

**Power Xpert® DX**

Low Voltage Power Distribution and Motor Control Center

# Power Xpert® DX

Low Voltage Power Distribution  
and Motor Control Center



**EATON**

*Powering Business Worldwide*





# Switchgear Technology is in our DNA

Eaton's knowledge and understanding of industries, applications, technology, and products enables us to offer customers safe, reliable, and high performance solutions.

We have always been part of the creation of new Low and Medium Voltage Switchgear technology, and that experience is in each and every one of us.

## **Eaton's Low Voltage Systems can meet the needs of any installation**

Eaton Low Voltage Systems are designed to be as space and energy efficient as possible while maintaining easy access for installation, operation and maintenance. Low Voltage Systems from Eaton are highly standardized systems supported by quick configurations, quoting facilities, and fast deliveries.

Eaton's comprehensive low voltage system product portfolio has been specifically designed to meet the needs of all types of installations. The extensive portfolio includes: Power Supply and Control Assemblies, Package Substations, Main and Sub-Main Switchboards, Busbar Trunking, Motor Control Centres, Power Factor Correction, and Engineered Assemblies.

As might be expected from such a comprehensive portfolio, Eaton's low voltage power distribution and control systems have been used in applications, such as: Water industries, Pharmaceutical industries, Industrial facilities, Food & Beverage, Infrastructure projects, Mining & Steel industry and Commercial applications such as: Shops, Schools, Hospitals, Warehouses, Hotels, Prisons, Data centers, and Sport stadiums.

## **Reliable, safe and standardized design**

Eaton's range of low voltage systems not only provides you with optimum power distribution and motor control functionalities, they meet your most demanding requirements for safety and flexibility. When it comes to safety, Eaton's low voltage systems offer the highest level of protection.

It is Eaton's policy that all products are subjected to rigorous testing and verification programs by, or under the supervision of, internationally recognized and respected third party organizations including: KEMA, ASTA, LOVAG and UL (Underwriters Laboratories). In addition to third party performance and quality verification many Eaton low voltage systems hold specialist approvals from: DNV, Lloyds, UL and KEMA.





# Power Xpert® DX Low Voltage Power Distribution and Motor Control Center



The Power Xpert® DX is Eaton's latest low voltage switch-gear up to 6300A. DX provides reliable, safety and efficient motor control and power distribution system for all industrial and commercial applications.

Integration of Eaton latest SMART devices allows to meet the requirements for intelligent MCC, remote controls, monitoring and diagnosis.

DX offers a state of the art solution for Power Distribution and Motor Control in a single low voltage platform.

Integrated interlocks ensure high safety for the personnel during operation, maintenance and test works.

Eaton's patented silver-plated scissor clamps ensure to be no damage for the fully insulated vertical distribution busbar system (maintenance free). A special contact design ensures that there is no welding to the vertical bus

in the event of high starting or short circuit currents. The customer only need to change the clamps and it's very convenient for maintenance)

The internal Segregation is up to Form4b, The withdrawable units of the DX can be modified and exchanged without a shut-down or power-off.

DX has been tested to IEC61439-1/2 standard, ensure the system safe. The internal ARC protection is 35KA/0.3s, DX has the more advanced Arc fault protection solution, all conductors could be insulated or separated to avoid Arc risk.

## Complete range up to 6300 A

Power Xpert DX is a complete range for power distribution and motor control up to 6300 A. In combination with Eaton's medium voltage switchgear, UPS (Uninterruptible Power Supplies), Busbar Trunking, Panelboards, Distribution Boards, project management and service capabilities, DX is part of any complete turn-key solution for all power distribution and control applications.



Data centers



Oil&Gas



Industry



Food



Infrastructure



# Features and Benefits

## Reliable in Operation

- Complete product design third party certified in accordance with GB7251.1/12 and IEC 61439-1/2 (Verification by testing):
  - Temperature raise limits
  - Short circuit validation
  - Dielectric properties
  - Clearances and creepage distances
  - Protection against electric shock and integrity of protective circuits
  - Mechanical operation
  - Seismic, Internal Arc, Salt spray test
  - Degree of protection of enclosures
- Quality assurance in accordance with DIN EN 9001 / ISO 9001;
- DX assemblies are built in Eaton factories with Eaton components with a proven track record;
- External degree of protection is IP42/54;
- Full insulated distribution busbar, maintenance free;
- Silver-plated scissor clamps ensure that there is no welding to the vertical bus in the event of high starting or short circuit currents.

## User Friendly

- "Slide and Guide" design enables optimal compartment alignment and ease of insertion and withdrawal;
- Ergonomical design of the switchboard provides easy and clear understanding of functionality;
- Intuitive withdrawal mechanics of the compartments allows for easy and safe compartment insertion and withdrawal;
- Simple operator interface with passive safety features allow for safe operation;
- Withdrawable units can be quickly and easily exchanged without having to disconnect any power or control cabling.

## Safe in Operation

- The rated current of the main busbar is up to 6300A (Icw=100kA/s), and less than 3200A is no derating design.
- Patented mechanical position mechanism, clear connection /test /disconnection positions, ensure operator safe, and the IP integrity IP2X is not compromised when the unit is in each position;
- Eaton's ARMS® Arc flash protection systems can supply the best safety for operator and power system;
- Full internal separation of all functional units designed in accordance with Form3b/4b;
- The internal ARC protection is 35kA/0.3s, DX has the more advanced Arc free/Arc proof design, All conducts can be insulated or separated to avoid Arc risk to supply a safer system for customer.

## System Flexibility

- Modular design;
- Small footprint;
- Symmetrical double insulation distribution busbars design, flexible exchange ability;
- Easy to upgrade and extend the switchboard;
- Cable connection from top and/or bottom (front and rear);
- The smallest frame dimension. stack ACBs solution saves the installation space. 425mm(W) × 600mm(D) × 2200mm(H) - 1600A.

## Total Cost of Ownership

- Up to 28 feeders (63 A frame MCCB or FCS) or 28 motor starters (18.5 kW DOL) can be installed in one single section to reduce footprint and achieve maximum density.
- The rated current of distribution busbar is 1800A (double) and 1000A(single), Icw=80kA/s, allows high density installation;
- Front/Rear access, and against the wall installation;
- Compartments or devices can be quickly and easily changed to ensure maximum uptime for the business processes.
- The use of high-grade materials and components, reduces maintenance to a minimum.





# Basic Design

The construction of the Power Xpert DX is modular in nature. It is built custom to application parameters and has a broad feature-set that can be tailored to meet your reliability and safety requirements.

The DX platform has three major sections:

- 1. **The busbar compartment**  
Located at the top of the structure where the horizontal and vertical busbars are found.

- 2. **The cabling section**  
Located in a separate fully segregated cable chamber housing both control and power cable terminations.
- 3. **The equipment section**  
At the front where the functional units are fitted.

The standard design is top mounting busbar, the system can be arranged for Front/Rear access, and also satisfy the installation to against wall. Cable can be connected from top/bottom. Arrangements for 'back to back' configurations are possible.



**Rear access**  
Top/bottom cable entry



**Front access**  
Bottom cable entry

## Motor Control and Power Distribution Center

- |                             |                            |                                  |                                    |
|-----------------------------|----------------------------|----------------------------------|------------------------------------|
| 1. Communication cable duct | 4. Cable compartment       | 7. drawer unit                   | 10. Hinge                          |
| 2. Meter compartment        | 5. Main busbar compartment | 8. Rear access cable compartment | 11. Lock                           |
| 3. Incomer/Feeder unit      | 6. 1/2 drawer unit         | 9. Head strip                    | 12. Front access cable compartment |



# Main Busbar System

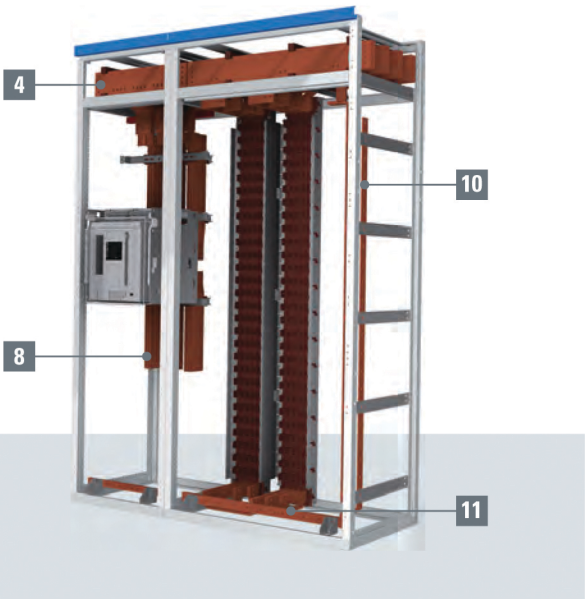
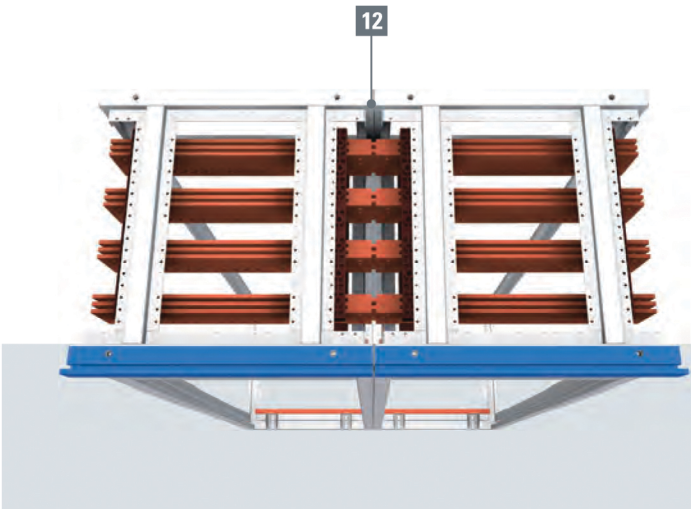
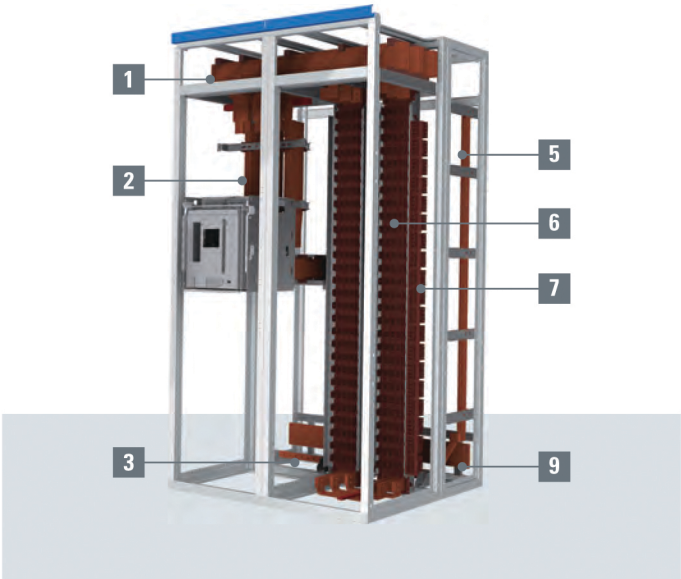
Power Xpert DX main busbars are arranged in a separate compartment to ensure the required form of separation and internal degree of protection.

The main busbar system is fully separated from the equipment and cable compartments. The busbars are rated up to 6300 A-100 kA /1 s.

The busbar has two options-naked or powder coated( Arc free design)

On-site extension of the main busbar system can be easily and quickly accomplished with the appropriate busbar coupling no drilling is required.

1. Main busbar
2. ACB branch busbar
3. Rear access PE
4. Front access N
5. Withdrawable panel rear access branch N, PE
6. Distribution busbar
7. Withdrawable panel cable connection terminals
8. Cable connection busbar
9. Rear access N
10. Withdrawable panel Front access branch N, PE
11. Front access PE
12. Coupling busbar

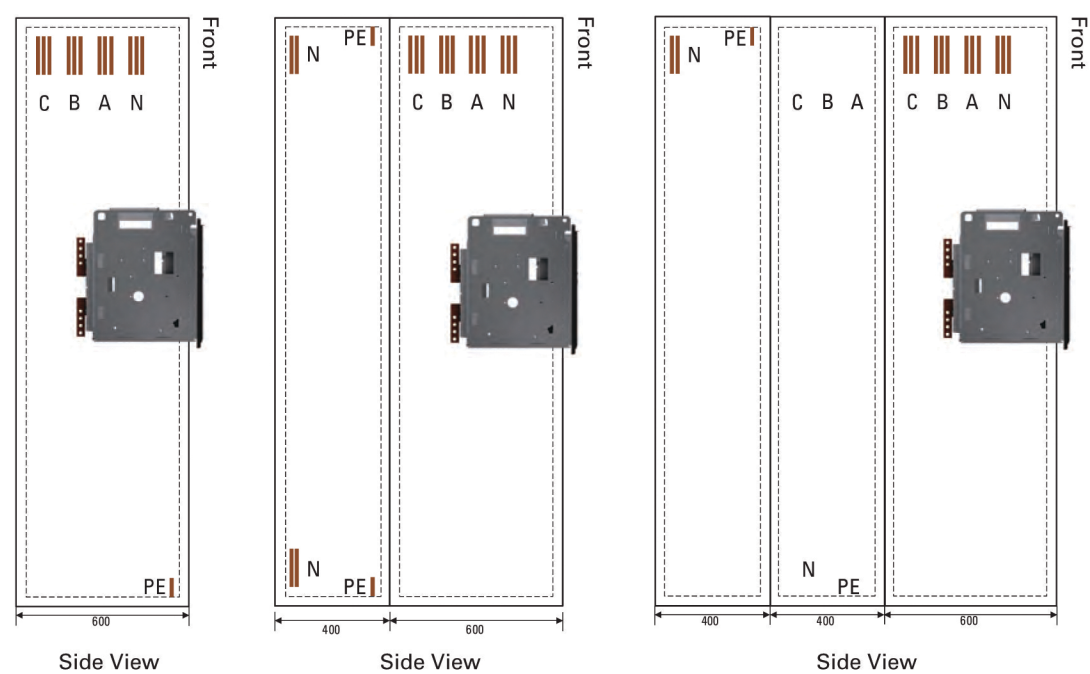


Ratings and cross-sections of available main busbars

load current	Type	Busbar cross section	Short circuit capacity I <sub>cw</sub> - 1s
1600 A	Cu	1 x 80 x 8 mm	30 kA
2000 A	Cu	1 x 100 x 8 mm	65 kA
2500 A	Cu	2 x 80 x 8 mm	80 kA
3200 A	Cu	2 x 120 x 8 mm	80 kA
3600 A	Cu	3 x 120 x 8 mm	80 kA
4000 A	Cu	3 x 120 x 8 mm	100 kA
5000 A	Cu	3 x 130 x 8 mm	100 kA
6300 A	Cu	2 x (3 x 120 x 8 mm)	100 kA



# Main Busbar Positon and Configuration

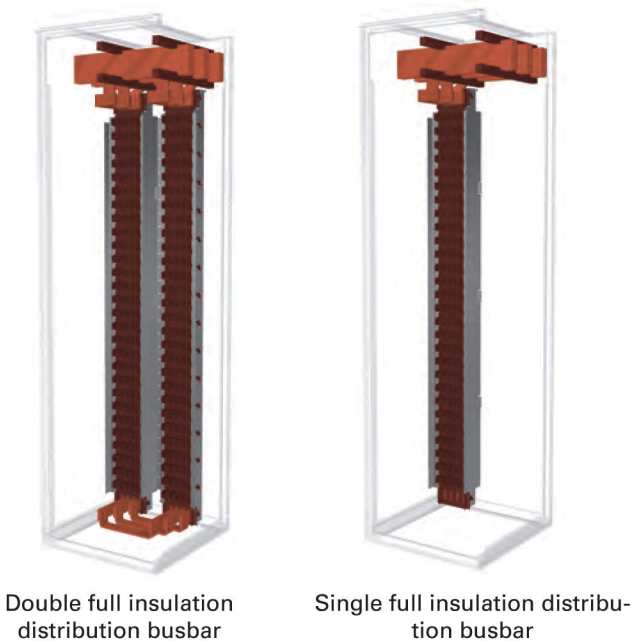


Main busbar position	Top	Top	Top
Neutral	Top/Bottom	Top/Bottom	Top/Bottom
PE	Bottom	Top/Bottom	Top/Bottom
Current rating	Up to 3200A	Up to 5000A	6300A
Standard dimension (mm)			
Height	2200	2200	2200
Depth	600	1000	1000/1400
Cable connection	Front access	Front/Rear access	Front/Rear access
	Bottom cable entry	Top/Bottom cable entry	Bottom cable entry (1000mm Deep) Top cable entry (1400mm Deep)

## Distribution Busbar System

Double/single full insulation distribution busbar system for withdrawable panel, maintenance free. The current rating is 1800A(double) and 1000A(single), Icw=80kA/s, The maximum installation density is 28 1/2 drawer units.

Distribution busbar current rating and cross section		
Current rating	Short circuit capacity	Cross section
1000 A	Up to 80kA/s	1 x 50 x 10 mm
1800 A	Up to 80kA/s	2 x 50 x 10 mm

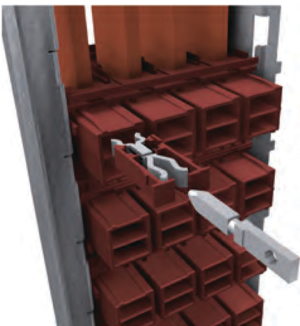




# Motor Control and Power Distribution drawer unit

Drawer units satisfy DOL/FR/SD/Soft starter/VFD, the maximum installation is 28 1/2drawer units. The internal separation is Form3b/4b.

Eaton's patented silverplated scissor clamps, used for the connection of the outgoing units to the vertical busbar, eliminate contact wear on the bus itself. A special contact design ensures that there is no welding to the vertical bus in the event of high starting or short circuit currents. It also passed 1000 times mechanism endurance test. and the IP integrity IP2X is not compromised when the unit is in each position. The initiative test position is convenient for operation.



Silverplated scissor clamps

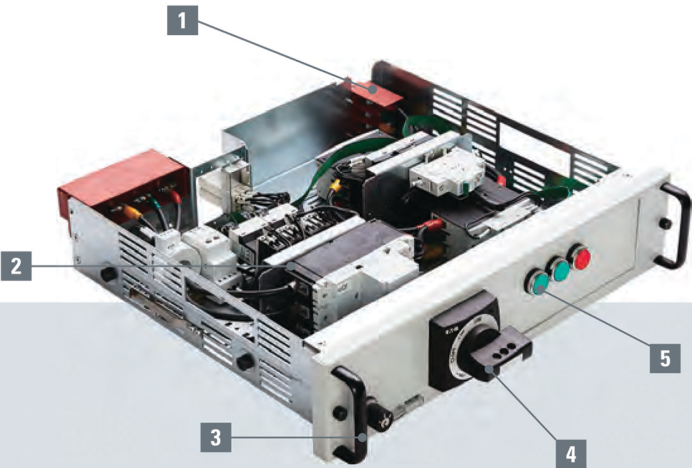


IP2x shielding of the vertical busbar

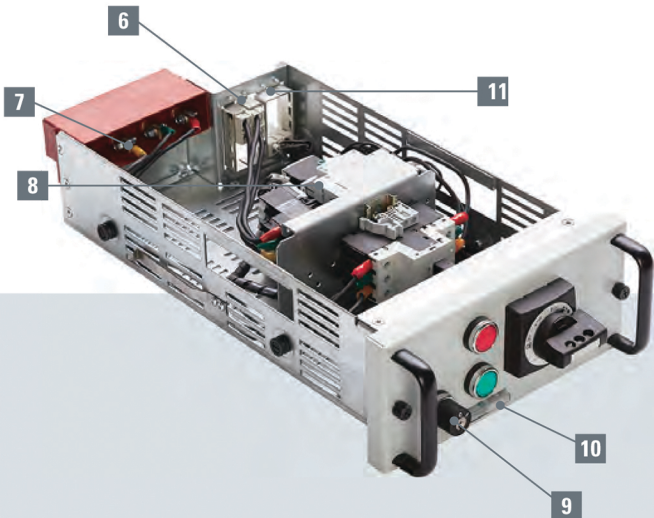
Unit Height	Unit Width	Motor starter	Feeder
125 mm -1/2	300 mm	18.5 KW	63A
125 mm	600 mm	22 KW	160A
187.5 mm	600 mm	45 KW	250A
250 mm	600 mm	75 KW	250A
312.5 mm	600 mm	90 KW	400A
375 mm	600 mm	132 KW	630A



Up to 28 motor starters (18.5kw 1/2drawer) in one section



Standard drawer unit  
Up to 22kW for motor starter



Half drawer unit  
Up to 18.5kW for motor starter

1. Load contacts

2. Main components installation area

3. Drawer handle

4. Circuit breaker handle
5. Control components installation area

6. Load contacts of half drawer

7. Line contacts

8. Auxiliary components installation area
9. Interlock button

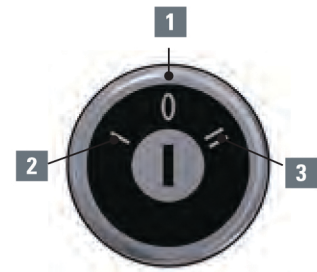
10. Position indicator

11. Auxiliary contacts



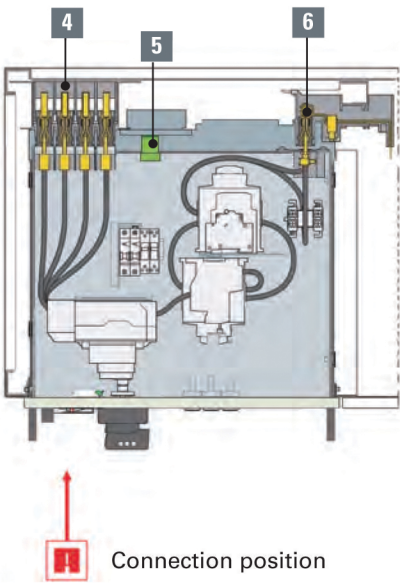
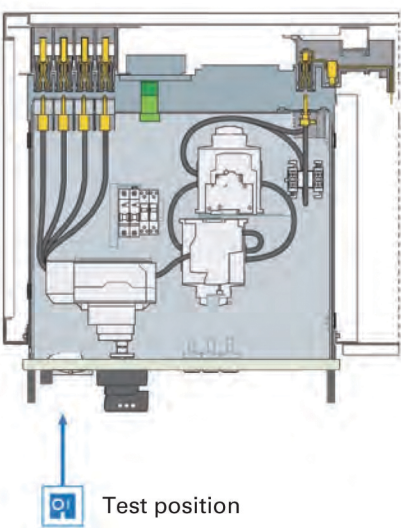
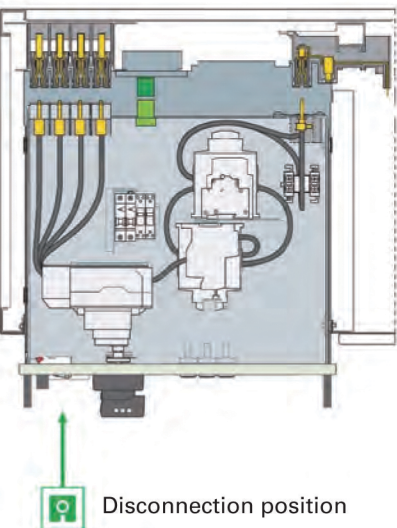
# Mcc Drawer Mechanism Interlock

Power Xpert® DX drawer adopts patented mechanical position mechanism with special key. Ergonomical design of the switchboard provides easy and clear understanding of functionality; Withdrawable units can be quickly and easily exchanged without having to disconnect any power or control cabling.



	Disconnection	Test	Connection
Line/Load contacts	Disconnected	Disconnected	Connected
Auxiliary contacts	Disconnected	Connected	Connected
Operation from disconnection to connection position	1. Insert the key 2. Turn the key to "I" position 3. Push drawer to test position	4. Turn the key to "II" position 5. Push drawer to connection position	6. Turn the key to "0" position 7. Pull out the key
Operation from connection to disconnection position	6. Turn the key to "0" position 7. Pull out the key	4. Turn the key to "II" position 5. Pull drawer to disconnection position	1. Insert the key 2. Turn the key to "I" position 3. Pull drawer to test position

- 1. Lock position
- 2. Move to "test" position
- 3. Move to "connection & disconnection" position
- 4. Line contacts
- 5. Auxiliary contacts
- 6. Load contacts



## Design philosophy of MCC Withdrawable units



### Type 2 Coordination

The International Electro - technical Commission (IEC) developed short circuit performance criteria for contactors and motor starters called Type 1 and Type 2 coordination. This standard defines motor controller protection levels following a short circuit fault.

#### Performance levels

Either Type 1 or Type 2 coordination are determined by the level of damage to components within a motor controller after a short circuit fault on the outgoing side

of the controller. The combination of a motor controller (contactor or starter) and short circuit protective device (manual motor protector, circuit breaker or fuse) must meet the following criteria as specified by IEC 60947-4-1.

Motor controllers with Type 1 coordination protection level are allowed to have significant damage after a short circuit and may not be suitable for further service without repair and replacement of parts.

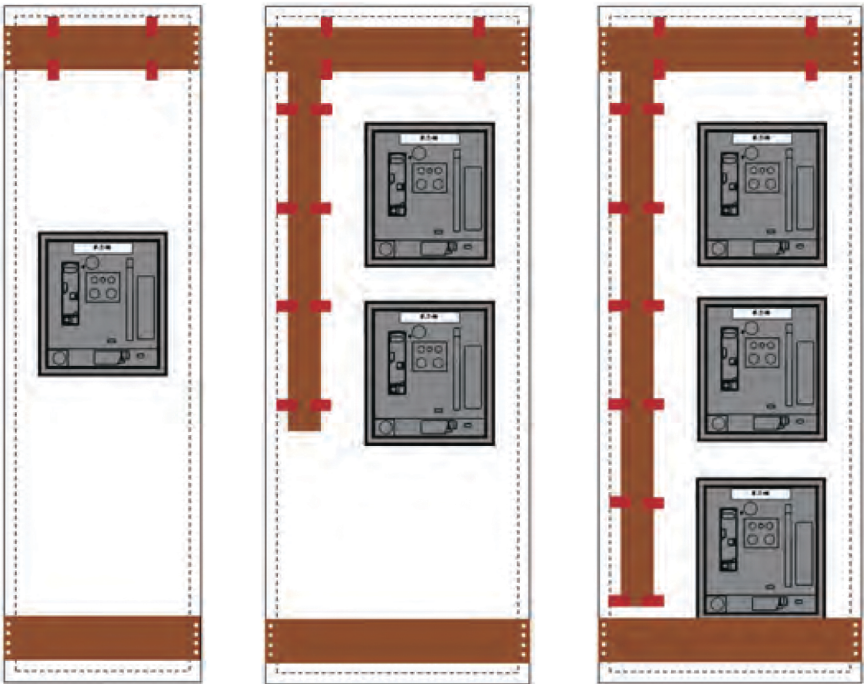
Type 2 coordination protection provides confidence that the motor control components will be operable following a short circuit fault. This reusability translates into huge savings due to reduced downtime and replacement costs.

DX motor control units are designed and tested to provide Type 2 protection in the entire system thus ensuring the highest uptime during its lifetime.



# Air Circuit Breaker Panels

- Complete incomer, feeder and buscoupler solutions;
- Eaton IZMX series circuit breaker
- The width of single ACB panel is 425mm (IZMX16), 600mm (IZMX16)/800mm (IZMX40) wide for stack ACBs solution;
- The current rating of double ACBs panel is up to 2500A (IZMX40)/1600A (IZMX16). The current rating of 3 ACBs solution is up to 2000A (IZMX40)/1250A (IZMX16)
- Flexible cable connection solution, top/bottom cable entry.



ACB section configuration		Single ACB section	Double ACBs section	3 ACBs section
ACB type	Current rating			
IZMX16	Up to 1600A	✓	✓	✓
IZMX40	Up to 4000A	✓	✓	✓
IZMX99	Up to 6300A	✓		
Dimension				
Height		2200	2200	2200
Width		425/600/800/1000/1100/1200/1350	600/800/1000	600/800/1000
Depth		600/1000/1400	600/1000/1400	600/1000/1400

## Cable connection

Main incoming power connections can accommodate cables and or busbar trunking systems. These can be connected from the top, bottom and side. Front or rear access can be available for this system. The withdrawable panel can also meet frant access(600mm deep) and rear access (≥1000mm deep) requirement.

The standard cable compartment is 400 mm deep (whether front access of rear access), it can meet cable installation requirement for high density drawer installation configuration. According to the requirement from customer, DX can customize the connection terminals to be convenient for cable installation.



# Form of Internal Separation

GB7251.1/12&IEC61439-1/2 defines the various forms of internal separation. The form of internal separation determines how busbars, functional units and terminals are separated from each other. DX is designed to provide separation in both Form 3b and 4b solutions.

Form 3b and 4b are defined as: the separation of the busbars from each functional unit and the separation of each functional unit from each other.

The difference between Form 3b and Form 4b is based on how the terminals for outgoing conductors are separated from each other.

Form 3b solution is defined as: the separation of terminals for external conductors from the functional units, but not from those of other functional units, i.e. a common cable chamber where all outgoing terminals are grouped together.

Form 4b solution is defined as: the separation of the terminals for external conductors associated with a functional unit from those of any other functional unit and the busbars. i.e individual separation of each functional units outgoing terminals from each other.

DX panels are designed around three different areas base on these form separation: the busbar compartment, function compartment, cable compartment.

Internal separation in accordance with GB7251.1/12&IEC61439-1/2

	Form 1	Form 2b	Form 3a	Form 3b	Form 4a	Form 4b
Busbars (main + distribution) are separated from functional units		✓	✓	✓	✓	✓
Functional units are separated from other functional units			✓	✓	✓	✓
Terminals are external to functional units			✓	✓		✓
Terminations to functional units are separated from each other			✓		✓	✓
Terminals are separated from the busbars	✓			✓	✓	✓
Power Xpert® DX supported forms of separation	✓			✓	✓	✓

## External Degree of Protection

Power Xpert® DX has a degree of protection IP42/IP54.

The different parts / compartments comply with the following degrees of protection:

- Between main busbar compartment and any other compartments: IP2X.
- Between switchgear and controlgear compartments and cable-entry compartment: IP2X.
- Between mutual compartments of each functional unit within a cubicle: IP2X.
- Within opened compartments: IP2X.
- Within switchgear with removed drawout units: IP2X.





# Reliable and Safe in Operation

**Tested in accordance with the requirement of GB/Z 18859, the internal Arc protection is up to 35KA/0.3s.**

**Quality assurance in accordance with DIN EN 9001/ ISO9001 with routine tests carried out in ISO 9001 certified Eaton manufacturing locations.**

**Compartments for drawout units can be modified without process interruption.**

**Interlocked mechanism to ensure safe operating / disconnected / test positions.**

**Safety due to use of Eaton standardized components which have a proven track record.**

**Eaton Air Circuit Breakers equipped with Arcflash Reduction Maintenance System™ (ARMS)**

An Eaton air circuit breaker equipped with ARMS can improve safety by providing a simple and reliable method to reduce fault clearing time. The ARMS is controlled by a lockable switch that can easily activate a separate analog circuit for faster tripping time at the work location and be incorporated into a Lock Out Tag Out (LOTO) procedure. Equipment downstream of a circuit breaker equipped with an Arcflash Reduction Maintenance System can have a significantly lower incident energy level, thus protecting operators or maintenance personnel who are working on a downstream energized piece of equipment.

Benefits of Arcflash Reduction Maintenance System™ are:

- Increased personnel safety by limiting the available arc flash energy.
- Simple to operate.
- Enabled with the circuit breaker door closed by a door mounted lockable switch or through communication to the breakers trip unit
- Enabled only for the time required to perform the work.
- Preserves overcurrent coordination under normal conditions.



## Arc-free and arc-proof zones\*

Eaton's philosophy is that the best way to mitigate the risks of internal arcing is to prevent the arc from happening in the first place.

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

**Arc proof zone** - Part of a circuit where an ignition wire can be applied and fulfilling all relevant criteria for the assessment of the test

1. Arc Proof segregated cable connections - Optional
2. Arc Free insulated busbar connections - Optional
3. Arc Free insulated main busbars - Optional
4. Arc Free insulated and segregated distribution busbars
5. Arc Free main contacts (line side)
6. Arc Proof functional units (load side) - Optional

\*Please Consult to Eaton



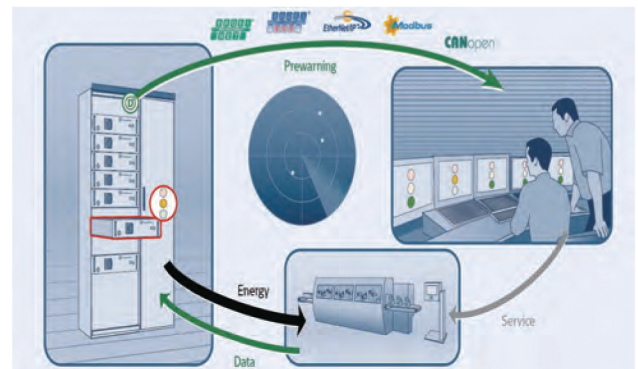
# Intelligent Motor Control Center

DX integrates Intelligent Motor Control Systems that provide comprehensive data and opportunities to further optimize equipment performance, efficiency and productivity.

This system handles all motor protection and control functions, communicates operational, diagnostic and statistical data, and organizes the communication between automation systems and motor feeders - providing both intelligent motor management and future-orientation.

The advantages of an Intelligent MCC are:

- Less downtime
- Less expensive (less DCS I/O, relays and wires)
- Reduced cost of ownership (engineering, testing, commissioning, fault finding)
- Broad functionality is available (e.g. energy measurement)
- Broad data is available (e.g. for predictive maintenance)
- Better authorization
- Open system
- Proven technology (large installed base)



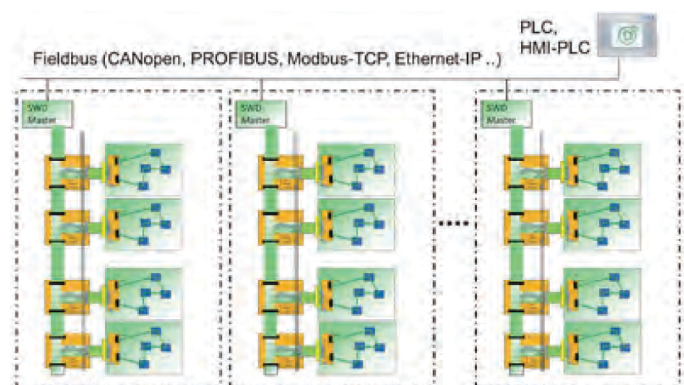
## SmartWire-DT® System

### The easy way for connection

In the past, switchgears, sensors and actuators are all wired separately to the I/O modules of PLC in centralized control system: Large wiring workload, Thick and expensive control cabinet, Time-consuming debug.

SmartWire-DT® was designed to solve these issues. The switch is directly connected to the bus SmartWire-DT® and to the director by gateway to minimize the wiring utilization: Wiring workload has been declined greatly, Size of cabinet has been decreased, Decrease Debugging time.

In future, New SmartWire-DT® will be further extended. Eaton's circuit breaker NZM and electronic motor protection switch could be connected to the system: Eaton would create a modern and prospective industrialized system.





# System flexibility

## Modular design and small Footprint

Any number of withdrawable compartment arrangements can be made. Motor Control and Distribution functionality is integrated within the one panel. A withdrawable motor starter or MCCB feeder unit can be placed in the same structure. DX is a compact system where up to 28 125 mm half drawers can be installed in one column to reduce footprint and have maximum density.

## Variable widths for cable Compartments

Generous sized cable ways are available for top and bottom cable entry. For the withdrawable units the cabling compartments are 400 or 600 mm wide, 600mm deep (front access), 400mm deep, 600mm.

## Easy to upgrade and extend the switchboard

The switchgear can be extended to both sides whenever this is required. So when the demands for the switchgear change it can be upgraded and panels can be added with minimal process interruptions.

## Suitable for cable and busbar connections

DX is designed for flexible customer connection methods: whether cables or busbar trunking systems.



# Total cost of ownership



## High Density stacking

For the withdrawable sections the distribution busbars are rated at 1000 A(single) and 1800 A(double) up to 80 kA / 1 s allowing a high density of outgoing units to reduce the total footprint of the installations. Up to 28 withdrawable units with 18.5 kW half drawer can be populated per panel.

## Compartments can be quickly and easily modified if necessary

Processes change and so does the need for motor control and power distribution. The DX is designed to be flexible when the units need to be upgraded or modified. This can all be done quickly and with minimum modifications to maximize up-time for your business process. The cable connection to drawout units can be carried out under live conditions so there are no interruptions.

## Reliable system design

The use of high-grade materials and components reduces maintenance to a minimum. Due to the systematic use of maintenance free joints, factory tightened to optimum torques, inspections or retightening of the electrical main connections is not required. The DX has a robust design with a minimum number of parts. In addition, the complete platform is certified to the highest degree and every system is routine tested in our factories.

# User Friendly

## Slide and Guide design for optimal compartment guidance

The DX is equipped with the slide and guide design for the withdrawable units to allow for reliable moving in and out of the compartments. For the operator this means that all the units will connect to the vertical busbars as intended.

## Ergonomical and intuitive design of the system

All compartments of the DX are designed in such a way that the system is safe and easy to operate. The use of an ergonomical, smooth and smart design prevents operators in the area of the switchgear to be injured (from moving parts or parts that stick out of the unit) or by wrong operation. The front panel is included with all the important functions that an operator needs for safe and efficient operation of a system.

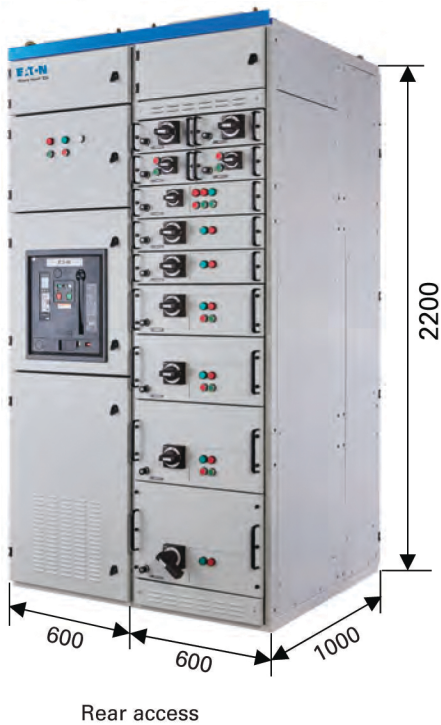
## Withdrawable units can be easily exchanged without having to disconnect any power or control cabling

If the withdrawable units are for the same function they can easily be exchanged with each other without major process interruptions because of (dis)connecting any cables. This capability potentially reduces the inventory of spare with - drawable units for a system.

# Electrical Data

System	Power Xpert DX
Standard	GB7251.1/12/IEC 61439-1/2
	IEC 61641
	IEEE 344
Rated operational voltage ( $U_e$ )	400V, 690VAC
Rated frequency (F)	50/60Hz
Internal Arc protection	35KA/300ms
Seismic	AG3
<b>Main busbar data</b>	
Rated insulation voltage ( $U_i$ )	1000V
Rated impulse withstand voltage ( $U_{imp}$ )	12kV
Rated current	Up to 6300A
Rated short-time withstand current ( $I_{cw}$ )	Up to 100kA-1s
Rated peak withstand current ( $I_{pk}$ )	Up to 220KA
<b>Vertical distribution busbar data</b>	
Rated insulation voltage ( $U_i$ )	1000V
Rated impulse withstand voltage ( $U_{imp}$ )	12kV
Application	Fixed/Plug-in/Withdrawable
Rated current	Up to 2500A
Rated short-time withstand current ( $I_{cw}$ )	Up to 100kA-1s
Rated peak withstand current ( $I_{pk}$ )	Up to 220KA
<b>Enclosure data</b>	
Degree of protection	IP42/54
Form of separation	Form2b/3b/4b
Entry of cables	Top/Bottom
Access	Front/Rear
Standard colour	RAL7035

# Dimensions (mm)







## **Customer Care Service Hotline**

Tel no.: (02) 8806-9716  
(046) 460-5313

## **Technical Service Hotline**

Mobile no. 0917-847-5699  
0917-523-1311  
0917-863-7325



*Powering Business Worldwide*

## **Manufacturing Plant Address**

**Cavite Light Industrial Park**

Brgy. Maguyam, Silang, Cavite, Phils. 4118