

**[ Making Changeover  
Safer, Smarter ]**



**Automatic Source Transfer  
Solutions in LV system**

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E&A's manufacturing operations at Navi Mumbai, Ahmednagar, Vadodara, Coimbatore and Mysuru in India adhere to global practices of excellence and receive support from well-equipped in-house design and development centres as well as tooling facilities that contribute to precision in manufacturing.



Switchgear Factory, Navi Mumbai



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# POWER TRANSFER SOLUTIONS

MANUAL  
SOURCE  
TRANSFER

MANUAL  
CHANGEOVER  
SWITCHES

AUTOMATIC  
SOURCE  
TRANSFER



MECHANICALLY INTERLOCK  
ACBs



MECHANICALLY INTERLOCKED  
MCCBs



MECHANICALLY INTERLOCKED  
CONTACTORS



MOTORISED CHANGEOVER  
SWITCHES



AUTOMATIC  
TRANSFER  
CONTROLLER

+

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# Automatic Source Transfer Solutions in LV system

Continuity of power supply is extremely important in any critical installations. In order to avoid any power outage, users often employ alternate sources such as DG set, UPS or integrated power generation units. This also demands a reliable power transfer scheme that switches from a preferred to an alternate source in the event of a power disruption & return back to the preferred supply when the supply returns.

There are two types of transfer systems. They are:

- **Manual Source Transfer Solution (MSTS):** These are generally toggle / knob operated switches or circuit breakers which need to be manually switched on so that the load circuit gets transferred from one power source to the other. The manual transfer switches can be used where power outage happens quite rarely and loss of power does not cause any loss to the appliances or systems used with the electric power supply
- **Automatic Source Transfer Solution (ASTS):** These automatically transfer the power to the load circuit from one power source to the other. Thus, these are more convenient to use as one does not have to manually operate to switch the power source. During normal power interruption, these switching devices will automatically transfer the load circuits to the emergency power source. Once normal power has been restored, the process is automatically reversed. Automatic transfer systems are useful where even a small loss of power can cause a lot of production losses. Automatic transfer systems have therefore found their popularity and utility in several industrial and commercial applications where a constant source of power is necessary

**Automatic Source Transfer Solutions:** operate in two different methods i.e. open transition and close transition.

## 1. Open Transition Transfer

- Break before make switching action. In this, the connection to one power source is opened before the connection to the other source is made and during this process of power transfer, the flow of electricity is interrupted. This changeover time can be adjusted by using different time-settings available in any voltage sensing controller
- This is the most popular method used in many installations for automatic power transfer. This system is widely used in applications which can accept a small interruption of power from few msec to few seconds
- It does not require alternate hot source (like a continuous running DG set or an UPS)

## 2. Closed Transition Transfer

- Make before break switching action for uninterrupted power transfer. This facilitate a seamless transfer of power supply from one source to other by momentarily paralleling both the sources (<100 msec) during the transfer period. The transfer switch monitors the phase angle difference between the two sources and when it approaches zero degree, the switch operates
- This system is used primarily in critical installations like Hospitals, Data Centres etc where even momentary power interruption is not acceptable
- However, this system necessarily requires alternate hot source (like a continuous running DG set or an UPS) all the time

While the closed transition method is the best to ensure no interruption of power at all, open transition method is more popularly used due to following reasons:

1. Most power transfer applications accept a momentary interruption in the order of 60 msec to 5 seconds
2. Non-availability of hot sources in most applications
3. Very high prices of close transition auto transfer switches
4. Multiple choices available to the user for open transition power transfer & protection with a combination of conventional switching, sensing & control devices
5. Ease of maintenance

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# Automatic Source Transfer Solutions in LV system

A typical open transition auto transfer system involves:

1. Two 4 pole, mechanically and/or electrically interlocked power switching devices which can be remotely operated
2. Voltage and/or frequency sensing accessories or controller
3. Back up protection devices like circuit breakers or fuses in case the power switching devices have only switching capability

As mentioned earlier, the key elements in any source transfer systems are:

1. Sensing & control
2. Switching & protection
3. Interlocking

## Sensing & Control

For any ASTS, it is important to monitor the source voltage to decide on which source needs to be in service & a control system to ensure the correct logic is in place to get the most optimized power. The different options used for this are:

- Use of Under voltage release in circuit breaker to monitor the source voltages & enable a control logic with auxiliary & trip alarm contacts
- Simple controller with separate voltage sensor, contactors, timers, logic & interlocking control circuit power
- High end digital auto transfer controller with in-built voltage, frequency sensor & a complete logic controller for all transfer control, interlocking features, multiple setting for voltage & time, digital display, communication etc.

## Switching & Protection

ASTS necessarily needs two separate 4 pole switching devices suitable to offer complete isolation in OFF state. Depending on the application & installation requirement, they must have on-load or off-load switching duty. In addition to the switching device, it must have the necessary protections available against any abnormal condition. The switching & protection functions can be combined into one device e.g. Air circuit breakers & Moulded Case circuit breakers. In case the switching devices like contactors, changeover switches etc, separate upstream protection devices like circuit breakers or HRC fuses must be provided.

## Interlocking

One of the key and a must safety feature for any open transition ASTS is to ensure that under no circumstances, both the sources will get switched on together even momentarily. Hence, reliable and failsafe mechanisms must be incorporated to ensure that the two switching devices are fully interlocked so that only one device can be closed at any point of time.

Interlocking of the two switching device can be done by following means:

1. Mechanical interlock - This is the most reliable method of interlocking. This can be done through suitable interlocking mechanisms like base plate, clutch wire or see-saw toggle interlocks
2. Electrical Interlocking - This is generally used in addition to the mechanical interlocks. It electrically interlocks the two switching devices like circuit breakers, contactors etc and can be logically programmed for operating sequence and with time delay etc. This can be done by using:
  - a. A combination of under voltage release with Auxiliary contacts for circuit breakers
  - b. Using an external controller & suitably wiring it
  - c. Using the NO & NC contacts with the coil in case of contactors

## Automatic Source Transfer Solutions in LV system

3. Self interlocked mechanism – This is generally adopted in the changeover SDs or Auto Transfer switches. The basic mechanism of SDs will not permit closure of both switches together

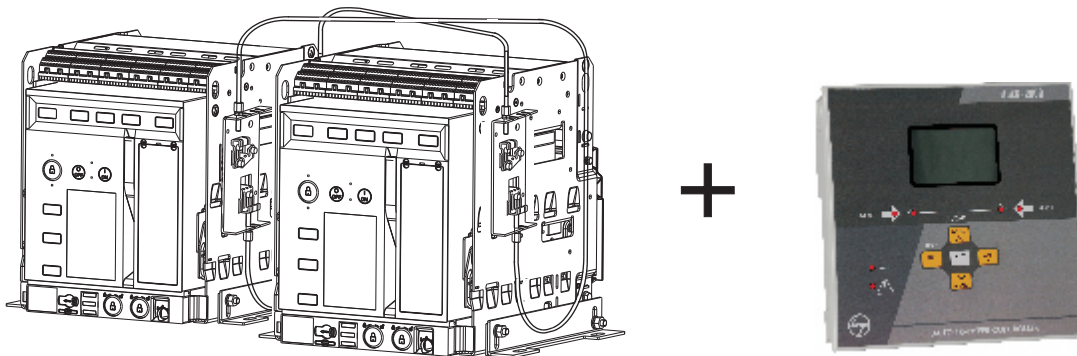
Keeping all the above requirements of ASTS, there can be multiple combinations which can be selected. The selection of transfer system for specific installations can be optimized by keeping following parameters in mind:

1. Feeder Ratings
2. Application need in terms of maximum acceptable change-over time
3. Desired features in terms of sensing & interlocking
4. Specific safety considerations
5. Panel space
6. Life expectancy
7. Cost

### Choice of ASTS Combinations

The different combinations available on LV system are as given below:

1. **Two electrically operated ACB for higher ratings with mechanical & electrical interlocks along with a sophisticated auto transfer controller**



**Mechanically Interlock ACBs**

**AuXC-2000**

- a. **Viable alternative beyond 1000 A**, same circuit breakers for switching, protection & isolation
- b. Through sophisticated Auto Transfer Controller AuXC-2000, multiple change-over logics for handling various supply faults based on Voltage & frequency sensing, and time setting options can be programmed
- c. Extendable life
- d. Minimum change-over time – 150 msec.

2. **Two motorized MCCBs, mounted on a mechanical interlock base plate & electrically interlocked through under voltage releases**



**Mechanically Interlocked MCCBs**

**Under-Voltage Release**

## Automatic Source Transfer Solutions in LV system

- a. **Simple & Easy to install**, same circuit breakers for switching, protection & isolation
- b. Voltage sensing & electrical interlocking through UV release
- c. Optimum panel space utilized, no extra cut-out in door
- d. Minimum change-over time – 100 msec.
- e. **Most economical MCCB based solution**

### 3. Two motorized MCCBs, mounted on a mechanical interlock base plate & electrically interlocked through a simple voltage controller



#### Mechanically Interlocked MCCBs

- a. **Easy to install**, same circuit breakers for switching, protection & isolation
- b. Voltage sensing & electrical interlocking, time delay setting through voltage controller
- c. Optimum panel space utilized, Controller can be mounted inside panel or on the door
- d. **Full MCCB life available for change-over operations**
- e. Minimum change-over time – 100 msec.
- f. Moderate increase in cost for MCCB based solution

### 4. Two motorized MCCBs, mounted on a mechanical interlock base plate & electrically interlocked through sophisticated auto transfer controller



#### Mechanically Interlocked MCCBs

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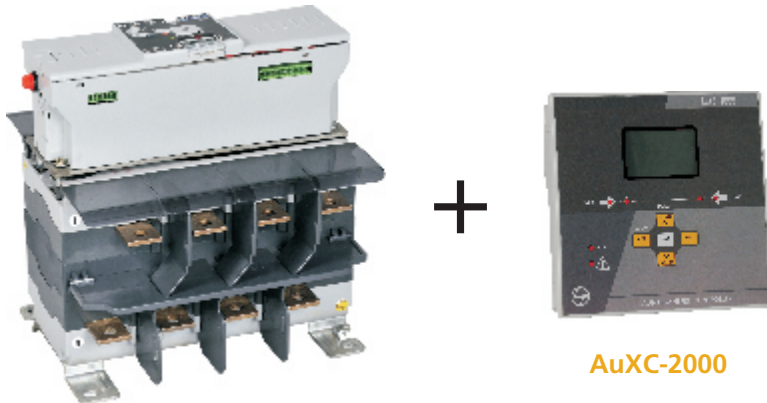
#### AuXC-2000

- a. Same circuit breakers for switching, protection & isolation
- b. Through sophisticated Auto Transfer Controller AuXC-2000, multiple change-over logics for handling various supply faults based on Voltage & frequency sensing, and time setting options can be programmed
- c. Optimum panel space utilized, Controller can be mounted inside panel or on the door
- d. **Full MCCB life available for change-over operations**
- e. Minimum change-over time – 100 msec.
- f. Comparatively expensive MCCB based solution due to additional cost of the sophisticated ASTS controller



## Automatic Source Transfer Solutions in LV system

5. One motorized Changeover switch disconnecter with either a simple voltage controller or a sophisticated auto transfer controller, backed up by suitable protective devices such as HRC fuses/ACBs/MCCBs



AuXC-2000

### Motorised Changeover Switches

- Single motorized Change-over switch for power transfer with self interlocked mechanism - higher reliability
  - Additional Fuse / Circuit breaker required for protection
  - Sensing, time setting option, multiple change-over logics etc, through either a simple or a sophisticated Auto Transfer Controller AuXC-2000
  - Least panel space required with fuse back up**
  - Higher mechanical life
  - Minimum change-over time - 1 sec.
  - Most economical Automatic Source Transfer Solution (with fuse back up and simple controller)**
6. Two mechanically & electrically interlocked power contactors, backed up by suitable protective devices such as ACBs/MCCBs/SDFs (also providing isolation). These can also have a simple voltage controller or a sophisticated auto transfer controller for enhanced features



AuXC-2000

### Mechanically Interlocked Contactors

- Simple and easy to install
- Suitable for loads from very low rating (9A) to high ratings (800A)**
- Additional SDF/Circuit breaker required for Protection & Isolation
- Can be simple voltage sensing change-over through the contactor coil or through a simple Auto Transfer Controller AuXC-2000
- Higher panel space required with both contactors & SDF/Circuit Breakers
- Stability of control supply for coil circuit to be ensured for higher reliability
- Very high mechanical (> 1 Million) & Electrical life (> 50,000)**
- Minimum changeover time – 30 to 50 msec.**
- Preferred for the installation requiring higher frequency of Changeover operations**

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## Automatic Source Transfer Solutions in LV system

E&A today offers a comprehensive and effective solution for all your Power transfer needs, through the various options discussed above.

In electrical Air Circuit Breakers and motorised MCCBs we offer the advantage of having an inbuilt short circuit protection. This not only makes the solution compact but also provides the user with high end protection features offered through our MATRIX releases. These kind of features are usually required in big industrial applications where these solutions work out to be the best.

The contactor solution is ideal for applications where switching frequency is very high. Such applications may be residential or commercial applications where switching frequency is high due to frequent power outages. The contactors having a high mechanical life coupled with an SCPD device offer an economical and reliable solution.

We also offer the solution of changeover switches which have inbuilt interlocking features. Hence, no separate interlocking accessories are required. Changeover switched having a good withstand capability. With changeover switched one also has the flexibility of choosing a controller instead of having one single unit. Based on requirement the user may go for simple voltage controller or advanced controller switches like AuXC-2000

Thus as seen above, we provide the user a great flexibility through a plethora of changeover solutions. The user can select the most optimum solution based on specific application requirement.

### **Below are the recommended changeover solutions based on specific applications**

- For applications where the switching frequency is high, contactor solution is recommended. This is because contactors have a high switching life. This solution works best in residential and commercial loads where power outages are very common leading to frequent switching between EB and DG
- For applications above 800A, changeover solution through Air circuit breakers is the most optimum. This solution works best in big industries as current levels are mostly above 800A
- In applications where the switching frequency is low, Motorized MCCB solution is recommended. This solution also offers the advantage of having both switching and protection in a single unit. This solution works best in residential and commercial applications, where both EB and DG supply are provided and frequency of switching is low
- In applications where there is frequent maintenance on the load side, changeover switches are recommended as they provide effective isolation. Also since changeover switches have inbuilt interlocking mechanism, no separate interlocking devices are required. Changeover switches are also recommended in applications involving changeover between drives and soft starters

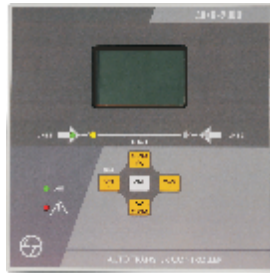
## Comparison of Automatic Source Transfer Solutions

A quick comparison of various Automatic Source Transfer Solution is tabulated below,

Parameters	ACB with AuXC-2000	MCCB with AuXC-2000	MCCB with basic controller	MCCB with U/V release	Change-over SD	Power Contactor
Feeder Ratings	400 - 6300 A	63 - 630 A	63 - 630 A	63 - 630 A	125 - 1000 A	16 - 800 A
Minimum Changeover time	150 msec	100 msec	100 msec	100 msec	1 second	20 to 50 msec
Interlocking	1. Mechanical through Clutch wire/ key locks 2. Electrical through U.V. release / controller	1. Mechanical through base plate interlock / key locks 2. Electrical through controller	1. Mechanical through base plate interlock / key locks 2. Electrical through controller	1. Mechanical through base plate interlock / key locks 2. Electrical through U.V. release	Mechanical through self-interlocked mechanism	1. Mechanical through base plate / side interlocks 2. Electrical through coil control or controller
Remote Operation	Through Motor	With Electrical Operating Mechanism on top	With Electrical Operating Mechanism on top	With Electrical Operating Mechanism on top	With Electrical Operating Mechanism on top	Through Electro-magnet
Panel space	High	Moderate	Moderate	Moderate	Low	High
Life- Mechanical no. of operating cycles (no load)	5,000 to 20,000	8,000 to 15,000	8,000 to 15,000	8,000 to 15,000	10,000 to 20,000	Approx 10 x 10 <sup>6</sup>
Life-Electrical no. of operating cycles (no load)	2,000 to 10,000	4,000 to 10,000	4,000 to 10,000	2,000 to 5,000	2,000 to 3,000	Approx 10,00000
Protection	In built	In built	In built	In built	Back-up Fuse/ circuit breaker	Back-up Fuse/ circuit breaker
Unique Feature	1. Extendable electrical life 2. Robust & maintainable product 3. In built Protection	1. Low panel space 2. In built protection	1. Low panel space 2. In built protection	1. Low panel space 2. In built protection 3. External controller not required	1. Low panel space 2. Fail proof self-interlock mechanism	1. Extendable life 2. Ease of maintenance
Cost (Scale 1 to 10)	9	7	5	4	3	4
Typical 630 A Change-over Scheme	2 Omega 4 pole EDO ACB (630A) with MTX1.5G + 1 AuXC-1000 / 1000H / 1000L controller +1 Clutch wire MIL kit	2 DN3-630 TM, 50 kA, 4 pole MCCBs (630A) + 2 SEOM + 1 AuXC-1000 / 1000H / 1000L controller + 1 MIL kit	2 DN3-630 TM, 50 kA, 4 pole MCCBs (630A) + 2 SEOM + 1 Basic controller + 1 MIL kit	2 DN3-630 TM, 50 kA, 4 pole MCCBs (630A) + 2 SEOM + 2 sets of UV release & aux contact + 1 MIL kit	1 C-Line Change-over SD (630A) + 1 EOM + Option 1 : 6 HN630 Fuses / Fuse Bases Option 2: 2 630A SDFs with fuses Option 3 : 2 DN630 MCCBs + 1 basic controller or AuXC-1000 / 1000H / 1000L	2 MCX 46 Contactors (700A) + 1 MIL kit + Option 1 : 2 630A SDFs with fuses Option 2 : 2 DN630 MCCBs + 1 basic controller or AuXC-1000 / 1000H / 1000L

# AuXC-2000 Controller

There are many electrical services which are required to be powered up always. Interruption of supply to these kinds of services is not desired. These loads are part of any industry, hospital, school, commercial buildings, shopping malls, name any place of importance. These loads can be firefighting system, emergency lighting, control stations, CCTV, emergency pumps, security system etc. E&A's micro-processor based Automatic Transfer Controller AuXC-2000 along with L&T switchgear is the answer to all auto source transfer requirements.



## Changeover Conditions

All the conditions which can help establish whether a power source is or is not suitable are defined by the user through setting following parameters

Parameter	Description
Minimum voltage	One or more phases too low
Maximum voltage	One or more phases too high
Phase loss	Threshold below which the unit intervention is quicker than with a normal decrease.
Asymmetry (unbalance)	Phases within the Maximum-Minimum range but too different from each other
Minimum frequency	Too low frequency
Maximum frequency	Too high frequency
Phase sequence	Reverse rotation of phases

## Intuitive user interface

- 5 keys membrane keypad for parameters setting.
- 128x80 pixel, Backlight LCD screen with 4 Grey levels.

## Status at a glance

- 4 LEDs for plant synoptic (source line and breakers status).
- 2 LEDs for alarm presence and AUTO mode active.

## Flexibility to suit side conditions

- Suitable for switching between Utility-Utility or Utility-Genset or Genset-Genset
- Selectability between auto and manual mode of switching
- Enabling and disabling of priority supply.
- Settable transition time for all events
- Selectability between Open before presence of secondary supply (OBP) & open after presence of secondary supply (OAP) available

## Programmable digital inputs, outputs & alarms to control changeover device

- 6 programmable digital inputs (negative).
- 6 + 1 digital outputs:
  - 6 relays with NO contact 8A 250VAC
  - 1 relays with changeover contact 8A 250VAC
- 18 alarms (4 user programmable alarms)

## Password access to prevent any unauthorized access

- The password is used to enable or lock the access to setting menu and to commands menu.

## Generator setup

- Management of generator set start-stop & cooling cycle
- Management of automatic test for generators with emergency and rotation.

## Failure simulation

- Test the changeover setup without connecting actual load

## EJP (Effacement Jours Pointe) function

- Switch from the main supply to standby power for the duration of a tariff period with higher prices.

## Event Logger

- Storage of last 100 events.

# AuXC-2000 Controller

AC Supply : terminals 13, 14	
Rated voltage Us	100 - 240V~
Operating voltage range	90 -264V~ 93.5 - 300V=
Frequency	45 - 66Hz
Power consumption/dissipation	3.8W - 9.5VA
Immunity time for microbreakings	≤50ms (110V~ ) ≤250ms (220V~ )
Recommended fuses	F1A (fast)
Insulation voltage	
AC Supply	
Rated insulation voltage	Ui 250V~
Rated impulse withstand voltage	Uimp 6kV
Power frequency withstand voltage	3kV
Line 1 and Line 2 voltage inputs	
Rated insulation voltage	Ui 480V~
Rated impulse withstand voltage	Uimp 6kV
Power frequency withstand voltage	3.8kV
OUT1 and OUT 2 outputs	
Insulation type	Single between OUT1 and OUT 2 Double toward the remaining groups
Rated insulation voltage	Ui 250V~
	Single Double
Rated impulse withstand voltage	Uimp 4kV Uimp 6kV
Power frequency withstand voltage	1.5kV 3kV
OUT 3 output	
Rated insulation voltage	Ui 250V~
Rated impulse withstand voltage	Uimp 6kV
Power frequency withstand voltage	3kV
OUT4-5 and OUT 6-7 outputs	
Insulation type	Single between OUT4-5 and OUT 6-7 Double toward the remaining groups
Rated insulation voltage	Ui 250V~
	Single Double
Rated impulse withstand voltage	Uimp 4kV Uimp 6kV
Power frequency withstand voltage	1.5kV 3kV
Line 1 and Line 2 voltage inputs: terminals 1-4 and 5-8	
Maximum rated voltage Ue	100...480V~ L-L (277VAC L-N)
Measuring range	50...576V~ L-L (333V~L-N)
Frequency range	45-65Hz
Measuring method	True RMS
Measuring input impedance	> 0.5MW L-N > 1,0MW L-L
Wiring mode	Single-phase, two-phase, three-phase with or without neutral or balanced three-phase system.
Ambient operating conditions	
Operating temperature +70°C	-30.....
Vibration resistance	-30... +80°C
Climatic sequence	<80% (IEC/EN 60068-2-78)
Shock resistance	2
Measurement category	3
Overvoltage category	III
Maximum pollution degree	Z/ABDM (IEC/EN 60068-2-61)
Relative humidity	15g (IEC/EN 60068-2-27)
Storage temperature	0.7g (IEC/EN 60068-2-6)

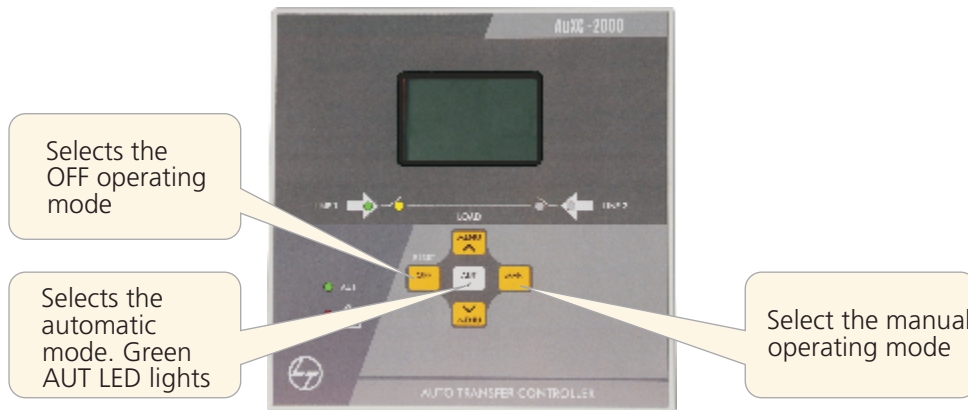
Measuring accuracy	
Mains and generator voltage	±0.25% f.s. ±1digit
Real time clock	
Energy storage	Back-up capacitors
Operating time without supply voltage	About 5 minites
Digital inputs: terminals 15 - 20	
Input type	Negative
Current input	≤8mA
Input "low" voltage	≤2,2
Input "high" voltage	≥3,4
Input delay	≥50ms
OUT1 and OUT 2 outputs: terminals 9,10 e 11,12	
Contact type	2 x 1 NO
Rated current	AC1 - 8A 250V~ DC1 - 8A 30V= AC15 -1.5A 250V~
Max rated voltage	300V~
Mechanical / electrical endurance	1x10 <sup>7</sup> / 1x10 <sup>5</sup> ops
OUT3 output: terminals 22, 23, 24	
Contact type	1 changeover
Rated current	AC1 - 8A 250V~ DC1 - 8A 30V= AC15 -1.5A 250V~
Max rated voltage	300V~
Mechanical / electrical endurance	1x10 <sup>7</sup> / 1x10 <sup>5</sup> ops
OUT4 and OUT 5 outputs: terminals 25,26,27	
Contact type	2 x 1 NO + contact common
Rated current	AC1 - 8A 250V~ DC1 - 8A 30V= AC15 -1.5A 250V~
Max rated voltage	300V~
Mechanical / electrical endurance	1x10 <sup>7</sup> / 1x10 <sup>5</sup> ops
Maximum current at contact common	10A
OUT6 and OUT 7 outputs: terminals 28,29,30	
Contact type	2 x 1 NO + contact common
Rated current	AC1 - 8A 250V~ DC1 - 8A 30V= AC15 -1.5A 250V~
Max rated voltage	300V~
Mechanical / electrical endurance	1x10 <sup>7</sup> / 1x10 <sup>5</sup> ops
Maximum current at contact common	10A
Connections	
Terminal type	Plug-in / removable
Cable cross section (min... max)	0.2-2.5 mm <sup>2</sup> (24... 12 AWG)
Tightening torque	0.56 Nm (5 lbin)
Housing	
Version	Flushmount
Material	Polycarbonate
Degree of protection	IP40 on front / IP20 terminals
Weight	680g

\*Notice: this product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures.

Ordering information	
AuXC Controller	ATC20000000

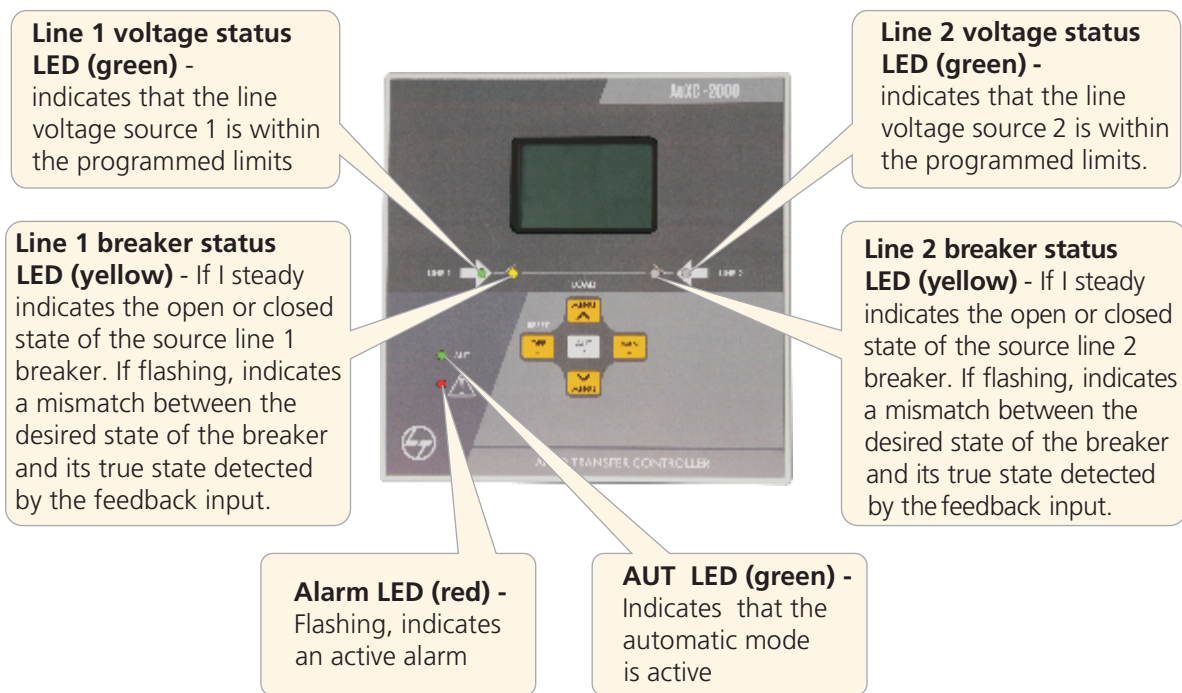
# AuXC-2000 Controller

## Front buttons functions



▲ and ▼ keys - Used to scroll through the display pages or to select the list of options in a menu. Simultaneously pressing ▼ + ▲ calls up the Main menu with rotating icons

## Front LED



## Operational Modes

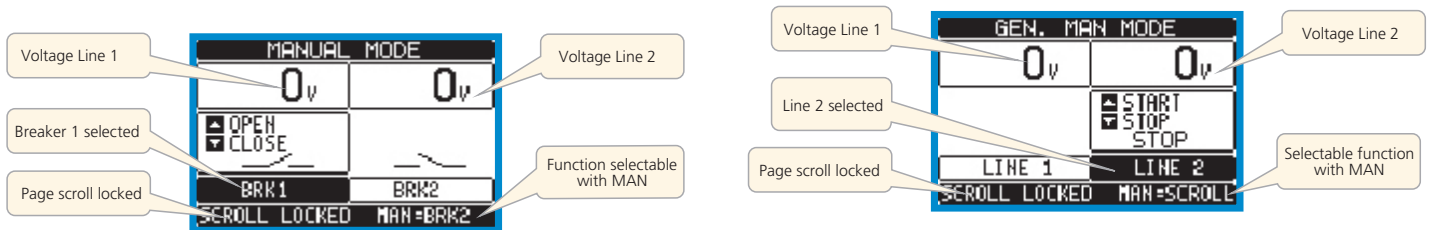
### OFF Mode

In this mode the device is disabled, and does not take any action. All views, both of the measures of the status LEDs remain active. If the control of the switching devices is impulsive, in OFF mode both open and close commands are disabled. If instead it is in continuous mode, the behaviour can be selected by P05.10. To access the programming menu is always necessary to enter in advance the OFF mode. Pressing the OFF-RESET button resets the retentive alarms, provided that the conditions that generated the alarm has been removed

# AuXC-2000 Controller

## Manual Mode








In this mode, you can manually control the switches on the display by selecting the switch that you want to control by pressing the MAN key, and pressing the ▲ or ▼ button to confirm the operation of closing or opening. While the opening-closing of the breakers is enabled, the page scroll is locked. Pressing MAN several times it is possible to unlock it and to move through other display pages. If is controlled manually closing a switch while the other is still closed, the unit will proceed before the opening of the other switch and then to the closure of the commanded one, inserting the interlock time programmed. When working with the generators, you can manually control the switching on and off of the generator in a manner similar to that described for switches, but moving on the page start / stop groups.



## Auto Mode

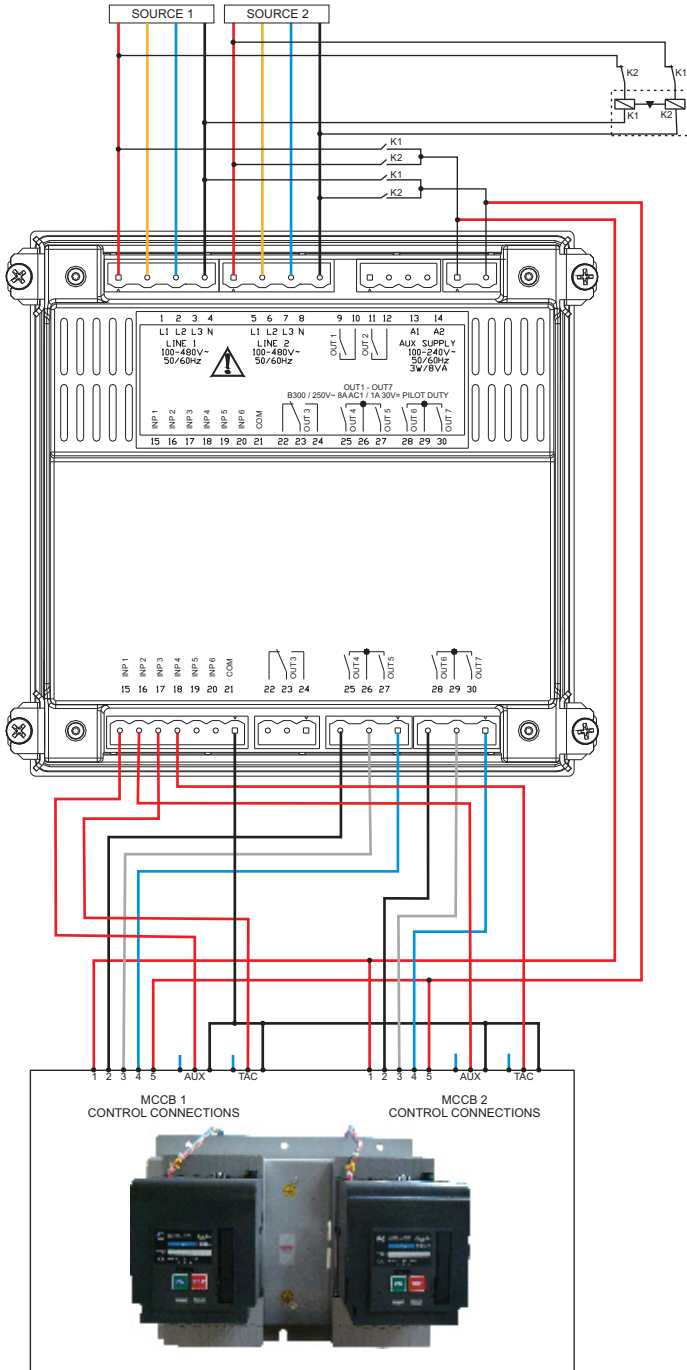
The AUT mode is highlighted by the lighting of the corresponding green LED. In automatic mode, the unit manages automatically the opening and closing of the breakers and the starting and stopping of generator sets. When the priority line voltage is out of bounds for a time longer than those set (line presence green LED turns off), the unit disconnects the load from the priority line and connect it to the secondary line, managing both start-up of any generator and interlock time delay. It is possible to program the unit to open the priority line breaker before or after the secondary line has been made available, through parameter P05.05 in the M05 Changeover menu. When the priority line comes back within the limits, the unit will switch back the load on it and decide the possible cooling cycle of the generator. It is possible also to lock the automatic return to the priority line by means of parameter P05.12. The cycles of automatic operation vary according to the type of application (utility-utility, utility-generator, generator-generator) and depending on the type of switching devices used (motorized breakers, motorized changeovers, contactors).

## Symbols & Wiring Diagrams

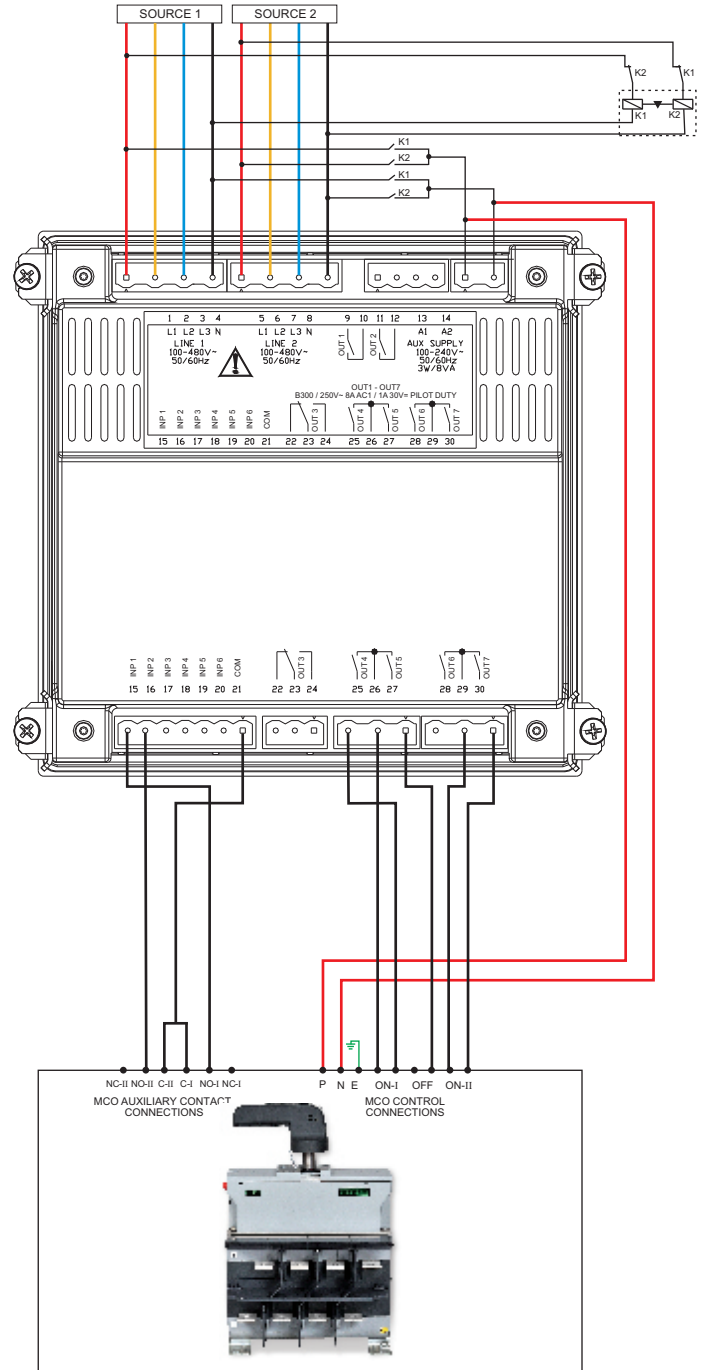
	Changeover switch
	HRC Fuse
	Circuit breaker
	Mechanical interlock kit
	Contactor coil
	NO contact
	NC contact

# Wiring Diagrams - AuXC-2000

## Control of Motorised Moulded Case Circuit Breakers (Without Undervoltage Relay)



## Control of Motorised Changeover Switch Disconnecter



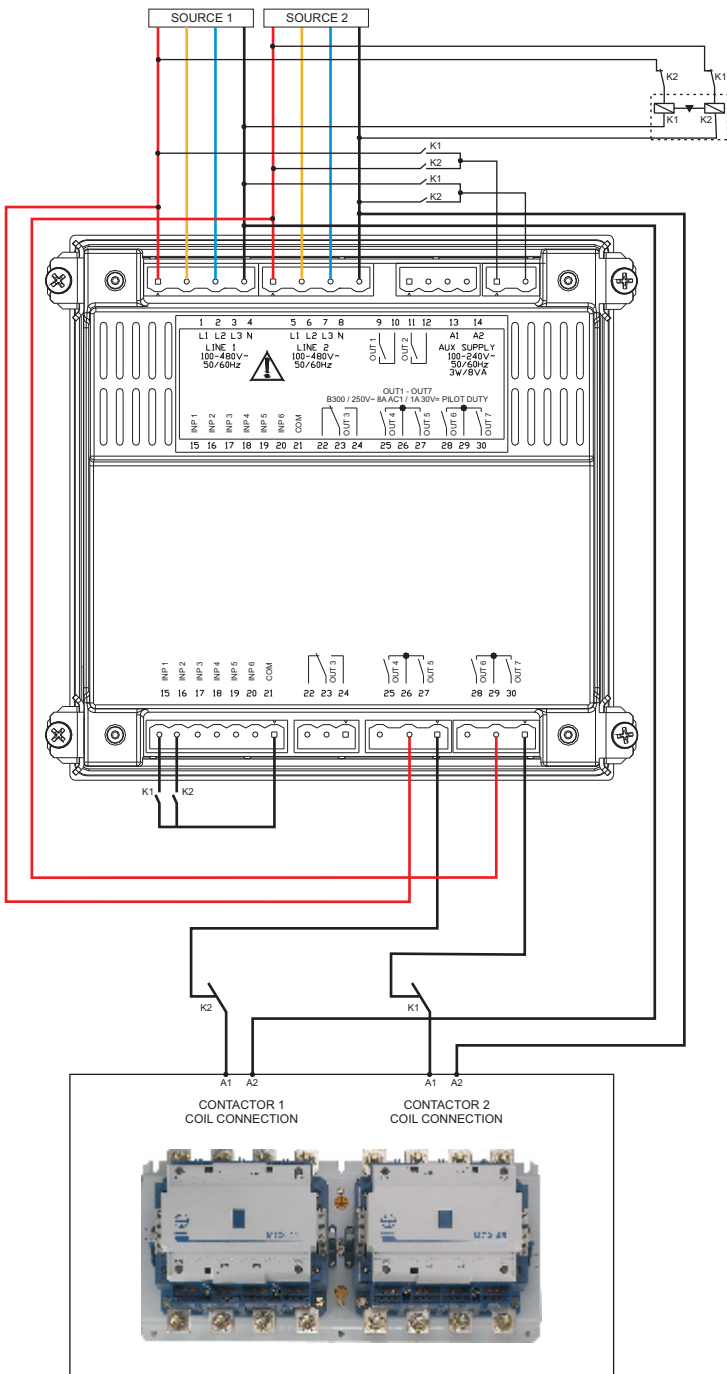
Programming	Connection Terminal	Parameter code	Setting (Description)
Others	-	P05.07	Breaker pulse or breaker continuous
Inputs	15(INP1)	P10.01.01	Line 1 breaker closed (Feedback 1)
	16(INP2)	P10.02.01	Line 2 breaker closed (Feedback 2)
	17(INP3)	P10.03.01	Line 1 circuit breaker protection (Trip 1)
	18(INP4)	P10.04.01	Line 2 circuit breaker protection (Trip 2)
Outputs	25(OUT4)	P11.04.01	Open line 1 contactor/circuit breaker
	27(OUT5)	P11.05.01	Close line 1 contactor/circuit breaker
	28(OUT6)	P11.06.01	Open line 2 contactor/circuit breaker
	30(OUT7)	P11.07.01	Close line 2 contactor/circuit breaker

Programming	Connection Terminal	Parameter code	Setting (Description)
Inputs	15(INP1)	P10.01.01	Line 1 breaker closed (Feedback 1)
	16(INP2)	P10.02.01	Line 2 breaker closed (Feedback 2)
Outputs	25(OUT4)	P11.04.01	Close line 1 contactor/circuit breaker
	27(OUT5)	P11.05.01	Open line 1 / line 2
	30(OUT7)	P11.07.01	Close line 2 contactor/circuit breaker
Others	-	P05.07	Changeover continuous



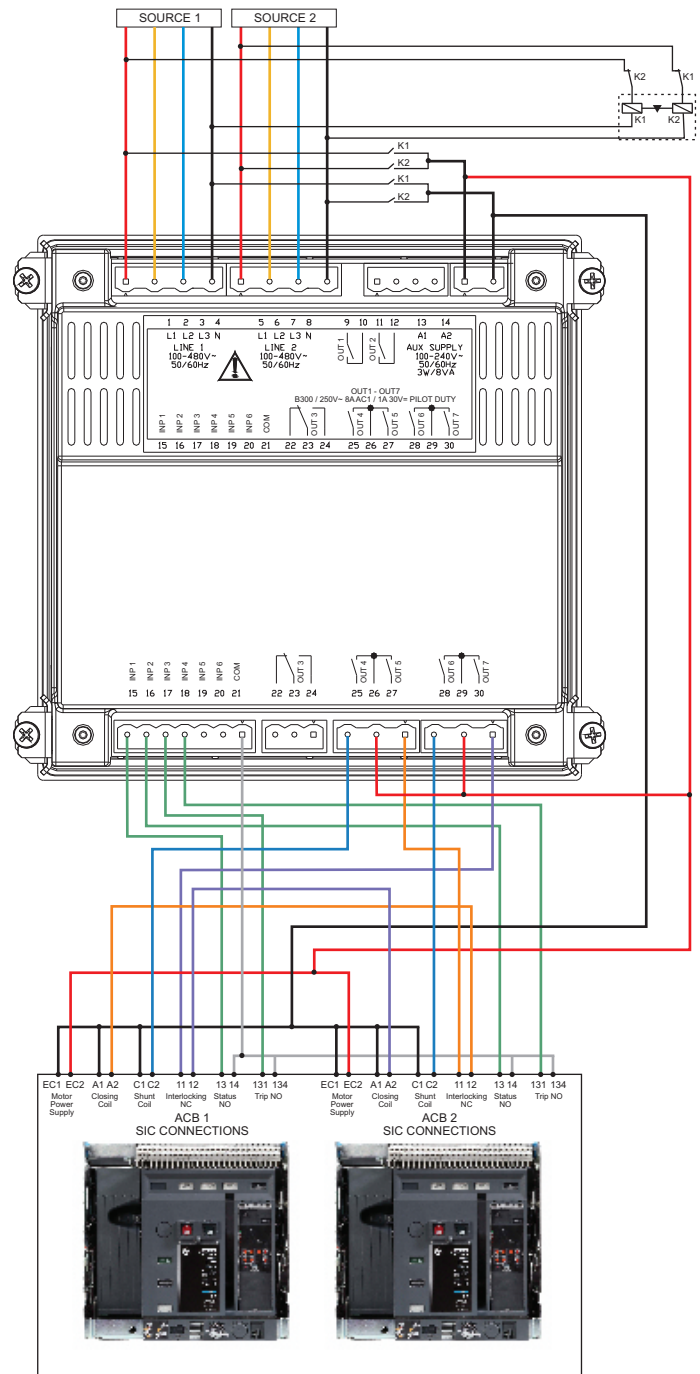
# Wiring Diagrams - AuXC-2000

## Control of Contactors



Programming	Connection Terminal	Parameter code	Setting (Description)
Inputs	15(INP1)	P10.01.01	Line 1 breaker closed (Feedback 1)
	16(INP2)	P10.02.01	Line 2 breaker closed (Feedback 2)
Outputs	27(OUT5)	P11.05.01	Close line 1 contactor/circuit breaker
	30(OUT7)	P11.07.01	Close line 2 contactor/circuit breaker
Others	-	P05.07	Contactors

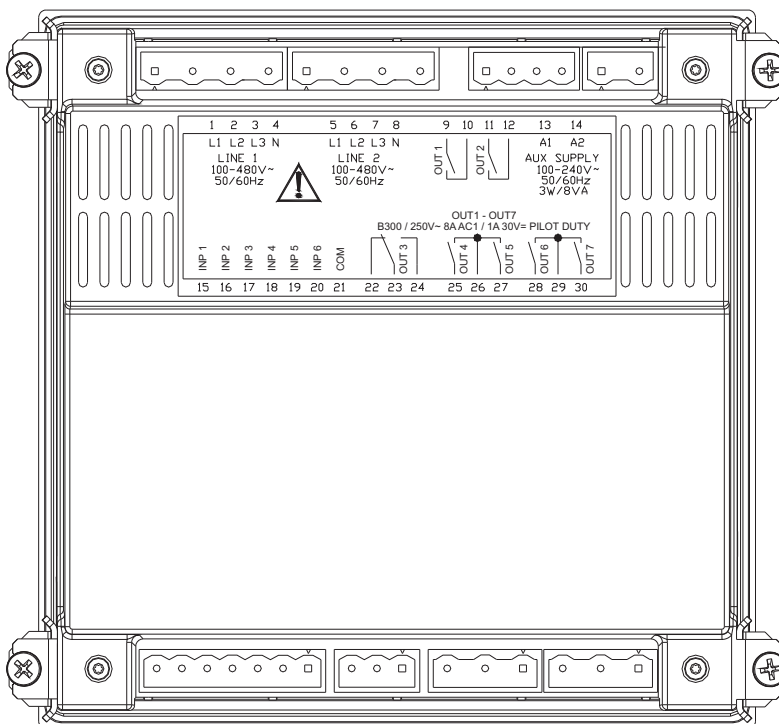
## Control of Omega ACBs



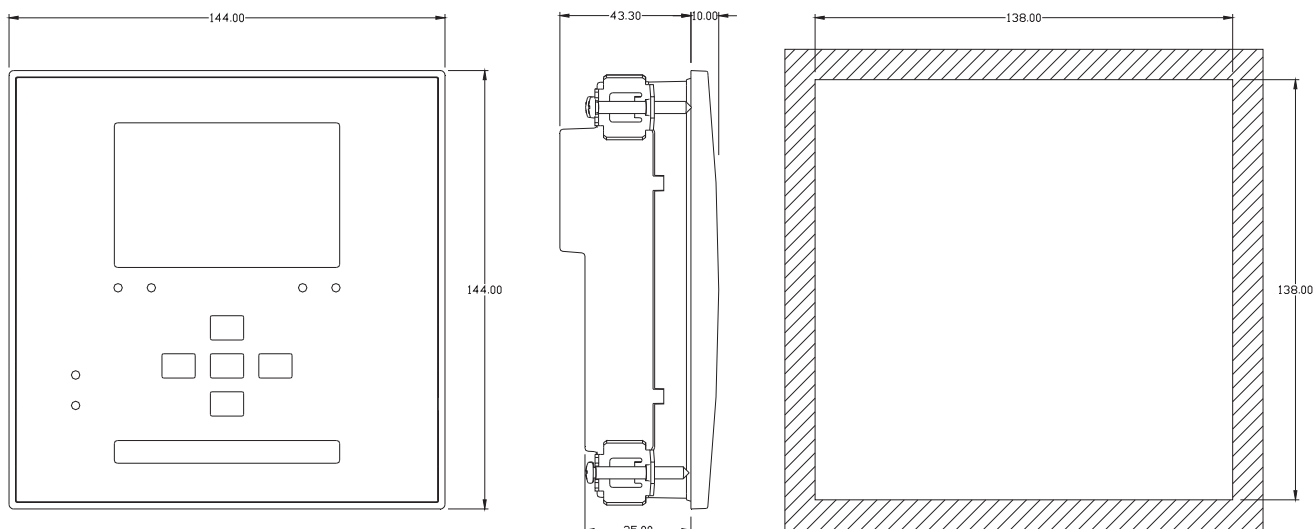
Programming	Connection Terminal	Parameter code	Setting (Description)
Others	-	P05.07	Breaker pulse or breaker continuous
Inputs	15(INP1)	P10.01.01	Line 1 breaker closed (Feedback 1)
	16(INP2)	P10.02.01	Line 2 breaker closed (Feedback 2)
	17(INP3)	P10.03.01	Line 1 circuit breaker protection (Trip 1)
	18(INP4)	P10.04.01	Line 2 circuit breaker protection (Trip 2)
Outputs	25(OUT4)	P11.04.01	Open line 1 contactor/circuit breaker
	27(OUT5)	P11.05.01	Close line 1 contactor/circuit breaker
	28(OUT6)	P11.06.01	Open line 2 contactor/circuit breaker
	30(OUT7)	P11.07.01	Close line 2 contactor/circuit breaker

# Overall Dimensions - AuXC-2000

## Rear Terminal Connections



## Panel Dimensions & Front Panel Cut-out



**U-POWER**  
**OMEGA** Air Circuit Breakers  
 Air Circuit Breakers

Frame				1					2			3			
Rated Uninterrupted Current (In) (A) at 50° C				400-2000			2500\$		400-3200			400-5000		6300#	
Version				N	S	H	S	H	N*	S	H	H	V	H	V
Rated Operational Voltage at 50/60 Hz.		Ue		upto 690V AC											
Rated Insulation Voltage at 50/60 Hz.		Ui		1000V AC											
Rated Impulse withstand Voltage		Uimp		12kV (Main Circuit) & 4kV (Auxiliary Circuit)											
Suitability for Isolation				Yes											
Degree of Protection on Breaker front				IP40 Intrinsic, IP54 available											
Pollution Degree Suitability				4											
Utilization Category				B											
Compliance				IS / IEC 60947 (Part-2), EN 60947-2, IEC 60947-2											
Rated Ultimate S.C. Breaking Capacity	Icu (kA)	400/415V AC		50	65	80	65	80	50	65	80	80	100	80	100
		500/550V AC		42	55	65	55	65	42	55	70	70	85	70	85
		660/690V AC		36	50	55	50	55	36	50	55	65	75	65	75
Rated Service S.C. Breaking Capacity	Ics (kA)	400/415V AC		100% Icu											
		500/550V AC													
		660/690V AC													
Rated Short-time Withstand Capacity	Icw (kA)	0.5sec		50	65	80	65	80	50	65	80	80	100	80	100
		1.0sec		50	65	80	65	80	50	65	80	80	100	80	100
		3.0sec		26	36	44	36	44	26	44	50	65	75	65	75
Rated S.C. Making Capacity	Icm (kA)	400/415V AC		105	143	176	143	176	105	143	176	176	220	176	220
		500/550V AC		88	121	143	121	143	88	121	154	154	187	154	187
		660/690V AC		76	105	121	105	121	76	105	121	143	165	143	165
Opening Time (ms)				40											
Closing Time (ms)				60											
Mechanical Life**		with maintenance		20000					15000			10000			
Electrical Life**		with maintenance		20000											
		without maintenance		10000			5000		5000			5000		2000	
Dimensions	Fixed ACB	W (mm)	Width 3P	347					447			647			
			Width 4P	447					581			847			
		D (mm)	Depth	324								334			
			H (mm)	Height	430										
	Draw-out ACB	W (mm)	Width 3P	347					447			647			
			Width 4P	447					581			847			
		D (mm)	Depth	421								431			
			H (mm)	Height	433										

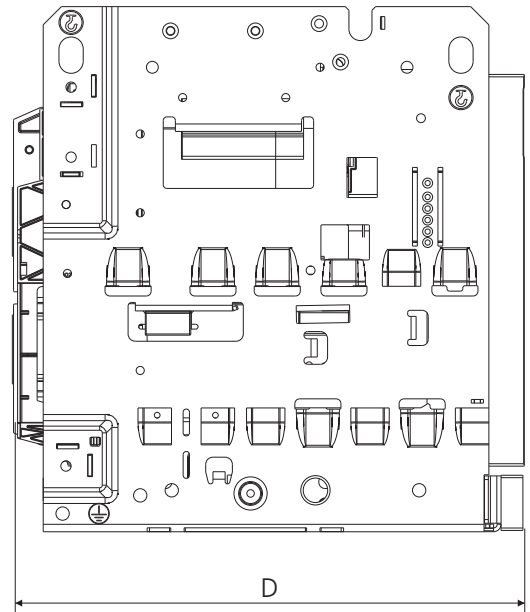
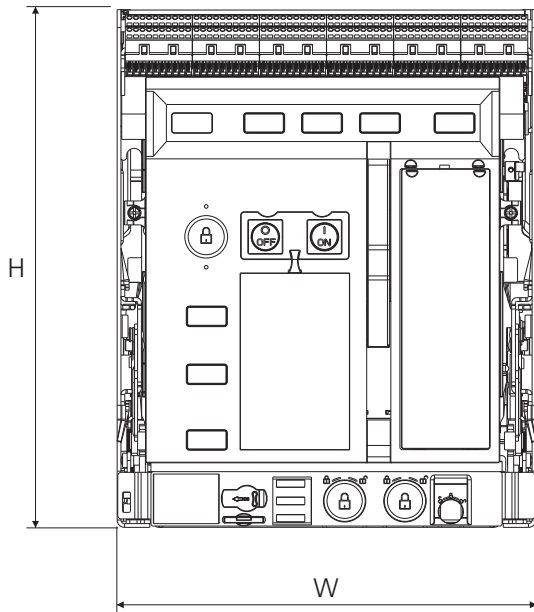
# Rated Uninterrupted Current (In) (A) at 40°C

\* Available till 2500A

\*\* Value corresponds operating cycle

\$ Please consult branch office for selection

U-POWER  
**OMEGA** Air Circuit Breakers  
 Air Circuit Breakers



H : Height

W : Width

D : Depth with flat terminals

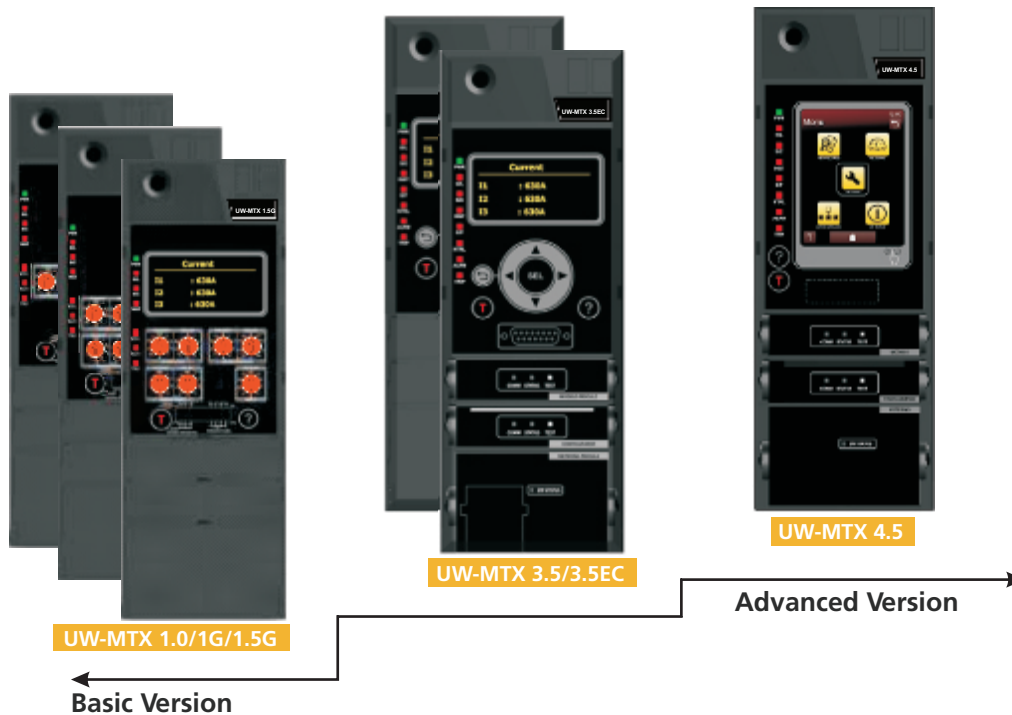
**Rating Specification Parameters for 50% N ACB**

Frame				3
Version				H / V
Rated Uninterrupted Current			In (A)	3200-6300
Dimensions	Fixed	Width 4P	50% W (mm)	747
	D/O	Width 4P	50% W (mm)	747

**Rating Specification Parameters for 200%N ACB**

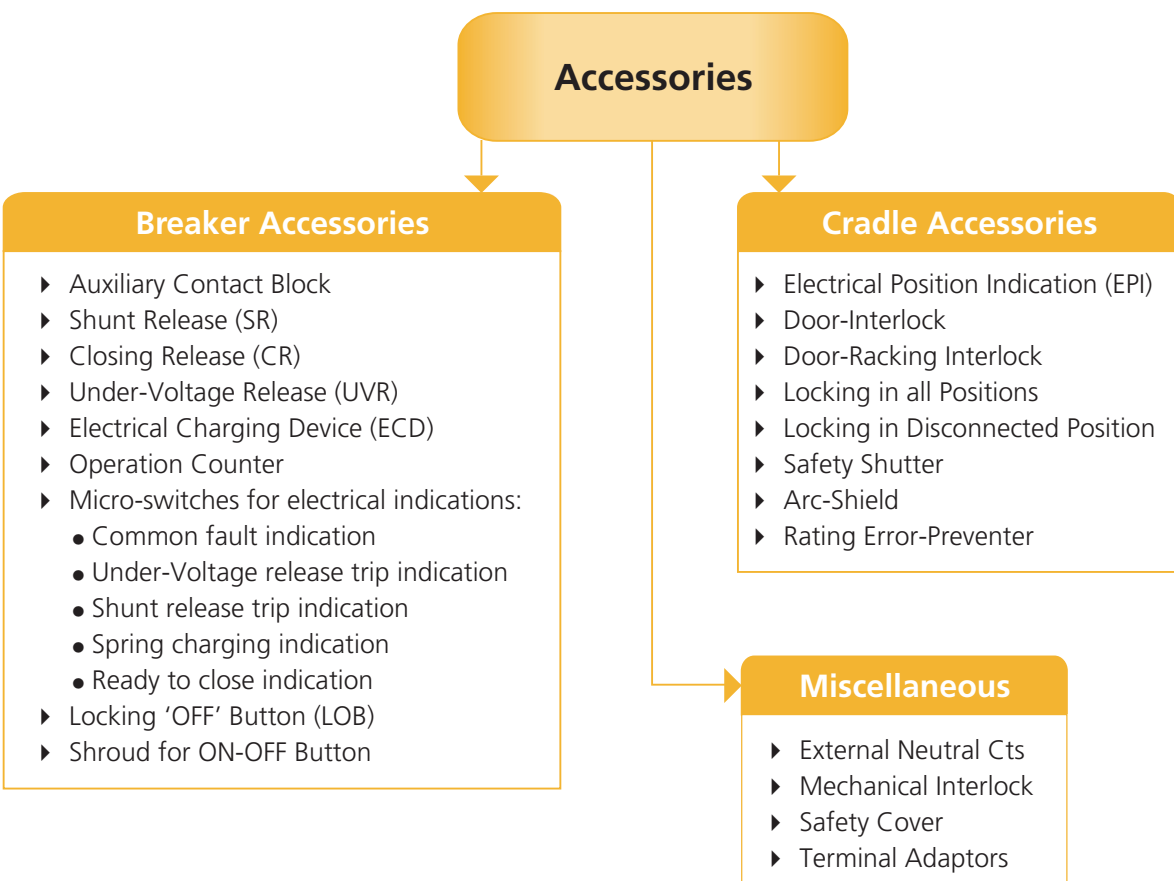
Frame			1	2	3	
Version			N & S	S & H	H & V	
Rated Uninterrupted Current			In (A)	400 to 1250	1600	2000-2500
Dimensions	Fixed ACB	200% W (mm)	447	581	647	
	Draw-out ACB	200% W (mm)	447	581	647	

## MATRIX Release Family



U-POWER

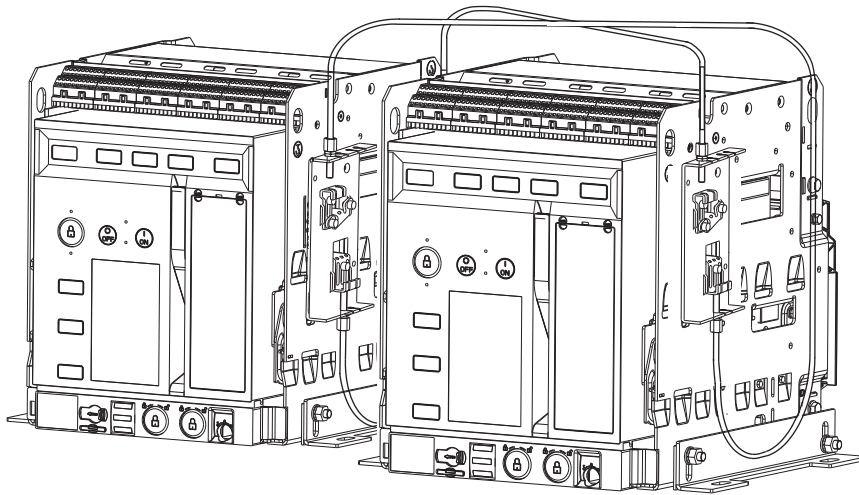
## OMEGA Accessories - Air Circuit Breakers



### Mechanical Interlock

Mechanical Interlock is used for interlocking breakers as per the desired control scheme. It can interlock up to three Omega ACBs of Fixed/Draw-out/Mixed version. The breakers can be interlocked in Vertical or Horizontal configuration.

**Cable Length:** 2/3/5 meter, minimum radius at cable bend: 70mm.



### Possible mounting arrangements:

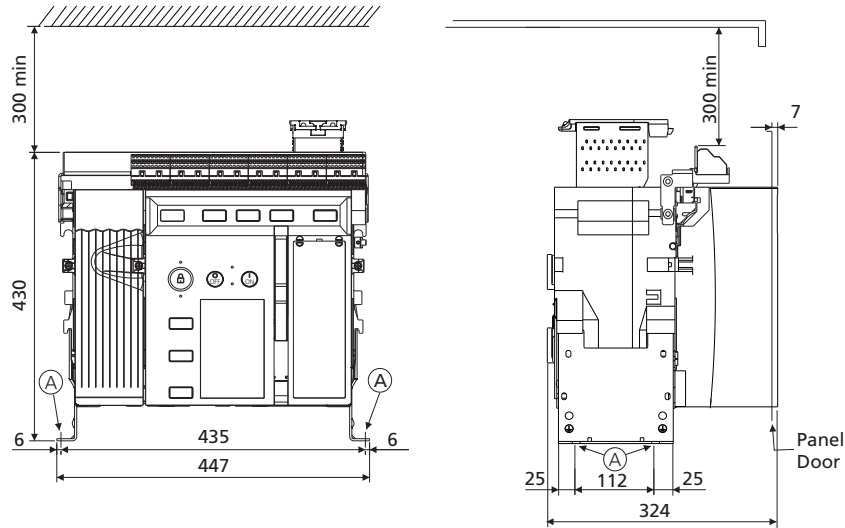
Type of Interlock	Typical Circuit	Interlocks Possible	Schematic Diagram																					
Two Incomers (2 I/C)		<table border="1"> <tr><td>A</td><td>B</td></tr> <tr><td>O</td><td>O</td></tr> <tr><td>I</td><td>O</td></tr> <tr><td>O</td><td>I</td></tr> </table>	A	B	O	O	I	O	O	I														
A	B																							
O	O																							
I	O																							
O	I																							
Three Incomers (3 I/C)		<table border="1"> <tr><td>A</td><td>B</td><td>C</td></tr> <tr><td>O</td><td>O</td><td>O</td></tr> <tr><td>I</td><td>O</td><td>O</td></tr> <tr><td>O</td><td>I</td><td>O</td></tr> <tr><td>O</td><td>O</td><td>I</td></tr> </table>	A	B	C	O	O	O	I	O	O	O	I	O	O	O	I							
A	B	C																						
O	O	O																						
I	O	O																						
O	I	O																						
O	O	I																						
Two Incomers & One Standby (2 I/C + 1 S/B)		<table border="1"> <tr><td>A</td><td>B</td><td>C</td></tr> <tr><td>O</td><td>O</td><td>O</td></tr> <tr><td>I</td><td>O</td><td>O</td></tr> <tr><td>O</td><td>I</td><td>O</td></tr> <tr><td>I</td><td>O</td><td>O</td></tr> <tr><td>O</td><td>O</td><td>I</td></tr> </table>	A	B	C	O	O	O	I	O	O	O	I	O	I	O	O	O	O	I				
A	B	C																						
O	O	O																						
I	O	O																						
O	I	O																						
I	O	O																						
O	O	I																						
Two Incomers & One Bus Coupler (2 I/C + 1 B/C)		<table border="1"> <tr><td>A</td><td>B</td><td>C</td></tr> <tr><td>O</td><td>O</td><td>O</td></tr> <tr><td>I</td><td>O</td><td>O</td></tr> <tr><td>O</td><td>I</td><td>O</td></tr> <tr><td>O</td><td>O</td><td>I</td></tr> <tr><td>O</td><td>I</td><td>I</td></tr> <tr><td>I</td><td>O</td><td>I</td></tr> </table>	A	B	C	O	O	O	I	O	O	O	I	O	O	O	I	O	I	I	I	O	I	
A	B	C																						
O	O	O																						
I	O	O																						
O	I	O																						
O	O	I																						
O	I	I																						
I	O	I																						

O - Breaker Open    I - Breaker Closed

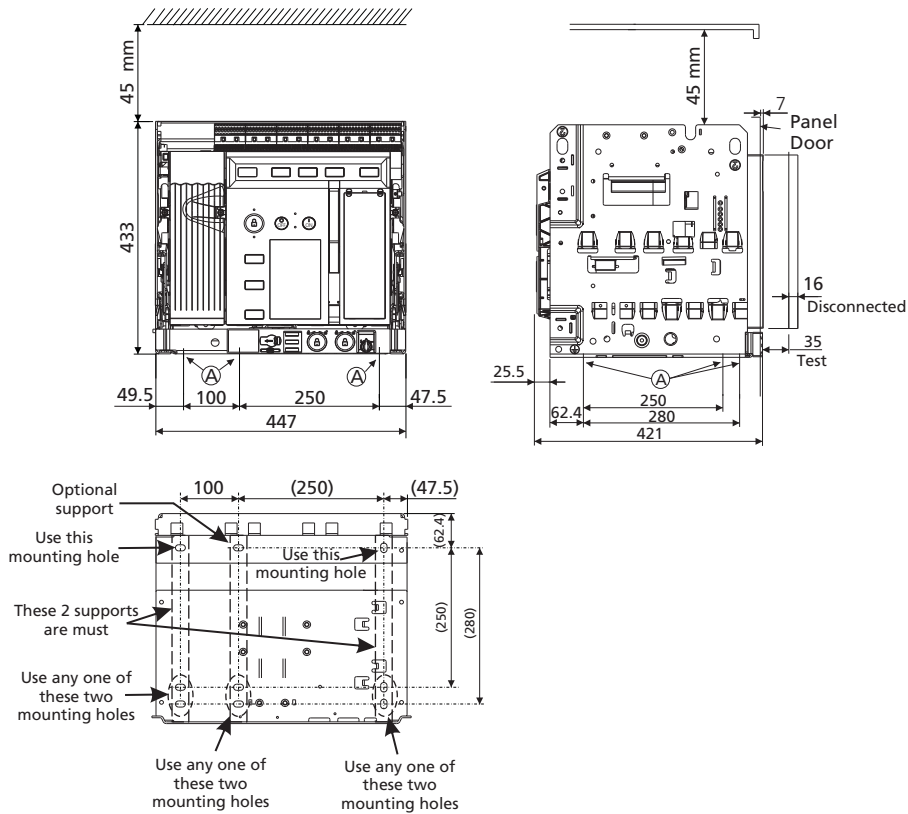
# Mounting Dimensions

## 400-1600A N & 400-2500A S/H Fr.1 4P (100% N)

### Fixed Circuit Breaker



### Draw-out Circuit Breaker



Details of 4P (200%) on request

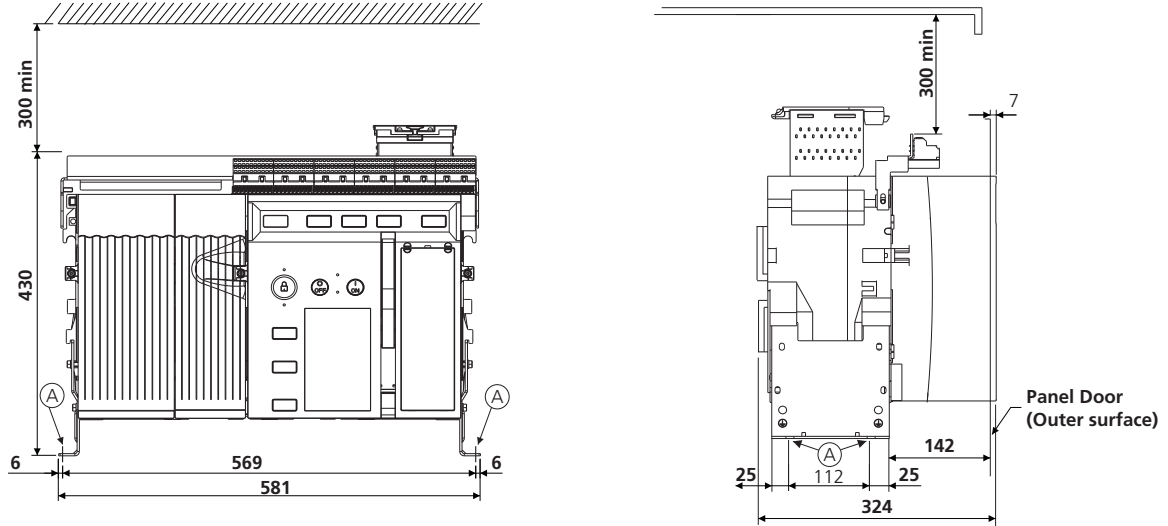
All Dimensions in mm

Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

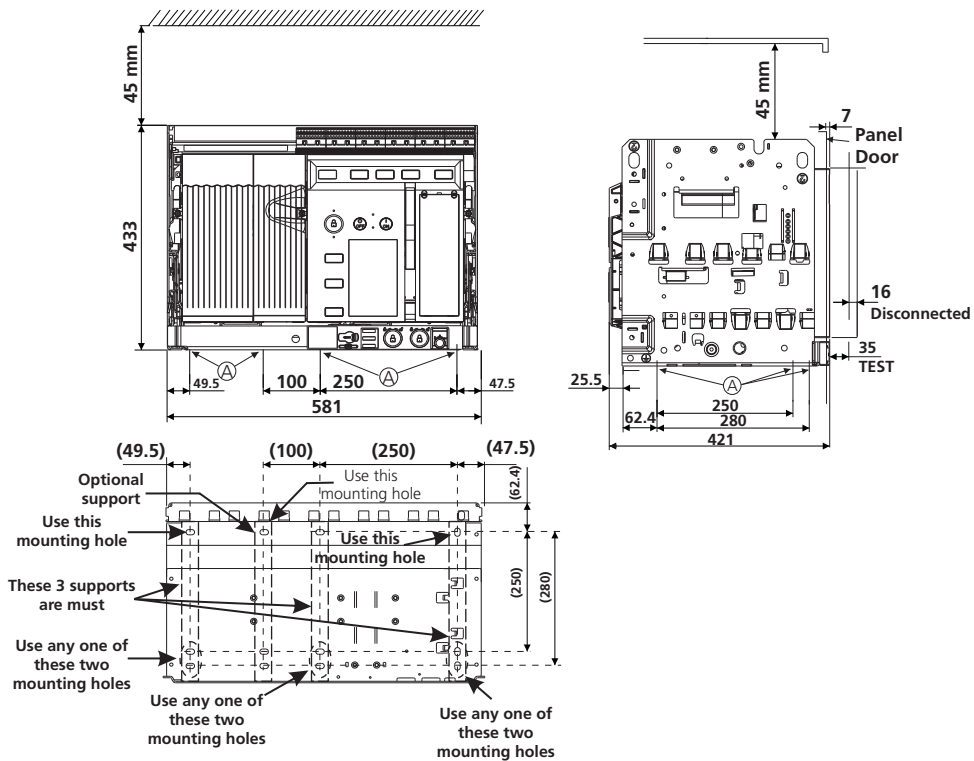
# Mounting Dimensions

## 400-3200A S/H Fr.2 4P (100% N)

### Fixed Circuit Breaker



### Draw-out Circuit Breaker



Details of 4P (200% N) on request

All Dimensions in mm

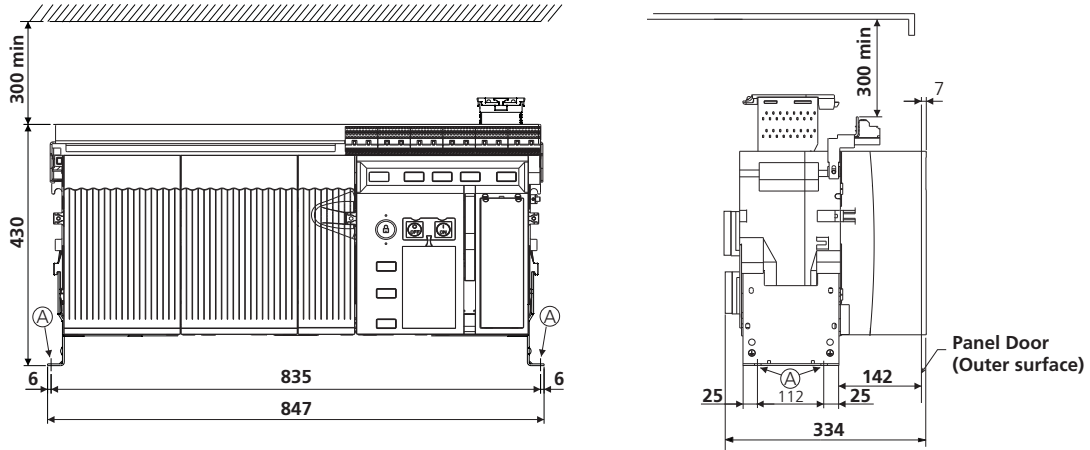
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt



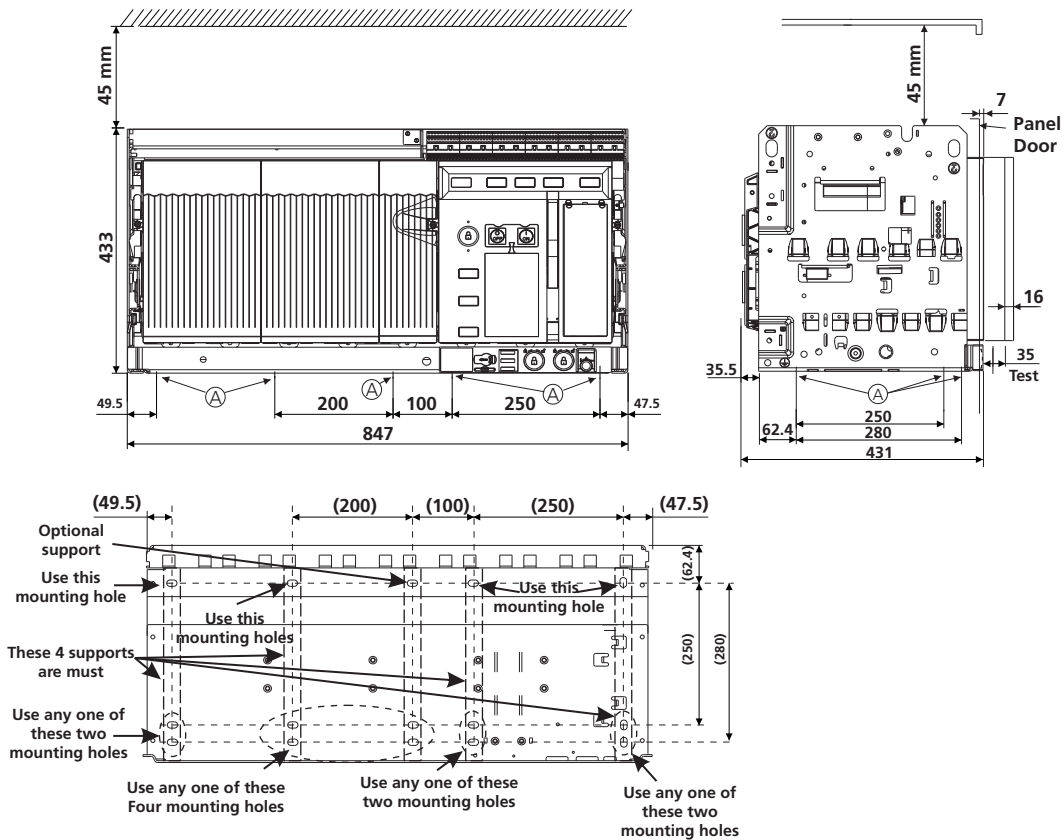
# Mounting Dimensions

## 400-6300A H/V Fr.3 4P (100% N)

### Fixed Circuit Breaker



### Draw-out Circuit Breaker



Details of 4P (50% N) on request

All Dimensions in mm

Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

# ACB Ordering Information

UW 1 08 N X D 1 2 9 0 0<sup>(5)</sup> OMEGA 800A Fr-1 50kA 3P EDO UW-MTX1.5G

Frame Size	
Frame - I	1
Frame - II	2
Frame - III	3

Current Ratings	
400A	04
630A	06
<b>800A</b>	<b>08</b>
1000A	10
1250A	12
1600A	16
2000A	20
2500A <sup>(4)</sup>	25
3200A	32
4000A	40
5000A	50
6300A	63

Selection for Breaking Capacity (Icu=Ics) <sup>(1)</sup>	
<b>50kA (Fr-I upto 2000A &amp; Fr-2 2500A)</b>	<b>N</b>
65kA (Fr-I & Fr-II)	S
80kA (Fr-I, Fr-II & Fr-III)	H
100kA (Fr-III)	V

Temperature Rise Monitoring <sup>(3)</sup>	
<b>Not Required</b>	<b>0</b>
Required	1

Selection for P&C Units	
B/C (w/o protection)	0
UW - MTX1.0	7
UW - MTX1G	8
<b>UW - MTX1.5G</b>	<b>9</b>
UW-MTX3.5	3
UW-MTX3.5EC <sup>(6)</sup>	4
UW-MTX4.5	5
UW-MTX3.5H	6

Type	
Manually Operated	1
<b>Electrically Operated</b>	<b>2</b>

Selection for control voltage <sup>(2)</sup>	
For Manually Operated	0
<b>240V AC ECD &amp; CR &amp; 240V AC SR</b>	<b>1</b>
240V AC ECD & CR & 24V DC SR	2

Version	
<b>Draw-out</b>	<b>D</b>
Fixed	F

Selection for No. of Poles	
<b>3 Pole</b>	<b>X</b>
4 Pole 100% N	F
4 Pole 50% N (in Fr-III only)	H
4 Pole 200% N (upto 2500A)	D

**Please Note :**

- <sup>(1)</sup> For Icu values please refer product catalogue
- <sup>(2)</sup> Other options of control voltage are available as accessory
- <sup>(3)</sup> Temperature protection is available in UW-MTX3.5/3.5EC/3.5H/4.5
- <sup>(4)</sup> For Fr-1, 2500A selection, please contact the nearest branch office
- <sup>(5)</sup> Refer point 'D' of Omega ACBs standard features
- <sup>(6)</sup> For system requiring 690V metering, kindly order separate Power Metering module with MTX 3.5 (refer ESP Price List)

## OMEGA ACBs are offered with following standard features:

**Draw-out version :** Omega ACBs with UW-MTX release will have inbuilt- Current Metering (MTX 1.5G/3.5/3.5EC/3.5H/4.5), Common Fault Indication microswitch, 4NO+4NC Aux. contacts, Smart-racking shutter, Safety shutter assembly, Racking Handle, Door sealing frame, Pad-locking arrangement for ON/OFF button, Rating Error Preventer, Arc shield.

- A) For ratings upto 1600A, one side vertical terminal adaptors (Bottom).
- B) For ratings 2000A & above, both side vertical terminal adaptors (Top & Bottom).
- C) For ratings 4000A & above, operation counter inbuilt.
- D) For rating 4000A & 5000A, replace 13th digit of ACB cat no with (recommended for Buscoupler only)
  - X : For Top Horizontal (Long) & Bottom Vertical
  - Y : For Top & Bottom Horizontal (Long)
 (Please refer Omega catalogue for details)

**Fixed Version :** Omega ACBs with UW-MTX release will have inbuilt- Current Metering (MTX 1.5G/3.5/3.5EC/3.5H/4.5), Common Fault Indication microswitch, 4NO+4NC Aux. contacts, Door sealing frame & Pad-locking arrangement for ON/OFF push button.

- A) For ratings upto 1600A, one side vertical terminal adaptors (Bottom).
- B) For ratings 2000A & above, both side vertical terminal adaptors (Top & Bottom).
- C) For ratings 4000A & above, operation counter inbuilt

Electrically operated ACB includes ECD (240V AC), CR (240V AC) & SR (240V AC OR 24V DC).



Dsine MCCB can be used for ASTS ranging from 63A to 630A with following different solutions

1. MCCB with AuXC-2000
2. MCCB with Basic controller (UV relay)
3. MCCB with UV release

## Technical Data Sheet

Frame		250A				400A				630A				
Type		DN2-250				DN3-400				DN3-630				
		D	N	S	V	D	N	S		D	N	S	V	
Release		TM/MP (MTX1.0/2.0/3.0)				TM/MP (MTX1.0/2.0/3.0)				TM/MP (MTX1.0/2.0/3.0)				
Current Range (A)		32, 40, 63, 80, 100, 125, 160, 200, 250				320, 400				500, 630, 320, 400, 500, 630				
Poles		3/4				3/4				3/4				
Impulse withstand Voltage $U_{imp}$ (kV)		8				8				8				
Rated Operational Voltage $U_e$ (V) (MAX)		690				690				690				
Rated Insulation Voltage $U_i$ (V)		800				800				800				
Utilization Category		A				A				A				
Standard		IEC60947-2, EN60947-2 & IS/IEC60947-2												
Rated Short Circuit Breaking Capacity	$I_{cu}$ (kA)	240 V AC	50	70	100	-	50	70	100	50	70	100	-	
		415 V AC	36	50	70	100	36	50	70	36	50	70	100	
		480 V AC	25	36	42	65	25	36	42	25	36	42	65	
		550 V AC	18	25	36	-	15	20	25	15	20	25	-	
		600 V AC	16	18	22	-	12	18	22	12	18	22	-	
	690 V AC	10	15	20	36	8	15	20	8	10	15	50		
	$I_{cs}$ as % $I_{cu}$	240 V AC	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	-	
		415 V AC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		480 V AC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		550 V AC	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	-	
600 V AC		100%	100%	100%	-	100%	100%	100%	100%	100%	100%	-		
690 V AC	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%			
Life	Mechanical	25000				25000				15000				
	Electrical @1.0 In	10000				10000*				4000				
Operating Frequency (Hz)		50/60												
Total Opening Time		<10 msec												
Finger-proof Terminals		Yes												
Suitable for Isolation		Yes												
IP Class		IP40												
Pollution Degree		III												
Load Line Bias		No												
Ambient Temperature		-5°C to 55°C												
Storage Temperature		-35°C to 70°C												
Mounting Position in vertical Plane		Vertical and 90° in both directions												
Dimensions (WxDxH) mm		3-Pole	105 x 96 x 179				140 x 111.5 x 266				140 x 111.5 x 266			
		4-Pole	140 x 96 x 179				183.5 x 111.5 x 266				183.5 x 111.5 x 266			
Weight (kg) (3/4 Pole)		2.5 / 3.3				5.5 / 7.2		5.8 / 7.4		6 / 7.8		6.3 / 8		
A C C E S S O R I E S	Internal	Auxiliary Contact	1 C / O or 2 C / O											
		Trip Alarm Contact	1 C / O											
		Auxiliary & Trip Alarm Contact	1 C / O + 1 C / O											
		Shunt Release	110 / 415 V AC 50 Hz, 24 / 110 / 220 V DC \$											
		Under Voltage Release	240 V AC 50 Hz											
R I E S	External	Rotary Operating Mechanism (Direct/Extended)	✓											
		Electrical Operating Mechanism	✓											
		Mechanical Interlock Kit	✓											
		Spreader Terminals	✓											
		Key lock	✓											
		Neutral CT with Adaptor Kit	Available for 3P MCCBs with MTX2.0 & MTX3.0 release only											
		Current Metering Module	Available for MTX2.0 release for current metering only @											
Display, Communication and Voltage Module		Available for MTX3.0 release for Communication & Power metering												

\$ : 'NO' of control contactor to be connected in series for 220V DC, 24V DC

@ : Contains display module & metering module, separate cable required for connection

\* : at 415V

DN2 -1500 @ 690V    DN3 -1000 @ 690V

- Notes :
- Any two internal accessories can be mounted at a time
  - Separate earth fault module required for earth fault protection using TM releases
  - $I_{cu}$  : Rated ultimate short-circuit breaking capacity
  - $I_{cs}$  : Rated service short-circuit breaking capacity
  - Reference Temperature 40°C & 50°C
  - V version MCCBs, to be used with extended Romanly

# Ordering Information

Combo:DN2-250D 40A 3P MTX 1.0,SEOM	CM90570XOFOX1
Combo:DN2-250D 40A 3P MTX 1.0,SEOM, UVR	CM90570QOFOX1
Combo:DN2-250N 40A 3P MTX 1.0,SEOM	CM92064XOFOX1
Combo:DN2-250S 40A 3P MTX 1.0,SEOM	CM97206XOFOX1
Combo:DN2-250N 40A 3P MTX 2.0,SEOM	CM97202XOFOAG
Combo:DN2-250D 63A 3P MTX 1.0,SEOM	CM90570XOHOX1
Combo:DN2-250D 63A 3P MTX 1.0,SEOM, UVR	CM90570OOHOX1
Combo:DN2-250N 63A 3P MTX 1.0,SEOM	CM92072XOHOX1
Combo:DN2-250D 63A 3P MTX 2.0,SEOM, UVR	CM90570OOHOAG
Combo: DN2-250D 63A 3P TM,SEOM, UVR	CM90570OOHOOG
Combo:DN2-250N 80A 3P TM,SEOM, Aux	CM97202XOJ5OG
Combo:DN2-250V 100A 3P MTX 1.0,SEOM	CM95055XOKOX1
Combo:DN2-250V 100A 3P MTX 1.0,SEOM, Aux	CM91136XOK5X1
Combo:DN2-250D 100A 3P MTX 1.0,SEOM	CM90571XOKOX1
Combo:DN2-100D 100A 3P MTX 1.0,SEOM, UVR	CM90029OOKOX1
Combo:DN2-100N 100A 3P MTX 1.0,SEOM, UVR	CM97202OOKOX1
Combo:DN2-250S 100A 3P MTX 1.0,SEOM	CM97206XOKOX1
Combo:DN2-250S 100A 3P MTX 1.0,SEOM, Aux	CM97206XOK5X1
Combo:DN2-250D 100A 3P MTX 2.0,SEOM	CM92015XOKOAG
Combo:DN2-100D 100A 3P MTX 2.0,SEOM, UVR	CM90029OOKOAG
Combo:DN2 100N 100A 3P MTX 2.0,SEOM, UVR	CM97202OOKOAG
Combo:DN2-100D 100A 3P MTX 3.0,SEOM, UVR	CM90029OOKOBG
Combo:DN2-100N 100A 3P MTX 3.0,SEOM, UVR	CM97202OOKOBG
Combo:DN2-100D 100A 3P TM,SEOM, UVR	CM90029OOKOOG
Combo:DN2-100N 100A 3P TM, SEOM, UVR	CM97202OOKOOG
Combo:DN2-250S 100A 3P TM,SEOM	CM97206XOKOOG
Combo:DN2-250S 100A 3P TM,SEOM, Aux	CM97206XOK5OG
Combo:DN2-250D 125A 3P TM,SEOM	CM92008XOLOOG
Combo:DN2-250D 125A 3P TM,SEOM, UVR	CM90029OOLOOG
Combo:DN2-250D 125A 3P TM,SEOM, UVR	CM90029OOLOOG
Combo:DN2-250N 125A 3P TM,SEOM, Aux	CM97202XOL5OG
Combo:DN2-250S 125A 3P TM,SEOM, Aux	CM97206XOL5OG
Combo:DN2-250V 160A 3P MTX 1.0,SEOM	CM95055XOMOX1
Combo:DN2-250V 160A 3P MTX 1.0,SEOM, Aux	CM91136XOM5X1
Combo:DN2-250D 160A 3P MTX 1.0,SEOM	CM90029XOMOX1
Combo:DN2-160D 160A 3P MTX 1.0,SEOM, UVR	CM90029OOMOX1
Combo:DN2-160N 160A 3P MTX 1.0,SEOM, UVR	CM97202OOMOX1
Combo:DN2-250S 160A 3P MTX 1.0,SEOM	CM97206XOMOX1
Combo:DN2-250S 160A 3P MTX 1.0,SEOM, Aux	CM97206XOM5X1
Combo:DN2-160S 160A 3P MTX 1.0,SEOM, UVR	CM97206OOMOX1
Combo:DN2-160D 160A 3P MTX 2.0,SEOM, UVR	CM90029OOMOAG
Combo:DN2 160N 160A 3P MTX 2.0,SEOM, UVR	CM97202OOMOAG
Combo:DN2-160S 160A 3P MTX 2.0,SEOM, UVR	CM97206OOMOAG
Combo:DN2-160D 160A 3P MTX 3.0,SEOM, UVR	CM90029OOMBG
Combo:DN2-160N 160A 3P MTX 3.0,SEOM, UVR	CM97202OOMBG
Combo:DN2-160S 160A 3P MTX 3.0,SEOM, UVR	CM97206OOMBG
Combo:DN2-250D 160A 3P TM,SEOM	CM90029XOMOOG
Combo:DN2-160D 160A 3P TM, SEOM, UVR	CM90029OOMOOG
Combo:DN2-160N 150A 3P TM,SEOM, UVR	CM97202OOMOOG
Combo:DN2-250S 160A 3P TM,SEOM	CM97206XOMOOG
Combo:DN2-250S 160A 3P TM,SEOM, Aux	CM97206XOM5OG
Combo:DN2-160S 160A 3P TM,SEOM, UVR	CM97206OOMOOG
Combo:DN2-250N 200A 3P TM,SEOM, UVR	CM97202OONOOG
Combo:DN2-250S 200A 3P TM,SEOM, Aux	CM97206XON5OG
Combo:DN2-250V 250A 3P MTX 1.0,SEOM	CM95055XOPOX1
Combo:DN2-250V 250A 3P MTX 1.0,SEOM, Aux	CM91136XOP5X1
Combo:DN2-250D 250A 3P MTX 1.0,SEOM	CM90029XOPOX1
Combo:DN2-250D 250A 3P MTX 1.0,SEOM, UVR	CM90029OPOX1
Combo:DN2-250N 250A 3P MTX 1.0,SEOM	CM97202XOPOX1
Combo:DN2-250N 250A 3P MTX 1.0,SEOM, UVR	CM97202OPOX1

Combo:DN2-250S 250A 3P MTX 1.0,SEOM	CM97206XOPOX1
Combo:DN2-250S 250A 3P MTX 1.0,SEOM, Aux	CM97206XOP5X1
Combo:DN2 250S 250A 3P MTX 1.0,SEOM, UVR	CM97206OPOX1
Combo:DN2-250D 250A 3P MTX 2.0,SEOM, UVR	CM90029OPOAG
Combo:DN2-250N 250A 3P MTX 2.0,SEOM, Aux	CM97202XOP5AG
Combo:DN2-250N 250A 3P MTX 2.0,SEOM, UVR	CM97202OPOAG
Combo:DN2-250S 250A 3P MTX 2.0,SEOM, UVR	CM97206OPOAG
Combo:DN2-250D 250A 3P MTX 3.0,SEOM, UVR	CM90029OPOBG
Combo:DN2-250N 250A 3P MTX 3.0,SEOM, UVR	CM97202OPOBG
Combo:DN2-250S 250A, 3P MTX 3.0,SEOM, UVR	CM97206OPOBG
Combo:DN2-250D 250A 3P TM,SEOM	CM92009XOPOOG
Combo:DN2-250D 250A 3P TM, SEOM, UVR	CM90029OPOOG
Combo:DN2-250N 250A 3P TM,SEOM	CM91206XOPOOG
Combo:DN2-250N 250A 3P TM,SEOM, UVR	CM97202OPOOG
Combo:DN2-250S 250A 3P TM,SEOM	CM97206XOPOOG
Combo:DN2-250S 250A 3P TM,SEOM, Aux	CM97206XOP5OG
Combo:DN2-250S 250A 3P TM, SEOM, UVR	CM97206OPOOG
Combo:DN3-400D 320A 3P TM,SEOM, UVR	CM93001OOQOOG
Combo:DN3-400N 320A 3P TM,SEOM, Shunt	CM90859OBQOOG
Combo:DN3-400S 320A 3P TM,SEOM, Aux	CM97204XOQ5OG
Combo:DN3-630V 400A 3P MTX 1.0,SEOM	CM91130XOROX1
Combo:DN3-630V 400A 3P MTX 1.0,SEOM, Aux	CM91137XOR5X1
Combo:DN3-400D 400A 3P MTX 1.0,SEOM	CM93001XOROX1
Combo:DN3-400D 400A 3P MTX 1.0,SEOM, Shunt	CM93001OBROX1
Combo:DN3-400D 400A 3P MTX 1.0,SEOM, UVR	CM93001OOROX1
Combo:DN3-400N 400A 3P MTX 1.0,SEOM	CM97200XOROX1
Combo:DN3-400N 400A 3P MTX 1.0,SEOM, Shunt	CM97200OBROX1
Combo:DN3-400N 400A 3P MTX 1.0,SEOM, UVR	CM97200OOROX1
Combo:DN3-400S 400A 3P MTX 1.0,SEOM	CM97204XOROX1
Combo:DN3-400S 400A 3P MTX 1.0,SEOM, Aux	CM97204XOR5X1
Combo:DN3-400S 400A 3P MTX 1.0,SEOM, UVR	CM97204OOROX1
Combo:DN3-400N 400A 3P MTX 2.0,SEOM	CM97200XOROAG
Combo:DN3-400N 400A 3P MTX 2.0,SEOM, Shunt	CM97200OBROAG
Combo:DN3-400N 400A 3P MTX 2.0,SEOM, UVR	CM97200OOROAG
Combo:DN3-400S 400A 3P MTX 2.0,SEOM, UVR	CM97204OOROAG
Combo:DN3-400D 400A 3P MTX 3.0,SEOM, Shunt	CM93001XOROBG
Combo DN3-400N 400A 3P MTX 3.0,SEOM, UVR	CM97200OOROBG
Combo:DN3-400S 400A 3P MTX 3.0,SEOM, UVR	CM97204OOROBG
Combo:DN3-400D 400A 3P TM,SEOM	CM93001XOROOG
Combo:DN3-400D 400A 3P TM,SEOM, UVR	CM93001OOROOG
Combo:DN3-400N 400A 3P TM,SEOM	CM97200XOROOG
Combo:DN3-400N 400A 3P TM, SEOM, UVR	CM97200OOROOG
Combo:DN3-400S 400A 3P TM,SEOM, Aux	CM97204XOR5OG
Combo:DN3-400S 400A 3P TM, SEOM, UVR	CM97204OOROOG
Combo:DN3-630D 630A 3P MTX 1.0,SEOM	CM93005XOTOX1
Combo:DN3-630D 630A 3P MTX 1.0,SEOM, Shunt	CM93005OBTOX1
Combo:DN3-630N 630A 3P MTX 1.0,SEOM, UVR	CM97200OOTOX1
Combo:DN3-630S 630A 3P MTX 1.0,SEOM	CM97204XOTOX1
Combo:DN3-630S 630A 3P MTX 1.0,SEOM, UVR	CM97204OOTOX1
Combo:DN3-630D 630A 3P MTX 2.0,SEOM, Shunt	CM93005OBTOAG
Combo:DN3-630N 630A 3P MTX 2.0,SEOM	CM97200XOTOAG
Combo:DN3-630N 630A 3P MTX 2.0,SEOM, UVR	CM97200OOTOAG
Combo:DN3-630S 630A 3P MTX 2.0,SEOM, UVR	CM97204OOTOAG
Combo DN3-630N 630A 3P MTX 3.0,SEOM, UVR	CM97200OOTOBG
Combo:DN3-630S 630A 3P MTX 3.0,SEOM, UVR	CM97204OOTOBG
Combo:DN3-630D 630A 3P TM,SEOM, Shunt	CM93005OBTOOG
Combo:DN3-630N 630A 3P TM,SEOM, UVR	CM97200OOTOOG
Combo:DN3-630S 630A 3P TM,SEOM, UVR	CM97204OOTOOG
Combo:DN2 250D 40A 4P MTX 1.0,SEOM	CM90030XOFOX1
Combo:DN2-250D 40A 4P MTX 2.0,SEOM	CM92155XOFOAG
Combo:DN2-250S 40A 4P MTX 3.0,SEOM	CM92165XOFOBG

## Ordering Information

Combo:DN2-250D 63A 4P MTX 2.0,SEOM	CM92154XOHOAG
Combo:DN2-250D 63A 4P MTX 2.0,SEOM, UVR	CM92154OOHOAG
Combo:DN2-250S 63A 4P MTX 3.0,SEOM	CM92164XOHOBG
Combo:DN2-250D 63A 4P TM,SEOM, UVR	CM90030OOHOOG
Combo:DN3-630V 63A 4P MTX 3.0,SEOM	CM90449XOHOBG
Combo:DN2-250D 80A 4P TM,SEOM, UVR	CM90030OOJOOG
Combo:DN2 100D 100A 4P MTX 1.0,SEOM, UVR	CM90030OOKOX1
Combo:DN2 100N 100A 4P MTX 1.0,SEOM, UVR	CM97203OOKOX1
Combo:DN2-250D 100A 4P MTX 2.0,SEOM	CM90030XOKOAG
Combo:DN2-100D 100A 4P MTX 2.0,SEOM, UVR	CM90030OOKOAG
Combo:DN2-100N 100A 4P MTX 2.0,SEOM, UVR	CM97203OOKOAG
Combo:DN2-100D 100A 4P MTX 3.0,SEOM, UVR	CM90030OOKOBG
Combo:DN2-100N 100A 4P MTX 3.0,SEOM, UVR	CM97203OOKOBG
Combo:DN2-250D 100A 4P TM,SEOM	CM90030XOKOOG
Combo:DN2-250D 100A 4P TM,SEOM, UVR	CM90030OOKOOG
Combo:DN2-100N 100A 4P TM,SEOM, UVR	CM97203OOKOOG
Combo:DN2-250S 100A 4P TM,SEOM	CM97207XOKOOG
Combo:DN2-250D 125A 4P TM,SEOM, UVR	CM90030OOLOOG
Combo:DN2 160D 160A 4P MTX 1.0,SEOM, UVR	CM90030OOMOX1
Combo:DN2-250N 160A 4P MTX 1.0,SEOM	CM97203XOMOX1
Combo:DN2-160N 160A 4P MTX 1.0,SEOM, UVR	CM97203OOMOX1
Combo:DN2-160S 160A 4P MTX 1.0,SEOM, UVR	CM97207OOMOX1
Combo:DN2-250D 160A 4P MTX 2.0,SEOM	CM90030XOMOAG
Combo:DN2-160D 160A 4P MTX 2.0,SEOM, UVR	CM90030OOMOAG
Combo:DN2-250N 160A 4P MTX 2.0,SEOM	CM97203XOMOAG
Combo:DN2-160N 160A 4P MTX 2.0,SEOM, UVR	CM97203OOMOAG
Combo:DN2-160S 160A 4P MTX 2.0,SEOM, UVR	CM97207OOMOAG
Combo:DN2-160D 160A 4P MTX 3.0,SEOM, UVR	CM90030OOMOBG
Combo:DN2-160N 160A 4P MTX 3.0,SEOM, UVR	CM97203OOMOBG
Combo:DN2-250S 160A 4P MTX 3.0,SEOM	CM97207XOMOBG
Combo:DN2-160S 160A 4P MTX 3.0,SEOM, UVR	CM97207OOMOBG
Combo:DN2-250D 160A 4P TM,SEOM	CM90030XOMOOG
Combo:DN2-160D 160A 4P TM,SEOM, UVR	CM90030OOMOOG
Combo:DN2-160N 160A 4P TM,SEOM, UVR	CM97203OOMOOG
Combo:DN2-250S 160A 4P TM,SEOM	CM97207XOMOOG
Combo:DN2-160S 160A 4P TM,SEOM, UVR	CM97207OOMOOG
Combo:DN2-250D 200A 4P TM,SEOM, SHUNT	CM90030OBNOOG
Combo:DN2-250D 200A 4P TM,SEOM, UVR	CM90030OONOOG
Combo:DN2 250D 250A 4P MTX 1.0,SEOM	CM90030XOPOX1
Combo:DN2 250D 250A 4P MTX 1.0,SEOM	CM90030XOPOX1
Combo:DN2-250D 250A 4P MTX 1.0,SEOM, Shunt	CM90030OBPOX1
Combo:DN2 250D 250A 4P MTX 1.0,SEOM, UVR	CM90030OPOX1
Combo:DN2-250N 250A 4P MTX 1.0,SEOM, UVR	CM97203OPOX1
Combo:DN2-250S 250A 4P MTX 1.0,SEOM, UVR	CM97207OPOX1
Combo:DN2-250T 250A 4P MTX 2.0,SEOM	CM91153XOPOAG
Combo:DN2-250T 250A 4P MTX 2.0,SEOM, UVR	CM91153OPOAG
Combo:DN2-250D 250A 4P MTX 2.0, SEOM, UVR	CM90030OPOAG
Combo:DN2-250N 250A 4P MTX 2.0,SEOM	CM97203XOPOAG
Combo:DN2-250N 250A 4P MTX 2.0,SEOM, UVR	CM97203OPOAG
Combo:DN2-250S 250A 4P MTX 2.0,SEOM, UVR	CM97207OPOAG
Combo:DN2-250D 250A 4P MTX 3.0,SEOM, UVR	CM90030OPOBG
Combo:DN2-250N 250A 4P MTX 3.0,SEOM	CM97203XOPOBG
Combo:DN2-250N 250A 4P MTX 3.0,SEOM, UVR	CM97203OPOBG
Combo:DN2-250S 250A 4P MTX 3.0,SEOM	CM97207XOPOBG
Combo:DN2-250S 250A 4P MTX 3.0,SEOM, UVR	CM97207OPOBG
Combo:DN2-250H 250A 4P MTX 3.0,SEOM, Aux	CM90408XOP5BG
Combo:DN2-250D 250A 4P TM,SEOM	CM90030XOPOOG
Combo:DN2-250D 250A 4P TM, SEOM, UVR	CM90030OPOOG
Combo:DN2-250N 250A 4P TM,SEOM, Shunt	CM97203OBPOOG
Combo:DN2-250N 250A 4P TM,SEOM, UVR	CM97203OPOOG

Combo:DN2-250S 250A 4P TM,SEOM	CM97207XOPOOG
Combo:DN2-250S 250A 4P TM,SEOM, UVR	CM97207OPOOG
Combo:DN3-630V 250A 4P MTX 3.0,SEOM	CM90451XOPOBG
Combo:DN3-400D 320A 4P TM,SEOM	CM90884XOQOOG
Combo:DN3-400D 400A 4P MTX 1.0,SEOM, Shunt	CM90884OBROX1
Combo:DN3-400D 400A 4P MTX 1.0,SEOM, UVR	CM90884OOROX1
Combo:DN3-400N 400A 4P MTX 1.0,SEOM	CM97201XOROX1
Combo:DN3-400N 400A 4P MTX 1.0,SEOM, UVR	CM97201OOROX1
Combo:DN3-400S 400A 4P MTX 1.0,SEOM, UVR	CM97205OOROX1
Combo:DN3-400D 400A 4P MTX 2.0,SEOM	CM90884XOROAG
Combo:DN3-400D 400A 4P MTX 2.0,SEOM, UVR	CM90884OOROAG
Combo:DN3-630T 400A 4P MTX 2.0,SEOM	CM91012XOROAG
Combo:DN3-400N 400A 4P MTX 2.0,SEOM	CM97201XOROAG
Combo:DN3-400N 400A 4P MTX 2.0,SEOM, Shunt	CM97201OBROAG
Combo:DN3-400N 400A 4P MTX 2.0,SEOM, UVR	CM97201OOROAG
Combo:DN3-630T 400A 4P MTX 2.0,SEOM, UVR	CM91012OOROAG
Combo:DN3-400S 400A 4P MTX 2.0,SEOM, UVR	CM97205OOROAG
Combo:DN3-630V 400A 4P MTX 3.0,SEOM	CM96141XOROBG
Combo:DN3-400D 400A 4P MTX 3.0,SEOM, UVR	CM90884OOROBG
Combo:DN3-630N 400A 4P MTX 3.0,SEOM	CM97201XOROBG
Combo:DN3-400N 400A 4P MTX 3.0,SEOM, UVR	CM97201OOROBG
Combo:DN3-400S 400A 4P MTX 3.0,SEOM	CM97205XOROBG
Combo DN3-400S 400A 4P MTX 3.0,SEOM, UVR	CM97205OOROBG
Combo:DN3-400D 400A 4P TM,SEOM	CM90884XOROOG
Combo:DN3-400D 400A 4P TM,SEOM, UVR	CM90884OOROOG
Combo:DN3-400N 400A 4P TM,SEOM, Shunt	CM97201OBROOG
Combo:DN3-400N 400A 4P TM,SEOM, UVR	CM97201OOROOG
Combo:DN3-400S 400A 4P TM,SEOM	CM97205XOROOG
Combo:DN3-400S 400A 4P TM,SEOM, UVR	CM97205OOROOG
Combo:DN3-630D 630A 4P MTX 1.0,SEOM	CM93007XOTOX1
Combo:DN3-630N 630A 4P MTX 1.0, SEOM, Shunt	CM97201OBTOX1
Combo:DN3-630N 630A 4P MTX 1.0,SEOM, UVR	CM97201OOTOX1
Combo:DN3-630S 630A 4P MTX 1.0,SEOM, UVR	CM97205OOTOX1
Combo:DN3-630D 630A 4P MTX 2.0,SEOM	CM93007XOTOAG
Combo:DN3-630D 630A 4P MTX 2.0,SEOM, UVR	CM93007OOTOAG
Combo:DN3-630T 630A 4P MTX 2.0,SEOM	CM91012XOTOAG
Combo:DN3-630N 630A 4P MTX 2.0,SEOM	CM97201XOTOAG
Combo:DN3-630N 630A 4P MTX 2.0,SEOM, UVR	CM97201OOTOAG
Combo:DN3-630T 630A 4P MTX 2.0,SEOM, UVR	CM91012OOTOAG
Combo:DN3-630S 630A 4P MTX 2.0,SEOM, UVR	CM97205OOTOAG
Combo DN3-630N 630A 4P MTX 3.0,SEOM, UVR	CM97201OOTOBG
Combo DN3-630S 630A 4P MTX 3.0,SEOM, UVR	CM97205OOTOBG
Combo:DN3-630D 630A 4P TM,SEOM, UVR	CM93007OOTOOG
Combo:DN3-630N 630A 4P TM,SEOM	CM97201XOTOOG
Combo:DN3-630N 630A 4P TM,SEOM, Shunt	CM97201OBTOOG
Combo:DN3-630N 630A 4P TM,SEOM, UVR	CM97201OOTOOG
Combo:DN3-630S 630A 4P TM,SEOM, UVR	CM97205OOTOOG
ACC DN2/DN3/DN4 ATAC 1C/O each – Right	CM99804O0000
ACC dsine DN3 630 Mech Interlock Kit	CM99854O0000

# Trip Units & Accessories

## Thermal Magnetic Releases

Variable Thermal, Variable Magnetic (DN2, DN3)



## Magnetic Releases

Motor Back up Protection Release (DN2, DN3 - Magnetic Protection only)



## Isolator

Switch Disconnecter (DN2 , DN3)



## Microprocessor Releases

MTX1.0 with LSI (DN2, DN3)



MTX2.0 with LSING + Current Metering (DN2, DN3)



MTX3.0 with LSING + Communication capable + Power Metering (DN2, DN3)



## Accessories

### Internal

- » Auxiliary Contact
- » Trip Alarm Contact
- » Aux+Trip Alarm Contact
- » Shunt
- » UV



Auxiliary Contact



TAC



Shunt Release



UV Release

### External

- » Stored Energy Electrically Operated Mechanism
- » External Neutral CT
- » ROMs
- » Key Locks
- » Spreaders
- » MIL Kit
- » GF Module
- » MTX Modules
- » Terminal Shrouds



SEEOM



External NCT



ROM



Spreaders

**Note:** For more details, please contact branch

## Technical Details of SEEOM

### Stored Energy Electrically Operated Mechanism

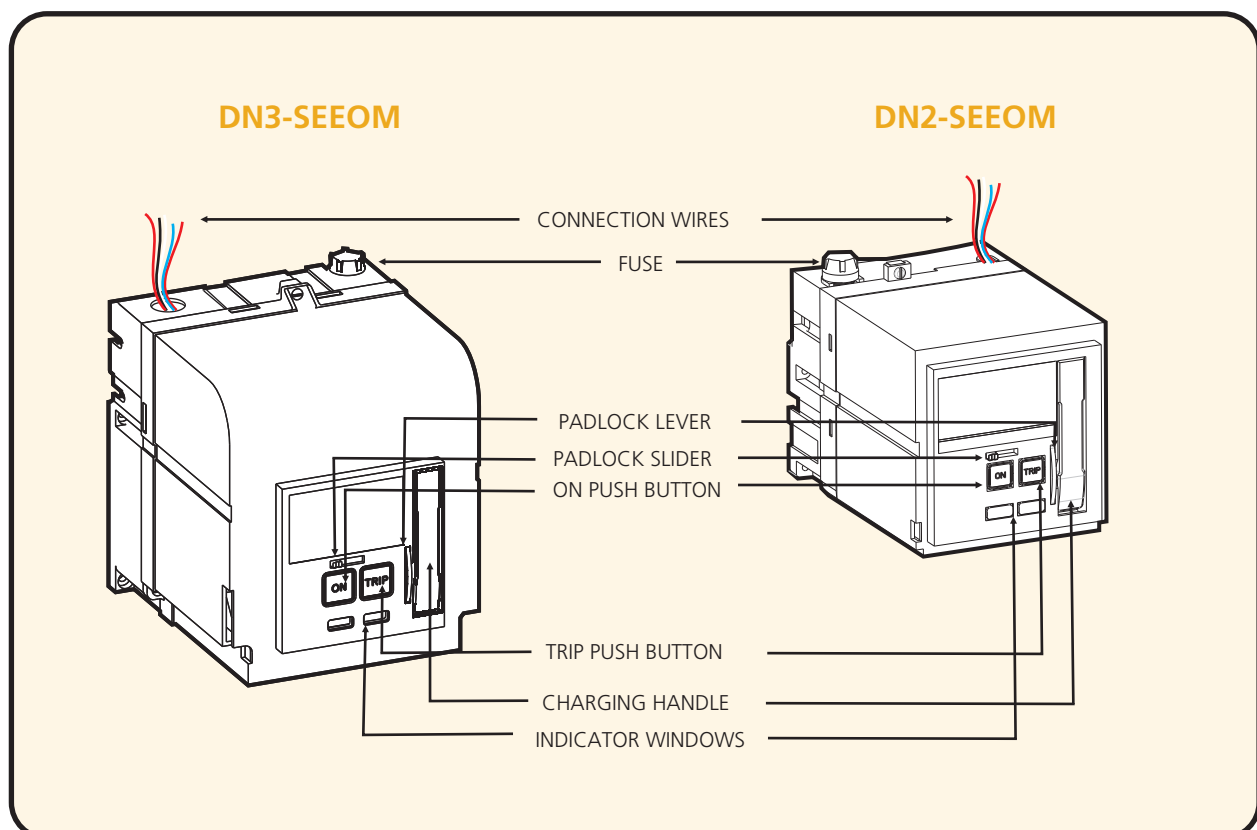
Specification	DN2	DN3
Operating voltage (V AC)	240V AC	240V AC
Operating voltage (%)	85 - 110%	85 - 110%
Closing time (ms)	60	90
Opening time (ms)	300	450
Power consumption (VA)	350	500
Life / No. of operations	16000	15000
Door cut out (mm) <sup>2</sup>	96 x 96	96 x 96
IP protection, on the front	IP30	IP30
Operating frequency	2/min	1/min
Min. control impulse time (ms)*	800	800

**Note:** For ordering information kindly contact nearest branch office.

\* At rated voltage



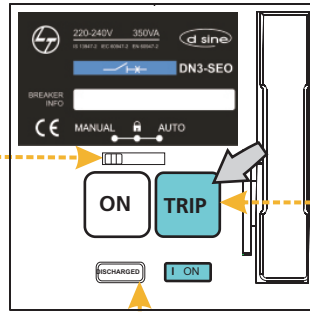
### Product Architecture



# Motorised MCCB Product Features

## Padlock Slider

The Padlock Slider can be set in AUTO mode for electrical operation or MANUAL mode for onsite manual operation by human personnel. As a safety feature the control supply of SEEOM is automatically cut off in manual operation.



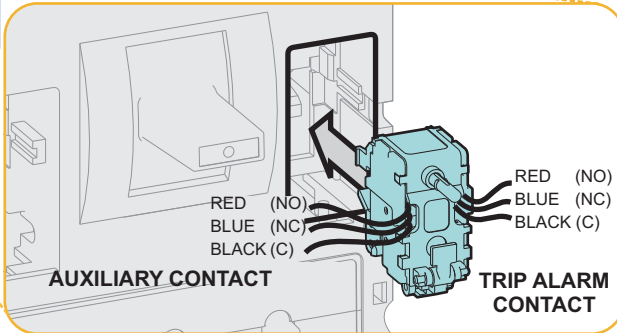
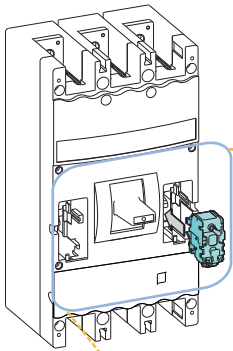
## ON and TRIP Push Buttons

ON and TRIP push buttons provided on the fascia assists in manual operation of SEEOM.

## Indicator Windows

The Charge/Discharge and ON/OFF window helps to ascertain the state of SEEOM and MCCB respectively.

EMERGENCY TRIP



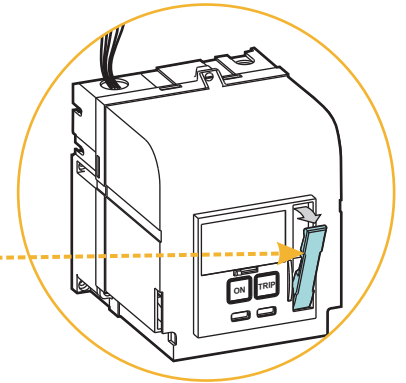
INDICATOR MODULE CONNECTIONS

## Auxiliary & Trip Alarm Contact

The Auxiliary (1NO & 1NC) and Trip alarm (1NO & 1NC) contacts are available to get status of MCCB. They can also be used to build a logic circuitry for changeover system and/or to get panel mounted status of MCCB.

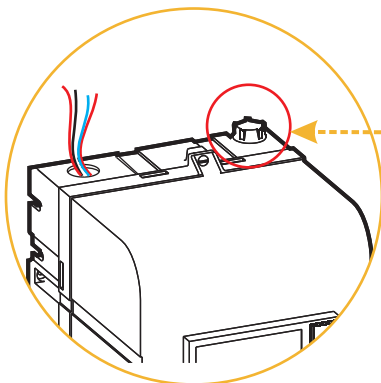
## Manual Charging Handle

The manual charging handle can be used for charging the spring of SEEOM and also resetting the MCCB in manual mode.



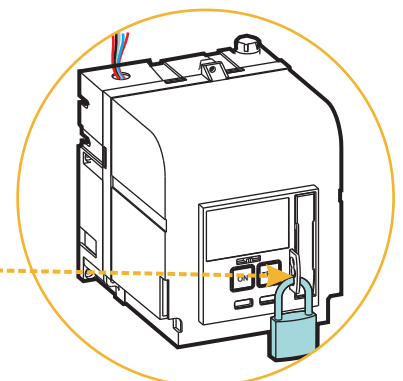
## Fuse Protection

The SEEOM is provided with a Cartridge type fuse to ensure healthiness of the control supply. It protects the internal components from damage due to faulty control supply.



## Padlocking

The SEEOM can be padlocked by up to three padlocks of Ø5mm to Ø7mm. It can also be used for Lock out and Tag out procedure used while undertaking maintenance of the system.

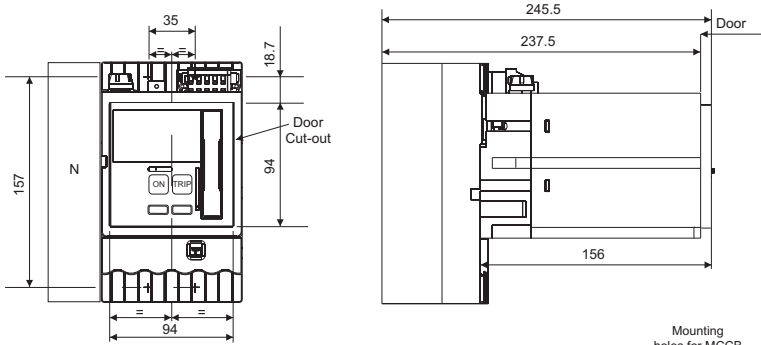




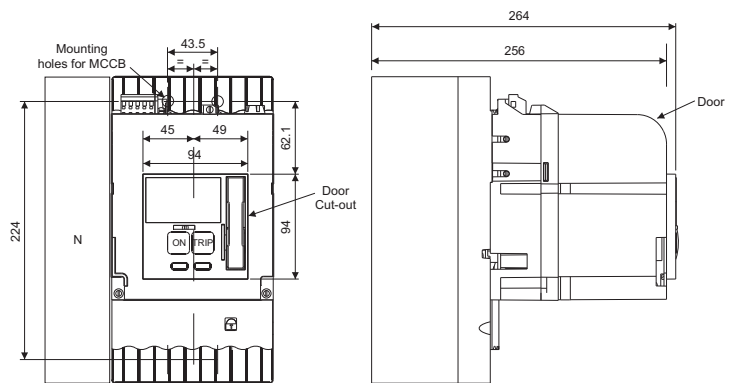
# Overall Dimensions

## MCCB with Stored Energy Electrically Operated Mechanism (SE-EOM)

### DN2

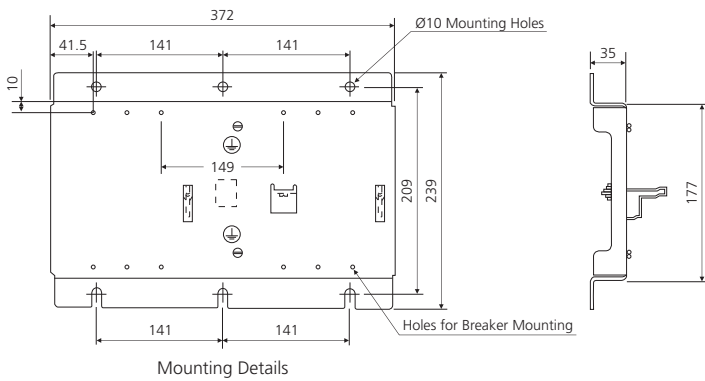


### DN3

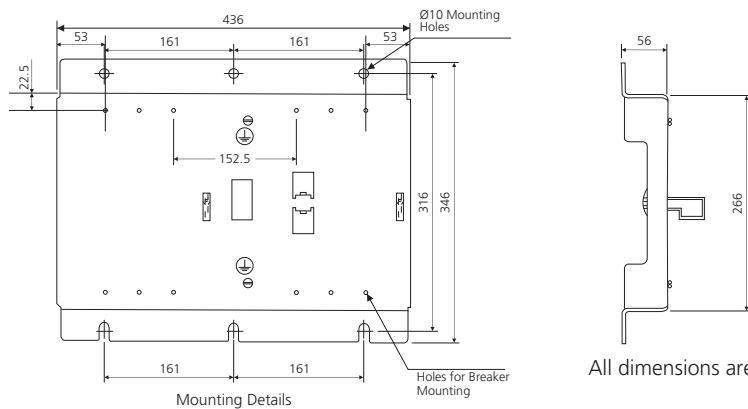


## Mechanical Interlocking Kit

### DN2

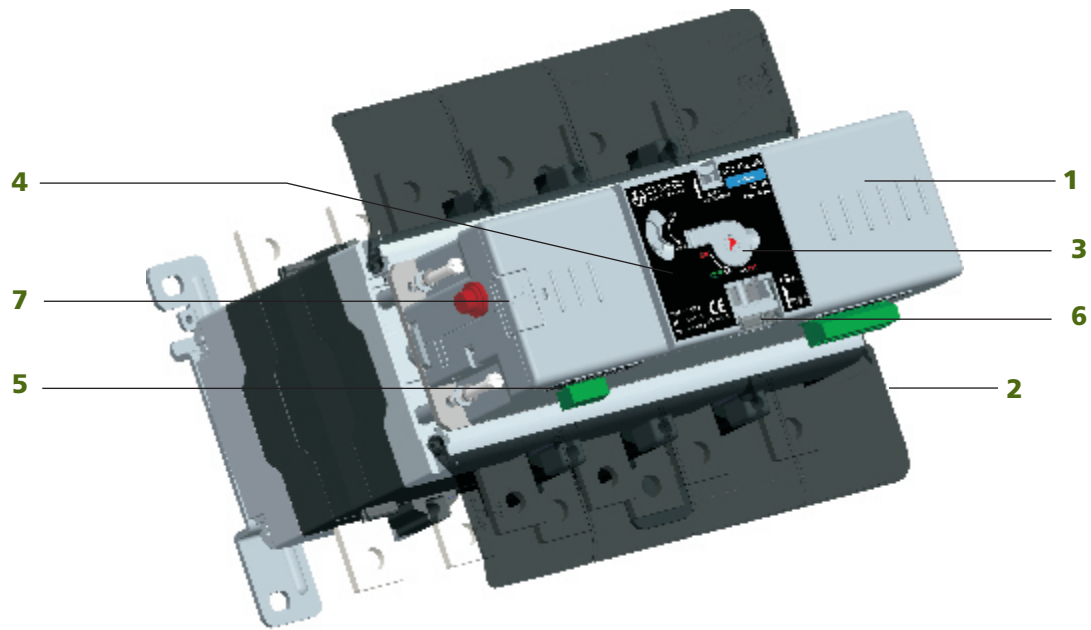


### DN3



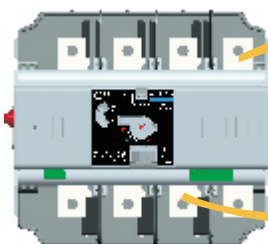
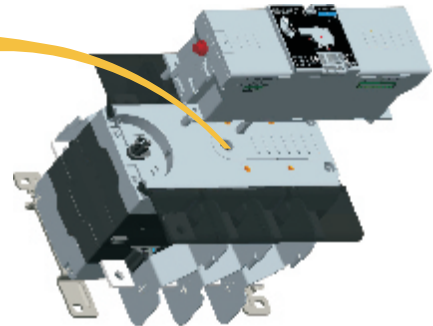
All dimensions are in mm

# Motorised Changeover Product Features



## 1. Site Mountable

Motorised kit (EOM) can be mounted over the manual changeover switch directly at site without any change in the panel area.



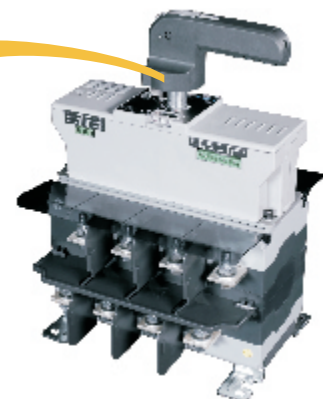
## 2. Clear Termination Access

Motorised kit (EOM) fits well within the body of the manual changeover switch, enabling clear access to the terminals even after mounting the motorised kit.

## 3. Manual Override

Manual operation of motorised changeover switch is also feasible through the manual override feature.

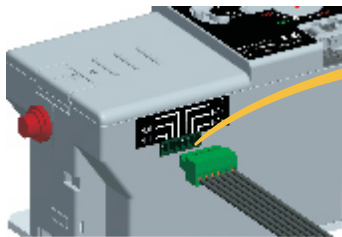
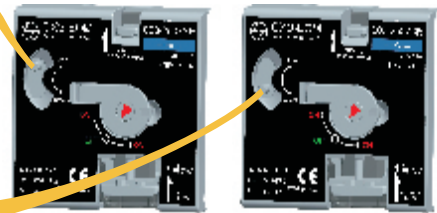
As a safety feature, the control supply of motorised kit (EOM) is automatically cut off during the insertion of handle.



## Motorised Changeover Product Features

### 4. Manual and Auto Mode Selection

The selector switch enables/disables the control supply to motorised changeover switch. Electrical operation is possible only in auto mode while manual mode allows the user to operate the motorised changeover switch manually using the handle safely by cut-off of supply to motorised changeover switch.



### 5. Auxiliary Contacts

It consists two sets of changeover contacts one for each S-D. It is prewired and prefitted in motorised changeover switch.

### 6. Pad Locking

Provision for padlocking in OFF position with three padlocks of Ø5 to Ø7. Padlocking possible in both auto and manual mode.

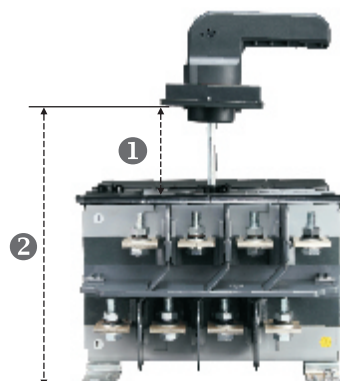
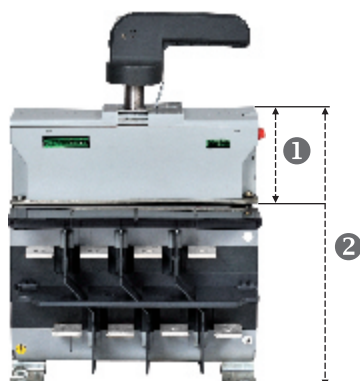


### 7. Fuse Protection

Inbuilt glass fuse of 5 x 20 size protects the motorised kit (EOM) during abnormalities. Also, spare fuse holder has been provided for storage of fuse.

### Compact Design

No change in H x W x D of motorised changeover switch and manual changeover switch.



# Changeover Switches

			Frame 2			
Rating (A)			125 A	160 A	200 A <sup>5</sup>	
Reference Standards						
Type designation			CO2-125	CO2-160	CO2-200	
No. of Poles			4 Pole	4 Pole	4 Pole	
Rated operational voltage (U <sub>e</sub> )			415	415	415	
Rated frequency			50 / 60	50 / 60	50 / 60	
Rated impulse withstand voltage (U <sub>imp</sub> )			12	12	12 <sup>5</sup>	
Pollution degree			3	3	3	
Conventional free air thermal current, I <sub>th</sub> at 40°C			125	160	200	
Conventional enclosed thermal current, I <sub>the</sub> at 40°C			125	160	200	
Rated operational current, I <sub>e</sub> AC-21A <sup>#</sup> / AC-22A <sup>#</sup> / AC-23A			125	160	200	
Rated operational power for AC-23A*			65	85	85	
Rated breaking capacity for AC-23A			1000	1280	1600	
Rated making capacity for AC-23A			1250	1600	2000	
Short time withstand, I <sub>cw</sub>	1 sec	(kA rms)	8	8	8	
	0.2 sec	(kA rms)	18	18	18	
Short-circuit making capacity, I <sub>cm</sub>			14	14	14	
Endurance (category A)	Mechanical	(O-I-O-II-O cycle)	16000	16000	16000	
	Electrical	(O-I-O-II-O cycle)	2000	2000	2000	
Type and size of fuse	DIN/Cylin▲		000	00	NA	
Rated fused short-circuit current at 415 V, 50/60 Hz	DIN/Cylin▲		100	100		
<b>Termination Capacity</b>						
Maximum Al. cable with lug			(sq mm)	95	95	150
Maximum link width			(mm)	30	30	30
Maximum link thickness			(mm)	5	5	5
Termination tightening torque			(N-m)	10	10	10
Operating torque center / side operating			(N-m)	10 / 13	10 / 13	10 / 13
Weight (without accessories)			(Kg)	4	4	4
<b>Motorised Kit Specification</b>						
Rated frequency	(Hz)			50		
Rated control voltage	(V)			240 V ac		
Control voltage range				85% - 110%		
Pollution degree	(%)			3		
Operating temperature	(°C)			-5 to + 55		
Ingress protection (from front)				IP30		
Max. current at 240 V ac	(A)			2		
Operating time (min)	O-I / I-O	(sec)		0.5		
	I-II / II-I	(sec)		1.4		
Black out time				1.4		
Control glass fuse current rating (240 V ac)	(A)			1.25		
Dimensions of motorised kit	Width	(mm)		210		
	Height	(mm)		84		
	Depth	(mm)		94		

\* These values are for 4 pole squirrel cage induction motors and are provided only for guidance and may vary as per the motor manufacturer

# Rated operational current, I<sub>e</sub> AC-21A / AC-22A

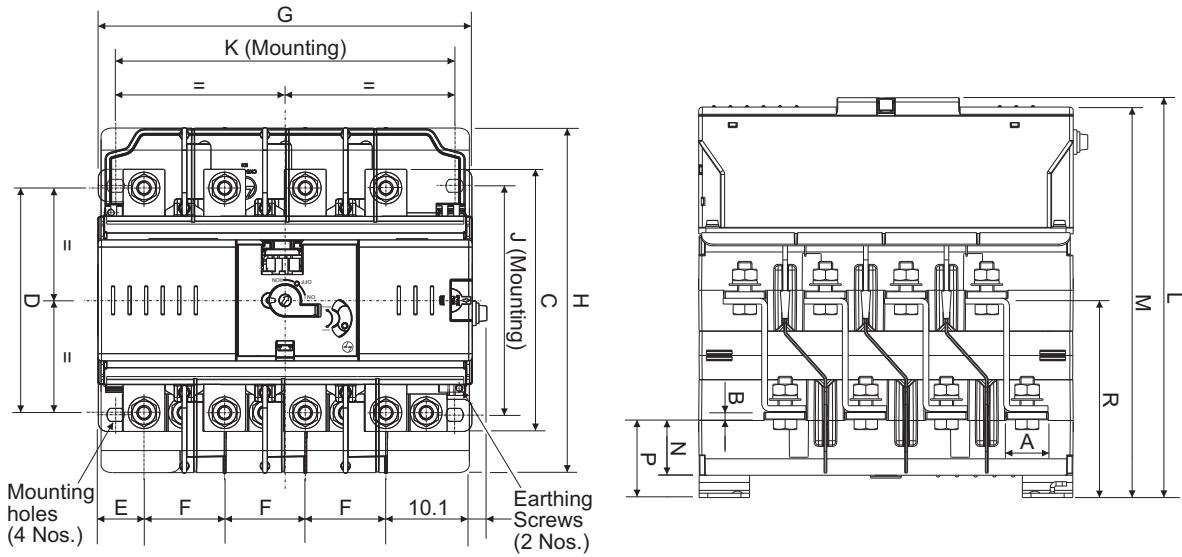
▲ Type cylindrical fuse

§ Claimed impulse withstand voltage with use of source separator and inter phase barriers

Frame 3		Frame 4		Frame 5			Frame 6		
250 A	315 A	400 A	630 A	630 A	800 A	1000 A	1250 A	1600 A	2000 A
IS / IEC 60947-3, EN 60947-3									
CO3-250	CO3-315	CO4-400	CO4-630	CO5-630	CO5-800	CO5-1000	CO6-1250	CO6-1600	CO6-2000
4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole
415	415	415	415	415	415	415	415	415	415
50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
12	12	12	12	12	12	12	12	12	12
3	3	3	3	3	3	3	3	3	3
250	315	400	630	630	800	1000	1250	1600	2000
250	315	400	630	630	800	1000	1250	1600	2000
250	315	400	630	630	800	1000	1250	1600*/1250	2000*/1250
132	160	225	315	315	400	450	710	710	710
2000	2520	3200	5040	5040	6400	8000	10000	10000	10000
2500	3150	4000	6300	6300	8000	10000	12500	12500	12500
<b>16</b>	<b>18</b>	<b>22</b>	<b>26</b>	<b>35</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>28</b>	<b>28</b>	<b>35</b>	<b>35</b>	<b>70</b>	<b>85</b>	<b>85</b>	<b>85</b>	<b>85</b>	<b>85</b>
32	36	46	55	73.5	105	105	105	105	105
<b>16000</b>	<b>16000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>
<b>2000</b>	<b>2000</b>	<b>2000</b>	<b>2000</b>	<b>2000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>500</b>
1	1	2	NA	3	3	NA	NA	NA	NA
100	100	100		100	100				
185	240	2 x 300	2 x 300	2 x 400	2 x 400	2 x 400	2 x 12 x 63	4 x 8 x 50	3 x 10 x 100
40	40	50	50	60	60	60	80	80	100
8	8	8	2 x 8	2 x 10	2 x 10	2 x 10	3 x 12	3 x 12	3 x 12
20	20	27	27	35	35	35	55	55	55
20 / 25	20 / 25	28 / 32	28 / 32	30 / 40	30 / 40	30 / 40	55	55	55
6.5	7	14	14.5	20	22	22	52	57	75
50	50	50	50	50	50	50	50	50	50
240 V ac	240 V ac	240 V ac	240 V ac	240 V ac	240 V ac	240 V ac	240 V ac	240 V ac	240 V ac
85% - 110%	85% - 110%	85% - 110%	85% - 110%	85% - 110%	85% - 110%	85% - 110%	85% - 110%	85% - 110%	85% - 110%
3	3	3	3	3	3	3	3	3	3
-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55	-5 to + 55
IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30
2	2	2	2	2	2	2	2	2	2
0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
1	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
260	310	310	310	380	380	380	274	274	274
84	84	84	84	84	84	84	108	108	108
94	94	94	94	94	94	94	118	118	118

# Overall Dimensions

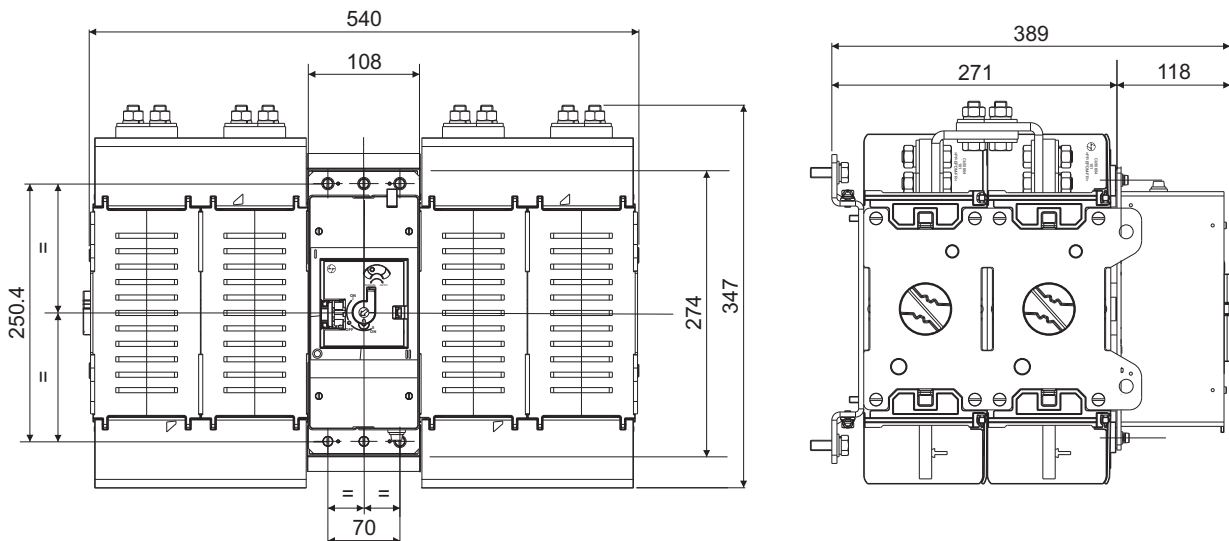
## CO2 to CO5 (125-1000A) Motorised Changeover Switch



Rating (A)	Frame		A	B	C	D	E	F	G	H	J	K
	CO	EOM										
125	CO2	CX2	22	3	138	121	28	44	210	211	120	190
160			22	3	138	121	28	44	210	211	120	190
200			26	5	150	121	28	44	210	211	120	190
250	CO3	CX3	29	4.5	182	156	32	56	260	239	159	235.4
315			35	5	198	164	32	56	260	239	159	235.4
400	CO4	CX4	40	5	228	202	32.3	70	310	329	200	286
630			40	6	228	202	32.3	70	310	329	200	286
630			50	6	264	228	-	80	380	351.6	220	345
800	CO5	CX5	50	8	264	228	-	80	380	351.6	220	345
1000			50	8	264	228	-	80	380	351.6	220	345

Frame		L	M	N	P	R	Mounting Hole Size	Earthing Screw Size
CO	EOM							
CO2	CX2	240.3	234.3	30	42	112	M6	M4
CO3	CX3	277.2	271.2	39	54	138	M8	M4
CO4	CX4	293.7	287.7	42	58	151	M8	M4
CO5	CX5	330.9	324.9	45	66.7	182	M8	M5

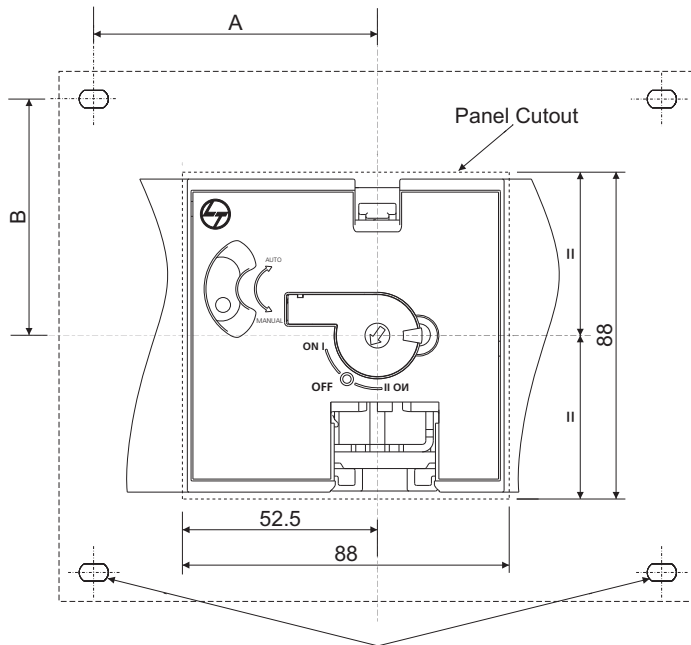
## CO6-1250/1600/2000 Motorised Changeover Switch



All dimensions are in mm

# Overall Dimensions

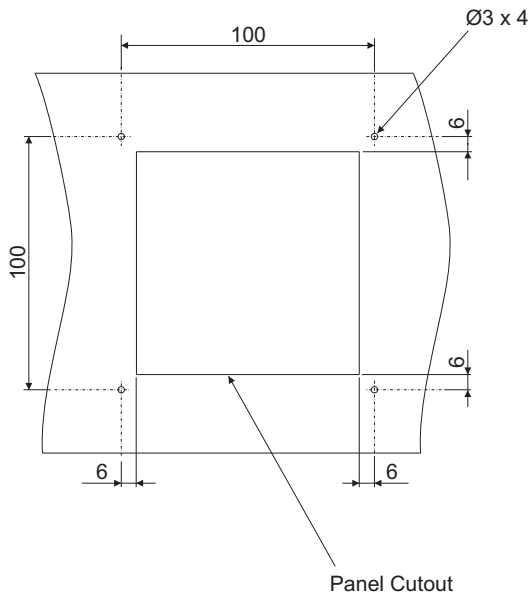
## Panel Cutout Motorised Changeover Switch



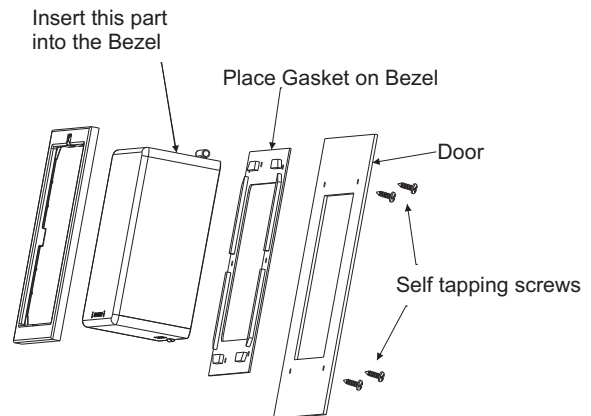
Type	A	B
CO2 with CX2	95	60
CO3 with CX3	117.7	79.5
CO4 with CX4	143	100
CO5 with Cx5	172.5	110

Mounting Holes of Respective Changeover Switch

## Drilling Plan for Mounting Bezel\* Motorised Changeover Switch

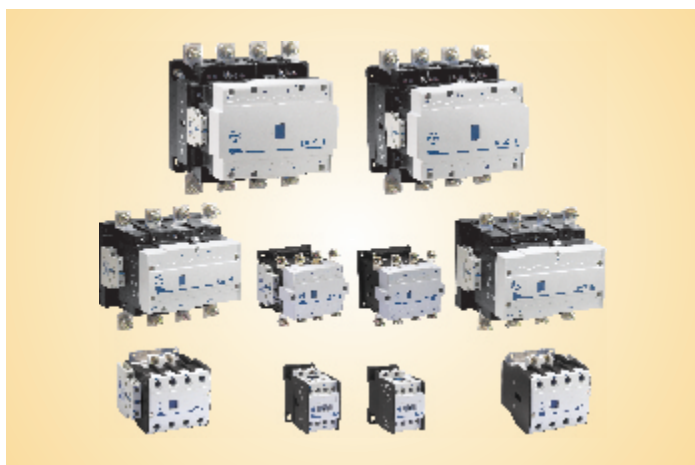


### BEZEL ASSEMBLY



\*Available with standard product.

# MCX Four Pole Contactor



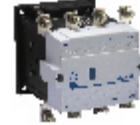
- Range from 16-800A AC1
- Wide operating band upto 100A AC1
- Compact mechanical interlock arrangement upto 80A



## Technical Data Sheet

Type		MCX 01	MCX 02	MCX 03	MCX 04
Catalogue no.		CS97009	CS97010	CS97011	CS97012
Conformance to standards					
Preferred DG ratings (kVA)		7.5	15	20	25
<b>Power contacts</b>					
No. of poles		4	4	4	4
Number of built-in auxiliary contacts		-	-	-	-
Rated insulation voltage, $U_i$		690V	690V	690V	690V
Rated operational voltage, $U_e$		415V	415V	415V	415V
Rated impulse withstand voltage, $U_{imp}$		8 kV	8 kV	8 kV	8 kV
<b>Conventional thermal current, <math>I_{th}</math>/Utilisation category AC1 at 55°C</b>		<b>16A</b>	<b>25A</b>	<b>32A</b>	<b>40A</b>
Service temperature		-20°C to 55°C	-20°C to 55°C	-20°C to 55°C	-20°C to 55°C
Main terminal capacity	With lug (sq mm)	1 x 6	1 x 6	1 x 6	1 x 6
	Link	-	-	-	-
	Solid conductor (sq mm)	2 x 4	2 x 4	2 x 4	2 x 4
	Multistrand conductors (sq mm)	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5
Auxiliary terminal capacity	Solid or multistrand conductors (sq mm)	-	-	-	-
<b>Coil</b>					
Voltage available for 50Hz opn, $U_c$ (V)		110, 220, 240, 415	110, 220, 240, 415	110, 220, 240, 415	110, 220, 240, 415
Pick-up	VA	68	68	68	68
	Watts	4	4	4	4
Hold-on	VA	11	11	11	11
	Watts	4	4	4	4
Limits of operation	Pick-up (% $U_c$ )	55 - 120	55 - 120	55 - 120	55 - 120
	Drop-off (% $U_c$ )	30 - 50	30 - 50	30 - 50	30 - 50
Overall dimensions H x W x D in mm		83 x 45 x 83.7	83 x 45 x 83.7	83 x 45 x 83.7	83 x 45 x 83.7
Mounting dimensions H x W in mm		(60 - 65 - 70) x 35	(60 - 65 - 70) x 35	(60 - 65 - 70) x 35	(60 - 65 - 70) x 35





MCX 11	MCX 12	MCX 13	MCX 22	MCX 23
CS97013	CS97014	CS97015	CS97017	CS97018
<b>IS/IEC 60947-4-1 &amp; IEC 60947-4-1</b>				
30	40	50	62.5	82.5
4	4	4	4	4
-	-	-	-	-
690V	690V	690V	690V	690V
415V	415V	415V	415V	415V
8 kV	8 kV	8 kV	8 kV	8 kV
<b>50A</b>	<b>63A</b>	<b>80A</b>	<b>100A</b>	<b>130A</b>
-20°C to 55°C	-20°C to 55°C	-20°C to 55°C	-20°C to 55°C	-20°C to 55°C
1 x 16	1 x 16	1 x 16	1 x 35	1 x 35
-	-	-	1 x (12.5 mm x 3 mm)	1 x (12.5 mm x 3 mm)
2 x 10	2 x 10	2 x 10	-	-
2 x 6	2 x 6	2 x 6	-	-
-	-	-	-	-
110, 220, 240, 415	110, 220, 240, 415	110, 220, 240, 415	240, 415	240, 415
180	180	180	190	190
22	22	22	22	22
5	5	5	5.5	5.5
50 - 120	50 - 120	50 - 120	65 - 120	65 - 120
25 - 45	25 - 45	25 - 45	40 - 60	40 - 60
80 x 83.5 x 91.8	80 x 83.5 x 91.8	80 x 83.5 x 91.8	109 x 103 x 120.5	109 x 103 x 120.5
(55 - 58) x 70	(55 - 58) x 70	(55 - 58) x 70	80 x 85	80 x 85

# MCX Four Pole Contactor



- Range from 16-800A AC1
- Wide operating band upto 100A AC1
- Compact mechanical interlock arrangement upto 80A



## Technical Data Sheet

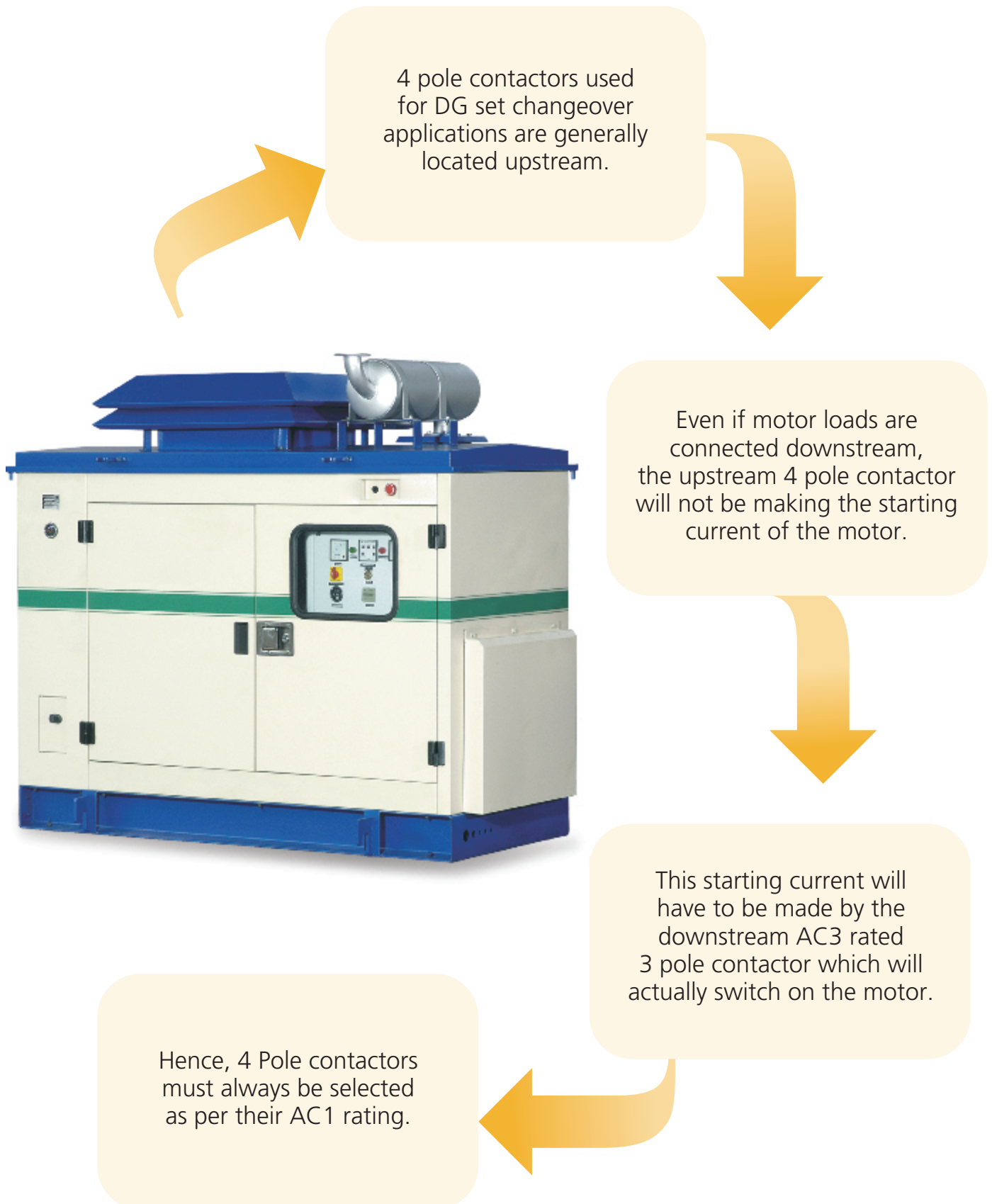
Type		MCX 32	MCX 33	MCX 34
Catalogue no.		CS97020	CS97021	CS97022
Conformance to standards				
Preferred DG ratings (kVA)		100	125	160
<b>Power contacts</b>				
No. of poles		4	4	4
Number of built-in auxiliary contacts		2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC
Rated insulation voltage, $U_i$		1000V	1000V	1000V
Rated operational voltage, $U_e$		415V	415V	415V
Rated impulse withstand voltage, $U_{imp}$		8 kV	8 kV	8 kV
<b>Conventional thermal current, <math>I_{th}</math> / Utilisation category AC1 at 55°C</b>		<b>160A</b>	<b>200A</b>	<b>255A</b>
Service temperature		-20°C to 55°C	-20°C to 55°C	-20°C to 55°C
Main terminal capacity	With lug (sq mm)	1 x 120	1 x 120	1 x 120
	Link	2 x (25 mm x 3 mm)	2 x (25 mm x 3 mm)	2 x (25 mm x 3 mm)
	Solid conductor (sq mm)	-	-	-
	Multistrand conductors (sq mm)	-	-	-
Auxiliary terminal capacity	Solid or multistrand conductors (sq mm)	-	-	-
<b>Coil</b>				
Voltage available for 50Hz opn, $U_c$ (V)		110, 240, 415	110, 240, 415	110, 240, 415
Pick-up	VA	550	550	550
Hold-on	VA	36	36	36
	Watts	10	10	10
Limits of operation	Pick-up (% $U_c$ )	80 - 110	80 - 110	80 - 110
	Drop-off (% $U_c$ )	35 - 65	35 - 65	35 - 65
Overall dimensions H x W x D in mm		175 x 183.5 x 152	175 x 183.5 x 152	175 x 183.5 x 152
Mounting dimensions H x W in mm		115 x 165	115 x 165	115 x 165



MCX 41	MCX 42	MCX 43	MCX 44	MCX 45	MCX 46	MCX 47
CS97023	CS97024	CS97025	CS97026	CS97027	CS97028	CS94291
<b>IS/IEC 60947-4-1 &amp; IEC 60947-4-1</b>						
200	225	250	320	380	437.5	500
4	4	4	4	4	4	4
2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC
1000V	1000V	1000V	1000V	1000V	1000V	1000V
415V	415V	415V	415V	415V	415V	415V
8 kV	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV
<b>325A</b>	<b>360A</b>	<b>400A</b>	<b>500A</b>	<b>600A</b>	<b>700A</b>	<b>800A</b>
-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C
2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
2 x (50 mm x 5 mm)	2 x (50 mm x 5 mm)	2 x (50 mm x 5 mm)	2 x (50 mm x 5 mm)	2 x (50 mm x 5 mm)	2 x (50 mm x 5 mm)	2 x (50 mm x 5 mm)
-	-	-	-	-	-	-
-	-	-	-	-	-	-
2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5
110, 240, 415	110, 240, 415	110, 240, 415	110, 240, 415	110, 240, 415	110, 240, 415	110, 240, 415
2100	2100	2100	2100	1000	1000	1000
95	95	95	95	25	25	25
35	35	35	35	10	10	10
80 - 110	80 - 110	80 - 110	80 - 110	80 - 110	80 - 110	80 - 110
35 - 65	35 - 65	35 - 65	35 - 65	35 - 65	35 - 65	35 - 65
278 x 248 x 221	278 x 248 x 221	275 x 248 x 221	275 x 248 x 221	275 x 248 x 221	275 x 248 x 221	275 x 248 x 221
170 x 225	170 x 225	170 x 225	170 x 225	170 x 225	170 x 225	170 x 225

## Four Pole Power Contactors for System Changeover

Why Four Pole contactors are selected as per AC-1 Utilization category



# Ordering Information

## Accessories for MCX

### Add-on Blocks



**MNX / MCX  
Top Add-on Block**

**MNX / MCX  
Side Add-on Block**

### Mechanical Interlock Kit



**MCX M3  
(MCX 21-22)**

## Spares for MCX



**MCX Spare Kits**

Accessories							
			MCX 01 - 04	MCX 11 - 13	MCX 21 - 23	MCX 31 - 34	MCX 41 - 47
	Mounting	Configuration	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
Add on Block	Top	4 NO	CS94112	CS94112	CS94112	-	-
		3 NO + 1 NC	CS94113	CS94113	CS94113	-	-
		2 NO + 2 NC	CS94114	CS94114	CS94114	-	-
		1 NO + 3 NC	CS94115	CS94115	CS94115	-	-
		4 NC	CS94116	CS94116	CS94116	-	-
		2 NO	CS94117	CS94117	CS94117	-	-
		1 NO + 1 NC	CS94118	CS94118	CS94118	-	-
		2 NC	CS94119	CS94119	CS94119	-	-
		1 NO	CS94120	CS94120	CS94120	-	-
		1 NC	CS94121	CS94121	CS94121	-	-
	First Left	1 NO + 1 NC	CS94220	CS94201	CS94201	CS94205	CS94205
	First Right	1 NO + 1 NC	CS94221	CS94202	CS94202	CS94206	CS94206
	Second Left	1 NO + 1 NC	-	CS94203	CS94203	CS94207	CS94207
Second Right	1 NO + 1 NC	-	CS94204	CS94204	CS94208	CS94208	
Mechanical Interlock Kit			CS94126	ST50540	CS93095	SS94992	CS94301
Surge Suppressors*			CS94166	CS94163	CS94163	CS94164	CS94165

Spares		
Contactor	Spare Kits	Spare Coil *
MCX 01 - 04	-	CS94105
MCX 11	CS94077	CS94009
MCX 12	CS94078	
MCX 13	CS90307	
MCX 21	CS94330	ST91291
MCX 22	CS94331	
MCX 23	CS90078	
MCX 31	CS94081	CS94196
MCX 32	CS94082	
MCX 33	CS94083	
MCX 34	CS94084	
MCX 41	CS94295	
MCX 42	CS94296	CS94195
MCX 43	CS94297	
MCX 44	CS94298	
MCX 45	CS94299	CS94193
MCX 46	CS94300	
MCX 47	CS90308	

\* Add 4 Digit Coil Suffix as per required voltage

Note: • For MCX 11 - 13 with mechanical interlock kit, side add-on block can not be used.

- Ordering suffix for add-on block and mechanical interlock kit is OOOO.

## Ordering Suffix for Coil Voltages

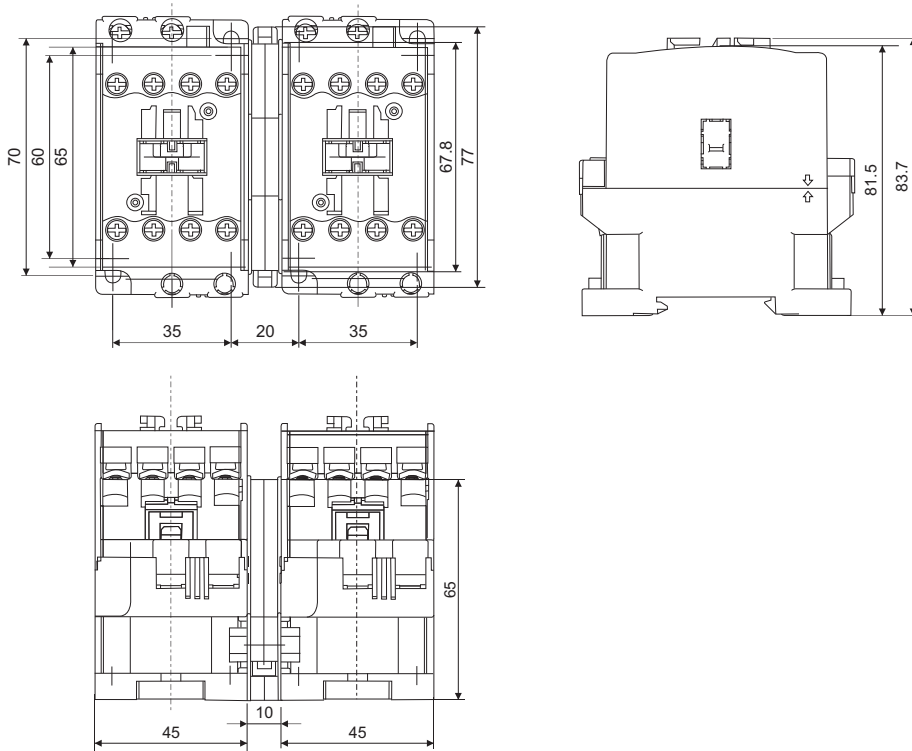
Std Coil voltage at 50Hz	24	42	48	110	220	240	360	380	415	440	525
Ordering Suffix	G000	J000	H000	A000	K000	B000	C000	L000	D000	P000	M000

Note: Ordering suffix for MCX 21/22/23: F000 - 240V AC, R000 - 415V AC

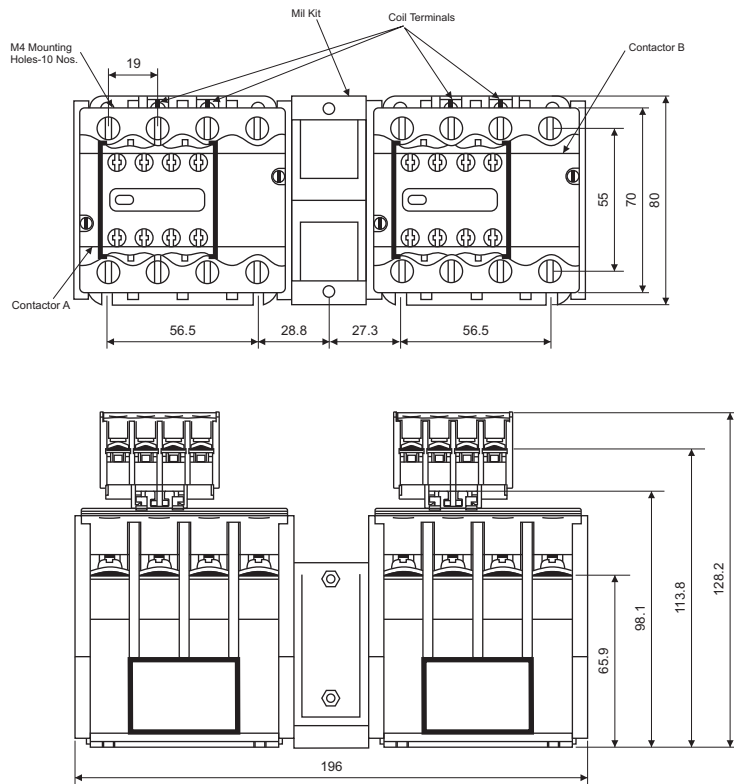
# Overall Dimensions

## Four Pole Contactors - Type MCX

### MCX 01-04



### MCX 11 / MCX 12 / MCX 13

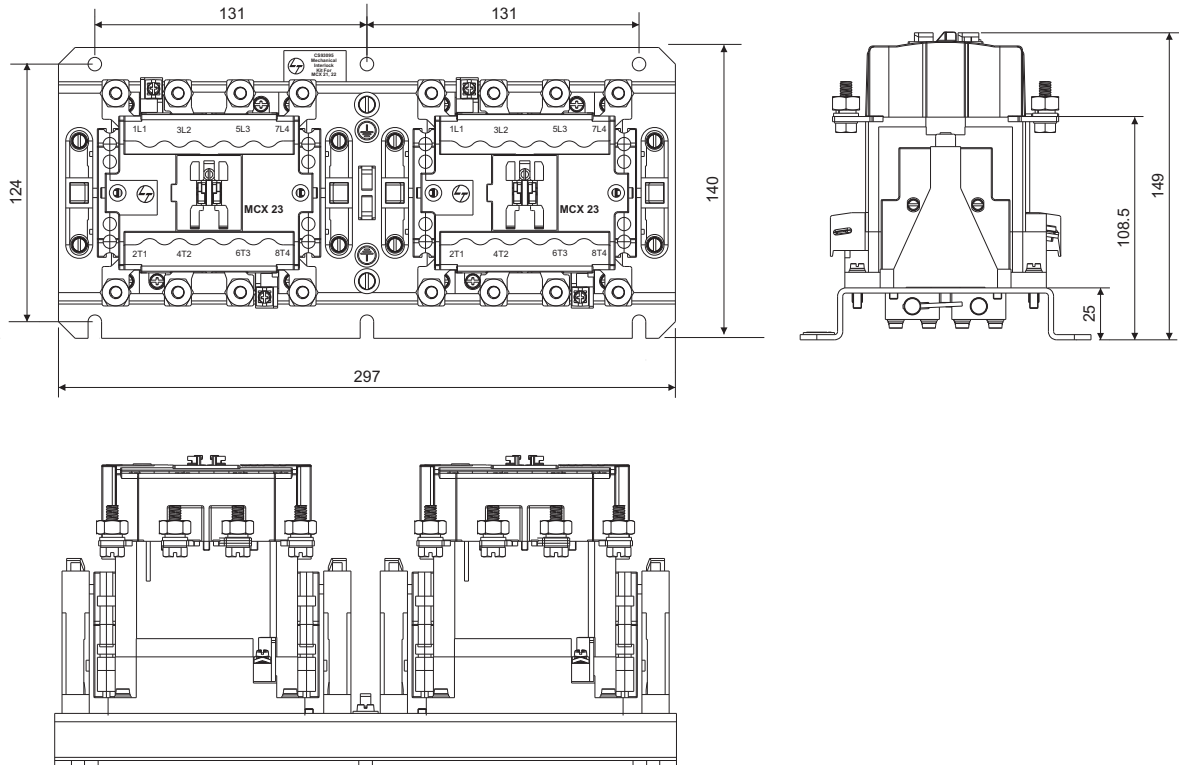


All Dimensions in mm

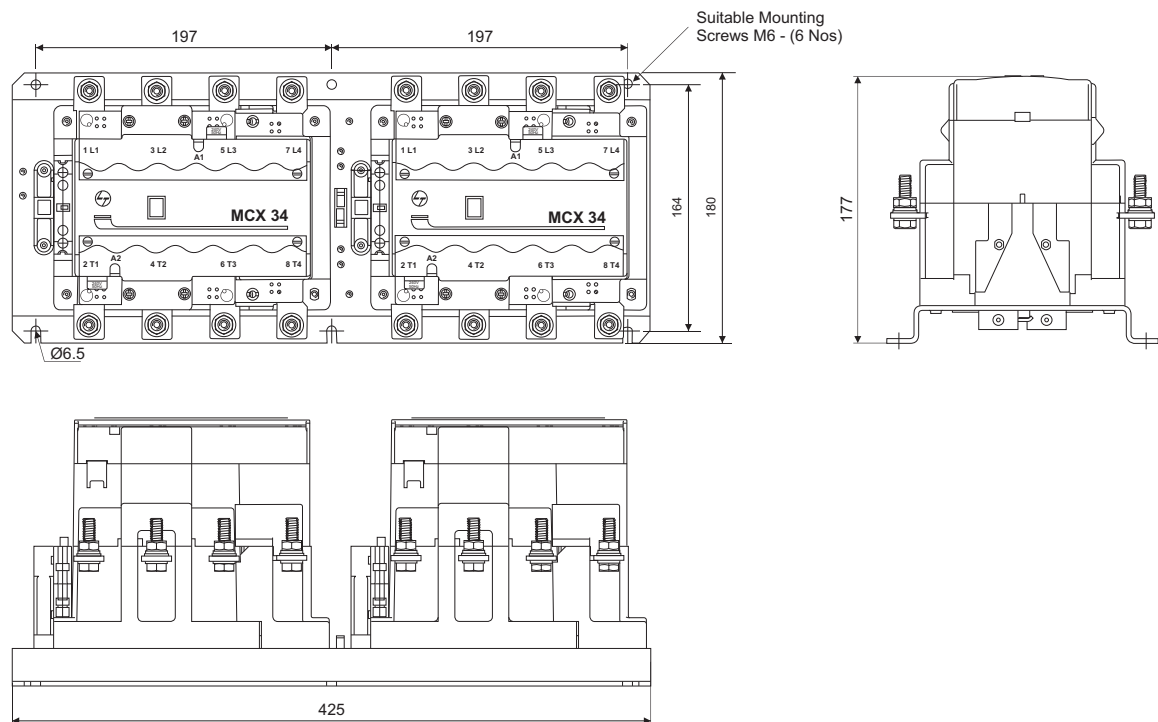
# Overall Dimensions

## Four Pole Contactors - Type MCX

### MCX 22-23



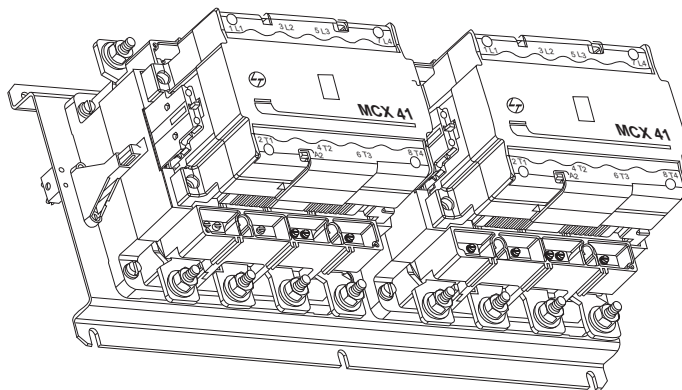
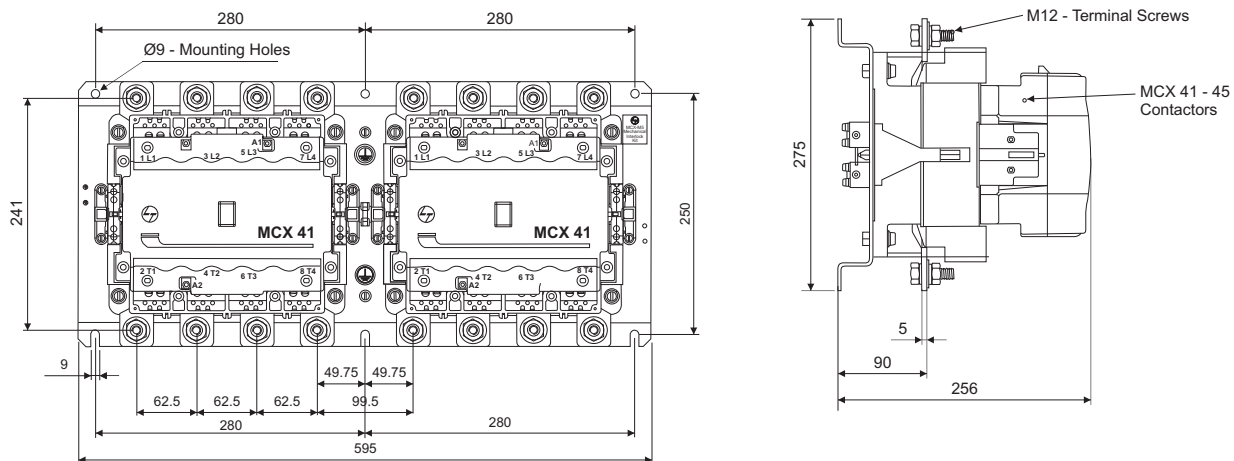
### MCX 32-34



# Overall Dimensions

## Four Pole Contactors - Type MCX

MCX 41 / MCX 42 / MCX 43 / MCX 44 / MCX 45 / MCX 46 / MCX 47







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