

# Automatic Source Transfer Solution in LV System



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# POWER TRANSFER SOLUTIONS

## MANUAL SOURCE TRANSFER

MANUAL  
CHANGEOVER  
SWITCHES

## AUTOMATIC SOURCE TRANSFER



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Popular among customers as L&T Switchgear, E&A offers a wide range of low and medium voltage switchgear, motor starters, electrical systems, industrial automation, building electrical solutions, energy management solutions, electrical modernization solutions and metering solutions. Its products and solutions cater to key sectors of economy like industries, utilities, infrastructure, building and agriculture.

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.



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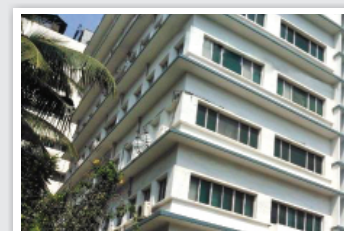
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# Making Changeover **Safer, Smarter**



**AuXC-2000**  
**Automatic Transfer Controller**

# 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

# 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
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

# Automatic Source Transfer Solutions in LV system

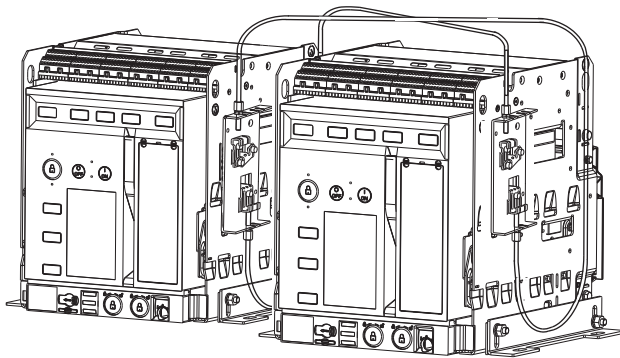
Keeping all the above requirements of ASTS, there can be multiple combinations which can be selected. The selection of transfer system for specific installations can be optimized by keeping following parameters in mind:

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**

+



**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**



**Motorised Changeover Switches**



**AuXC-2000**

- a. Single motorized Change-over switch for power transfer with self interlocked mechanism - higher reliability
- b. Additional Fuse / Circuit breaker required for protection
- c. Sensing, time setting option, multiple change-over logics etc, through either a simple or a sophisticated Auto Transfer Controller AuXC-2000
- d. Least panel space required with fuse back up**
- e. Higher mechanical life
- f. Minimum change-over time - 1 sec.
- g. 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**



**Mechanically Interlocked Contactors**



**AuXC-2000**

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

# 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 switches having a good withstand capability. With changeover switches 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.

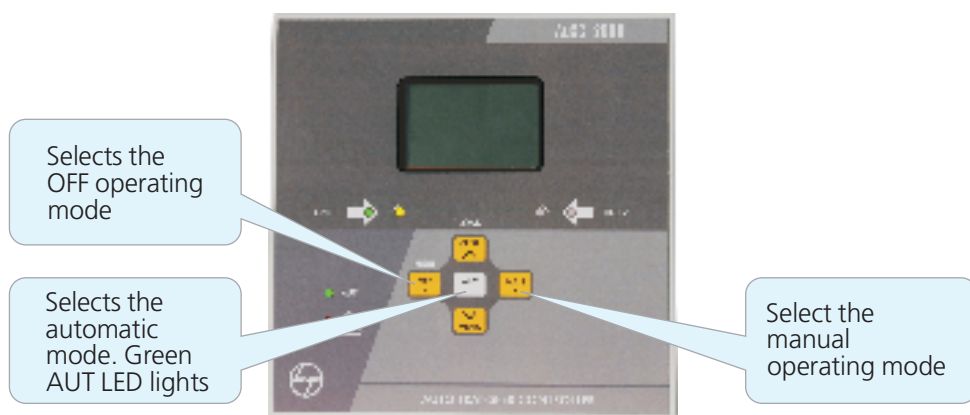
# AuXC-2000 Controller

<b>AC Supply : terminals 13, 14</b>	
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)
<b>Insulation voltage</b>	
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
<b>Line 1 and Line 2 voltage inputs: terminals 1-4 and 5-8</b>	
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.
<b>Ambient operating conditions</b>	
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)

<b>Measuring accuracy</b>	
Mains and generator voltage	±0.25% f.s. ±1digit
<b>Real time clock</b>	
Energy storage	Back-up capacitors
Operating time without supply voltage	About 5 minutes
<b>Digital inputs: terminals 15 - 20</b>	
Input type	Negative
Current input	8mA
Input "low" voltage	2,2
Input "high" voltage	3,4
Input delay	50ms
<b>OUT1 and OUT 2 outputs: terminals 9,10 e 11,12</b>	
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
<b>OUT3 output: terminals 22, 23, 24</b>	
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
<b>OUT4 and OUT 5 outputs: terminals 25,26,27</b>	
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
<b>OUT6 and OUT 7 outputs: terminals 28,29,30</b>	
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
<b>Connections</b>	
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)
<b>Housing</b>	
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.	
<b>Ordering information</b>	
AuXC Controller	ATC20000000

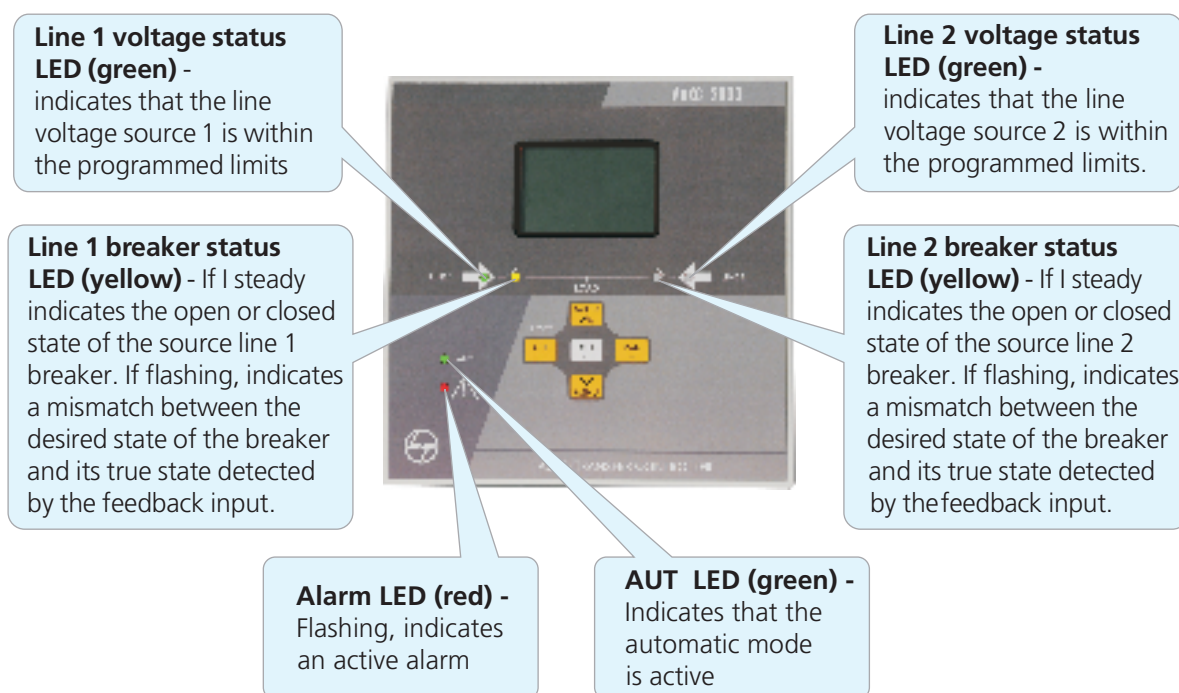
# AuXC-2000 Controller

## 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

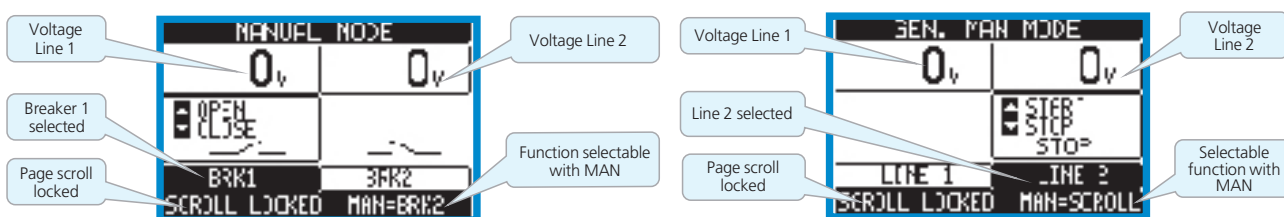
### OFF Mode

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).

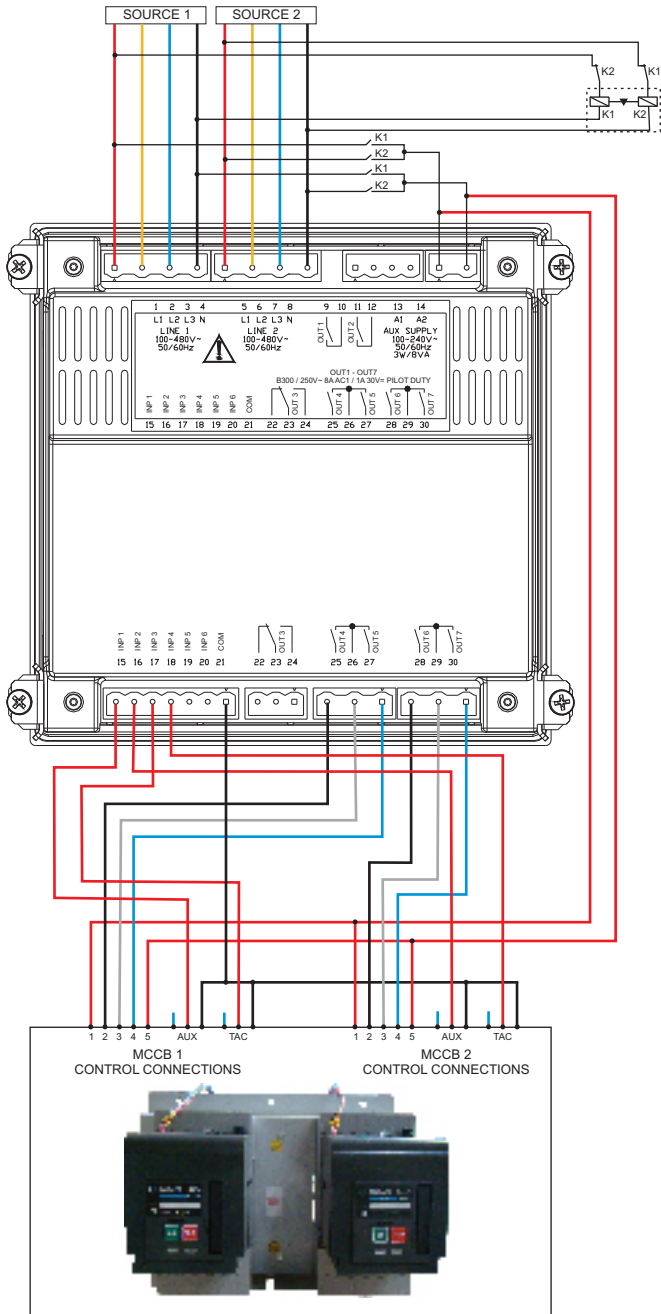
## Symbols & Wiring Diagrams

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

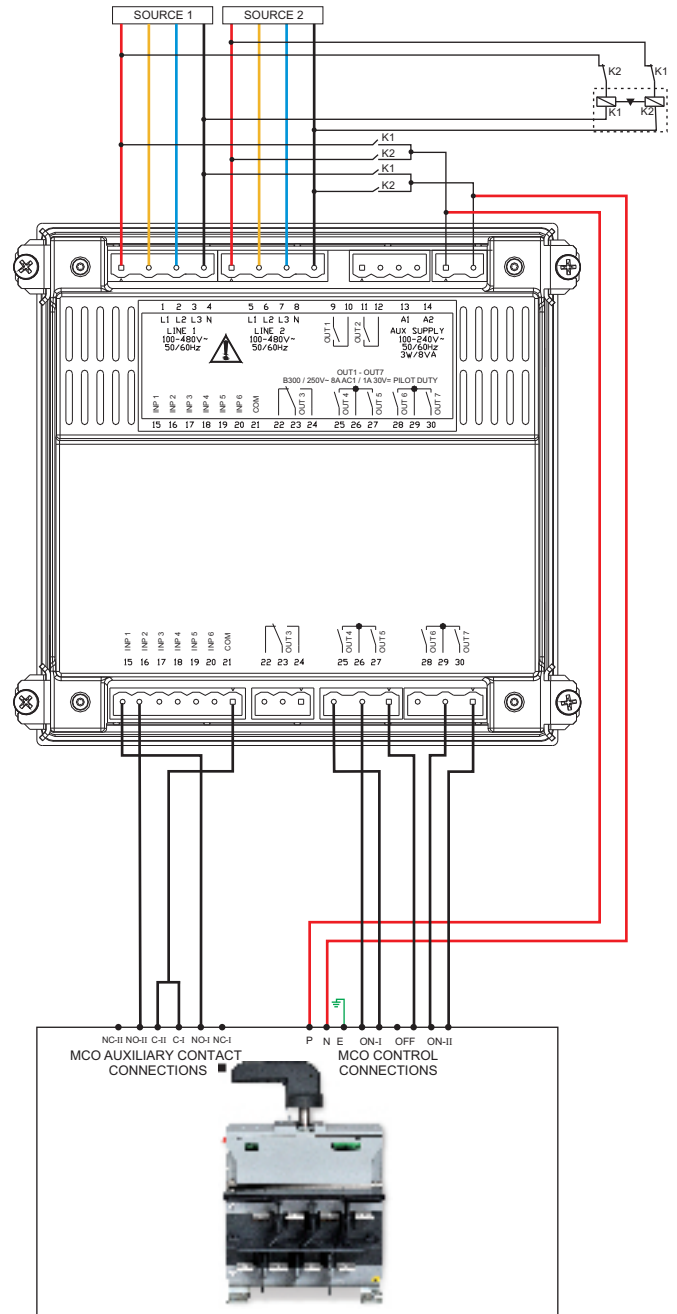


# Wiring Diagrams - AuXC-2000

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



## Control of Motorised Changeover Switch Disconnecter

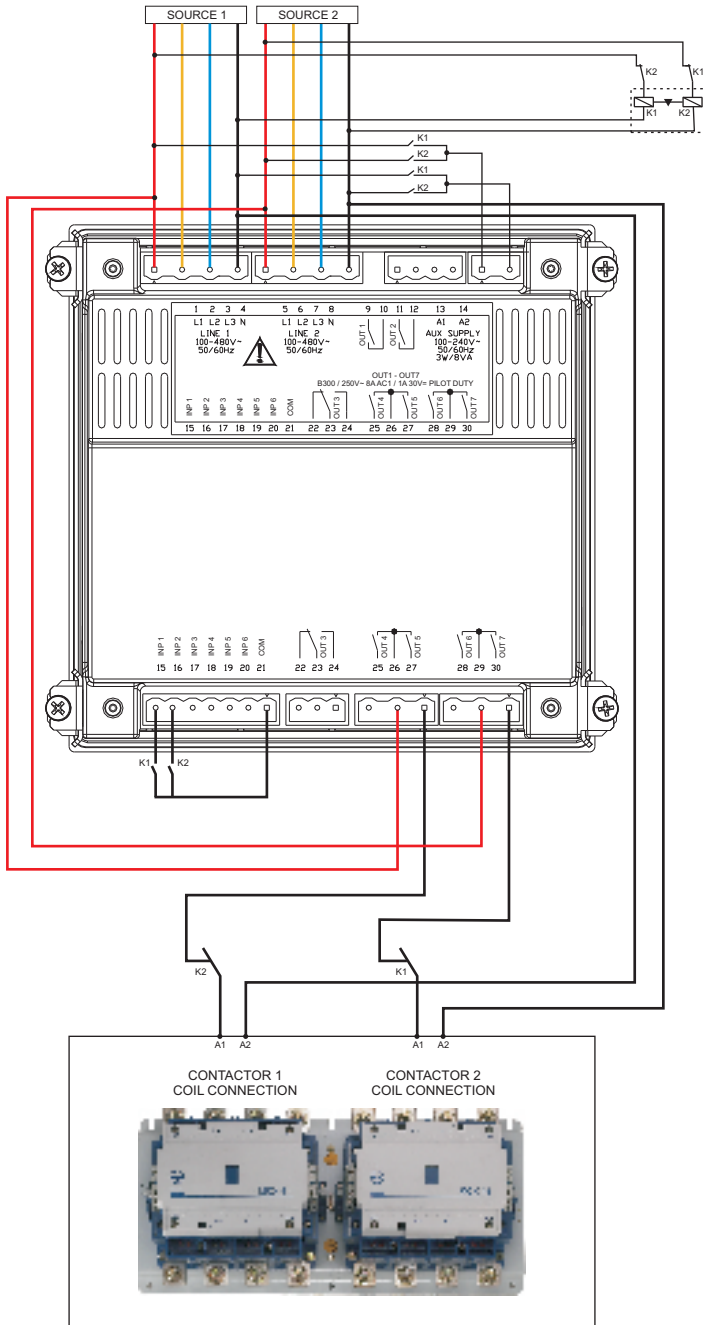


Programming	Connection Terminal	Parameter code	Setting (Description)
Others	-	P05.07	Breaker pulse or breaker continuous
Inputs	15(INP1)	P10.01.01	Line 1 breaker closed (Feedback 1)
	16(INP2)	P10.02.01	Line 2 breaker closed (Feedback 2)
	17(INP3)	P10.03.01	Line 1 circuit breaker protection (Trip 1)
	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

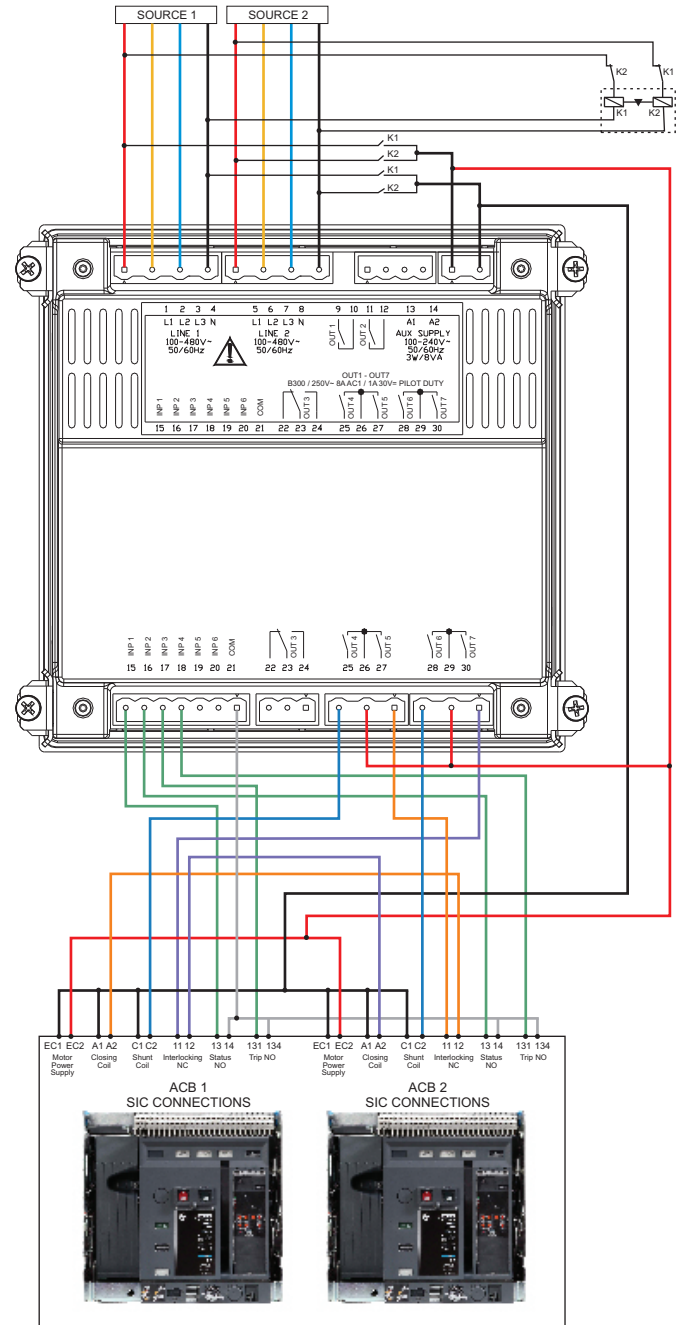
# Wiring Diagrams - AuXC-2000

## 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

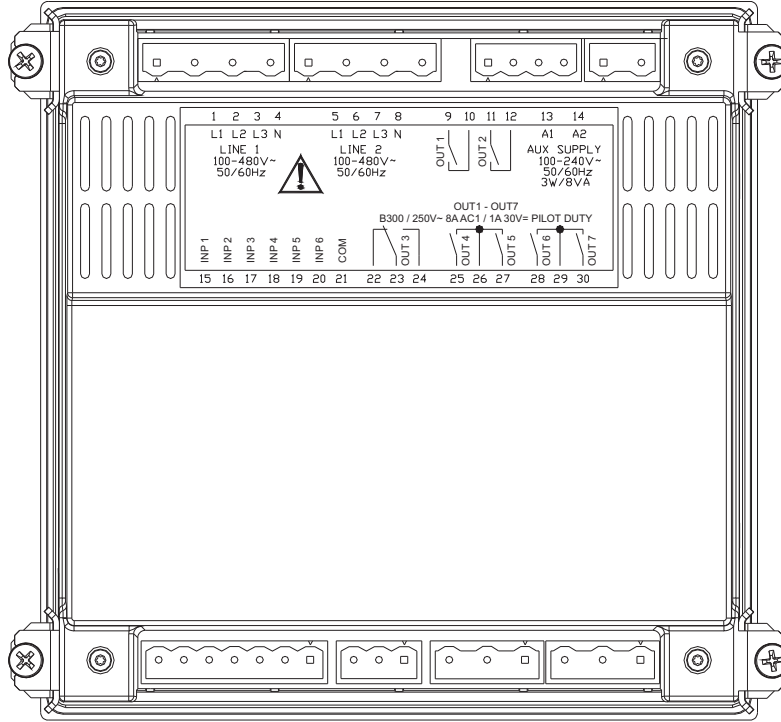
## Control of Omega ACBs



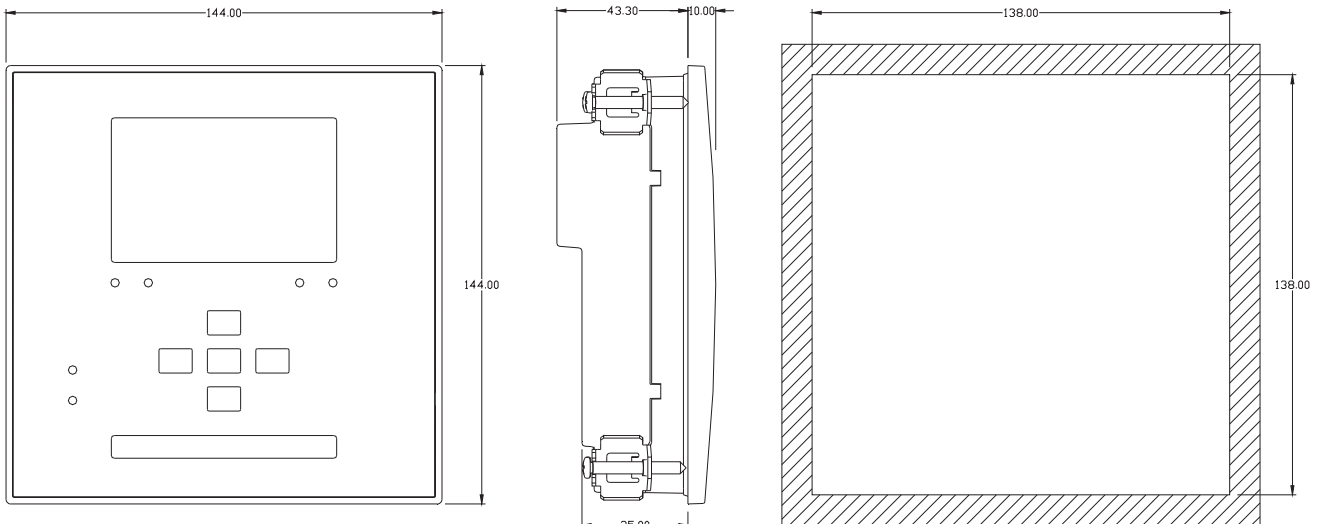
Programming	Connection Terminal	Parameter code	Setting (Description)
Others	-	P05.07	Breaker pulse or breaker continuous
Inputs	15(INP1)	P10.01.01	Line 1 breaker closed (Feedback 1)
	16(INP2)	P10.02.01	Line 2 breaker closed (Feedback 2)
	17(INP3)	P10.03.01	Line 1 circuit breaker protection (Trip 1)
	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

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				15000			10000				
		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			
			Height		430										
	Draw-out ACB	W (mm)	Width 3P		347				447			647			
			Width 4P		447				581			847			
		D (mm)	Depth		421							431			
			Height		433										

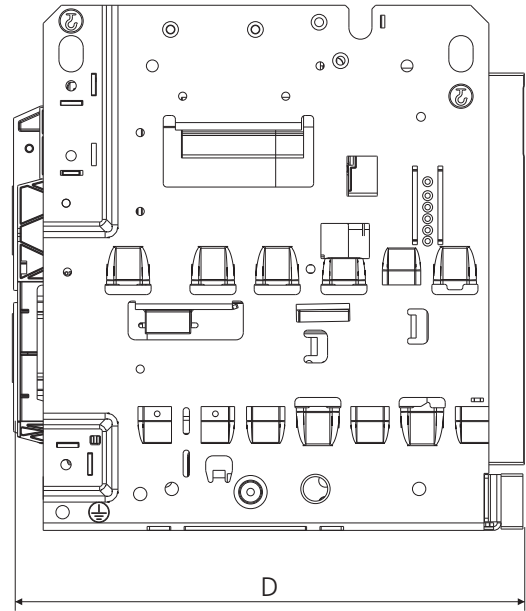
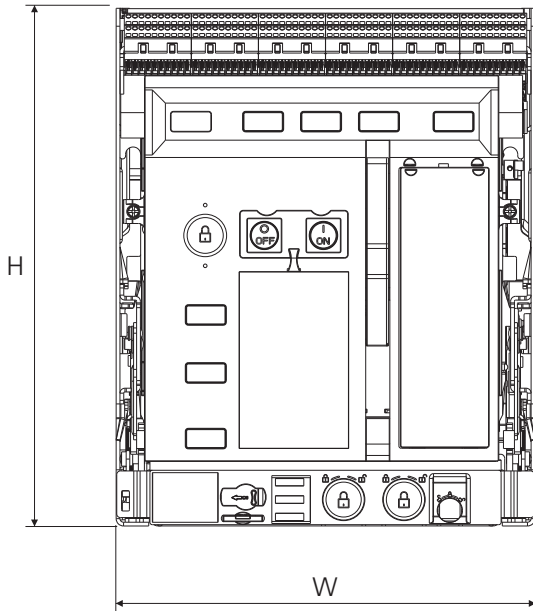
# Rated Uninterrupted Current (In) (A) at 40°C

\* Available till 2500A

\*\* Value corresponds operating cycle

\$ Please consult branch office for selection

U-POWER  
**OMEGA** Air Circuit Breakers



H : Height

W : Width

D : Depth with flat terminals

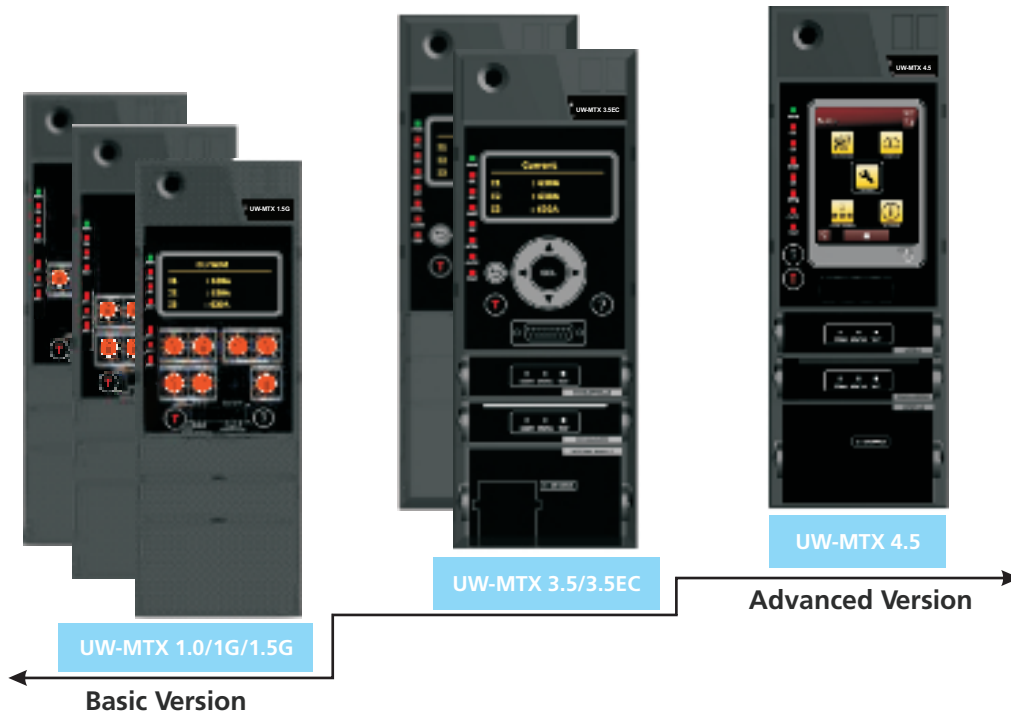
**Rating Specification Parameters for 50% N ACB**

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



## Accessories - Air Circuit Breakers

### Breaker Accessories

- ▶ Auxiliary Contact Block
- ▶ Shunt Release (SR)
- ▶ Closing Release (CR)
- ▶ Under-Voltage Release (UVR)
- ▶ Electrical Charging Device (ECD)
- ▶ Operation Counter
- ▶ Micro-switches for electrical indications:
  - Common fault indication
  - Under-Voltage release trip indication
  - Shunt release trip indication
  - Spring charging indication
  - Ready to close indication
- ▶ Locking 'OFF' Button (LOB)
- ▶ Shroud for ON-OFF Button

### Cradle Accessories

- ▶ Electrical Position Indication (EPI)
- ▶ Door-Interlock
- ▶ Door-Racking Interlock
- ▶ Locking in all Positions
- ▶ Locking in Disconnected Position
- ▶ Safety Shutter
- ▶ Arc-Shield
- ▶ Rating Error-Preventer

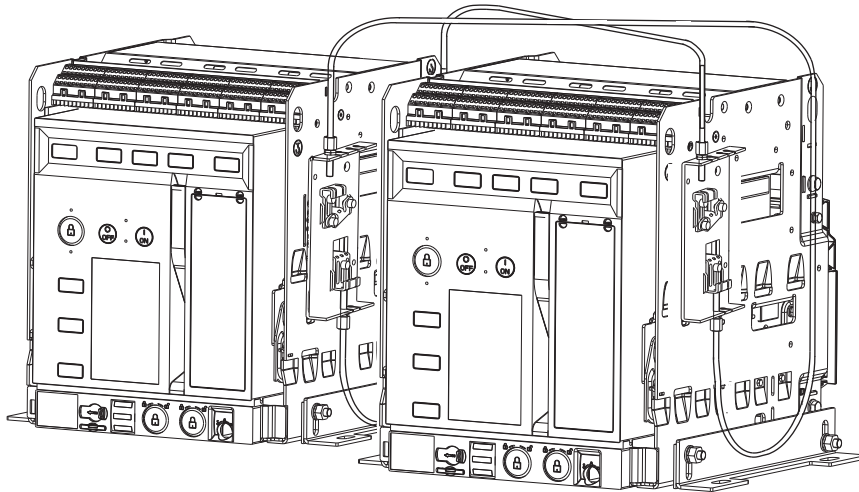
### Miscellaneous

- ▶ External Neutral Cts
- ▶ Mechanical Interlock
- ▶ Safety Cover
- ▶ Terminal Adaptors

## 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>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 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>I</td><td>I</td><td>O</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	I	I	O	I	O	I	
A	B	C																						
O	O	O																						
I	O	O																						
O	I	O																						
O	O	I																						
I	I	O																						
I	O	I																						

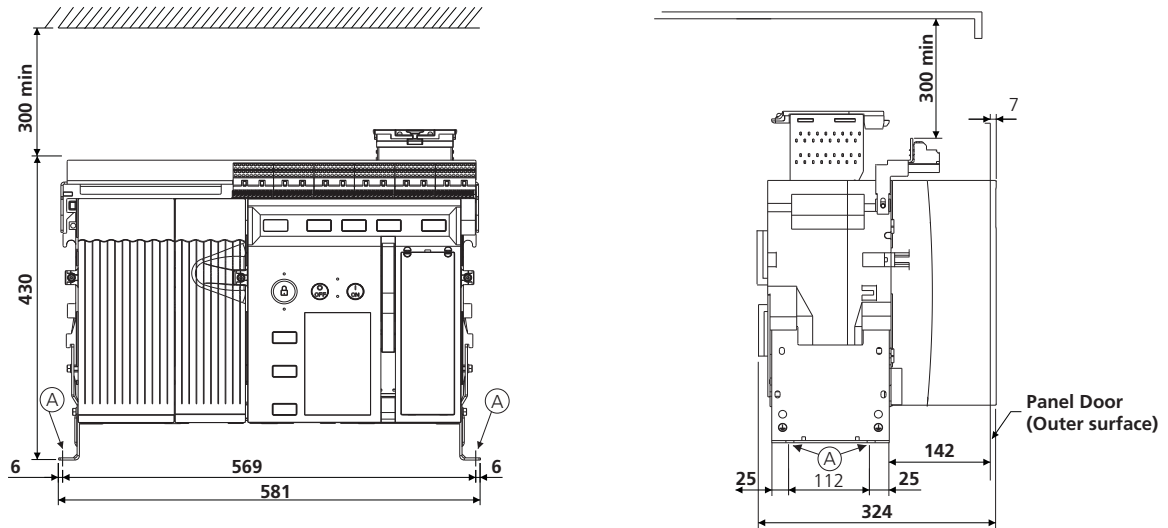
O - Breaker Open    I - Breaker Closed



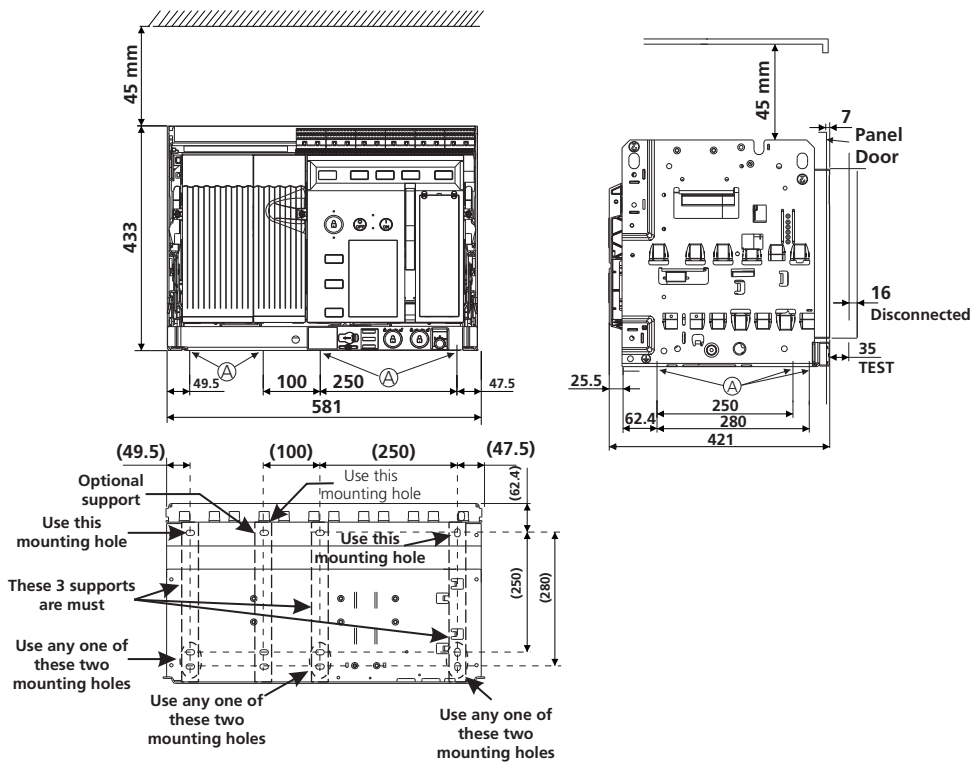


### 400-3200A S/H Fr.2 4P (100% N)

#### Fixed Circuit Breaker



#### Draw-out Circuit Breaker



Details of 4P (200%) on request

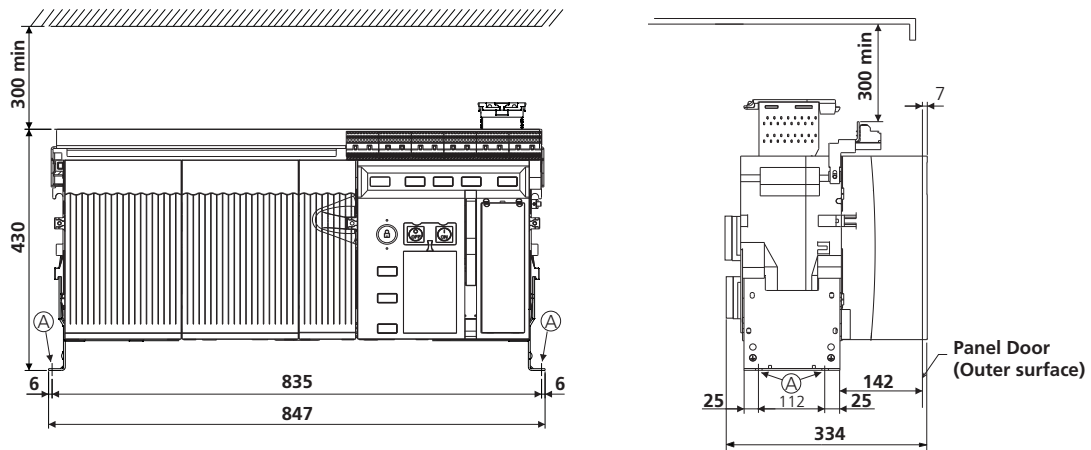
All Dimensions in mm

(A) Mounting holes suitable for M10 / Equivalent BS bolt

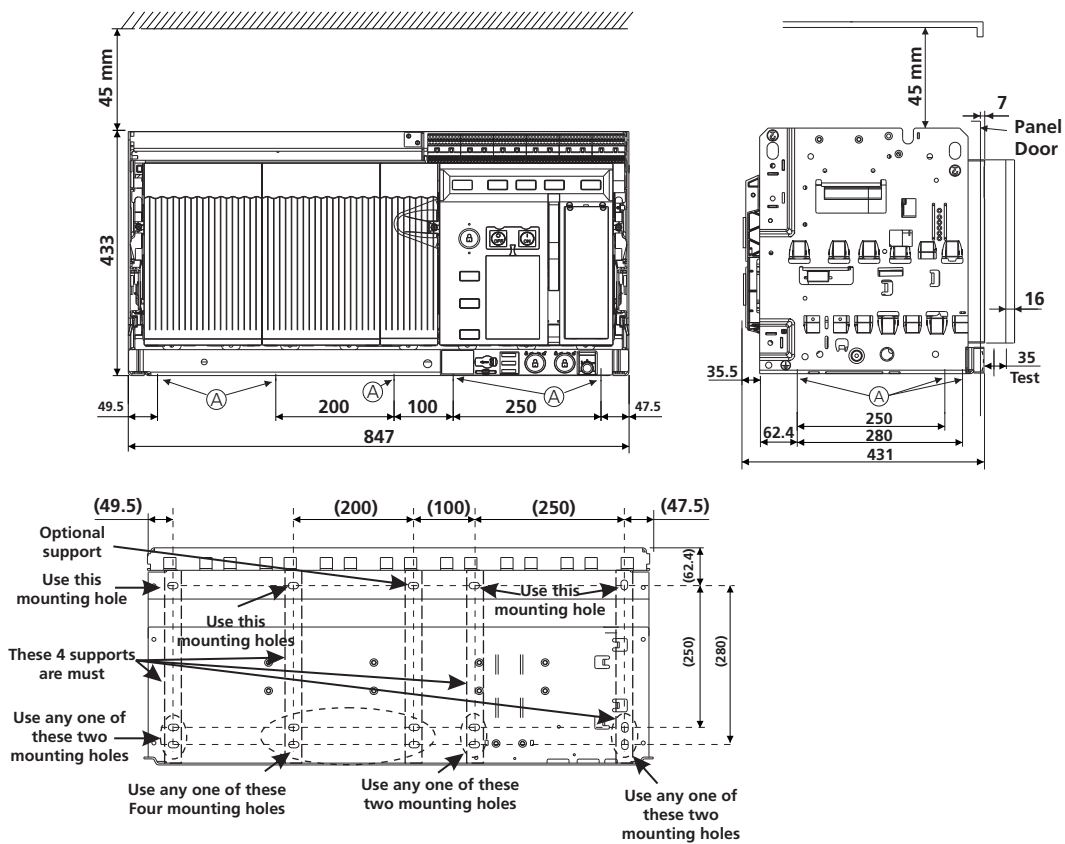
All Dimensions in mm

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

#### Fixed Circuit Breaker



#### Draw-out Circuit Breaker

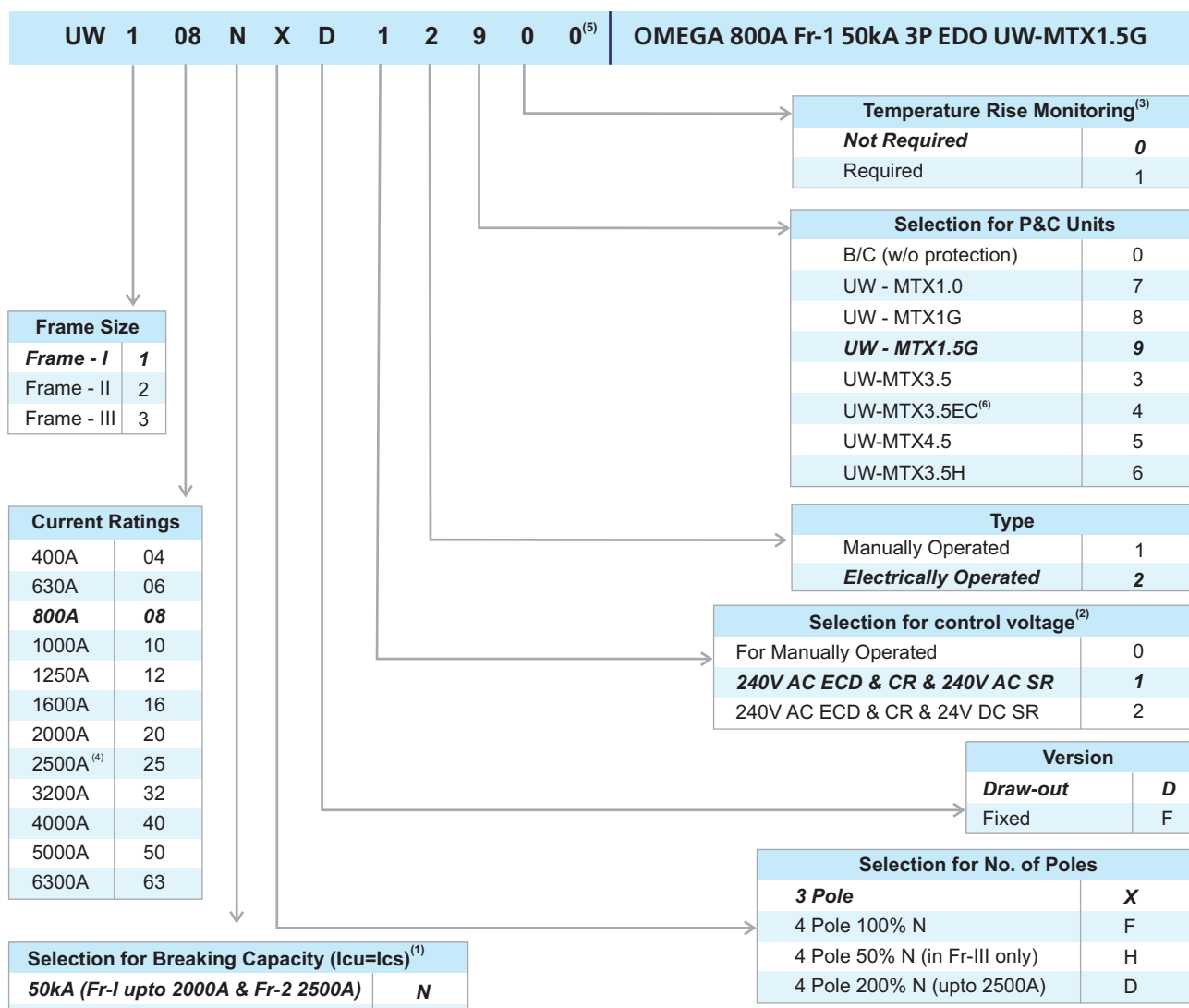


Details of 4P (50% N) on request

All Dimensions in mm

Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

All Dimensions in mm



**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)

## 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			15000			15000	
	Electrical @1.0 In	10000			10000*	4000			4000			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	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 \$										
S S O R I E S	External	Under Voltage Release	240 V AC 50 Hz										
		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:DN2-250S 250A 3P MTX 1.0,SEOM	CM97206XOPOX1
Combo:DN2-250D 40A 3P MTX 1.0,SEOM, UVR	CM905700OFOX1	Combo:DN2-250S 250A 3P MTX 1.0,SEOM, Aux	CM97206XOP5X1
Combo:DN2-250N 40A 3P MTX 1.0,SEOM	CM92064XOFOX1	Combo:DN2-250S 250A 3P MTX 1.0,SEOM, UVR	CM97206OPOX1
Combo:DN2-250S 40A 3P MTX 1.0,SEOM	CM97206XOFOX1	Combo:DN2-250D 250A 3P MTX 2.0,SEOM, UVR	CM90029OPOOAG
Combo:DN2-250N 40A 3P MTX 2.0,SEOM	CM97202XOFOAG	Combo:DN2-250N 250A 3P MTX 2.0,SEOM, Aux	CM97202XOP5AG
Combo:DN2-250D 63A 3P MTX 1.0,SEOM	CM90570XOHOX1	Combo:DN2-250N 250A 3P MTX 2.0,SEOM, UVR	CM97202OPOOAG
Combo:DN2-250D 63A 3P MTX 1.0,SEOM, UVR	CM905700OHOX1	Combo:DN2-250S 250A 3P MTX 2.0,SEOM, UVR	CM97206OPOOAG
Combo:DN2-250N 63A 3P MTX 1.0 SEOM	CM92072XOHOX1	Combo:DN2-250D 250A 3P MTX 3.0,SEOM, UVR	CM90029OPOOBG
Combo:DN2-250D 63A 3P MTX 2.0,SEOM, UVR	CM905700OHOAG	Combo:DN2-250N 250A 3P MTX 3.0,SEOM, UVR	CM97202OPOBG
Combo: DN2-250D 63A 3P TM,SEOM, UVR	CM905700OHOOG	Combo:DN2-250S 250A, 3P MTX 3.0,SEOM, UVR	CM97206OPOOBG
Combo:DN2-250N 80A 3P TM,SEOM, Aux	CM97202XOJ5OG	Combo:DN2-250D 250A 3P TM,SEOM	CM92009XOPOOG
Combo:DN2-250V 100A 3P MTX 1.0,SEOM	CM95055XOKOX1	Combo:DN2-250D 250A 3P TM, SEOM, UVR	CM90029OPOOOG
Combo:DN2-250V 100A 3P MTX 1.0,SEOM, Aux	CM91136XOK5X1	Combo:DN2-250N 250A 3P TM,SEOM	CM91206XOPOOG
Combo:DN2-250D 100A 3P MTX 1.0,SEOM	CM90571XOKOX1	Combo:DN2-250N 250A 3P TM,SEOM, UVR	CM97202OPOOOG
Combo:DN2-100D 100A 3P MTX 1.0,SEOM, UVR	CM90029OOKOX1	Combo:DN2-250S 250A 3P TM,SEOM	CM97206XOPOOG
Combo:DN2-100N 100A 3P MTX 1.0,SEOM, UVR	CM97202OOKOX1	Combo:DN2-250S 250A 3P TM,SEOM, Aux	CM97206XOP5OG
Combo:DN2-250S 100A 3P MTX 1.0,SEOM	CM97206XOKOX1	Combo:DN2-250S 250A 3P TM, SEOM, UVR	CM97206OPOOOG
Combo:DN2-250S 100A 3P MTX 1.0,SEOM, Aux	CM97206XOK5X1	Combo:DN3-400D 320A 3P TM,SEOM, UVR	CM93001OOQOOG
Combo:DN2-250D 100A 3P MTX 2.0,SEOM	CM92015XOKOAG	Combo:DN3-400N 320A 3P TM,SEOM, Shunt	CM90859OBQOOG
Combo:DN2-100D 100A 3P MTX 2.0,SEOM, UVR	CM90029OOKOAG	Combo:DN3-400S 320A 3P TM,SEOM, Aux	CM97204XOQ5OG
Combo:DN2 100N 100A 3P MTX 2.0,SEOM, UVR	CM97202OOKOAG	Combo:DN3-630V 400A 3P MTX 1.0,SEOM	CM91130XOROX1
Combo:DN2-100D 100A 3P MTX 3.0,SEOM, UVR	CM90029OOKOBG	Combo:DN3-630V 400A 3P MTX 1.0,SEOM, Aux	CM91137XOR5X1
Combo:DN2-100N 100A 3P MTX 3.0,SEOM, UVR	CM97202OOKOBG	Combo:DN3-400D 400A 3P MTX 1.0,SEOM	CM93001XOROX1
Combo:DN2-100D 100A 3P TM,SEOM, UVR	CM90029OOKOOG	Combo:DN3-400D 400A 3P MTX 1.0,SEOM, Shunt	CM93001OBROX1
Combo:DN2-100N 100A 3P TM, SEOM, UVR	CM97202OOKOOG	Combo:DN3-400D 400A 3P MTX 1.0,SEOM, UVR	CM93001OOROX1
Combo:DN2-250S 100A 3P TM,SEOM	CM97206XOKOOG	Combo:DN3-400N 400A 3P MTX 1.0,SEOM	CM97200XOROX1
Combo:DN2-250S 100A 3P TM,SEOM, Aux	CM97206XOK5OG	Combo:DN3-400N 400A 3P MTX 1.0,SEOM, Shunt	CM97200OBROX1
Combo:DN2-250D 125A 3P TM,SEOM	CM92008XOLOOG	Combo:DN3-400N 400A 3P MTX 1.0,SEOM, UVR	CM97200OOROX1
Combo:DN2-250D 125A 3P TM,SEOM, UVR	CM90029OOLOOG	Combo:DN3-400S 400A 3P MTX 1.0,SEOM	CM97204XOROX1
Combo:DN2-250D 125A 3P TM,SEOM, UVR	CM90029OOLOOG	Combo:DN3-400S 400A 3P MTX 1.0,SEOM, Aux	CM97204XOR5X1
Combo:DN2-250N 125A 3P TM,SEOM, Aux	CM97202XOL5OG	Combo:DN3-400S 400A 3P MTX 1.0,SEOM, UVR	CM97204OOROX1
Combo:DN2-250S 125A 3P TM,SEOM, Aux	CM97206XOL5OG	Combo:DN3-400N 400A 3P MTX 2.0,SEOM	CM97200XOROAG
Combo:DN2-250V 160A 3P MTX 1.0,SEOM	CM95055XOMOX1	Combo:DN3-400N 400A 3P MTX 2.0,SEOM, Shunt	CM97200OBROAG
Combo:DN2-250V 160A 3P MTX 1.0,SEOM, Aux	CM91136XOM5X1	Combo:DN3-400N 400A 3P MTX 2.0,SEOM, UVR	CM97200OOROAG
Combo:DN2-250D 160A 3P MTX 1.0,SEOM	CM90029XOMOX1	Combo:DN3-400S 400A 3P MTX 2.0,SEOM, UVR	CM97204OOROAG
Combo:DN2-160D 160A 3P MTX 1.0,SEOM, UVR	CM90029OOMOX1	Combo:DN3-400D 400A 3P MTX 3.0,SEOM, Shunt	CM93001XOROBG
Combo:DN2-160N 160A 3P MTX 1.0,SEOM, UVR	CM97202OOMOX1	Combo DN3-400N 400A 3P MTX 3.0,SEOM, UVR	CM97200OOROBG
Combo:DN2-250S 160A 3P MTX 1.0,SEOM	CM97206XOMOX1	Combo DN3-400S 400A 3P MTX 3.0,SEOM, UVR	CM97204OOROBG
Combo:DN2-250S 160A 3P MTX 1.0,SEOM, Aux	CM97206XOM5X1	Combo:DN3-400D 400A 3P TM,SEOM	CM93001XOROOG
Combo:DN2-160S 160A 3P MTX 1.0,SEOM, UVR	CM97206OOMOX1	Combo:DN3-400D 400A 3P TM,SEOM, UVR	CM93001OOROOG
Combo:DN2-160D 160A 3P MTX 2.0,SEOM, UVR	CM90029OOMOAG	Combo:DN3-400N 400A 3P TM,SEOM	CM97200XOROOG
Combo:DN2 160N 160A 3P MTX 2.0,SEOM, UVR	CM97202OOMOAG	Combo:DN3-400N 400A 3P TM, SEOM, UVR	CM97200OOROOG
Combo:DN2-160S 160A 3P MTX 2.0,SEOM, UVR	CM97206OOMOAG	Combo:DN3-400S 400A 3P TM,SEOM, Aux	CM97204XOR5OG
Combo:DN2-160D 160A 3P MTX 3.0,SEOM, UVR	CM90029OOMOBG	Combo:DN3-400S 400A 3P TM, SEOM, UVR	CM97204OOROOG
Combo:DN2-160N 160A 3P MTX 3.0,SEOM, UVR	CM97202OOMOBG	Combo:DN3-630D 630A 3P MTX 1.0,SEOM	CM93005XOTOX1
Combo:DN2-160S 160A 3P MTX 3.0,SEOM, UVR	CM97206OOMBG	Combo:DN3-630D 630A 3P MTX 1.0,SEOM, Shunt	CM93005OBTOX1
Combo:DN2-250D 160A 3P TM,SEOM	CM90029XOMOOG	Combo:DN3-630N 630A 3P MTX 1.0,SEOM, UVR	CM97200OOTOX1
Combo:DN2-160D 160A 3P TM, SEOM, UVR	CM90029OOMOOG	Combo:DN3-630S 630A 3P MTX 1.0,SEOM	CM97204XOTOX1
Combo:DN2-160N 150A 3P TM,SEOM, UVR	CM97202OOMOOG	Combo:DN3-630S 630A 3P MTX 1.0,SEOM, UVR	CM97204OOTOX1
Combo:DN2-250S 160A 3P TM,SEOM	CM97206XOMOOG	Combo:DN3-630D 630A 3P MTX 2.0,SEOM, Shunt	CM93005OBTOAG
Combo:DN2-250S 160A 3P TM,SEOM, Aux	CM97206XOM5OG	Combo:DN3-630N 630A 3P MTX 2.0,SEOM	CM97200XOTOAG
Combo:DN2-160S 160A 3P TM,SEOM, UVR	CM97206OOMOOG	Combo:DN3-630N 630A 3P MTX 2.0,SEOM, UVR	CM97200OOTOAG
Combo:DN2-250N 200A 3P TM,SEOM, UVR	CM97202OONOOG	Combo:DN3-630S 630A 3P MTX 2.0,SEOM, UVR	CM97204OOTOAG
Combo:DN2-250S 200A 3P TM,SEOM, Aux	CM97206XON5OG	Combo DN3-630N 630A 3P MTX 3.0,SEOM, UVR	CM97200OOTOBG
Combo:DN2-250V 250A 3P MTX 1.0,SEOM	CM95055XOPOX1	Combo DN3-630S 630A 3P MTX 3.0,SEOM, UVR	CM97204OOTOBG
Combo:DN2-250V 250A 3P MTX 1.0,SEOM, Aux	CM91136XOP5X1	Combo:DN3-630D 630A 3P TM,SEOM, Shunt	CM93005OBTOOG
Combo:DN2-250D 250A 3P MTX 1.0,SEOM	CM90029XOPOX1	Combo:DN3-630N 630A 3P TM,SEOM, UVR	CM97200OOTOOG
Combo:DN2-250D 250A 3P MTX 1.0,SEOM, UVR	CM90029OPOX1	Combo:DN3-630S 630A 3P TM,SEOM, UVR	CM97204OOTOOG
Combo:DN2-250N 250A 3P MTX 1.0,SEOM	CM97202XOPOX1	Combo:DN2 250D 40A 4P MTX 1.0,SEOM	CM90030XOFOX1
Combo:DN2-250N 250A 3P MTX 1.0,SEOM, UVR	CM97202OPOX1	Combo:DN2-250D 40A 4P MTX 2.0,SEOM	CM92155XOFOAG
		Combo:DN2-250S 40A 4P MTX 3.0,SEOM	CM92165XOFOBAG

# Ordering Information

Combo:DN2-250D 63A 4P MTX 2.0,SEOM	CM92154XOHOAG	Combo:DN2-250S 250A 4P TM,SEOM	CM97207XOPOOG
Combo:DN2-250D 63A 4P MTX 2.0,SEOM, UVR	CM92154OOHOAG	Combo:DN2-250S 250A 4P TM,SEOM, UVR	CM97207OOPOOG
Combo:DN2-250S 63A 4P MTX 3.0,SEOM	CM92164XOHOBG	Combo:DN3-630V 250A 4P MTX 3.0,SEOM	CM90451XOPOBG
Combo:DN2-250D 63A 4P TM,SEOM, UVR	CM90030OOHOOG	Combo:DN3-400D 320A 4P TM,SEOM	CM90884XOQOOG
Combo:DN3-630V 63A 4P MTX 3.0,SEOM	CM90449XOHOBG	Combo:DN3-400D 400A 4P MTX 1.0,SEOM, Shunt	CM90884OBROX1
Combo:DN2-250D 80A 4P TM,SEOM, UVR	CM90030OOJOOG	Combo:DN3-400D 400A 4P MTX 1.0,SEOM, UVR	CM90884OOROX1
Combo:DN2 100D 100A 4P MTX 1.0,SEOM, UVR	CM90030OOKOX1	Combo:DN3-400N 400A 4P MTX 1.0,SEOM	CM97201XOROX1
Combo:DN2 100N 100A 4P MTX 1.0,SEOM, UVR	CM97203OOKOX1	Combo:DN3-400N 400A 4P MTX 1.0,SEOM, UVR	CM97201OOROX1
Combo:DN2-250D 100A 4P MTX 2.0,SEOM	CM90030XOKOAG	Combo:DN3-400S 400A 4P MTX 1.0,SEOM, UVR	CM97205OOROX1
Combo:DN2-100D 100A 4P MTX 2.0,SEOM, UVR	CM90030OOKOAG	Combo:DN3-400D 400A 4P MTX 2.0,SEOM	CM90884XOROAG
Combo:DN2-100N 100A 4P MTX 2.0,SEOM, UVR	CM97203OOKOAG	Combo:DN3-400D 400A 4P MTX 2.0,SEOM, UVR	CM90884OOROAG
Combo:DN2-100D 100A 4P MTX 3.0,SEOM, UVR	CM90030OOKOBG	Combo:DN3-630T 400A 4P MTX 2.0,SEOM	CM91012XOROAG
Combo:DN2-100N 100A 4P MTX 3.0,SEOM, UVR	CM97203OOKOBG	Combo:DN3-400N 400A 4P MTX 2.0,SEOM	CM97201XOROAG
Combo:DN2-250D 100A 4P TM,SEOM	CM90030XOKOOG	Combo:DN3-400N 400A 4P MTX 2.0,SEOM, Shunt	CM97201OBROAG
Combo:DN2-250D 100A 4P TM,SEOM, UVR	CM90030OOKOOG	Combo:DN3-400N 400A 4P MTX 2.0,SEOM, UVR	CM97201OOROAG
Combo:DN2-100N 100A 4P TM,SEOM, UVR	CM97203OOKOOG	Combo:DN3-630T 400A 4P MTX 2.0,SEOM, UVR	CM91012OOROAG
Combo:DN2-250S 100A 4P TM,SEOM	CM97207XOKOOG	Combo:DN3-400S 400A 4P MTX 2.0,SEOM, UVR	CM97205OOROAG
Combo:DN2-250D 125A 4P TM,SEOM, UVR	CM90030OOLOOG	Combo:DN3-630V 400A 4P MTX 3.0,SEOM	CM96141XOROBG
Combo:DN2 160D 160A 4P MTX 1.0,SEOM, UVR	CM90030OOMOX1	Combo:DN3-400D 400A 4P MTX 3.0,SEOM, UVR	CM90884OOROBG
Combo:DN2-250N 160A 4P MTX 1.0,SEOM	CM97203XOMOX1	Combo:DN3-630N 400A 4P MTX 3.0,SEOM	CM97201XOROBG
Combo:DN2-160N 160A 4P MTX 1.0,SEOM, UVR	CM97203OOMOX1	Combo:DN3-400N 400A 4P MTX 3.0,SEOM, UVR	CM97201OOROBG
Combo:DN2-160S 160A 4P MTX 1.0,SEOM, UVR	CM97207OOMOX1	Combo:DN3-400S 400A 4P MTX 3.0,SEOM	CM97205XOROBG
Combo:DN2-250D 160A 4P MTX 2.0,SEOM	CM90030XOMOAG	Combo DN3-400S 400A 4P MTX 3.0,SEOM, UVR	CM97205OOROBG
Combo:DN2-160D 160A 4P MTX 2.0,SEOM, UVR	CM90030OOMOAG	Combo:DN3-400D 400A 4P TM,SEOM	CM90884XOROOG
Combo:DN2-250N 160A 4P MTX 2.0,SEOM	CM97203XOMOAG	Combo:DN3-400D 400A 4P TM,SEOM, UVR	CM90884OOROOG
Combo:DN2-160N 160A 4P MTX 2.0,SEOM, UVR	CM97203OOMOAG	Combo:DN3-400N 400A 4P TM,SEOM, Shunt	CM97201OBROOG
Combo:DN2-160S 160A 4P MTX 2.0,SEOM, UVR	CM97207OOMOAG	Combo:DN3-400N 400A 4P TM,SEOM, UVR	CM97201OOROOG
Combo:DN2-160D 160A 4P MTX 3.0,SEOM, UVR	CM90030OOMOBG	Combo:DN3-400S 400A 4P TM,SEOM	CM97205XOROOG
Combo:DN2-160N 160A 4P MTX 3.0,SEOM, UVR	CM97203OOMOBG	Combo:DN3-400S 400A 4P TM,SEOM, UVR	CM97205OOROOG
Combo:DN2-250S 160A 4P MTX 3.0,SEOM	CM97207XOMOBG	Combo:DN3-630D 630A 4P MTX 1.0,SEOM	CM93007XOTOX1
Combo:DN2-160S 160A 4P MTX 3.0,SEOM, UVR	CM97207OOMOBG	Combo:DN3-630N 630A 4P MTX 1.0, SEOM, Shunt	CM97201OBTOX1
Combo:DN2-250D 160A 4P TM,SEOM	CM90030XOMOOG	Combo:DN3-630N 630A 4P MTX 1.0,SEOM, UVR	CM97201OOTOX1
Combo:DN2-160D 160A 4P TM,SEOM, UVR	CM90030OOMOOG	Combo:DN3-630S 630A 4P MTX 1.0,SEOM, UVR	CM97205OOTOX1
Combo:DN2-160N 160A 4P TM,SEOM, UVR	CM97203OOMOOG	Combo:DN3-630D 630A 4P MTX 2.0,SEOM	CM93007XOTOAG
Combo:DN2-250S 160A 4P TM,SEOM	CM97207XOMOOG	Combo:DN3-630D 630A 4P MTX 2.0,SEOM, UVR	CM93007OOTOAG
Combo:DN2-160S 160A 4P TM,SEOM, UVR	CM97207OOMOOG	Combo:DN3-630T 630A 4P MTX 2.0,SEOM	CM91012XOTOAG
Combo:DN2-250D 200A 4P TM,SEOM, SHUNT	CM90030OBNOOG	Combo:DN3-630N 630A 4P MTX 2.0,SEOM	CM97201XOTOAG
Combo:DN2-250D 200A 4P TM,SEOM, UVR	CM90030OONOOG	Combo:DN3-630N 630A 4P MTX 2.0,SEOM, UVR	CM97201OOTOAG
Combo:DN2 250D 250A 4P MTX 1.0,SEOM	CM90030XOPOX1	Combo:DN3-630T 630A 4P MTX 2.0,SEOM, UVR	CM91012OOTOAG
Combo:DN2 250D 250A 4P MTX 1.0,SEOM	CM90030XOPOX1	Combo:DN3-630S 630A 4P MTX 2.0,SEOM, UVR	CM97205OOTOAG
Combo:DN2-250D 250A 4P MTX 1.0,SEOM, Shunt	CM90030OBPOX1	Combo:DN3-630D 630A 4P MTX 3.0,SEOM, UVR	CM93007OOTOBG
Combo:DN2 250D 250A 4P MTX 1.0,SEOM, UVR	CM90030OPOX1	Combo DN3-630N 630A 4P MTX 3.0,SEOM, UVR	CM97201OOTOBG
Combo:DN2-250N 250A 4P MTX 1.0,SEOM, UVR	CM97203OPOX1	Combo DN3-630S 630A 4P MTX 3.0,SEOM, UVR	CM97205OOTOBG
Combo:DN2-250S 250A 4P MTX 1.0,SEOM, UVR	CM97207OPOX1	Combo:DN3-630D 630A 4P TM,SEOM, UVR	CM93007OOTOOG
Combo:DN2-250T 250A 4P MTX 2.0,SEOM	CM91153XOPOAG	Combo:DN3-630N 630A 4P TM,SEOM	CM97201XOTOOG
Combo:DN2-250T 250A 4P MTX 2.0,SEOM, UVR	CM91153OPOAG	Combo:DN3-630N 630A 4P TM,SEOM, Shunt	CM97201OBTOOG
Combo:DN2-250D 250A 4P MTX 2.0, SEOM, UVR	CM90030OPOAG	Combo:DN3-630N 630A 4P TM,SEOM, UVR	CM97201OOTOOG
Combo:DN2-250N 250A 4P MTX 2.0,SEOM	CM97203XOPOAG	Combo:DN3-630S 630A 4P TM,SEOM, UVR	CM97205OOTOOG
Combo:DN2-250N 250A 4P MTX 2.0,SEOM, UVR	CM97203OPOAG	ACC DN2/DN3/DN4 ATAC 1C/O each – Right	CM998040000
Combo:DN2-250S 250A 4P MTX 2.0,SEOM, UVR	CM97207OPOAG	ACC dsine DN3 630 Mech Interlock Kit	CM998540000
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		

# Trip Units & Accessories

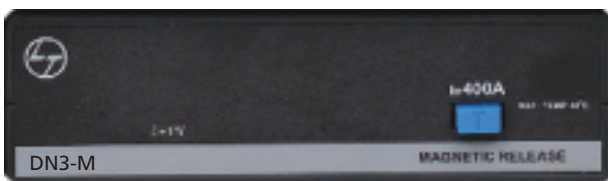
## Thermal Magnetic Releases

Variable Thermal, Variable Magnetic (DN2, DN3)



## Magnetic Releases

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



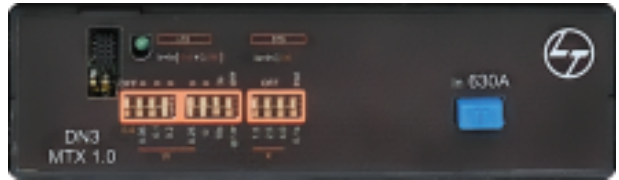
## Isolator

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

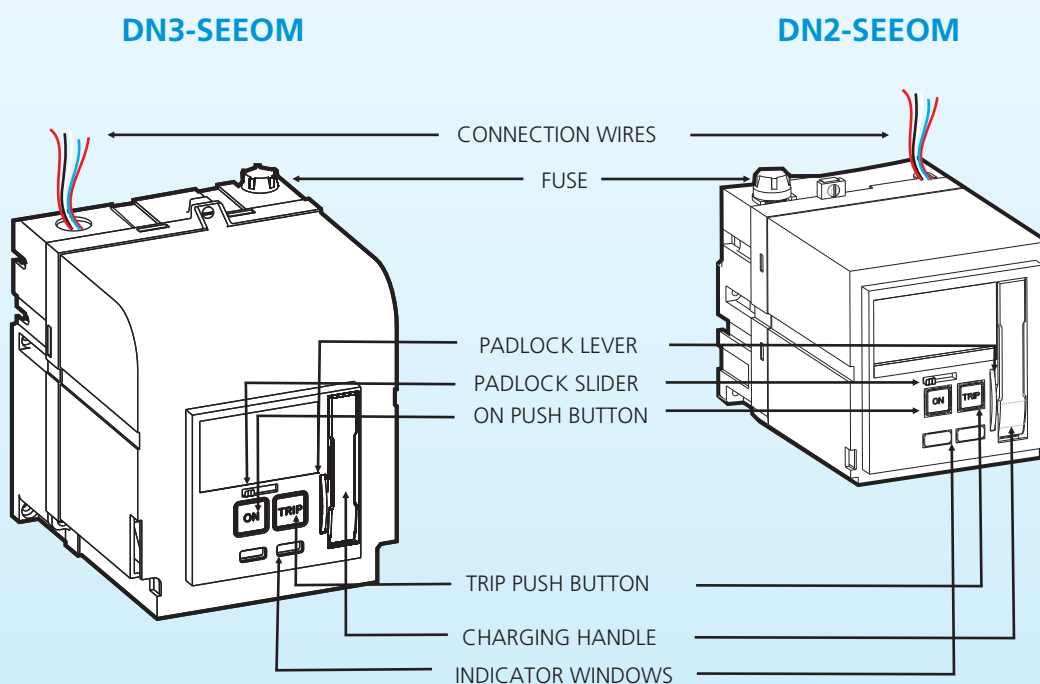
Specification	DN2	DN3
Operating voltage (V AC)	240V AC	240V AC
Operating voltage (%)	85 - 110%	85 - 110%
Closing time (ms)	60	90
Opening time (ms)	300	450
Power consumption (VA)	350	500
Life / No. of operations	16000	15000
Door cut out (mm) <sup>2</sup>	96 x 96	96 x 96
IP protection, on the front	IP30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

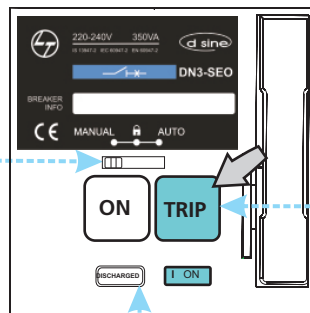




# Motorised MCCB Product Features

## 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.



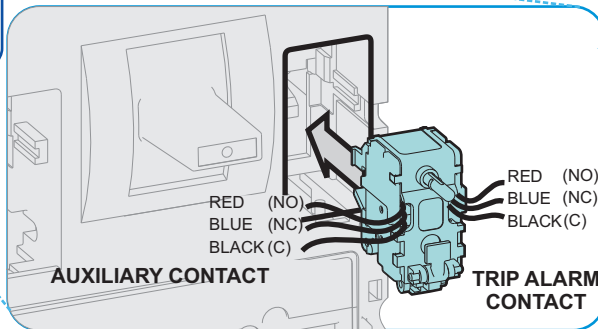
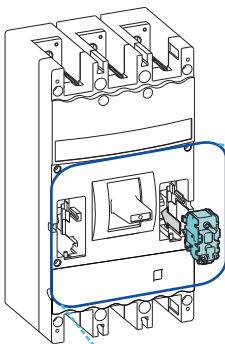
EMERGENCY TRIP

## 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.



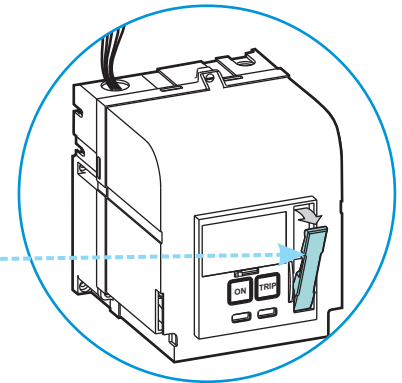
INDICATOR MODULE CONNECTIONS

## 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

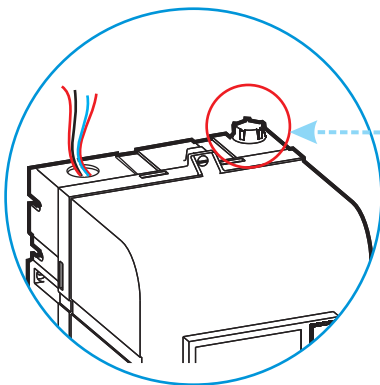
## Manual Charging Handle

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



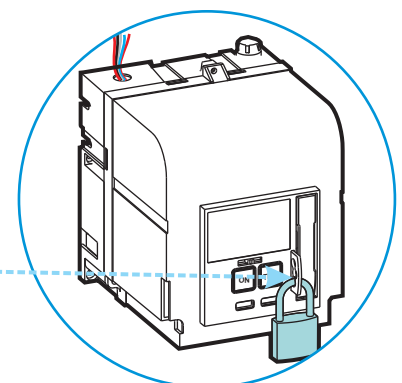
## Fuse Protection

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

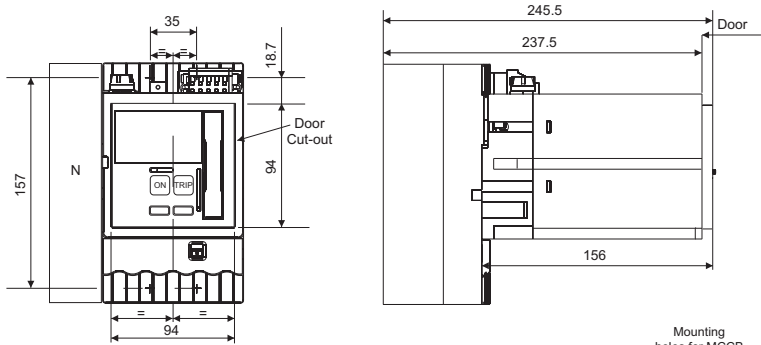
The SEEOM can be padlocked by up to three padlocks of Ø5mm to Ø7mm. It can also be used for Lock out and Tag out procedure used while undertaking maintenance of the system.



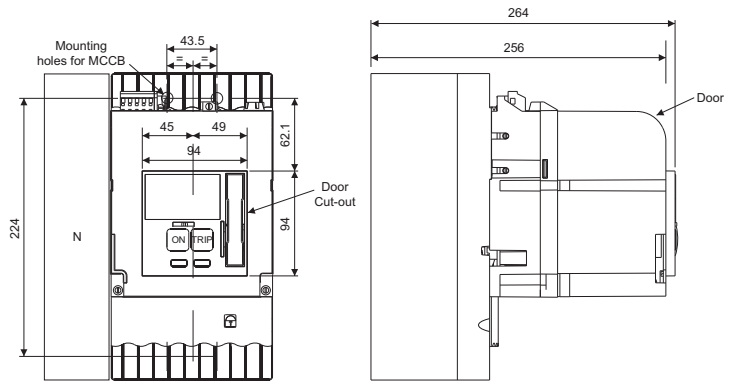
# Overall Dimensions

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

DN2

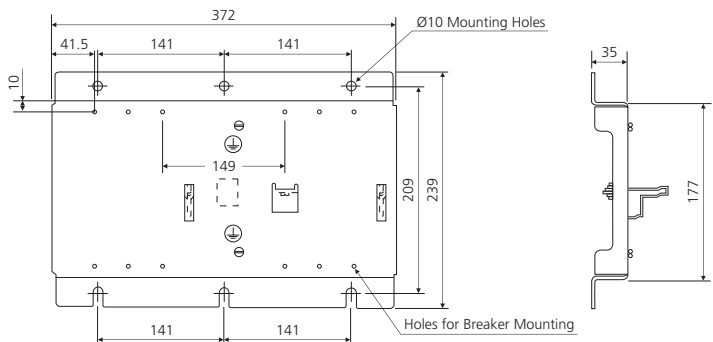


DN3



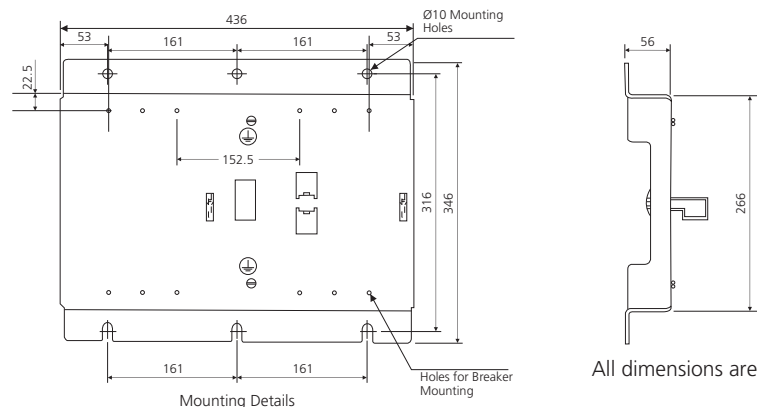
## Mechanical Interlocking Kit

DN2



Mounting Details

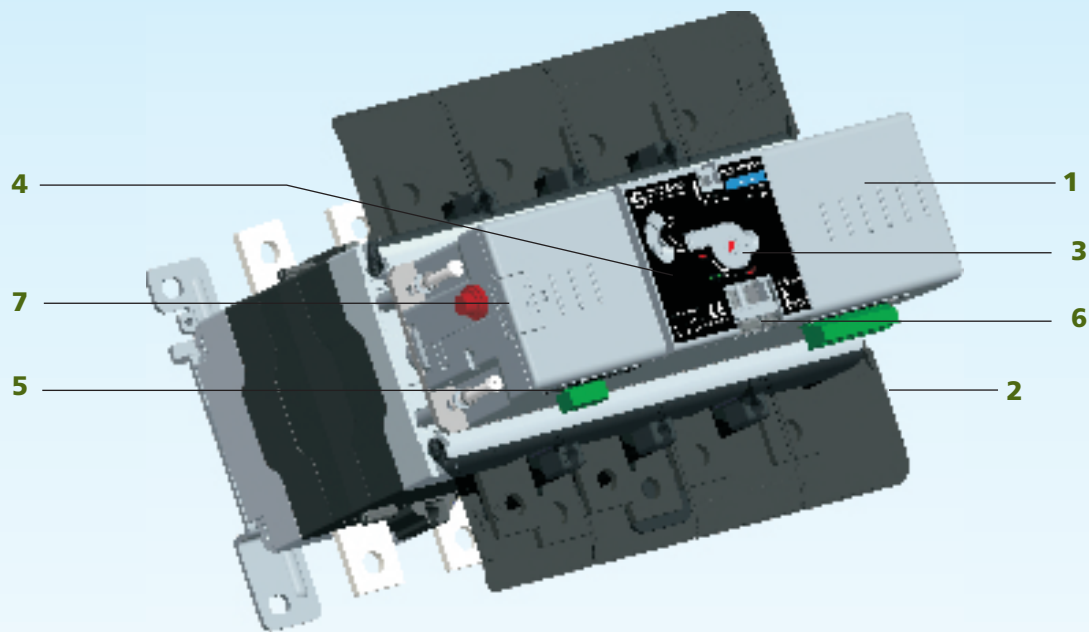
DN3



Mounting Details

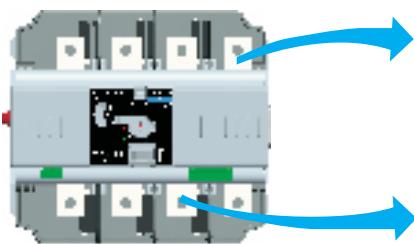
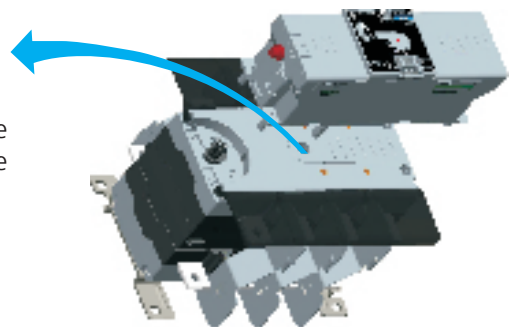
All dimensions are in mm

# 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.



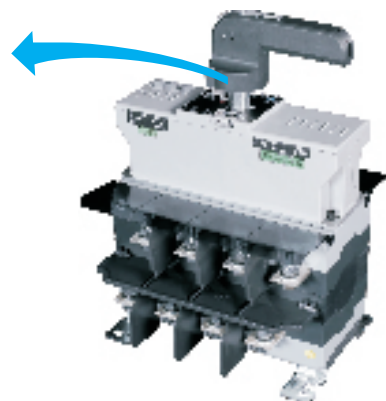
## 2. Clear Termination Access

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.

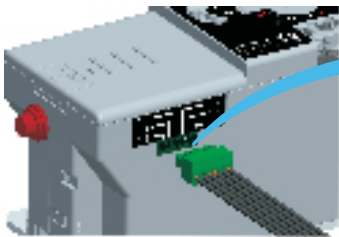
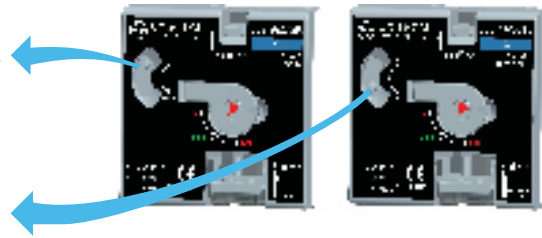
As a safety feature, the control supply of motorised kit (EOM) is automatically cut off during the insertion of handle.



# 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.

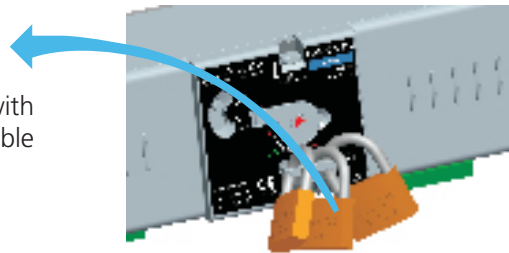


## 5. Auxiliary Contacts

It consists two sets of changeover contacts one for each S-D. It is prewired and prefit 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.

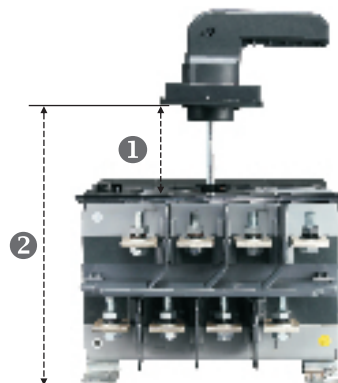
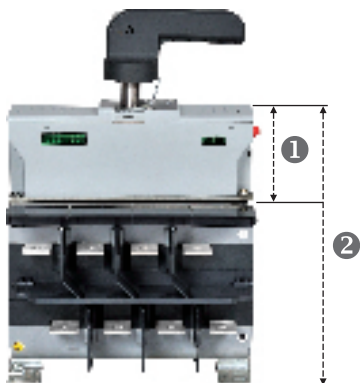


## 7. Fuse Protection

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			Frame 3		Frame 4		Frame 5			Frame 6		
Rating (A)	Unit	125 A	160 A	200 A <sup>S</sup>	250 A	315 A	400 A	630 A	630 A	800 A	1000 A	1250 A	1600 A	2000 A
Reference Standards		IS / IEC 60947-3, EN 60947-3												
Type designation		CO2-125	CO2-160	CO2-200	CO3-250	CO3-315	CO4-400	CO4-630	CO5-630	CO5-800	CO5-1000	CO6-1250	CO6-1600	CO6-2000
No. of Poles		4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole
Rated operational voltage (U <sub>e</sub> )	(V)	415	415	415	415	415	415	415	415	415	415	415	415	415
Rated frequency	(Hz)	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Rated impulse withstand voltage (U <sub>imp</sub> )	(kV)	12	12	12 <sup>S</sup>	12	12	12	12	12	12	12	12	12	12
Pollution degree		3	3	3	3	3	3	3	3	3	3	3	3	3
Conventional free air thermal current, I <sub>th</sub> at 40°C	(A)	125	160	200	250	315	400	630	630	800	1000	1250	1600	2000
Conventional enclosed thermal current, I <sub>thc</sub> at 40°C	(A)	125	160	200	250	315	400	630	630	800	1000	1250	1600	2000
Rated operational current, I <sub>e</sub> AC-21A <sup>#</sup> / AC-22A <sup>#</sup> / AC-23A	(A)	125	160	200	250	315	400	630	630	800	1000	1250	1600 <sup>#</sup> /1250	2000 <sup>#</sup> /1250
Rated operational power for AC-23A*	(kW)	65	85	85	132	160	225	315	315	400	450	710	710	710
Rated breaking capacity for AC-23A	(A)	1000	1280	1600	2000	2520	3200	5040	5040	6400	8000	10000	10000	10000
Rated making capacity for AC-23A	(A)	1250	1600	2000	2500	3150	4000	6300	6300	8000	10000	12500	12500	12500
Short time withstand, I <sub>sw</sub>	1 sec	(kA rms)	8	8	8	16	18	22	26	35	50	50	50	50
	0.2 sec	(kA rms)	18	18	18	28	28	35	35	70	85	85	85	85
Short-circuit making capacity, I <sub>cm</sub>	(kA peak)	14	14	14	32	36	46	55	73.5	105	105	105	105	105
Endurance (category A)	Mechanical	(O-I-O-II-O cycle)	16000	16000	16000	16000	16000	10000	10000	10000	10000	10000	10000	10000
	Electrical	(O-I-O-II-O cycle)	2000	2000	2000	2000	2000	2000	2000	2000	1000	1000	1000	500
Type and size of fuse	DIN/Cylin <sup>▲</sup>	000	00	NA	1	1	2	NA	3	3	NA	NA	NA	NA
Rated fused short-circuit current at 415 V, 50/60 Hz	DIN/Cylin <sup>▲</sup> (kA rms)	100	100	NA	100	100	100	NA	100	100	NA	NA	NA	NA
<b>Termination Capacity</b>														
Maximum Al. cable with lug	(sq mm)	95	95	150	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
Maximum link width	(mm)	30	30	30	40	40	50	50	60	60	60	80	80	100
Maximum link thickness	(mm)	5	5	5	8	8	8	2 x 8	2 x 10	2 x 10	2 x 10	3 x 12	3 x 12	3 x 12
Termination tightening torque	(N-m)	10	10	10	20	20	27	27	35	35	35	55	55	55
Operating torque center / side operating	(N-m)	10 / 13	10 / 13	10 / 13	20 / 25	20 / 25	28 / 32	28 / 32	30 / 40	30 / 40	30 / 40	55	55	55
Weight (without accessories)	(Kg)	4	4	4	6.5	7	14	14.5	20	22	22	52	57	75
<b>Motorised Kit Specification</b>														
Rated frequency	(Hz)		50		50		50		50		50		50	
Rated control voltage	(V)		240 V ac		240 V ac		240 V ac		240 V ac		240 V ac		240 V ac	
Control voltage range			85% - 110%		85% - 110%		85% - 110%		85% - 110%		85% - 110%		85% - 110%	
Pollution degree	(%)		3		3		3		3		3		3	
Operating temperature	(°C)		-5 to + 55		-5 to + 55		-5 to + 55		-5 to + 55		-5 to + 55		-5 to + 55	
Ingress protection (from front)			IP30		IP30		IP30		IP30		IP30		IP30	
Max. current at 240 V ac	(A)		2		2		2		2		2		2	
Operating time (min)	O-I / I-O	(sec)	0.5		0.6		0.7		0.7		0.7		0.7	
	I-II / II-I	(sec)	1.4		1.4		1.4		1.4		1.4		1.4	
Black out time	(sec)		1.4		1.4		1.4		1.4		1.4		1.4	
Control glass fuse current rating (240 V ac)	(A)		1.25		1		1.25		1.25		1.25		1.25	
Dimensions of motorised kit	Width	(mm)	210		260		310		380		274		108	
	Height	(mm)	84		84		84		84		84		118	
	Depth	(mm)	94		94		94		94		94		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

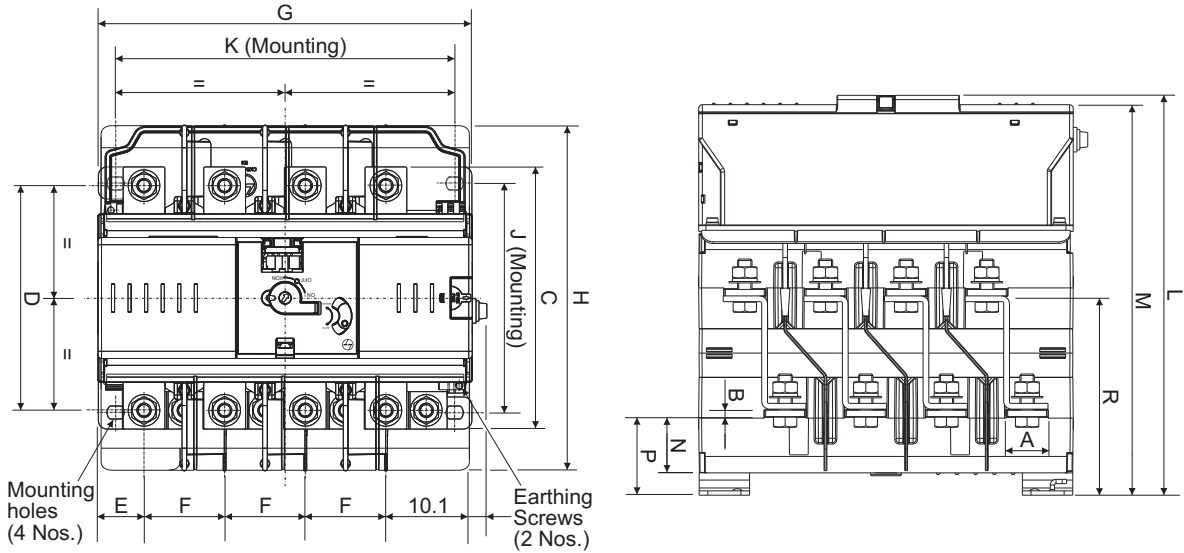
# Rated operational current, I<sub>e</sub> AC-21A / AC-22A

▲ Type cylindrical fuse

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

# Overall Dimensions

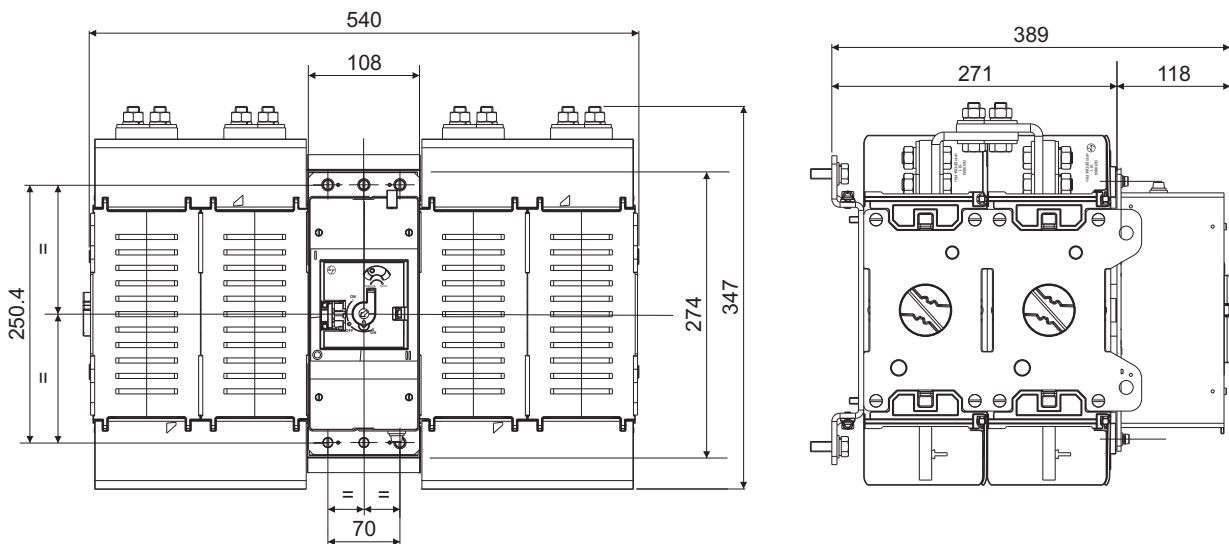
## CO2 to CO5 (125-1000A) Motorised Changeover Switch



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	CO5	CX5	50	6	264	228	-	80	380	351.6	220	345
800			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

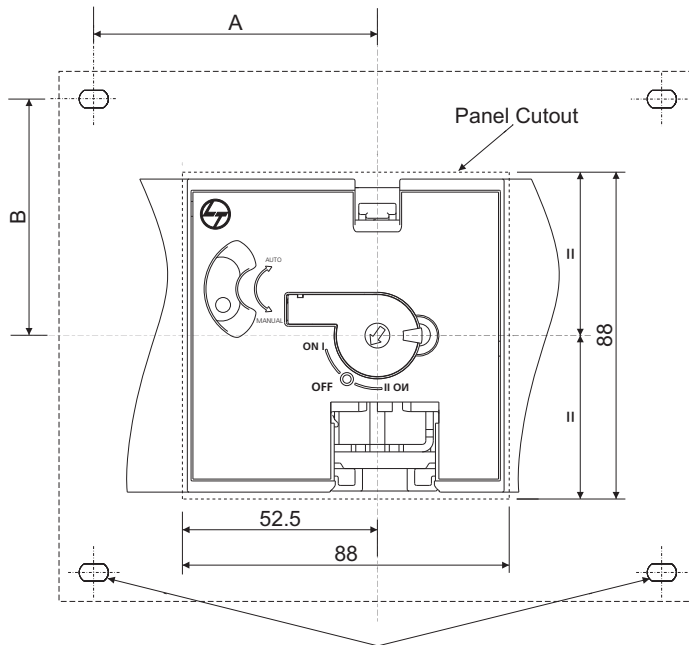
## CO6-1250/1600/2000 Motorised Changeover Switch



All dimensions are in mm

# Overall Dimensions

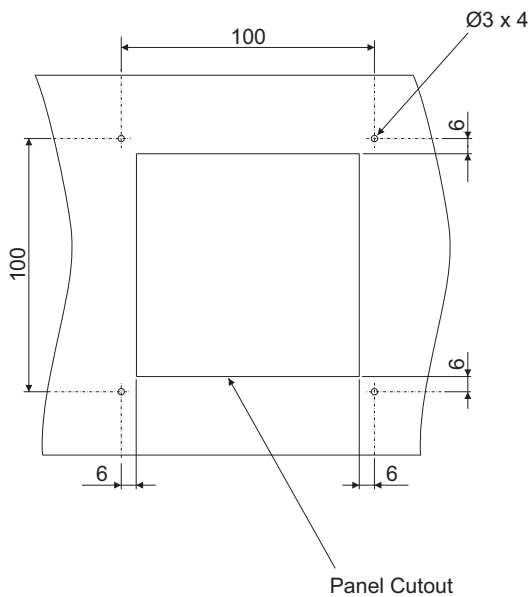
## Panel Cutout Motorised Changeover Switch



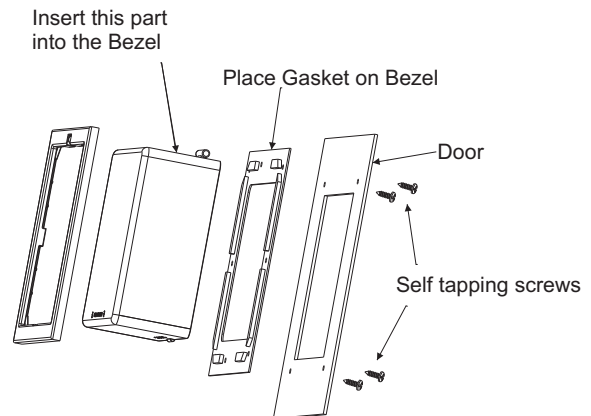
Type	A	B
CO2 with CX2	95	60
CO3 with CX3	117.7	79.5
CO4 with CX4	143	100
CO5 with Cx5	172.5	110

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

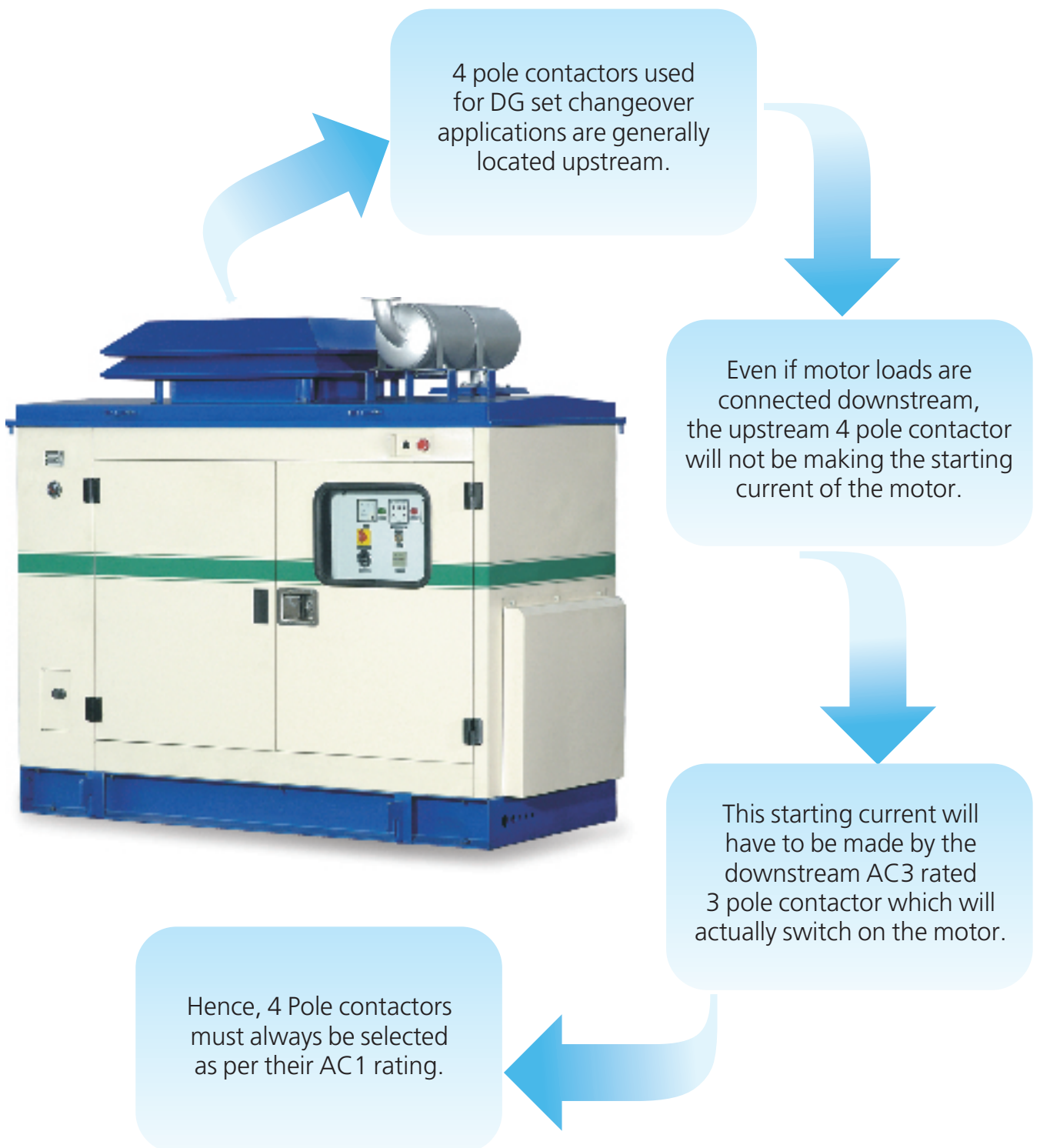
Type	MCX 01	MCX 02	MCX 03	MCX 04	MCX 11	MCX 12	MCX 13	MCX 22	MCX 23	
Catalogue no.	CS97009	CS97010	CS97011	CS97012	CS97013	CS97014	CS97015	CS97017	CS97018	
Conformance to standards	IS/IEC 60947-4-1 & IEC 60947-4-1									
Preferred DG ratings (kVA)	7.5	15	20	25	30	40	50	62.5	82.5	
<b>Power contacts</b>										
No. of poles	4	4	4	4	4	4	4	4	4	
Number of built-in auxiliary contacts	-	-	-	-	-	-	-	-	-	
Rated insulation voltage, $U_i$	690V	690V	690V	690V	690V	690V	690V	690V	690V	
Rated operational voltage, $U_e$	415V	415V	415V	415V	415V	415V	415V	415V	415V	
Rated impulse withstand voltage, $U_{imp}$	8 kV	8 kV	8 kV	8 kV	8 kV	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>	<b>50A</b>	<b>63A</b>	<b>80A</b>	<b>100A</b>	<b>130A</b>	
Service temperature	-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	-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	1 x 16	1 x 16	1 x 16	1 x 35	1 x 35
	Link	-	-	-	-	-	-	-	1 x (12.5 mm x 3 mm)	1 x (12.5 mm x 3 mm)
	Solid conductor (sq mm)	2 x 4	2 x 4	2 x 4	2 x 4	2 x 10	2 x 10	2 x 10	-	-
	Multistrand conductors (sq mm)	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 6	2 x 6	2 x 6	-	-
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	110, 220, 240, 415	110, 220, 240, 415	110, 220, 240, 415	240, 415	240, 415
Pick-up	VA	68	68	68	68	180	180	180	190	190
	Watts	4	4	4	4	5	5	5	5.5	5.5
Hold-on	VA	11	11	11	11	22	22	22	22	22
	Watts	4	4	4	4	5	5	5	5.5	5.5
Limits of operation	Pick-up (% $U_c$ )	55 - 120	55 - 120	55 - 120	55 - 120	50 - 120	50 - 120	50 - 120	65 - 120	65 - 120
	Drop-off (% $U_c$ )	30 - 50	30 - 50	30 - 50	30 - 50	25 - 45	25 - 45	25 - 45	40 - 60	40 - 60
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	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
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	(55 - 58) x 70	(55 - 58) x 70	(55 - 58) x 70	80 x 85	80 x 85





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

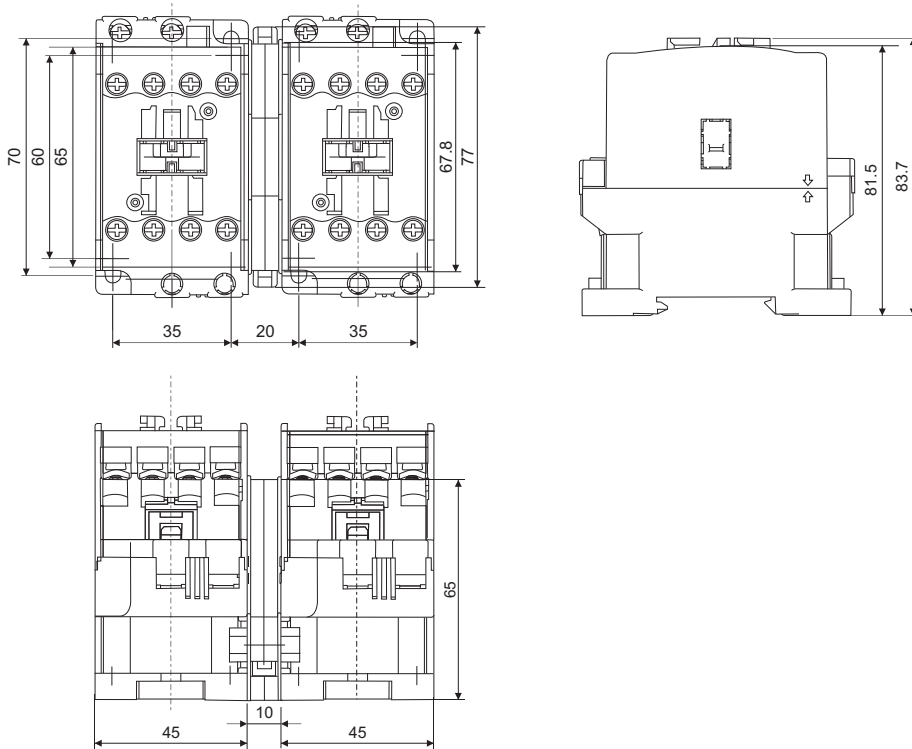
Std Coil voltage at 50Hz	24	42	48	110	220	240	360	380	415	440	525
Ordering Suffix	G000	J000	H000	A000	K000	B000	C000	L000	D000	P000	M000

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

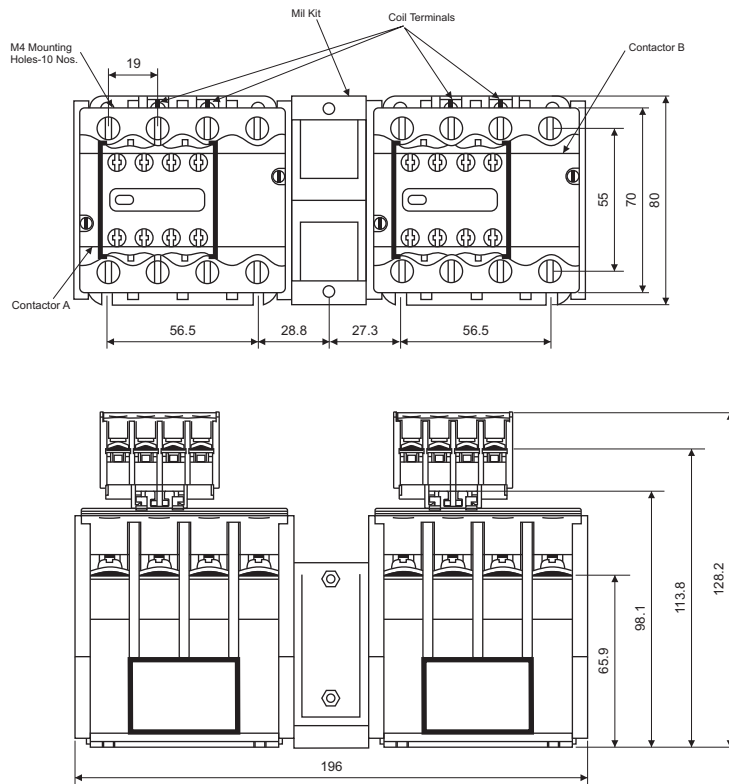
# Overall Dimensions

## Four Pole Contactors - Type MCX

### MCX 01-04



### MCX 11 / MCX 12 / MCX 13

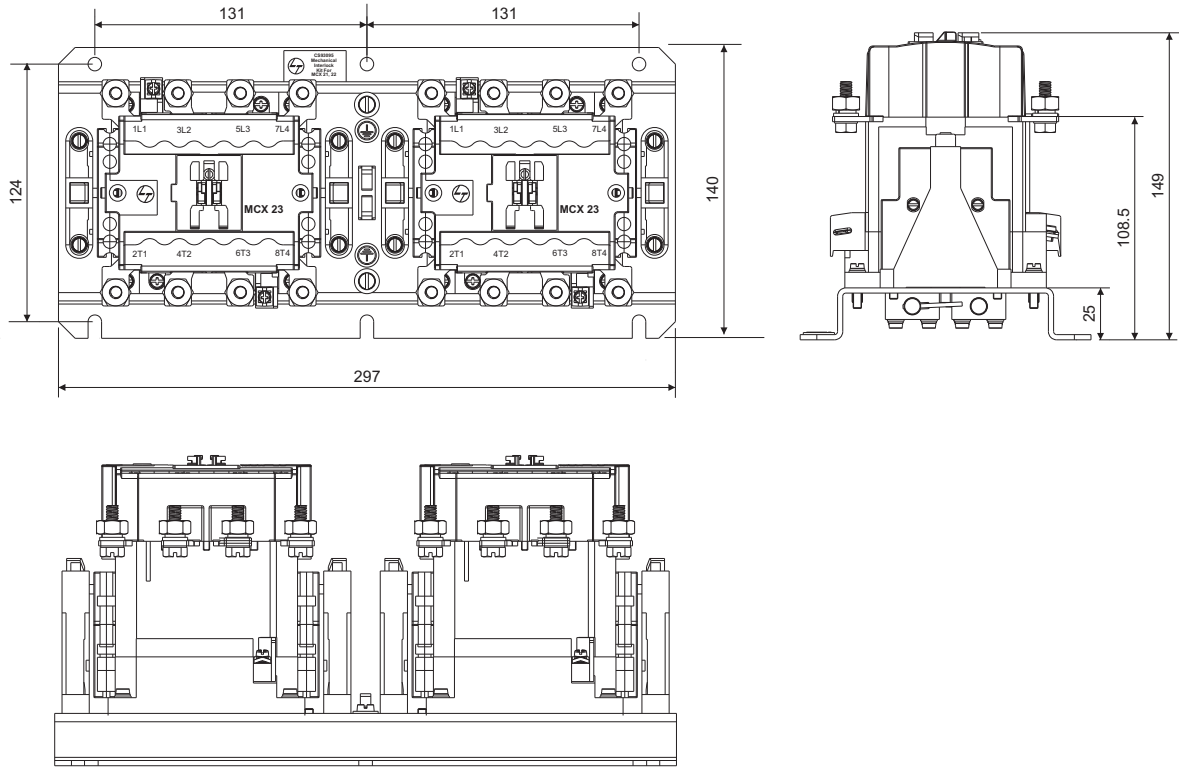


All Dimensions in mm

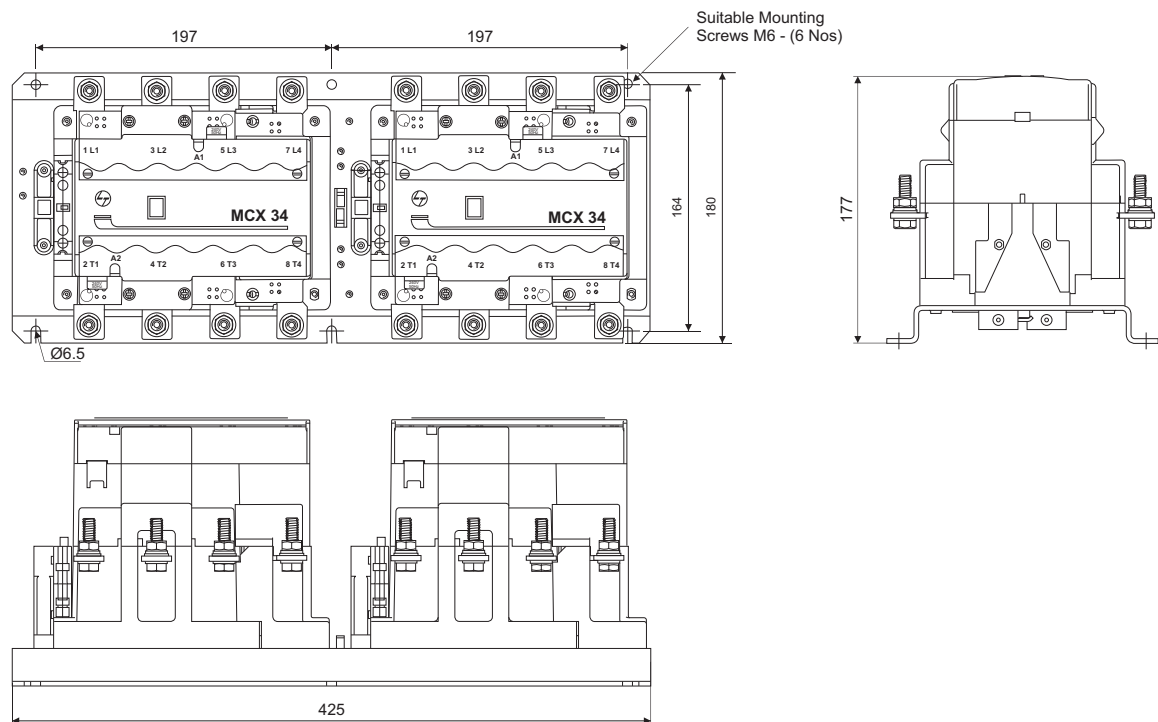
# Overall Dimensions

## Four Pole Contactors - Type MCX

### MCX 22-23



### MCX 32-34









Enclosed Automatic Transfer Switch



# Introduction

Rapid industrialization and urbanization are leading to ever-rising demand for reliable electricity.

Technological advancement and changing lifestyles have given rise to many applications which demand 24 X7 uninterruptible power supply. In some industries, power outages for even short duration may lead to considerable commercial losses.

E&A's Enclosed Automatic Transfer Switch(ATS) constantly monitors the incoming power sources and seamlessly switches the load to the 'back-up' supply when it senses variation or abnormality in the main supply. Once main supply is restored, the load is automatically shifted to the main supply.

Option of priority source selection and swapping gives additional flexibility to suit different site requirements.

These switches are very convenient to use as one does not have to manually operate the switch.

The typical applications are in critical processes in various industries and also in growing residential, commercial & infrastructure segments.

## **Enclosed Automatic Transfer Switch (ATS):**

E&A's C-Line Motorised Changeover switch alongwith AuxC 2000 controller is completely pre-programmed and pre-wired Automatic Source Transfer Solution.

What's more is that the complete ensemble is mounted in a smart engineered SS enclosure providing a ready, convenient -to-use solution.

**Automatic Solution | Pre-wired | Flexible Settings**

# Enclosed Automatic Transfer Switch

Range:  
125A to 630A,  
415V AC



## Flexibility

- Priority Source Selection
- Adjustable Time Delay (0.1 sec to 3 hours)
- Suitable for 3-Phase as well as 1-Phase Sources



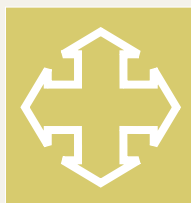
## Performance

- Double-Break Contact System offering High Short-time withstand (ICW)
- High Mechanical & Electrical Life: Double than requirement of IS/IEC Standard
- Suitable for Aluminium Termination



## Safety

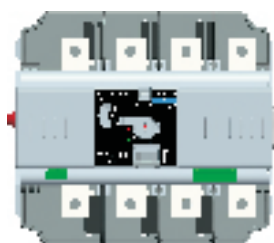
- Protections : UV/OV, Phase Sequence, Single Phasing, Frequency
- Authorized Access Control through Password Protection
- Inbuilt Terminal Shrouds, Phase Barriers & Source Separator



## Convenience

- Ample Space for Cable Termination, No need of Separate Cable Gland Box
- Ease of Generator Control (ON-OFF Cooling Cycle, Self-Test)
- Cyclic Event Logger : Logs 100 Events

# Motorised Changeover Product Features



## 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



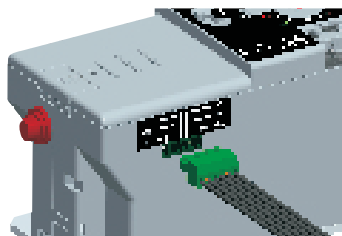
## Manual override

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



## 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 control supply to motorised changeover switch



## Auxiliary contacts

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



## Pad locking

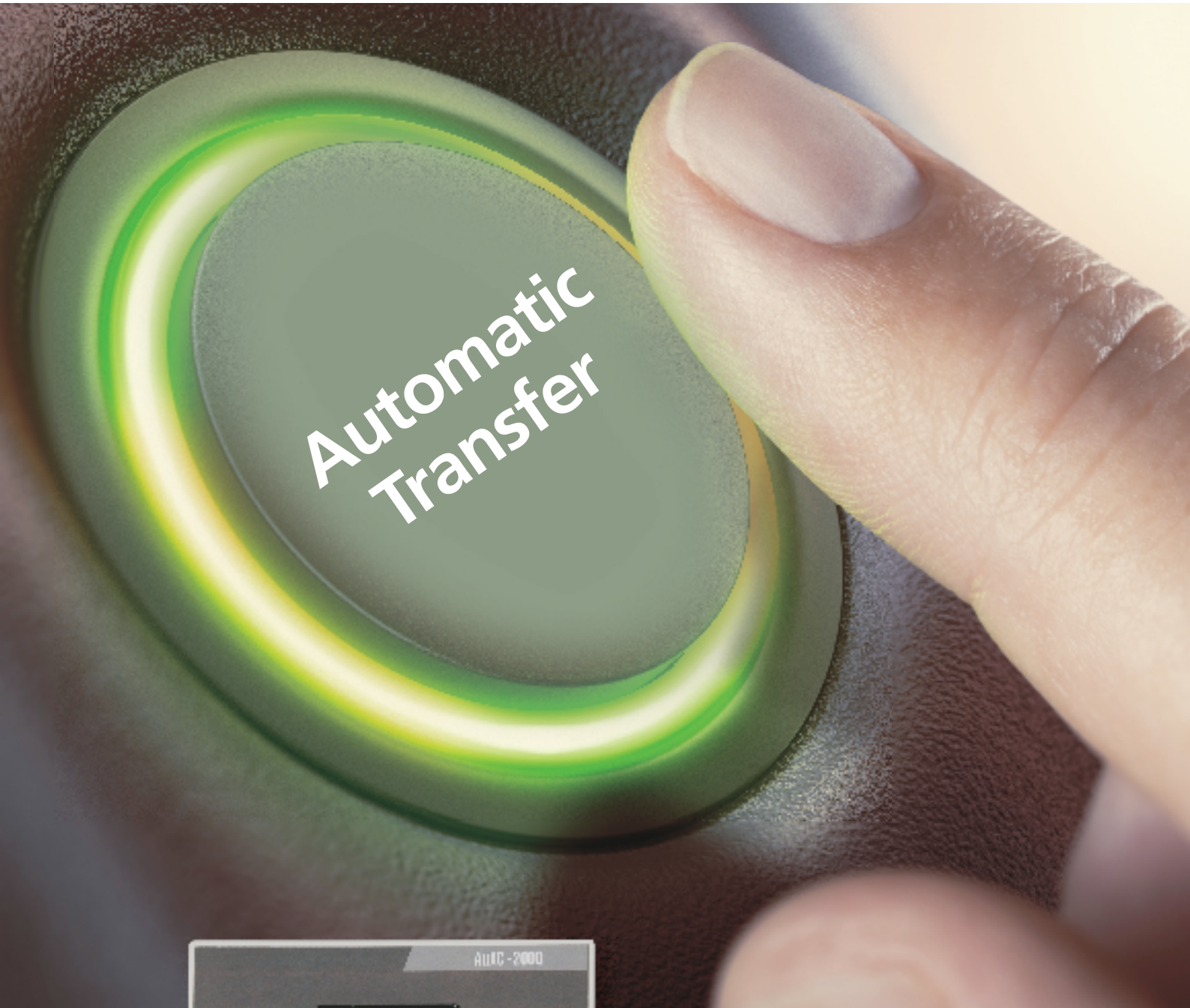
Provision for padlocking in OFF position with three padlocks of Ø5 to Ø7. Padlocking possible in both auto and manual mode



## 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

## AuXC-2000 Controller

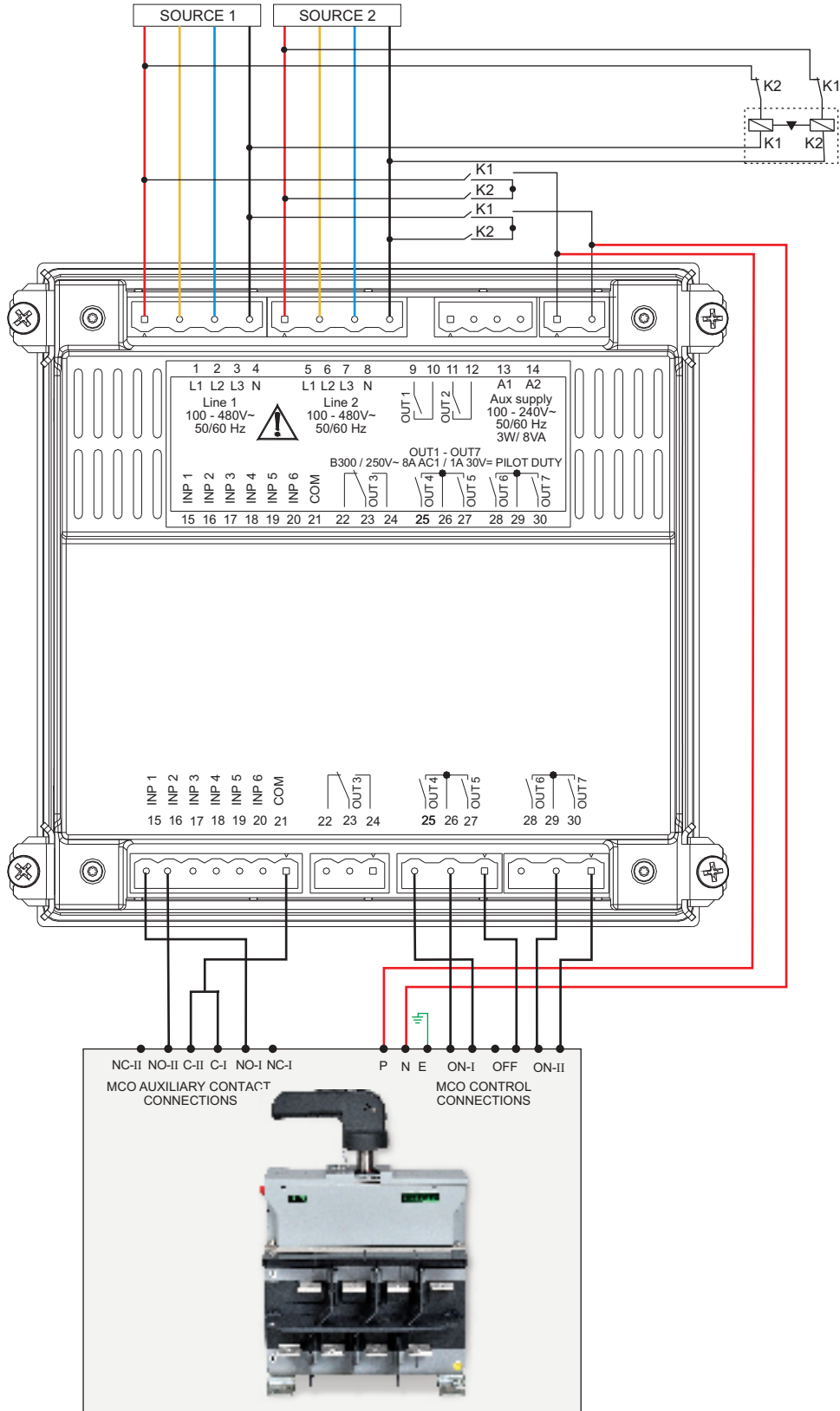


E&A's micro-processor based Automatic Transfer Controller AuXC-2000 in E&A Enclosed ATS is the answer to all auto source transfer requirements.

## Enclosed Automatic Transfer Switch

Rating(A)	Unit	Frame 2			Frame 3		Frame 4		
		125A	160A	200A	250A	315A	400A	630A	
Reference Standards		IS / IEC 60947-3, EN 60947-3, IS / IEC 60947-6-1, EN 60947-6-1							
Type Designation		ATS-125	ATS-160	ATS-200	ATS-250	ATS-315	ATS-400	ATS-630	
No. of Poles		4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	
Rated Operational Voltage(Ue) (power circuit)		415	415	415	415	415	415	415	
Rated Impulse Withstand Volatge(Uimp) ( power circuit)	(V)	12	12	12	12	12	12	12	
Rated Operational Voltage(Ue) (control circuit)	(kV)								
Rated Impulse Withstand Volatge(Uimp) ( control circuit)	(kV)	4	4	4	4	4	4	4	
Rated Frequency	(Hz)	50/60	50/60	50/60	50/60	50/60	50/60	50/60	
Pollution Degree		3	3	3	3	3	3	3	
Conventional enclosed thermal current at 40°(Ithe)	(A)	125	160	200	250	315	400	630	
Rated Operational Current(I the) according to IS/IEC: 60947-3									
415Vac, AC-21A / AC-22A / AC-23A	(A)	125	160	200	250	315	400	630	
Rated Operational Current(I the) according to IS/IEC: 60947-6									
415Vac, AC-31B	(A)	125	160	200	250	315	400	500	
415Vac, AC-31A	(A)	125	160	200	250	315	400	500	
415Vac, AC-32B	(A)	125	160	200	250	315	400	500	
Rated breaking capacity for AC-23A	(A)	1000	1280	1600	2000	2520	3200	5040	
Rated making capacity for AC-23A	(A)	1250	1600	2000	2500	3150	4000	6300	
Short time withstand, Icw	1 sec	(kA rms)	8	8	10	16	18	22	26
	0.2 sec	(kA rms)	18	18	18	28	28	35	35
Short-circuit making capacity, Icm	(kA peak)	14	14	17	32	36	46	55	
Endurance (category AC 23A)	Mechanical	(O-I-O-II-O cycle)	16000	16000	16000	16000	16000	10000	10000
Endurance (category AC 23A)	Electrical	(O-I-O-II-O cycle)	2000	2000	2000	2000	2000	2000	2000
Rated fused short-circuit current at 415V, 50/60 Hz	DIN/Cylin	(kA rms)	100	100	100	100	100	100	100
Operating torque		(N-m)	10	10	10	20	20	28	28
Weight		(kg)	18.2	18.2	19.0	29.5	30.0	41.3	41.6
Rated Control Voltage		(V)	240	240	240	240	240	240	240
Control Voltage Range		(%)	85%-110%	85%-110%	85%-110%	85%-110%	85%-110%	85%-110%	85%-110%
Max. Current at 240V ac		(A)	2	2	2	2	2	2	2
Operating time	O-I / I-O	(sec)	1.5	1.5	1.5	1.6	1.6	1.7	1.7
	I-II / II-I	(sec)	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Black out time		(sec)	2.2	2.2	2.2	2.2	2.2	2.2	
Termination									
Maximum Al. cable with lug		( sq. mm)	95	95	150	185	240	2 X 300	2 X 300
Maximum link width		(mm)	30	30	30	40	40	50	50
Maximum link thickness		(mm)	5	5	5	8	8	8	2 * 8
Termination tightening torque		(N-m)	10	10	10	20	20	27	27

# Wiring Diagrams & Control Logic



## Pre-programmed Parameters

	Connection Terminal	Code	Setting (Description)
Inputs	15(INP1)	M10>> P10.01.01	Line 1 closed (Feedback 1)
	16(INP2)	M10>> P10.02.01	Line 2 closed(Feedback 2)
Outputs	25(OUT4)	M11>> P11.04.01	Close line 1
	27(OUT5)	M11>> P11.05.01	Open line 1 / line 2
Others	30(OUT7)	M11>> P11.07.01	Close line 2
	-	M05>> P05.07	Changeover Pulse

## Time Delay Setting

Parameter	Code	Preprogrammed	Available Setting
Line 1 to Line 2 interlock time	M05>>P05.03	0.1	0.1....1800Sec
Line 2 to Line 1 interlock time	M05>>P05.04	0.1	0.1....1800Sec
Presence delay (When Line 2 source not available)	M06>>P06.07	1	1....6000Sec
Presence delay (When Line 2 source available)	M06>>P06.08	1	1....6000Sec
Presence delay (When Line 1 source not available)	M07>>P07.07	1	1....6000Sec
Presence delay (When Line 2 source available)	M07>>P07.08	1	1....6000Sec

## Protection Parameter Setting

Parameter	Code	Preprogrammed
Phase Sequence Control	M02>>P02.05	OFF
Undervoltage setting for Line 1	M06>>P06.01	85%
Oversvoltage setting for Line 1	M06>>P06.04	110%
Undervoltage setting for Line 2	M07>>P07.01	85%
Oversvoltage setting for Line 2	M07>>P07.04	110%

## General Control Setting

Parameter	Code	Preprogrammed	Available Setting
Select Nominal Voltage	M02>>P02.01	415	50-5000 V AC
Select Voltage Control Mode	M02>>P02.07	L-L	L-L L-N L-L+L-N
Select Priority Line	M05>>P05.02	-1-	-1- Line 1 -2- Line 2

## Generator Start/Stop Control

Parameter	Code	Preprogrammed	Comments
Digital Output 3 (Terminal No. 22 & 23)	M11>> P11.03.01	Start/Stop remote control of line 2 generator	Hardwire to generator controller for ON/OFF Control
Digital Input 6 (Terminal No. 20 & 21)	M10>> P10.06.01	Generator ready 2	Hardwire for generator status feedback

Note : Refer AuXC2000- Automatic Transfer Controller Manual for further details and complete settings/programming parameters

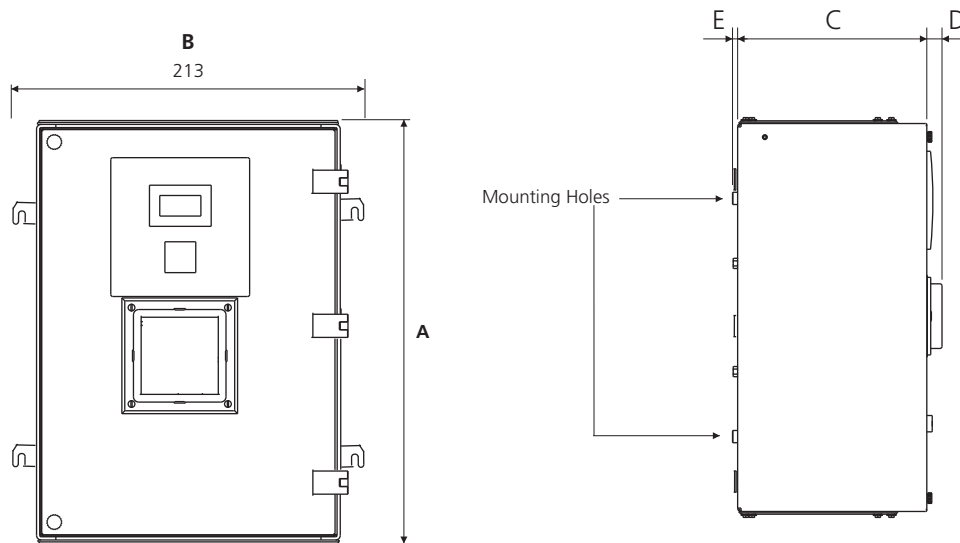
## Ordering Information

Description	CAT No.
Enclosed ATS, Frame 2, 125A	CK90161BSOO
Enclosed ATS, Frame 2, 160A	CK90162BSOO
Enclosed ATS, Frame 2, 200A	CK90163BSOO
Enclosed ATS, Frame 3, 250A	CK90164BSOO
Enclosed ATS, Frame 3, 315A	CK90165BSOO
Enclosed ATS, Frame 4, 400A	CK90166BSOO
Enclosed ATS, Frame 4, 630A	CK90167BSOO

## Cat. Nos. for Accessories

Rating (A)	125	160	200	250	315	400	630
HANDLE	CK903740000					CK903780000	
AuXC-2000 CONTROLLER	ATC20000000					ATC20000000	

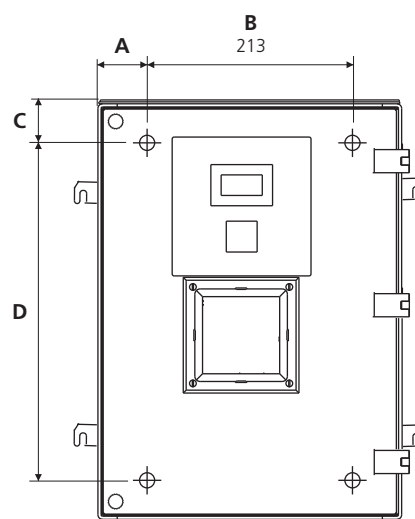
# Enclosed ATS Overall Dimensions



RATING (A)	A	B	C	D	E	MOUNTING HOLE SIZE
125/160/200	439	409	243	66	7.5	M8
250/315	578	486	278	66	7.5	M8
400/630	740	561.2	297	66	7.5	M8

## Dimensions for Enclosure Mounting

RATING(A)	A	B	C	D
125/160/200	51	213	44.5	350
250/315	88.5	213	114	350
400/630	59.5	346	70	600

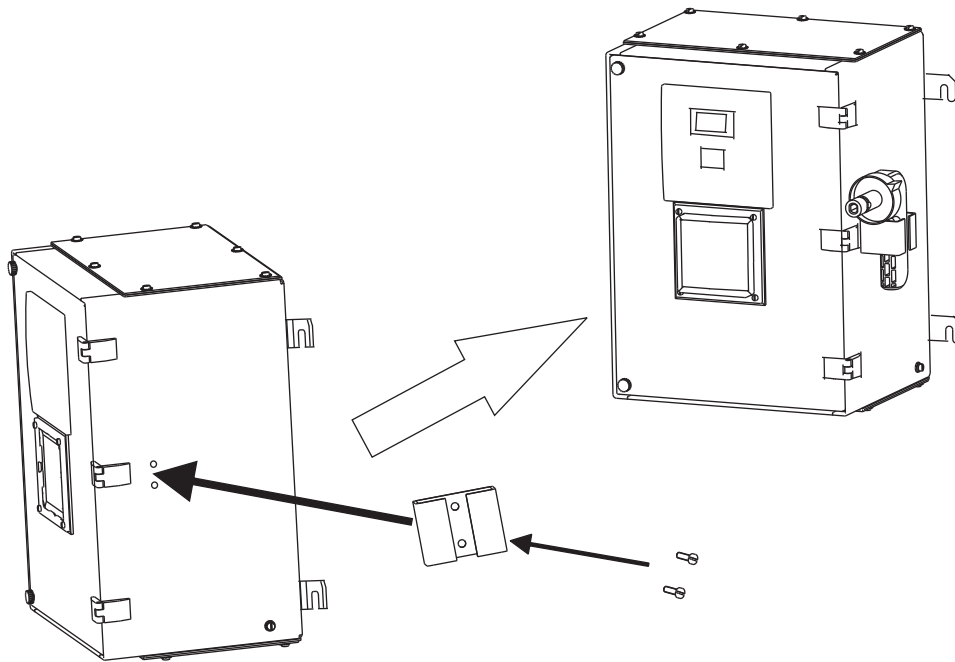




# Enclosed ATS Handle Clamp & IP Cover Mounting

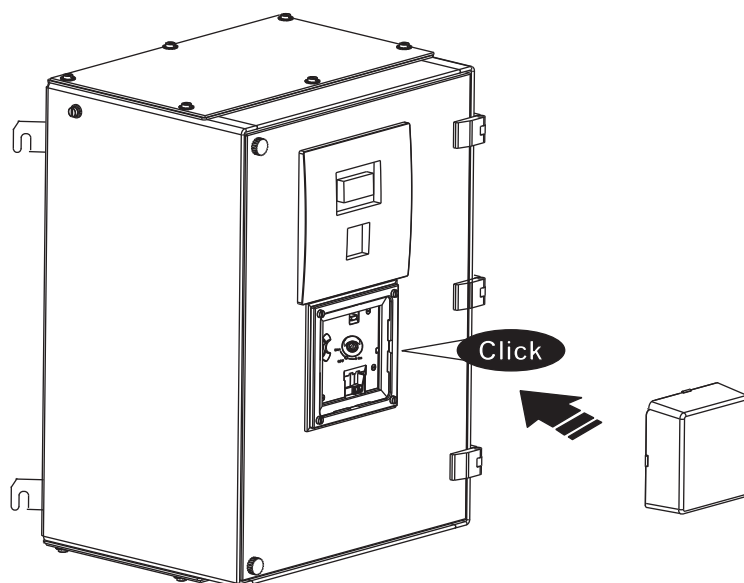
## Clamp Mounting for Handle

- Remove the screws and fix clamp to the enclosure as shown.
- Keep the handle inside the clamp when not in use.



## IP Cover Mounting

Insert the IP cover as shown



Caution: Remove IP cover for manual operation.

# THREE PHASE AUTOMATIC CHANGEOVER WITH CURRENT LIMITER



# Three Phase Automatic Changeover With Current Limiter

- Settable overload current limit at DG side
- Separate power consumption monitoring for mains & genset
- Settable TPN / SPN mode for three phase and single phase DG supply

## Standards :

IEC 60947-5-1

IEC 61000-4

IEC 60068-2



32/32 A

40/32 A\*

40/40 A



50/50 A

63/50 A\*

63/63 A



80/80 A



125/125 A

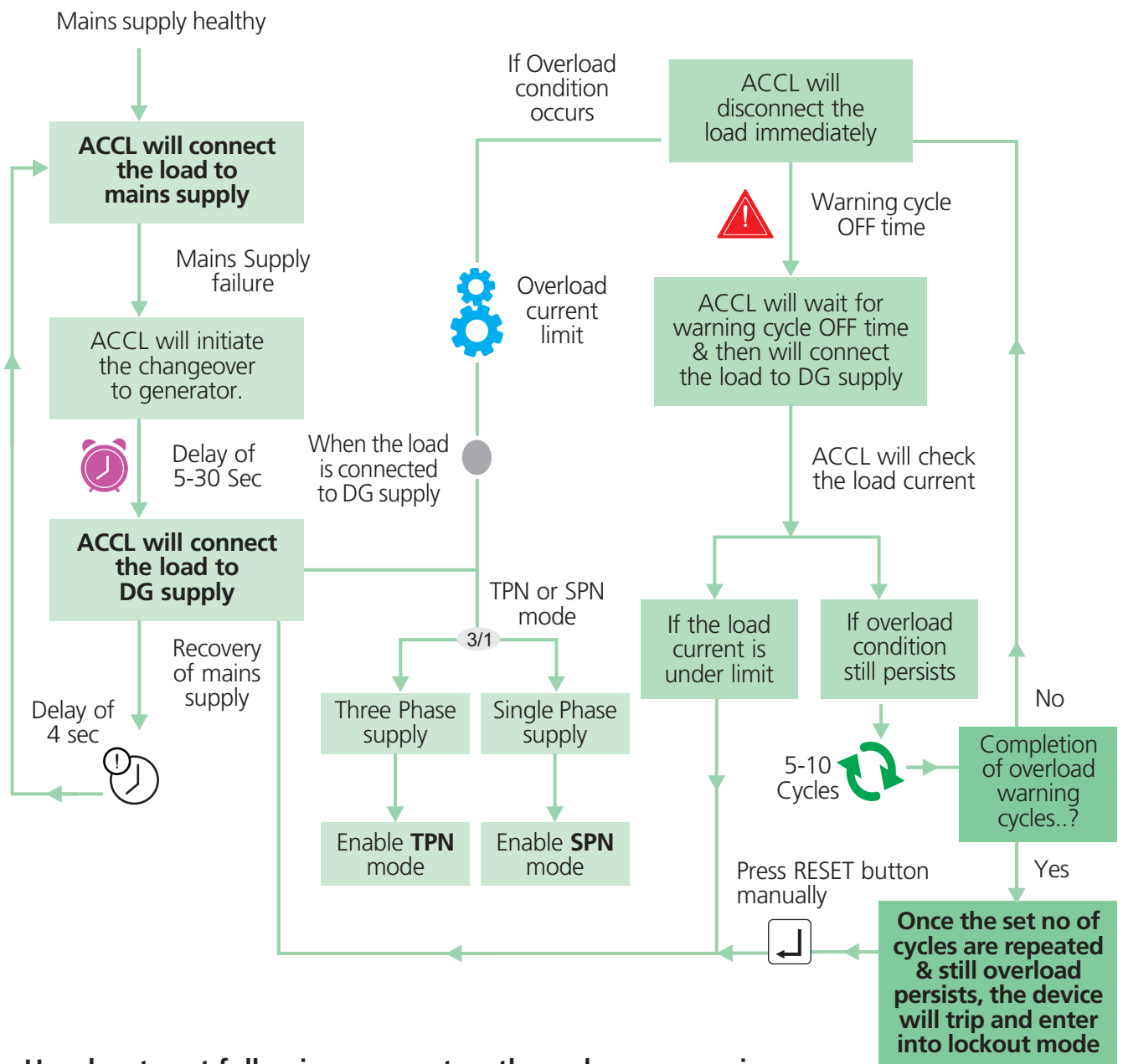
\* Specially designed where DG set for power back up is not 100%










# Technical Specifications

Rating	32/32	40/32	40/40	50/50	63/50	63/63	80/80	125/125
<b>Electrical Characteristics :</b>								
Supply Voltage	180V - 265V AC							
Supply Frequency	50Hz (±3%)							
Power Consumption	≤7 VA			≤12 VA			≤24 VA	≤24 VA
Number of poles	3 P + N							
Utilization category	AC1							
Duty	Continuous							
Accuracy	Class 1							
DG to EB transfer time	4 sec							
Mains to Load transfer time	4 sec							
Power Source Priority	Mains (EB)							
<b>Programmable Parameters :</b>								
User Password	Settable from 0000 to 9000. <b>Default - Disable</b>							
DG ON time	5sec –30sec settable. <b>Default - 9sec</b>							
Over load Warning cycles	5 to 10 settable. <b>Default - 10 cycles</b>							
Warning cycle OFF time	6sec – 150sec settable. <b>Default-6sec</b> (ON Time : 5sec fixed)							
Under Voltage (UV)	180V to 210V settable. <b>Default - Disable</b> (In default condition, Device trips if voltage is less than 160V)							
Over Voltage (OV)	250V to 280V settable. <b>Default - Disable</b> (In default condition, Device trips if voltage is above 280V)							
DG output supply	TPN or SPN settable. <b>Default - TPN</b>							
Single Phasing Protection	Enable / Disable. <b>Default - Enable</b>							
<b>Display Parameters :</b>								
Display type	7 segment 6 Digit Red LED Display							
Run Parameters displayed for Active Source (EB or DG)	<b>Each Phase:</b> Current, Voltage, Active Power, Power Factor, Line to Line Voltage <b>Average:</b> Phase Current, Phase Voltage, Line Voltage, Power Factor. Total active Power, Units (KWH), Load Hours and Supply frequency.							
<b>Fault Tripping :</b>								
Fault protection for both EB and DG	Over Current, Under Voltage, Over Voltage, Phase loss, Voltage error.							
Trip Time	4 Sec for UV/OV fault and Immediate trip for phase fail, extreme UV (less than 115V) and extreme OV (above 320V)							
<b>Environmental Characteristics :</b>								
Operating Temperature	-5° to +55°C							
Storage Temperature	-10° to +60°C							
Humidity	95% RH (Non - condensing)							
Pollution Degree	2							
<b>Mechanical characteristics</b>								
Tightening Torque	1.2 Nm			1.2 Nm			2.0 Nm	3.0 Nm
Main pole Terminal	M4			M4			M5	M6
No of cable x (Min. range - Max. range)	1 x 1-10 mm sq			1 x 4-16 mm sq			1 x 4-25 mm sq	1 x 10-70 mm sq
Dimensions (H x W x D)	178 x 164.6 x 125			234.7 x 260 x 125			298 x 246 x 125	451 x 380 x 179.4
Weight (Kg)	1.8			4.3			5.2	11.7

# Operation




## User has to set following parameters through programming

-  DG ON time between 5-30 sec (2.E)\*
-  DG Overload current limit (1.B)\*
-  TPN / SPN mode of DG supply (2.F)\*
-  Warning cycle off time between 6-150 sec (4.B)\*
-  Number of overload warning cycles (4.A)\*
-  Undervoltage setting between 180-210 V (2.B)\*
-  Overvoltage setting between 250-280 V (2.D)\*


\* Refer page no 6 - Edit Menu Structure to set specific parameter with the help of programming

# Features


**HIGHER RELIABILITY**  
The device will automatically detect the mains failure and initiate the changeover to generator. On recovery of mains supply, the load is automatically transferred with a delay of 4 sec to mains supply.





**SAVE DG FROM ABRUPT LOADING**  
ACCL connects the load to generator with delay of 5 to 30 sec [adjustable] to safeguard the generator from abrupt loading. DG ON time should be configured through programming. {2.E}\*





**SUITABLE FOR TPN / SPN DG SUPPLY**  
Three phase as well as single phase loads can be operated when connected to DG supply. TPN or SPN mode should be configured with the help of programming. {2.F}\*





**CONFIGURABLE DG CURRENT SETTING**  
DG overload current limit can be set through programming right from 1A to max rating of device. Different units are not required for different current ratings. {1.B}\*





**FLEXIBLE OPERATIONAL PARAMETERS**  
User programmable parameters such as DG ON time, number of warning cycles, warning cycle OFF Time, SPP feature, generator supply [1Ph or 3Ph] through User configurable password.





**ENERGY CONSUMPTION MONITORING**  
ACCL measures and displays the energy consumption of load [KWH unit] separately for mains and DG along with load ON hours. It also displays electrical parameters like voltage, current, active Power, power factor and frequency of active source to which load is connected.





**OV & UV PROTECTION**  
If voltage falls or exceeds the preset limits set by user, ACCL will disconnect the load. On recovery of healthy voltage, load will be automatically connected. Limits of OV & UV can be set through programming. {OV : 2.D} {UV : 2.B}





**SINGLE PHASE PROTECTION**  
If SPP feature is enabled, then ACCL will transfer the Load to generator when any of the phase fails. If SPP feature is disabled, then ACCL will transfer the load to generator only when R phase fails. {6.B}\*




**HIGHLY SECURED**  
The devices is protected with fixed master password & changeable slave password. Master password permits the DG overload current setting & slave password permits to other editable parameters. {5.B}\*




**EASE OF ACCESS**  
Simple and convenient programming using 4 keys with edit and view facility separately. A specific parameter can be reached directly instead of scrolling all parameters.

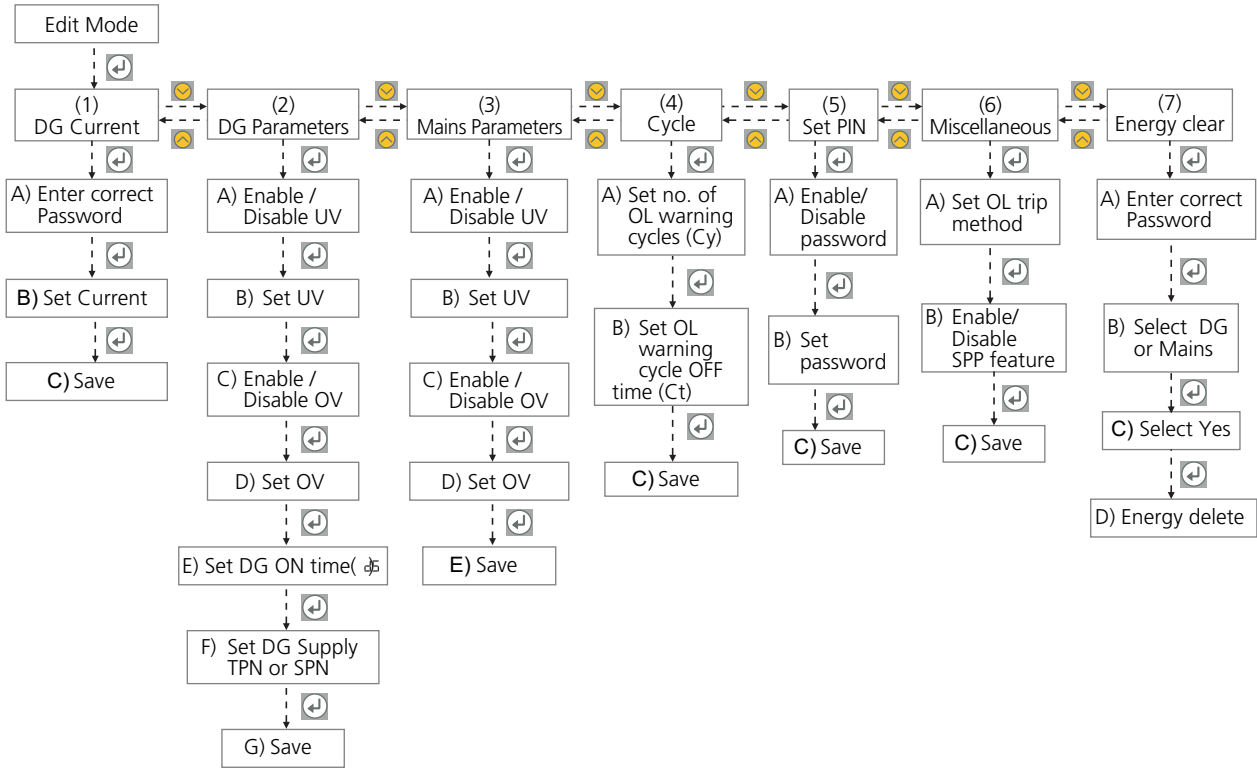


\* Refer page no 6 - Edit Menu Structure to set specific parameter with the help of programming

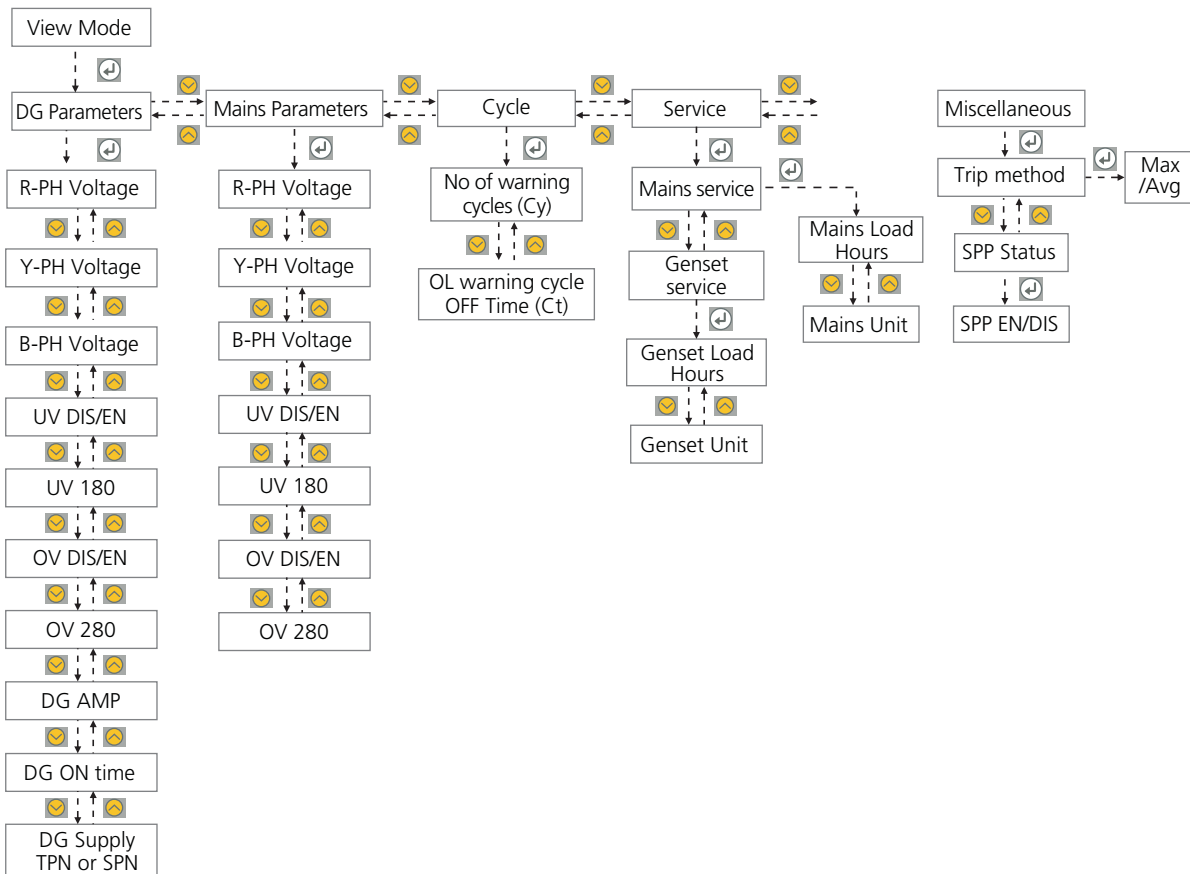
# Programming

## Edit Menu Structure

- Press ESC to enter programming (Edit) mode, when run parameters are displayed.



## View Menu Structure



## DISPLAY OF Parameters

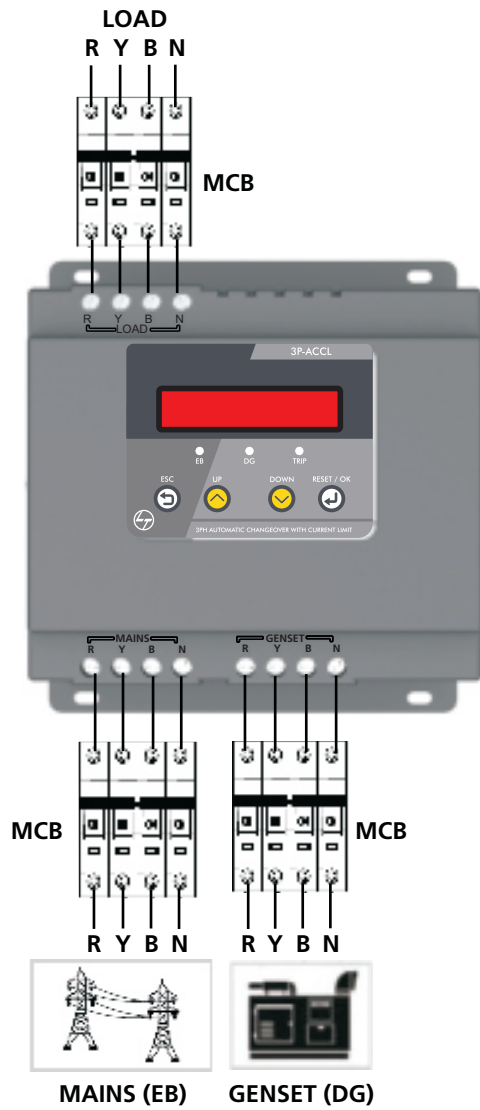
Display	Meaning
Ƨot. P <sub>o</sub> Ƨ	Total active power
A <sub>v</sub> .L.Ƨt <sub>9</sub>	Average line voltage
LL	Line to line voltage
A <sub>v</sub> .P.Ƨt <sub>9</sub>	Average phase voltage
L <sub>n</sub>	Line to neutral voltage
A <sub>v</sub> .P. A <sub>TP</sub>	Average phase current
A	Ampere
A <sub>v</sub> .P. F <sub>Ƨt</sub>	Average Power factor
PF	Power factor
F <sub>r</sub> E <sub>9</sub>	Frequency
F	Frequency
PH. Ƨt <sub>9</sub>	Phase voltage
u <sub>r</sub>	R phase voltage
u <sub>y</sub>	Y phase voltage
u <sub>b</sub>	B phase voltage
L <sub>n</sub> .Ƨt <sub>9</sub>	Line voltage
r <sub>y</sub>	RY phase voltage
y <sub>b</sub>	YB phase voltage
b <sub>r</sub>	BR phase voltage
PH. A <sub>TP</sub>	Phase current
A <sub>r</sub>	R phase current

Display	Meaning
A <sub>y</sub>	Y phase current
A <sub>b</sub>	B phase current
A <sub>Ƨt</sub> . P <sub>o</sub> Ƨ	Active Power
Ƨ <sub>r</sub>	R phase active power
Ƨ <sub>y</sub>	Y phase active power
Ƨ <sub>b</sub>	B phase active power
P <sub>o</sub> Ƨ. F <sub>Ƨt</sub>	Power factor
P <sub>r</sub>	R phase power factor
P <sub>y</sub>	Y phase power factor
P <sub>b</sub>	B phase power factor
L <sub>d</sub> . H <sub>r</sub>	Total Load ON hours
Ƨ <sub>n</sub> t <sub>t</sub>	Energy consumption units (KWH)
F <sub>H</sub> Ƨ 40.2	Over load fault with fault current
F <sub>L</sub> Ƨ 178	Low voltage fault with fault voltage
F <sub>H</sub> Ƨ255	High voltage fault with fault voltage
PH. E <sub>rr</sub>	Phase loss fault
u. E <sub>rr</sub>	Voltage fault
E <sub>n</sub> . E <sub>rr</sub>	Hardware fault

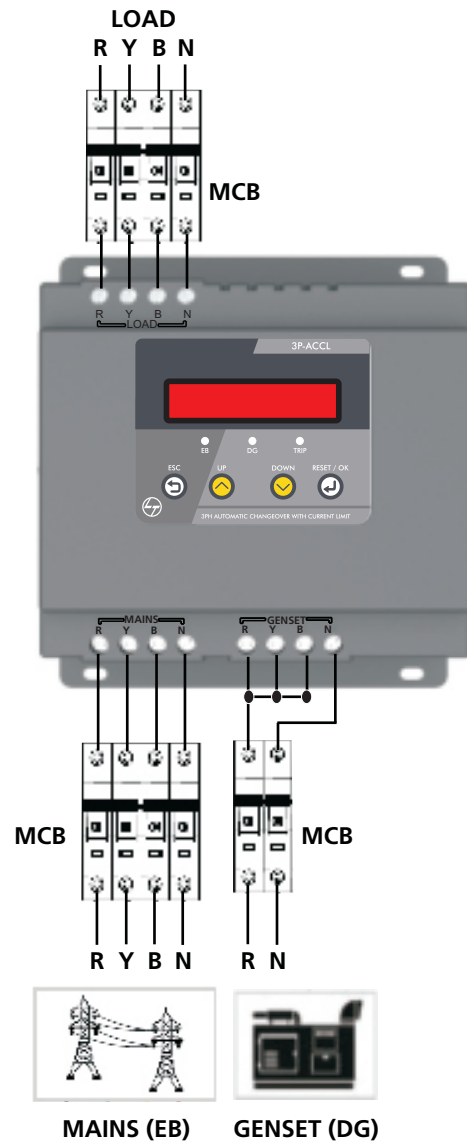


# Recommended Connection

## For DG Supply Three Phase



## For DG Supply Single Phase

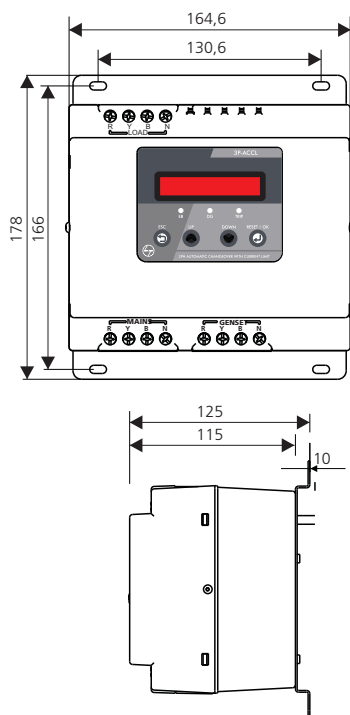


## Ordering Information

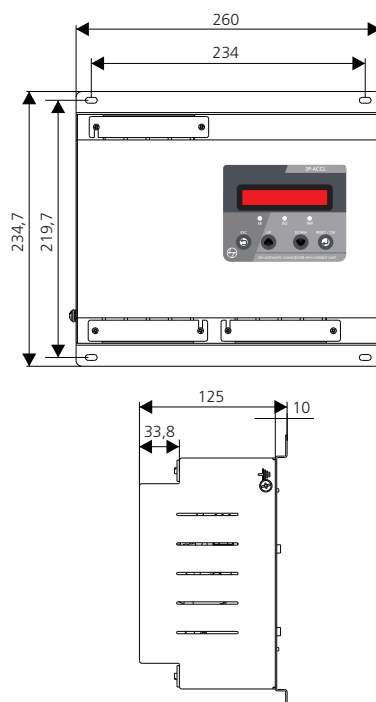
Raing	Cat. No.	Description
32/32 A	AUCL03032032	Digital ACCL, TPN-TPN, 32A Mains, 32A Genset
40/32 A	AUCL03040032	Digital ACCL, TPN-TPN, 40A Mains, 32A Genset
40/40 A	AUCL03040040	Digital ACCL, TPN-TPN, 40A Mains, 40A Genset
50/50 A	AUCL03050050	Digital ACCL, TPN-TPN, 50A Mains, 50A Genset
63/50 A	AUCL03063050	Digital ACCL, TPN-TPN, 63A Mains, 50A Genset
63/63 A	AUCL03063063	Digital ACCL, TPN-TPN, 63A Mains, 63A Genset
80/80 A	AUCL03080080	Digital ACCL, TPN-TPN, 80A Mains, 80A Genset
125/125 A	AUCL03125125	Digital ACCL, TPN-TPN, 125A Mains, 125A Genset

# Dimensions

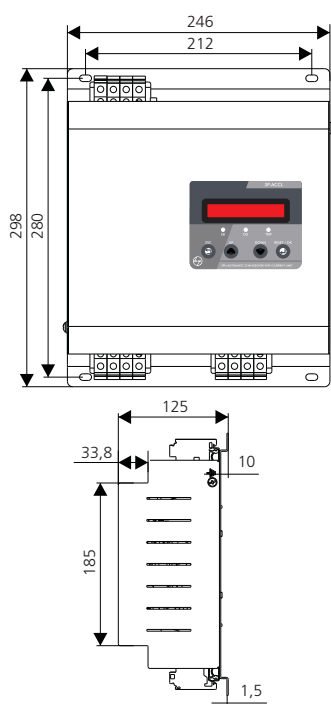
## 40 A



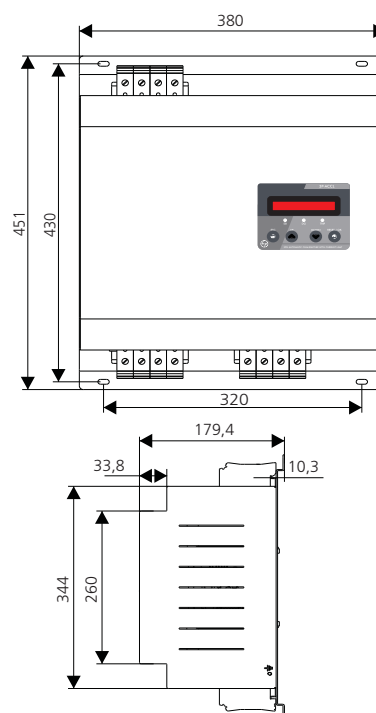
## 63 A



## 80 A



## 125 A

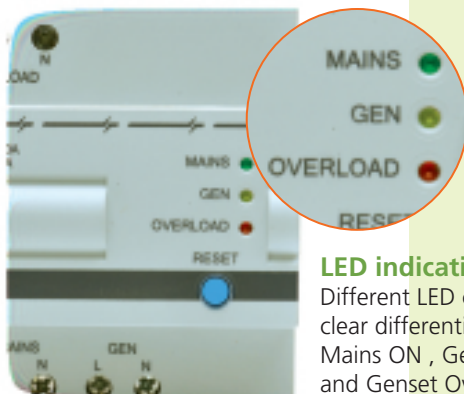


# Single Phase - ACCL Automatic Changeover with Current Limiter

A perfect solution for efficient distribution of generator power in high-rise apartments, townships, and commercial buildings. ACCL consists of three separate pair of terminals - two for connecting single phase supplies (main and back-up) and one for connecting single phase load. The ACCL will switch the load to back-up/generator supply when main/default supply goes off. On resumption of default supply, ACCL will automatically switch from back-up to default supply.



## Intelligent and Reliable



### LED indication

Different LED colors for clear differentiation between Mains ON, Genset ON and Genset Overload



### Reset Button

To Restore the supply to load, after non essential loads are switched off

## Range Highlights

- Conforms to IEC 60947-6, IEC 60947-3
- Wide Range of Current Ratings
  - (Generator side) - 1.5A to 30A
  - (Electricity Boards side)- 30A
- No. of Poles 1P+N
- Protection Degree - IP20
- Reliable microcontroller based design for sensing & control
- Lower power consumption
- RoHS compliant

## Product Specifications


ELECTRICAL	
Rated Operational Voltage	230V
Rated Insulation Voltage	500V
Rated Impulse Voltage	2.5kV
Rated Frequency	50Hz
Electrical Life (Operating Cycles)	6000
Utilization Category	AC 31B (IEC 60947-6) / AC 21A (IEC 60947-3)
Conditional short-circuit current	3kA
Dielectric strength	2kV

MECHANICAL	
Changeover time (Mains to DG)	~ 11 sec.

INSTALLATION	
Terminal Capacity	6 mm <sup>2</sup> (flexible) 10 mm <sup>2</sup> (rigid)

GENERAL	
Operating Temperature	-5°C to 50°C

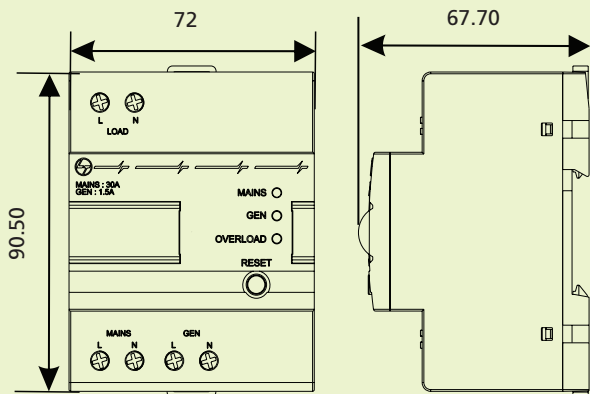
## Product Range

Description	Single Phase ACCL	Modules	Cat. Nos.	M.R.P.( <sup>^</sup> ) Per Unit
	30A/1.5A	4	AUCL010301E5	1890
	30A/2.5A	4	AUCL010302E5	1890
	30A/3A	4	AUCL01030003	1890
	30A/4A	4	AUCL01030004	1890
	30A/5A	4	AUCL01030005	1890
	30A/6A	4	AUCL01030006	1890
	30A/8A	4	AUCL01030008	1890
	30A/10A	4	AUCL01030010	1890
	30A/12A	4	AUCL01030012	1890
	30A/15A	4	AUCL01030015	1890
	30A/20A	4	AUCL01030020	1890
	30A/30A	4	AUCL01030030*	1890

\* Non-current limiting variant

### Dimension Details - ACCL

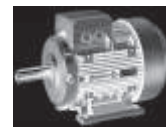
in mm



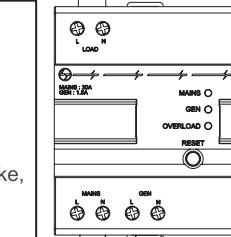
### Connection Diagram

Connect necessary loads like,

1. Tube Lights / CFL,
2. Laptop, Television,
3. Mixer, Juicer etc.



- Connect heavy loads 'Directly on MAINS' like,
1. Motors.
  2. AC.
  3. Geysers.



MCB/  
RCBO

Mains

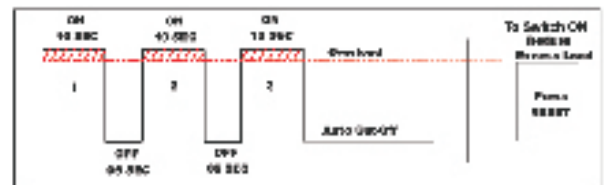
MCB/  
RCBO

Genset

### Recommended Backup MCB Ratings:

ACCL Ratings		MCB Ratings		ACCL Cat. Nos.
Mains	Genset	On Mains Side	On Genset Side	
30 A	1.5 A	32 A	2 A	AUCL010301E5
	2.5 A		3 A	AUCL010302E5
	3 A		3 A	AUCL01030003
	4 A		4 A	AUCL01030004
	5 A		5 A	AUCL01030005
	6 A		6 A	AUCL01030006
	8 A		10 A	AUCL01030008
	10 A		10 A	AUCL01030010
	12 A		16 A	AUCL01030012
	15 A		16 A	AUCL01030015
	20 A		20 A	AUCL01030020

### Timing Diagram:



Product improvement is a continuous process. For the latest information and special applications, Please contact any of our offices listed here. Product photographs shown are for representative purpose only