakdown, which can cause system failure. Additionally, an increase in current can increase power consumption and waste valuable energy.	Thermal trip behavior is defined by UL, CSA and IEC standards. Trip class is settable from 5–40 by 1. Provides power factor monitoring and low voltage protection features.
Jam Similar to thermal overload in that it is a current draw on the motor above normal operating conditions.	Mechanical stall, interference, jam or seizure of the motor or motor load.	The motor attempts to drive the load, which has more resistive force due to the mechanical interference. In order to drive the load, the motor draws an abnormal amount of current, which can lead to insulation breakdown and system failure.	Provides a configurable Jam setting that is active during “motor run state” to avoid nuisance trips. Trip Threshold 50–400% of FLA. Trip Delay 1–20 seconds.
Ground fault A line to ground fault.	A current leakage path to ground	An undetected ground fault can burn through multiple insulation windings, ultimately leading to motor failure.	The C445 has three methods for detecting ground fault. 1. Residual current ground fault function is part of the original design for the C445. 2. Pulse ground fault detection function works with a system that has a pulser installed and can detect pulses from 1 to 8 A. (<i>contact factory</i>) 3. Zero sequence—this uses the C445XG-MOD and CTs to detect a ground fault that occurs on a high resistance ground or direct connected ground. This system will detect ground currents between 30 mA and 10 A. (<i>contact factory</i>)
Imbalanced phases (voltage & current) Uneven voltage or currents between phases in a three-phase system.	When a three-phase load is powered with a poor quality line, the voltage per phase may be imbalanced.	Imbalanced voltage causes large imbalanced currents and as a result this can lead to motor stator windings being overloaded, causing excessive heating, reduced motor efficiency and reduced insulation life.	Provides two protection settings that address this problem. The user can choose to set current imbalance thresholds or voltage imbalance thresholds, each of which can trip the starter. Additionally, both of these may be monitored through C445's advanced monitoring capabilities, allowing the customer to notice in real-time when and where a condition is present.
Phase rotation (phase-reversal) One of the three-phase current is not present.	Multiple causes, loose wire, improper wiring, grounded phase, open fuse, and so on.	Single-phasing can lead to unwanted motor vibrations in addition to the results of imbalanced phases as listed above.	Fixed protective setting that takes the starter offline if a phase drops below 60% of the other two phases
Frequency variance When line frequency is inconsistent.	Malfunctioning alternator speed regulator, or poor line quality caused by an overload of a supply powered by individual sources.	Variations in frequency can cause increases in losses, decreasing the efficiency of the motor. In addition, this can result in interference with synchronous devices.	Advanced monitoring capabilities allow the user to monitor frequency in real time. Users can also optionally set an alarm or trip threshold for frequency variations from 70–110%.

Load-based protections

Definition	Source	Result	Power Xpert C445 protection
Under current or low power Average rms current provided to the motor falls below normal operating conditions.	Under current is usually associated with a portion of the user's load disappearing. Examples of this would be a broken belt, a dry-pump (low suction head) or a deadheaded centrifugal pump.	If under current goes undetected, a mechanical failure can and has occurred. In the case of a pump, running a pump dry or running a pump in a dead-headed condition can cause excessive heating, damaging expensive seals and breaking down desired fluid properties.	C445 has two protection settings to detect this: under current and low power. Low power is a more consistent way of ensuring detection as power is linear with motor load, where as current is not. An unloaded motor may draw 50% of its rated current, but the power draw will be less than 10% of rated power due to a low power factor.
High power The motor load is drawing more power than it should at normal operating conditions.	This is typical of batch processing applications where several ingredients flow into a mixer. When a substance's consistency changes and viscosity increases from what is expected, the motor may use more power to blend the mixture. Out-of-tolerance conditions can be detected using the High Power and Low Power settings.	If a high-power fault goes undetected, the result may be a batch of material that does not meet specification.	Monitors the three-phase real power. If the real power value is estimated above the set threshold for the set length of time, a fault is detected and the overload will trip the starter. Additionally, power can be monitored in real-time.

Line-based protections

Definition	Source	Result	Power Xpert C445 protection
Overvoltage When the line voltage to the motor exceeds the specified rating	Poor line quality	An overvoltage condition leads to a lower than rated current draw and a poor power factor. A trip limit of 110% of rated voltage is recommended. Over voltage can also lead to exceeding insulation ratings.	Monitors the maximum rms value of the three-phase voltages. If the rms value rises above the set threshold for the set length of time, a fault is detected and the overload can trip the starter or send and display an alarm of the condition. All line-related faults have an “alarm-no-trip” mode.
Undervoltage When the line voltage to the motor is below the specified rating.	Poor line quality	An undervoltage condition leads to excessive current draw. This increases the heating of the motor windings and can shorten insulation life. A trip limit set to 90% of rated voltage is recommended.	Monitors the maximum rms value of the three-phase voltages. If the rms value rises above the set threshold for the set length of time, a fault is detected and the overload can trip the starter or send and display an alarm of the condition. All line-related faults have an “alarm-no-trip” mode.

CHG harsh & hazardous area gateway

Remote monitoring, increase operational efficiency through actionable insights derived from your data.

CHG harsh and hazardous area gateway assemblies and subscription service provide a wireless connection to Eaton's Brightlayer Industrial (BLI) digital platform.

It is compatible with our Crouse-Hinds series Smart EBMX explosionproof enclosures, ACE DG1 explosionproof variable frequency drives and SCSR portable combination starters. The gateway can be purchased in conjunction with these solutions or retrofitted into an existing install base.

Keep employees safe

Remote monitoring capabilities help minimize the time employees spend in harsh and hazardous areas to monitor and troubleshoot equipment.

Reduce downtime

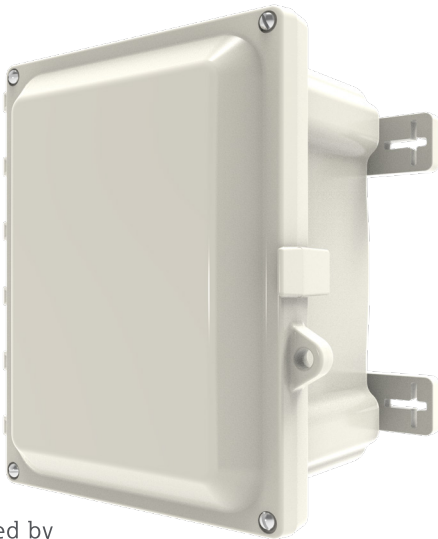
Anytime, anywhere access to real-time alerts, alarms, and trend data to identify and alleviate variables that impact performance before they cause downtime.

Compliance alignment

Actively monitor critical parameters to help ensure your systems adhere to policies, codes and standards.

Subscription includes Brightlayer Industrial Remote Monitoring

With the purchase of a 1-year subscription, the CHG harsh and hazardous area gateway allows for connection to Eaton's Brightlayer on your desktop and mobile device.



Powered by
Brightlayer



Learn more about Brightlayer
Scan QR code or go to: eaton.com/Brightlayer



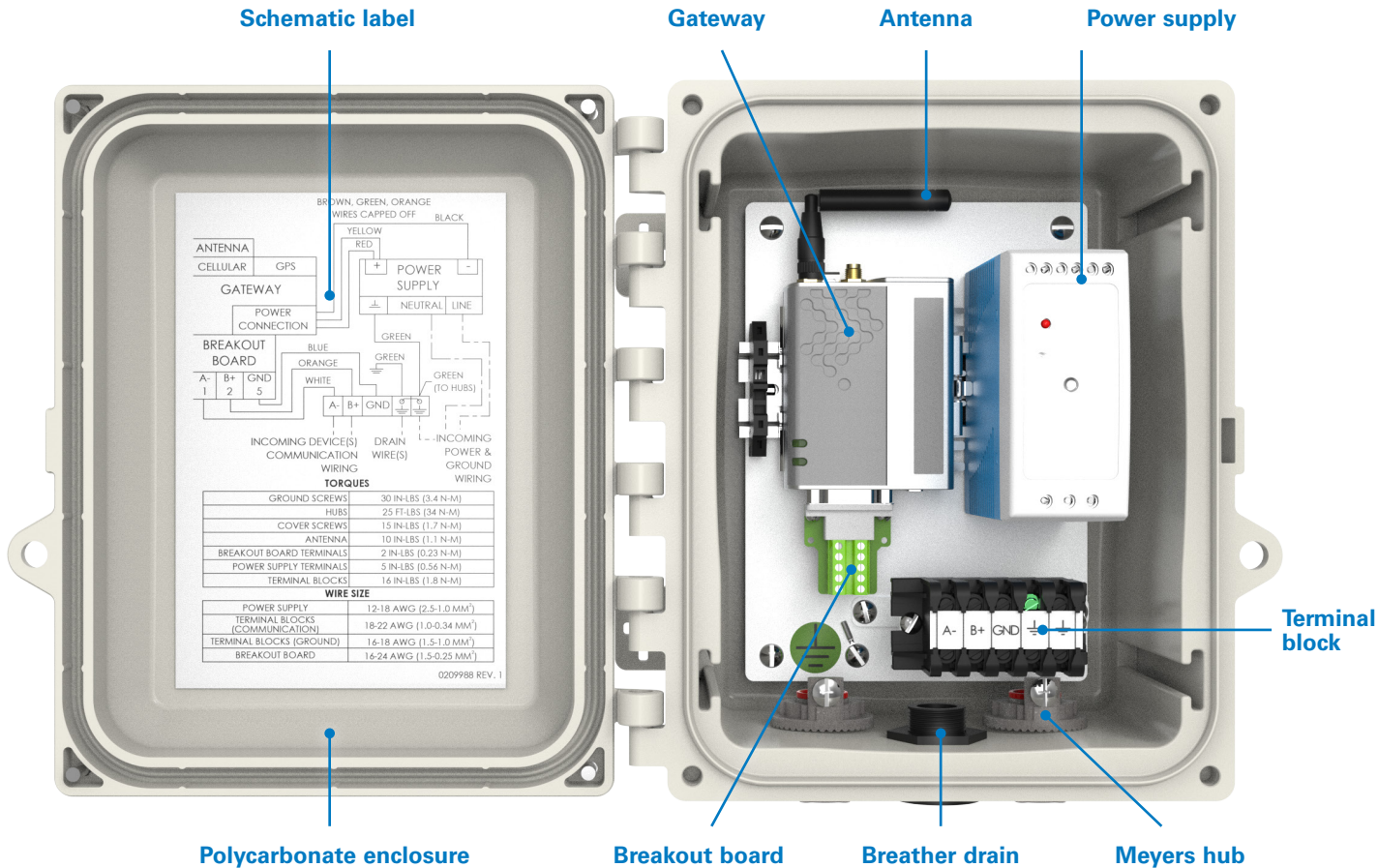
Ease of installation

Includes terminal block for easy wire termination for up to six devices.



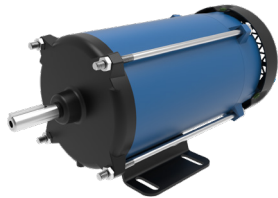
Secure

Eaton's Secure Development Lifecycle helps ensure platform cybersecurity by the application of technical standards, tools and processes.



How it works

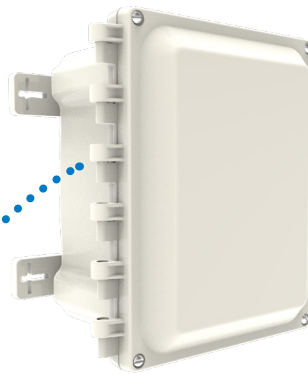
The CHG gateway assembly enables the simple and secure connection of your assets to Eaton's Brightlayer Industrial Remote Monitoring application. Improve uptime and prevent equipment damage with data captured from your installed equipment. Get the actionable insights and alerts you need on a single screen, anywhere, anytime, on any device.



Critical system in harsh and hazardous area



Eaton digitally enabled product
(EBMX explosionproof motor control shown)



Crouse-Hinds series CHG gateway



Equipment data and insights

Certifications and specifications

Hazardous

NEC/CEC standards:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, IIC
- Class II, Division 1, Groups F, G
- Class III
- Zone 22
- Type 4X; IP66
- T-Code: T4

UL standards:

- UL61010-1
- UL121201
- UL50E
- File E499908

CSA standard:

- CSA C22.2 No. 61010-1
- CSA C22.2 No. 213-17
- CSA C22.2 No. 94.2

Industrial/non-hazardous

NEC/CEC standards:

- Type 4X; IP66
- T-Code: T4

UL standards:

- UL61010-1
- UL50E
- File E529455

CSA standard:

- CSA C22.2 No. 61010-1
- CSA C22.2 No. 94.2

Additional specifications

Communication protocol:

- Modbus RTU (Remote Terminal Unit) protocol utilizing the RS-485 serial interface.

Temperature range

- -20°C to +47°C

Weight

- Standard configuration: 5 lbs.
- Additional entries configuration: 6 lbs.

Cellular carriers supported

- AT&T

Electrical ratings

- Voltage: 100-240 VAC
- Input amps: 0.064 A Max
- Frequency: 50/60 Hz

Technical support

CHG Gateway Hardware Support (General inquiry, installation, components, subscription):

(866) 764-5454
crousecustomerctr@eaton.com

Brightlayer Industrial Application Support (Interface/gateway configuration and updates):

877-ETN-CARE
Option 2, Option 9, Option 2

BLsupport@eaton.com

Learn more about Brightlayer

Scan QR code or go to:
eaton.com/Brightlayer



Ordering information

Part number	Description
BLI-CHG-D2-S	Hazardous rated gateway, standard configuration (1/2" Myers hubs, Qty=2)
BLI-CHG-D2-S-6	Hazardous rated gateway, additional entries configuration (1/2" Myers hubs, Qty=7)
BLI-CHG-4X-S	Non-hazardous rated gateway, standard configuration (1/2" Myers hubs, Qty=2)
BLI-CHG-4X-S-6	Non-hazardous rated gateway, additional entries configuration (1/2" Myers hubs, Qty=7)
BLI-CH-PWR-ESS	1 year subscription to Brightlayer Industrial Remote Monitoring

Ordering information – Breaker

Part number example

EBMX1B-W4PD3-AIC-TCP

EBMX hazardous rated breaker, size 1 enclosure, Eaton Power Defense breaker, 50A breaker trip, 65kAIC breaker, Modbus TCP communication

EBMX

Series

Hazardous rated enclosure with clamping technology

1

Enclosure size

1	15A to 100A
2	125A to 200A
3	225A to 500A

• PD1-PD4: Size 1 enclosure (up to 100A) or Size 2 enclosure (up to 200A)

• PD5-PD8: Size 3 enclosure (up to 500A)

• PD9: Size 3 enclosure (up to 225A)

B

Function

Breaker in clamped EBMX enclosure

W

Breaker manufacturer

Eaton

4

Line voltage

1	120 VAC
2	240 VAC
4	480 VAC
6	600 VAC

• 240, 480 and 600 VAC line voltages come with 100VA transformer. Only pilot lights allowed in top two operator positions at these voltages.

PD3

Breaker trip

PDG2 Frame	PD1	15A to 60A
	PD2	32A to 100A
	PD3	50A to 150A
	PD4	80A to 200A
PDG3 Frame	PD5	45A to 125A
	PD6	90A to 250A
	PD7	160A to 400A
	PD8	250A to 600A
PDG2 Frame	PD9	80A to 225A (does not have motor protection)

• Modbus Serial is standard communication protocol

• Breakers are rated up to 600VAC

AIC

Options

AIC	65kAIC at 480V (PDG2 frame: 25kAIC at 600V)
BST	Shunt trip, 120V
HT	+60°C enclosure rating (enclosure only)
HS	Six operator holes (Size 2 & Size 3 enclosures only)
MT	Freeze-tested breaker; -50°C enclosure rating
R11	Space heater, 25 watts, 120V
R22	Space heater, 25 watts, 240V
R44	Space heater, 25 watts, 480V
RLN	120V red LED light with "ON" legend plate
S214	External ground lug
S752	External epoxy coating
S753	Internal and external epoxy coating
S756V	Breather and drain, Class I, Groups B, C, D
S784	Auxiliary switch on circuit breaker: 1A & 1B (Standard with PDG2 Frame. Select for PDG3 Frame)
S785	Auxiliary switches on circuit breaker: 2A & 2B (Only available with PDG3 frame)
S786	12-point terminal block, 30 amp, 300V (Size 2 & Size 3 enclosures only)

• List selected options in alphanumeric order.

• Only one option of each type allowed unless otherwise noted.

• 4 spaces maximum for cover operators.

• Size 2 enclosure with HS Option: Operator cannot be in bottom hole (6th position) when using S786 Option

• Only "HT" or "MT" option can be selected (not both).

TCP

Communication, power supply and protection options – for Power Defence only

TCP	Modbus TCP
PFB	Profibus
RPS	Remote power supply (requires 24 VDC remote power)
LSIG	Power Defence LSIG breakers
ARMS	Maintenance mode protection (PD5-PD8 only)

• List selected options in alphanumeric order.

• TCP, PFB & RPS options: If size 1 enclosure is selected, only one can be chosen

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EATON'S CROUSE-HINDS

Ordering information – Motor starter

Part number example

EBMX1S-F1W4 RLN-MMR005

EBMX hazardous rated motor starter, size 1 enclosure, Eaton full voltage, non-reversing starter with CPT, starter size 1, 480V, red LED pilot light, 1A to 5A motor management relay

EBMX 1 S – F 1 W 4 RLN – MMR005

Series

EBMX

Hazardous rated enclosure with clamping technology

Enclosure size

1	NEMA starter sizes 0-2
2	NEMA starter size 3
3	NEMA starter size 4

Function

S	Starter in clamped EBMX enclosure
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Starter function

F	Full voltage, non-reversing starter, 120V coil, with CPT
G	Full voltage, non-reversing starter*, without CPT

* Starter coil equals line voltage.

NEMA starter size

0
1
2
3
4

Starter manufacturer

W Eaton

Line voltage

1	120 VAC
2	240 VAC
4	480 VAC
6	600 VAC

• 240, 480 and 600 VAC line voltages with MMR options requires CPT ("F" starter function option) or customer supplied 120 VAC control power.

Cover operator

GLB	Green LED pilot light with blank legend plate
GLF	Green LED light with "OFF" legend plate
PB23	Start/stop pushbutton with "START" & "STOP" legend plates (two positions)
RLN	Red LED light with "ON" legend plate
RLB	Red LED pilot light with blank legend plate
RR2	2 position selector switch with "ON -OFF" legend plate
RR3	3 position selector switch with "HAND OFF AUTO" legend plate
blank	No cover operators

• List operators starting with top position.

Options

HT	+60°C enclosure rating
HS	Six operator holes (Size 2 & Size 3 enclosures only)
MT	-50°C enclosure rating
R11	Space heater, 25 watts, 120V
R22	Space heater, 25 watts, 240V
R44	Space heater, 25 watts, 480V
S214	External ground lug

- List selected options in alphanumeric order.
- Only one option of each type allowed unless otherwise noted.
- 4 spaces maximum for cover operators.
- Size 2 enclosure with HS Option: Operator cannot be in bottom hole (6th position) when using S786 Option.
- For starter function "F" (CPT): Only pilot lights are allowed in the first two positions

S752	External epoxy coating
S753	Internal and external epoxy coating
S756V	Breather and drain, Class I, Groups B, C, D
S781	Auxiliary contact on starter: (1) NO & (1) NC
S782	Auxiliary contacts on starter: (2) NO & (2) NC
S783	Auxiliary contacts on starter: (3) NO & (3) NC
S786	12-point terminal block, 30 amp, 300V

Options – Smart motor management

MMR005	Motor management relay – Current range: 1A to 5A, Size 1 enclosure
MMR032	Motor management relay – Current range: 4A to 32A, Size 1 enclosure
MMR045	Motor management relay – Current range: 6A to 45A, Size 1 enclosure
MMR072	Motor management relay – Current range: 9A to 72A, Size 1 or 2 enclosure
MMR090	Motor management relay – Current range: 11A to 90A, Size 2 or 3 enclosure
MMR136	Motor management relay – Current range: 17A to 136A, Size 2 or 3 enclosure

- List selected options in alphanumeric order.
- MMR options use one operator position for reset pushbutton and it is located in lowest possible position.
- Reset requires 120V to operate. Either select CPT starter function "F" or 120 VAC line voltage "1".
- For MMR options, Modbus Serial is the standard communication protocol.
- MMR options use a Freedom contactor and Power Xpert C445 intelligent motor management relay

Communication and power supply options – for motor management relay only

TCP	Modbus TCP
PFB	Profibus
RPS	Remote power supply (requires 120 VAC remote power)



Ordering information – Combo starter

Part number example

EBMX2C-F2W4B-PD2RLNLSIG

EBMX hazardous rated combo starter, size 2 enclosure, Eaton full voltage, non-reversing starter with CPT, starter size 2, red LED, 480V, Power Defense LSIG breaker

EBMX 2 C – F 2 W 4 B – PD2 RLN LSIG

Series	
EBMX	Hazardous rated enclosure with clamping technology
Enclosure size	
2	NEMA starter sizes 0-2
3	NEMA starter sizes 3 & 4
Function	
C	Combo starter

Combo starter function	
F	Full voltage, non-reversing starter, 120V coil, breaker, with CPT
G	Full voltage, non-reversing starter, breaker, without CPT
H	Full voltage, non-reversing starter, 120V coil, HMCP, with CPT (Not available with Power Defense breakers)
K	Full voltage, non-reversing starter, HMCP, without CPT (Not available with Power Defense breakers)

- For starters without CPT (G & H), starter coil equals line voltage.
- Starter functions H & K are not available when Power Defense breakers are used in configuration.

FLA	NEMA size			
	FLA range	0,1	2	3,4
Blank	0.0 - 0.0	•	•	•
A	0.8 - 1.3	•	•	
B	1.2 - 2.0	•	•	
C	1.8 - 2.9	•	•	
D	2.2 - 3.5	•	•	
E	3.2 - 5.2	•	•	
F	4.6 - 7.4	•	•	
G	6.8 - 11.0	•	•	
H	9.1 - 14.0	•	•	
J	14.0 - 22.8	•	•	
L	23.5 - 38.5	•	•	
M	39.6 - 57.4		•	
N	53.9 - 74.9		•	
P	8.0 - 11.5			•
Q	11.4 - 15.7			•
R	14.3 - 19.0			•
S	18.0 - 24.5			•
T	24.6 - 33.4			•
V	33.5 - 45.6			•
W	45.7 - 62.1			•
X	62.2 - 84.6			•
Y	84.7 - 115.0			•
Z	106.0 - 144.0			•

NEMA starter size	
0	
1	
2	
3	
4	

Starter manufacturer	
W	Eaton

Line voltage	
1	120 VAC
2	240 VAC
4	480 VAC
6	600 VAC

- Power Defense breakers with 240, 480 and 600 VAC line voltages must use combination starter function "F" or a separate 120 VAC power is needed for communication control system.
- MMR options with 240, 480 and 600 VAC line voltages must use combination starter function with CPT ("F" or "H") or a separate 120 VAC power is needed for communication control system.

Power Defense Breaker trip

PDG2 Frame	PD1	15A to 60A
	PD2	32A to 100A
	PD3	50A to 150A
	PD4	80A to 200A

- Modbus Serial is standard communication protocol
- Breakers are rated up to 600VAC

Breaker trip (only with "F" or "G" as combo starter function)

015	050	125
020	070	150
030	090	175
040	100	200

- 15-125A rated 600V/347 VAC maximum;
- 150-250A rated 600 VAC maximum.

HMCP trip (only with "H" or "K" as combo starter function)

003	030	100
007	050	250
015	070	Only available with NEMA 4 starter

- 15-125A rated 600V/347 VAC maximum;
- 150-250A rated 600 VAC maximum.

Cover operators*

GLB	Green LED pilot light with blank legend plate
GLF	Green LED light with "OFF" legend plate
PB23	Start/stop pushbutton with "START" & "STOP" legend plates (two positions)
RLB	Red LED pilot light with blank legend plate
RLN	Red LED light with "ON" legend plate
RR2	2 position selector switch with "ON-OFF" legend plate
RR3	3 position selector switch with "HAND OFF AUTO" legend plate
blank	No cover operators

- List selected operators starting with top position.

S214	External ground lug
S752	External epoxy coating
S753	Internal and external epoxy coating
S756V	Breather and drain, Class I, Groups B, C, D
S781	Auxiliary contact on starter: (1) NO & (1) NC
S782	Auxiliary contacts on starter: (2) NO & (2) NC
S783	Auxiliary contacts on starter: (3) NO & (3) NC
S784	Auxiliary switch on circuit breaker: 1A & 1B (standard with PDG2 frame. Select for PDG3 frame)
S785	Auxiliary switches on circuit breaker: 2A & 2B (only available with PDG3 frame)
S786	12-point terminal block, 30 amp, 300V

- ER and MMR options uses one operator position for reset pushbutton and it is located in lowest possible operator position. Reset requires 120V to operate. Select starter function "F" or "H" if the line voltage is not 120 VAC.

Options

AIC	65kAIC at 480V, 35kAIC at 600V
BST	Shunt trip, 120V
ER	Electronic overload relay (starter) (not available w/ MMR options or NEMA 4 starters) Current range: NEMA Size 0: 1A to 5A; NEMA Size 1: 4A to 20A; NEMA Size 2: 9A to 45A; NEMA Size 3: 20A to 100A
ET	Electronic trip (thermal magnetic standard) (available in 70A or larger; 600 VAC maximum; not available with Power Defense breakers)
HT	Ambient compensated breaker; +60°C enclosure rating
HS	Six operator holes (Size 2 & Size 3 enclosures only)
MT	Freeze-tested breaker; -50°C enclosure rating
R11	Space heater, 25 watts, 120V
R22	Space heater, 25 watts, 240V
R44	Space heater, 25 watts, 480V

- List selected options in alphanumeric order.

Motor management relay options

(select before choosing communication, power supply and protection options)

MMR005	Motor management relay – Current range: 1A to 5A, Size 2 enclosure
MMR032	Motor management relay – Current range: 4A to 32A, Size 2 enclosure
MMR045	Motor management relay – Current range: 6A to 45A, Size 2 enclosure
MMR072	Motor management relay – Current range: 9A to 72A, Size 2 or 3 enclosure
MMR090	Motor management relay – Current range: 11A to 90A, Size 2 or 3 enclosure
MMR136	Motor management relay – Current range: 17A to 136A, Size 3 enclosure

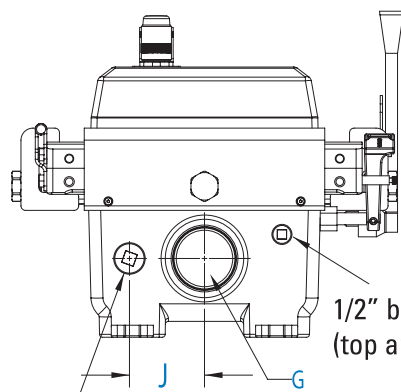
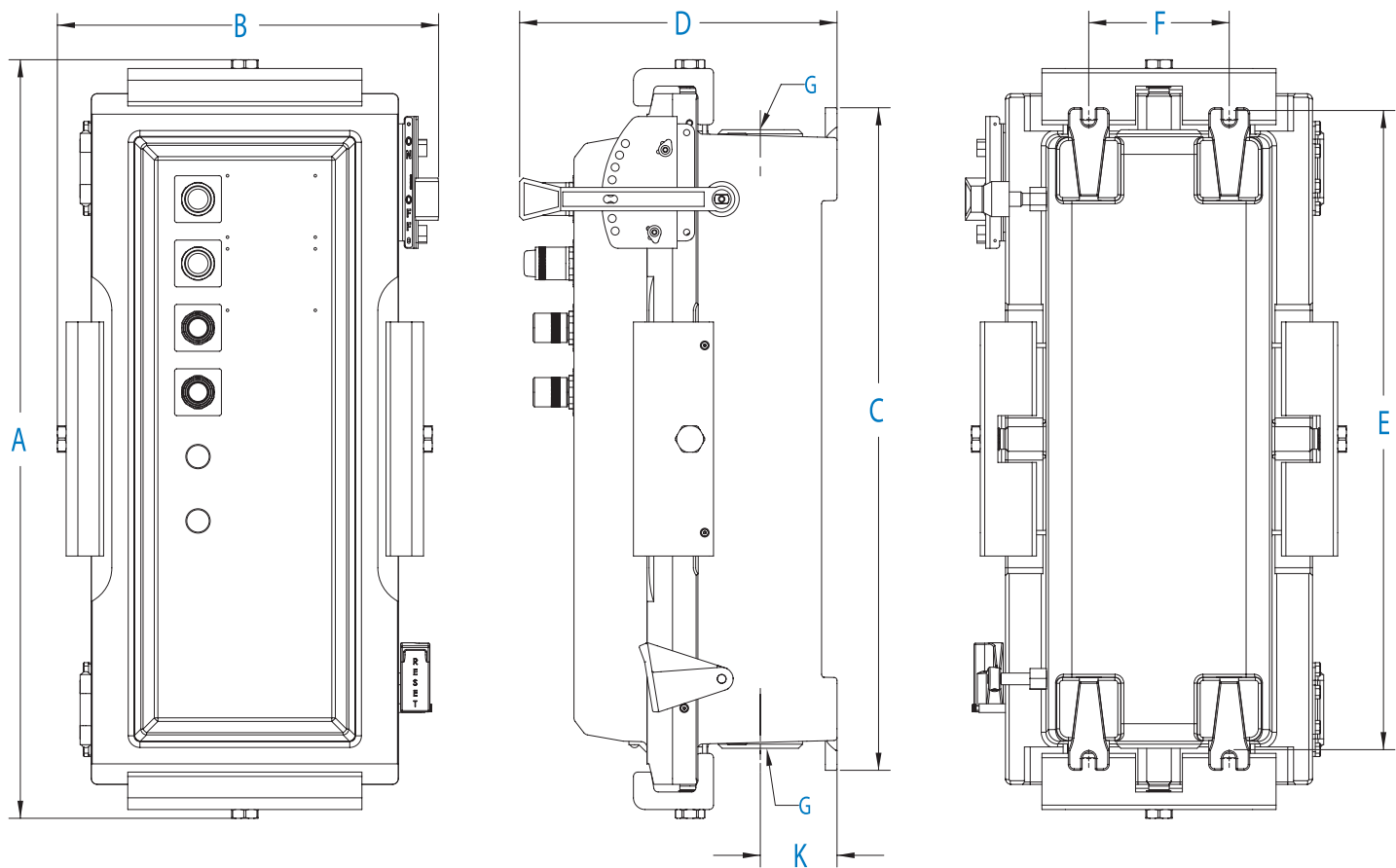
- List selected options in alphanumeric order.
- MMR options use one operator position for reset pushbutton and it is located in lowest possible position.
- For MMR options, Modbus Serial is the standard communication protocol.
- MMR options uses Freedom contactor and Power Xpert C445 intelligent motor management relay

Communication and power supply options – for motor management relay only

TCP	Modbus TCP
PFB	Profibus
RPS	Remote power supply (requires 24 VDC remote power)
LSIG	Power Defense LSIG breakers

- Power Defense breakers and MMR relays get the same communication protocol when selected together.

Dimensions (inches)



Enclosure size	A	B	C	D	E	F	G		J	K
							drilled & tapped	w/ reducer		
1	22.11	15.98	18.04	12.86	17.13	6.00	2 NPT	1.5 NPT	3.12	3.01
2	32.40	16.28	28.31	13.56	27.25	6.00	3 NPT	2.5 NPT	3.12	3.28
3	42.28	17.93	38.15	13.85	37.25	6.00	3 NPT	2.5 NPT	3.93	3.56

1" control conduit
(top and bottom)

1/2" breather/drain
(top and bottom)

- List selected options in alphanumeric order.
- Only one option of each type allowed unless otherwise noted.
- 4 spaces maximum for cover operators.
- Size 2 enclosure with HS Option: Operator cannot be in bottom hole (6th position) when using S786 Option"
- Only "HT" or "MT" option can be selected (not both).

Notes

[illegible]

Notes

[illegible]

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