Lauritz Knudsen
Electrical & Automation

Onload Changeover Switch

ABOUT US

Lauritz Knudsen Electrical & Automation, formerly known as L&T Switchgear, is a leading player in the electrical industry owing to its 70+ years of strong legacy and commitment to the nation's growth. The brand is dedicated to providing a wide range of electrical and automation products and solutions to vital sectors of the economy, including industries, utilities, infrastructure, buildings, and agriculture. Our extensive portfolio includes low-voltage and medium-voltage switchgear, automation solutions, tailored software, and services.

With manufacturing operations in Ahmednagar, Vadodara, and Coimbatore, we adhere to global standards of excellence. Our operations are supported by well-equipped, in-house design and development centers, as well as tooling facilities, ensuring precision in manufacturing.

We proudly operate six Switchgear Training Centers (STCs) across Pune, Lucknow, Coonoor, Vadodara, Delhi, and Kolkata. These centers offer tailor-made classroom courses and lab learning experiences for technicians, customers, engineers, professionals, and students.

With a deep national presence and one of the largest electrical distribution networks, comprising over 1500 partners across the country, we are committed to driving excellence and delivering superior products and solutions that power India's growth journey.

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Changeover Switch Applications

Change-over switches for applications in all walks of life for backup power for industrial applications
- Power plants
- Data centers
- Production plants
- Farming facilities

Critical lighting and air conditioning for mass transportation hubs
- Airport runways
- Underground railways
- Car parks

Ensured continuity of public services
- Water pumping stations
- Sewage treatment plants
- Telecommunications

Buildings (back up power, lighting, sprinklers, elevators etc.)
- Hospitals
- Shops and malls
- Hotels and restaurants
- Sport stadiums and arenas
- Private residences

Changeover Switches

As industrial processes and IT applications diversify, ensuring a reliable power supply is increasingly vital for reducing production and maintenance costs. During emergencies, the operational logic of power distribution can become intricate due to the involvement of mechanical devices responsible for functions such as making, breaking, conducting, and isolating power. At times, the need arises to transfer loads from one power supply to another, particularly when energy use is restricted or when the supply source is overloaded

To meet any and all of your change-over, bypass, and transfer needs, we offer a wide variety of switches ranging from 40 to 2000 Amperes. E&A includes switches that allow you to transfer from one source to another manually, remotely, or automatically.

There are two types of transfer systems. They are:

- **Manual Transfer system:** These are generally toggle / knob operated switches 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.
- **Bypass :** Bypass Switches are meant for special application and help to maintain continuity of supply to the load in case of breakdown/maintenance of UPS or Servo stabilizer used in the circuit. These simply 'bypass' the UPS/ Servo stabilizer, in case it needs maintenance or in case of breakdown. The removal of the UPS/ Servo stabilizer is safe as it is now isolated from both input and output side.

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 change-over time can be adjusted by using different time setting 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).

- **Automatic Transfer system :** 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 losses in the system. Automatic transfer systems have therefore found their popularity and utility in several industrial and commercial applications where a constant source of power is necessary

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 Centre 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:

Changeover Switches

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

C-line Changeover Switches
Transfer Switch offering much more…

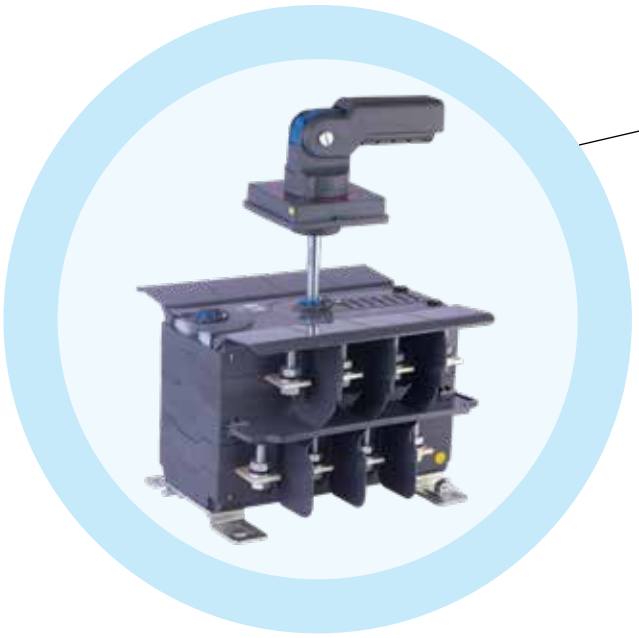
C-LINE ensures a high standard of safety through its dependable switching mechanism, which operates independently of the user's speed of operation. This mechanism incorporates a fail-safe mechanical interlock for all 3 positions in the I-0-II versions. Additionally, the inclusion of I-0-II position indicators directly on the handle and mechanism further enhances operational safety.

C-LINE offers on-load switching and isolation capabilities with its AC-23 and AC-33 characteristics, tested according to standards IEC 60947-3 and IEC 60947-6-1. This enables safe on-load switching for various types of loads. Its onload transfer capabilities eliminate the need to isolate loads before transfer, providing an economical solution. Moreover, it is easy to connect as wide spearhead terminals enable easy termination of Aluminium cables / Busbars and provide better clearances.

Changeover Switches

Electrical & Automation (E&A) offers you a unique series of Changeover Switches combining compactness with high performance & customer convenience, thus, making it a state-of-the-art product in changeover technology.

The C-line range covers ratings from 40 A to 2000 A in 6 frame sizes. These changeover switches are available in open execution, Sheet steel enclosure, motorised version & Enclosed ATS version.



SS Enclosure inclusive of cable gland box

Motorised changeover switch

Enclosed Automatic Transfer Switch

Basic function of Changeover Switches
Onload Changeover S-D has 3 stable positions as defined below

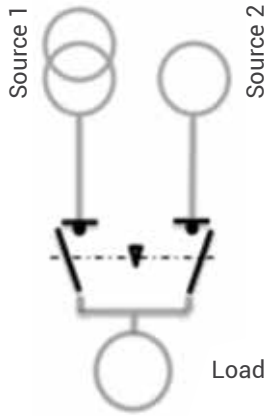
POSITION I	POSITION O	POSITION II
Switch is in ON position with normal supply available at the outgoing terminals.	Switch is in OFF position & outgoing terminals are isolated from both supplies (normal & alternate supplies)	Switch is in ON position with alternate supply available at the outgoing terminals.

Onload Changeover S-D consists of two separate sets of terminals for incoming supplies and a set of output terminals to connect the common load. Thus, changeover switch ensures continuity of supply to the load by alternating between normal and alternate supply.

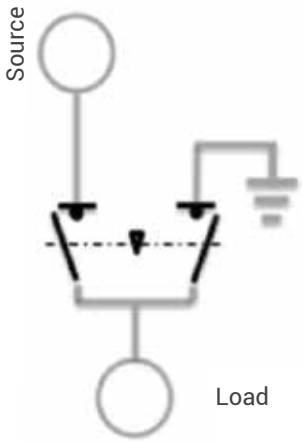
Changeover Switches Application

Application

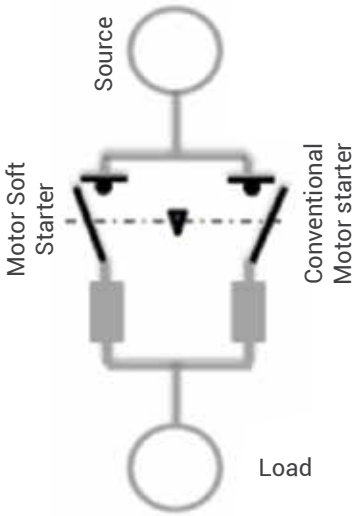
Reliable Changeover between either Primary and back up sources



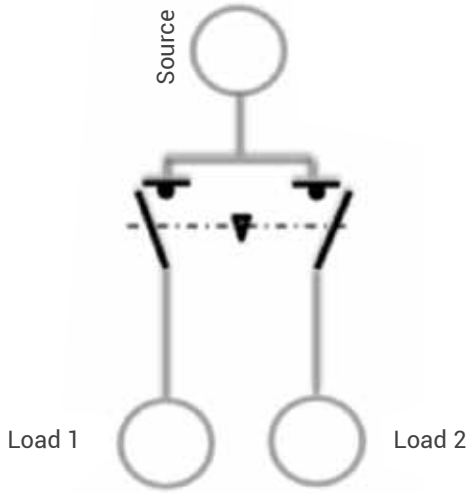
Earthing of equipment such as motors or Signaling electrical lines and isolated load in a fail-safe way

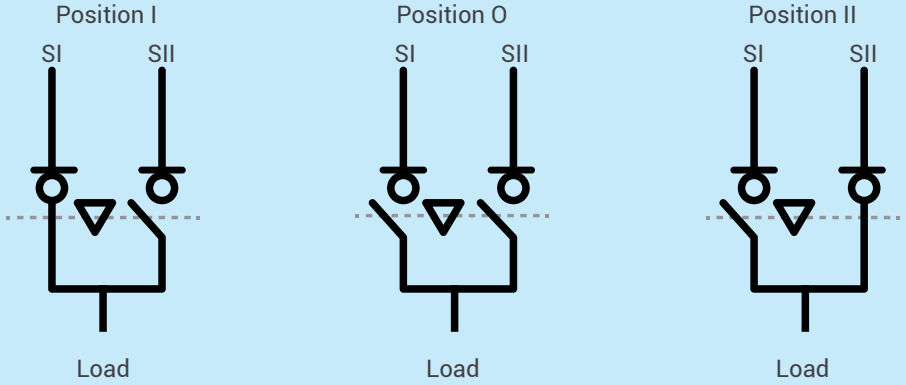


Switching between Soft Starter & Conventional starter connected to same Motor load



Switching of the power supply from one load to another load in order to ensure that they both age at an equal rate





Superior Performance

Higher short-time withstand Capacity	Contact system is of double break, knife type having self wiping action with electrodynamic compensation. This ensures reliable performance during normal as well as short circuit fault conditions, offering higher shorttime withstand rating.
Higher life	Changeover switch offers high electrical and mechanical life in compact frame sizes. The electrical and mechanical life are two times the requirement of the standard.
Total flexibility of connection	Factory fitted external shorting links can be easily removed and fitted on the other side as required at site (125 A to 2000 A). This gives more flexibility at the time of installation. For Frame 1(63A, 100A & 125A), CAT no.s for top and bottom shorting links are available.
Maximum termination capacity	Changeover Switch provides generous terminal capacity in its compact size, facilitating aluminium termination.
Higher ground clearance	Higher ground clearance between terminals and mounting base plate ensures adequate clearance even after connecting cables. This eliminates the possibility of phase to ground flash over.
Total Safety	Changeover Switch provides complete safety by providing terminal shrouds, source separator and inter-phase barriers.
Safe and reliable	C-LINE ensures a high standard of safety through its dependable switching mechanism, which operates independently of the user's speed of operation. This mechanism incorporates a fail-safe mechanical interlock for all 3 positions in the I-0-II versions. Additionally, the inclusion of I-0-II position indicators directly on the handle and mechanism further enhances operational safety.
High Performance Level	C-LINE offers on-load switching and isolation capabilities with its AC-23 and AC-33 characteristics, tested according to standards IEC 60947-3 and IEC 60947-6-1. This enables safe on-load switching for various types of loads. Its on-load transfer capabilities eliminate the need to isolate loads before transfer, providing an economical solution.
Quick & Easy Installation Tall	Easy to connect as wide spearhead terminals enable easy termination of Aluminium cables / Busbars and provide better clearances.

Product Range

Onload Changeover S-Ds are available from 63 A to 2000 A.
The range is covered through 6 frames as shown below.

Frame No.	Ratings (A)		
I	40* / 63	100	125
II	125	160	200
III	250	315	
IV	400	630	
V	630	800	1000
VI	1250	1600	2000

* 40A for motorized version of changeover

Versions

Changeover Switches are available in open execution, Sheet steel enclosure, fused version and motorised version.

- **Changeover S-D suitable for open execution**

  Changeover S-D, which can be commissioned in panels are of open execution type and provide IP20 protection from front.

- **Onload changeover S-D in SS enclosures**

  Onload Changeover S-Ds are available in sheet steel enclosure with adequate space for cable terminations so that additional cable entry boxes are not required. Cable gland plates are also provided with the switch. The smartly engineered enclosure is powder coated with RAL 7032 shade.

- **Motorised Changeover S-D**

  On load changeover S-Ds are available in motorised version with control voltage 240 V ac from 40A to 2000A ? There is no difference in product dimensions of manual and motorised changeover S-Ds (125 A to 2000 A).

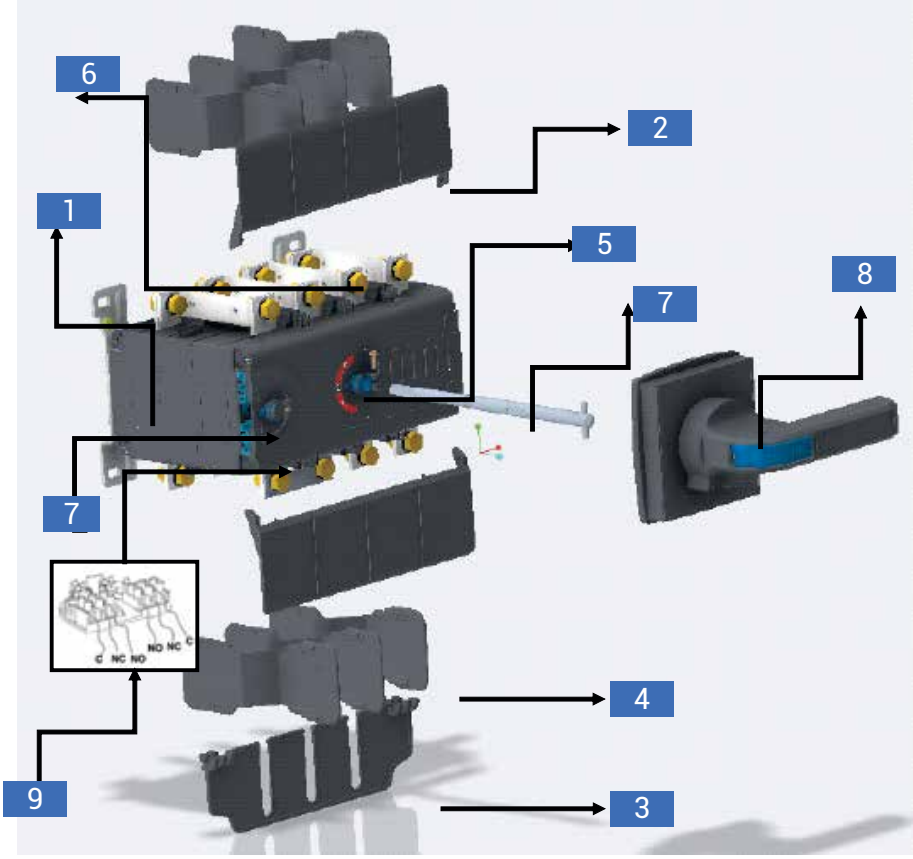
- **Enclosed ATS**

  Enclosed ATS harnesses the power of advanced Power Transfer Controller AuxC 2000 and Motorised Changeover Switch to provide a seamless Automatic Transfer.

- **CZ Bypass:**

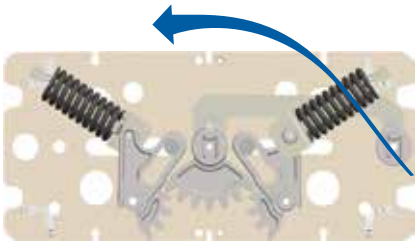
  CZ Bypass Switches are easy to install, operate and inspect. Armored with safety featureslike terminal shrouds, phase barriers & door interlock, the CZ Bypass Switches are designed to battle against accidental faults and inadvertent operations. Robust construction allows to withstand higher fault currents without any deterioration.

Manual Changeover Product Feature



1. Mechanism

A single, compact and modular mechanism cassette operates two Switch-Disconnectors and provides mechanical interlocking between them. The use of patented, self interlocked and dual dead center mechanism in CO range provides higher reliability for changeover function.

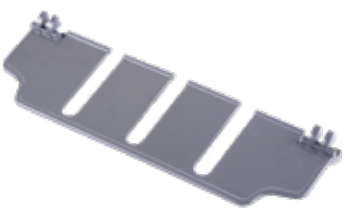


2. Terminal shroud

These shrouds provide complete touch proof design and prevent accidental touching of live terminals. They are click fit type. Due to hinge type terminal shrouds, it can be turned by 90 degree, hence terminals can be inspected without removing these shrouds.

3. Source separator

Source separator is used to isolate two incoming supplies and to eliminate possibility of flash over between two supplies due to accidental falling of external objects.



Manual Changeover Product Feature

4. Inter-phase barriers

Inter-phase barriers are provided for additional safety to eliminate possibility of inter-phase short-circuit.

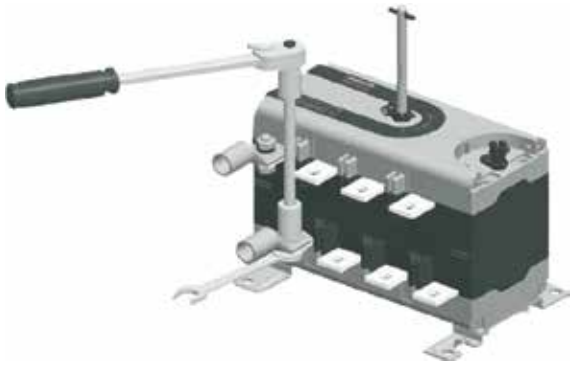
5. Positive ON / OFF indication of S-Ds

The Changeover S-D indicates true position of contacts.

6. Staggered terminals

The Changeover S-Ds are designed to have staggered terminal arrangement for top and bottom S-Ds. It provides clear access to all terminals from the front, ensuring ease of termination.

All terminal joints can be easily inspected without the need of removing termination of top S-D.



7. Interchangeable dual shaft position with site convertibility

Patented dual dead enter mechanism enables the user to choose between central and side shaft positions for operating handle.

This can be easily converted on site as required (125A to 1000A).

Manual Changeover Product Feature

Interchangeable Shorting link :

Factory fitted external shorting links can be easily removed and fitted on theother side as required at site (125 A to 2000 A). This gives more flexibility at the time of installation. For Frame 1 (63A, 100A & 125A), CAT nos for top and bottom shorting links are available.

8. Handle

The Changeover Switch has a unique flip-able operating handle for ratings 250 Amp and above which enables user to operate the switch with two hands. The handle also offers the following features:

- Provision for Padlocking in OFF position with three Padlocks of Ø5 to Ø7
- Defeat feature in both ON states and auto restoration of panel door
- IP54 with extended type operating handle

Two hand type flip-able handle
250 A & above rating

One hand type handle
upto 200 A rating

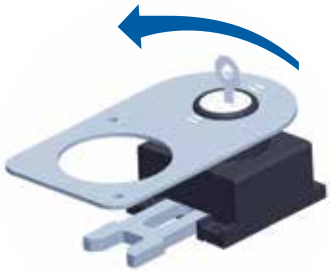
Changeover unit
padlockable in OFF state by 3 pad locks

9. Auxiliary contact kit

It consists of two sets changeover contacts one for each S-D. This kit is pre-wired with terminal blocks and is offered as a standard feature with open execution Manual Changeover Switches.

10. Castell lock

Accessory to lock the Changeover Switch in OFF state and using this can have interlocking schemes between multiple Switches.



Sheet steel enclosure

The Changeover Switches are available in sheet steel enclosure with adequate space for cable terminations so that additional cable entry boxes are not required.

Changeover Switch with Direct Handle

Compact direct handle 63 A and 125 A changeover switch suitable for double door DB. It occupies only 10 Mod space (45 x 140 cut-out).

Manual Changeover Product Feature

			Frame 1			Frame 2		
Rating (A)		**Unit**	**63 A**	**100 A**	**125 A**	**125 A**	**160 A**	**200 A$**
Reference Standards								
Type designation			CO1-63	CO1-100	CO1-125	CO1-125	CO1-160	CO2-200
No. of Poles			4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole
Rated operational voltage (U_e)		(V)	415	415	415	415	415	415
Rated frequency		(Hz)	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Rated insulation voltage (U_i)		(V)	1000	1000	1000	1000	1000	1000
Rated impulse withstand voltage (U_{imo})		(kV)	8	8	8	12	12	12$
Pollution degree			3	3	3	3	3	3
Conventional free air thermal current, I_{th} at 40°C		(A)	63	100	125	125	160	200
Conventional enclosed thermal current, I_{the} at 40°C		(A)	63	100	125	125	160	200
Rated operational current, I_e AC-21A# /AC - 22A# /AC - 23A		(A)	63	100	125	125	160	200
Rated operational power for AC-23A*		(kW)	37	50	65	65	85	85
Rated breaking capacity for AC-23A		(A)	504	800	1000	1000	1280	1600
Rated making capacity for AC-23A		(A)	630	1000	1250	1250	1600	2000
Short time withstand, I_{cw}	1 sec	(kA rms)	4	5	5	8	8	8
	0.2 sec	(kA rms)	7	10	10	18	18	18
Short-circuit making capacity, I_{cm}		(kA peak)	5.9	7.7	7.7	14	14	14
Endurance (category A)	Mechanical	(O-I-O-II-O cycle)	20000	20000	20000	16000	16000	16000
	Electrical	(O-I-O-II-O cycle)	3000	3000	2000	2000	2000	2000
Power loss per pole(W)			1.0	2.2	1.9	2.5	4.1	6.4
Type and size of fuse	DIN/Cylindncal	-	14 x 51ae	NA	NA	000	00	NA
Rated fused short-circuit current at 415 V, 50/60 Hz	DIN/Cylinae	(kA rms)	80ae			100	100	
Auxiliary Contact Rating			1.5A/250Vac	1.5A/250Vac	1.5A/250Vac	1.5A/250Vac	1.5A/250Vac	1.5A/250Vac
Termination Capacity								
Maximum Al. cable with lug		(sq mm)	25	50	70	95	95	150
Maximum link width		(mm)	16	22	22	30	30	30
Maximum link thickness		(mm)	2	4.7	4.7	5	5	5
Termination tightening torque		(N-m)	4.5	4.5	4.5	10	10	10
Operating torque center / side operating		(N-m)	4.5	4.5	4.5	10/13	10/13	10/13
Weight (without accessories)		(Kg)	2	2.5	2.7	4	4	4

* 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, AC-21A/AC-22A
æ Type cylindrical fuse
$ Claimed Impulse withstand voltage with use of source separator and inter phase barriers




Frame 3		Frame 4		Frame 5			Frame 6		
250 A	**315 A**	**400A**	**630 A**	**630 A**	**800 A**	**1000 A**	**1250 A**	**1600 A**	**2000 A**
IS / IEC 60947-3, EN 60947-3									
CO3-250	CO3-315	CO4-400	CO4-630	CO5-630	CO5-800	CO5-1000	CO6-1250	CO6-1600	CO6-2000
4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole
415	415	415	415	415	415	415	415	415	415
50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
12	12	12	12	12	12	12	12	12	12
3	3	3	3	3	3	3	3	3	3
250	315	400	630	630	800	1000	1250	1600	2000
250	315	400	630	630	800	1000	1250	1600	2000
250	315	400	630	630	800	1000	1250	1600#/1250	2000#/1250
132	160	225	315	315	400	450	710	710	710
2000	2520	3200	5040	5040	6400	8000	10000	10000	10000
2500	3150	4000	6300	6300	8000	10000	12500	12500	12500
16	18	22	26	35	50	50	50	50	50
28	28	35	35	70	85	85	85	85	85
32	36	46	55	73.5	105	105	105	105	105
16000	16000	10000	10000	10000	10000	10000	10000	10000	10000
2000	2000	2000	2000	2000	1000	1000	1000	1000	500
7.5	10.9	12.8	31.8	23.8	32.6	51.0	39.1	58.9	84
1	1	2	NA	3	3	NA	NA	NA	NA
100	100	100		100	100				
1.5A/250Vac	1.5A/250Vac	6A/250Vac	6A/250Vac	6A/250Vac	6A/250Vac	6A/250Vac	10A/250Vac	10A/250Vac	10A 250Vac
185	240	2 x 300	2 x 300	2 x 400	2 x 400	2 x 400	2 x 12 x 63	4 x 8 x 50	3 x 10 x 100
40	40	50	50	60	60	60	80	80	100
8	8	8	2 x 8	2 x 10	2 x 10	2 x 10	3 x 12	3 x 12	3 x 12
20	20	27	27	35	35	35	55	55	55
20/25	20/25	28/32	28/32	30/40	30/40	30/40	55	55	55
6.5	7	14	14.5	20	22	22	52	57	75

Altitude derating chart for COS

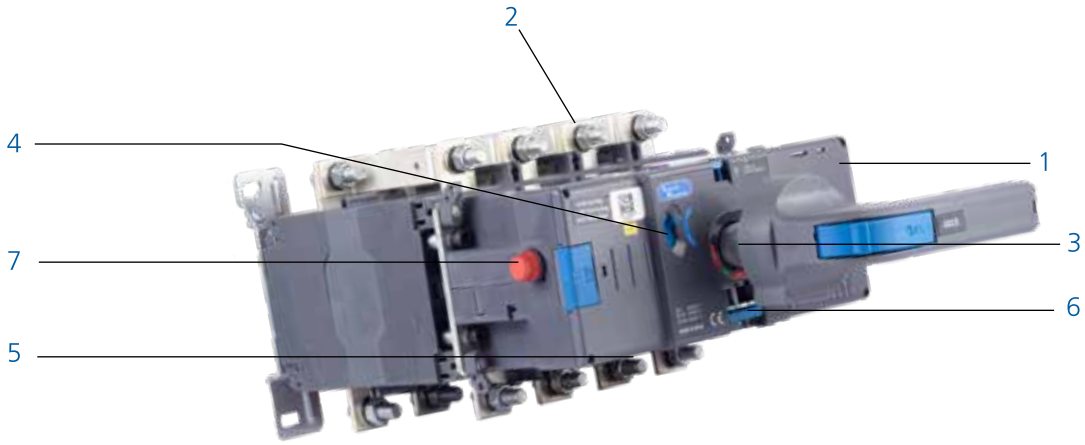
De-rating at different altitudes for COS							
Altitude	Height	(m)	at 2000	3000	4000	5000	6000
Rated operational voltagev	Ue	(V)	415	374	332	291	249
Rated operational current	Ie	(A)	Ie	0.98Ie	0.96Ie	0.94Ie	0.92Ie
Conventional enclosed thermal current	Ithe	(A)	Ithe	0.91 Ithe	0.81 Ithe	0.76 Ithe	0.7Ithe
Impulse withstand voltage	Uimp	(kV)	8	7.2	6.4	5.6	4.8
Impulse withstand voltage	Uimp	(kV)	12	10.8	9.6	8.4	7.2
Rated insulation voltage	Ui	(V)	690	621	522	483	414
Rated insulation voltage	Ui	(V)	1000	900	800	700	600

Technical Specifications of Motorised Kit

			Frame 1	Frame 2
Rating (A)		**Unit**	**40 to 125**	**125 to 200**
Reference Standards				
Rated frequency		(Hz)	50	50
Rated control voltage		(V)	240 V ac	240 V ac
Control voltage range		(%)	85%-110%	85%-110%
Pollution degree			3	3
Operating temperature		(°C)	-5 to +55	-5 to +55
Ingress protection (from front)			IP30	IP30
Max. current at 240 V ac		(A)	2	2
Operating time (min)	O-I / I-O	(sec)	< 0.4	0.5
	I-II / II-I	(sec)	<0.75	1.4
Black out time		(sec)	< 0.4	1.4
Control glass fuse current rating	(240 V ac)	(A)	NA	1.25
Dimensions of motorised kit	Width	(mm)	244	210
	Height	(mm)	84	84
	Depth	(mm)	127	94

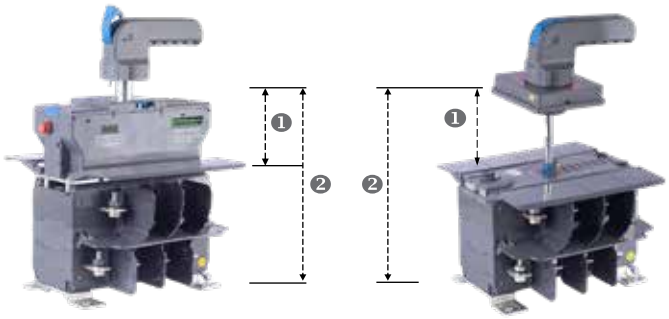
Frame 3	Frame 4	Frame 5	Frame 6
250 to 315	**400 to 630**	**630 to 1000**	**1250 to 2000**
IS/IEC 60947-3, IEC 60947-3, EN60947-3			
50	50	50	50
240 V ac	240 V ac	240 V ac	240 V ac
85%-110%	85%-110%	85%-110%	85%-110%
3	3	3	3
-5 to + 55	-5 to +55	-5 to +55	-5 to +55
IP30	IP30	IP30	IP30
2	2	2	2
0.6	0.7	0.7	0.7
1.4	1.4	1.4	1.4
1.4	1.4	1.4	1.4
2	2	2	2
260	310	380	274
84	84	84	108
94	94	94	118

Motorised Changeover Product Features



1. Compact design

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



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 by using the handle safely. As a safety feature the control supply of motorised changeover is automatically cut off during the insertion of handle.

5. Auxiliary contacts

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

6. Pad locking

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

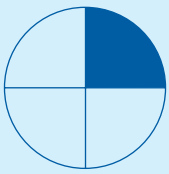
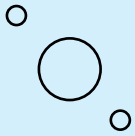
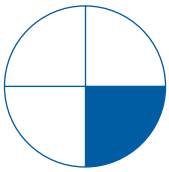
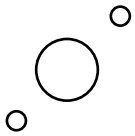
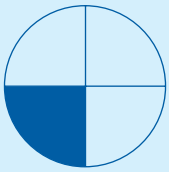
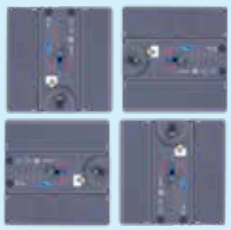
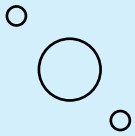
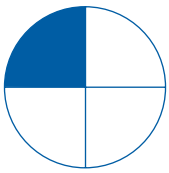
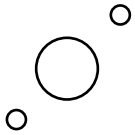
7. Fuse protection

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.

Universal Mounting for Manual Changeover Range

The manual changeover range also offers a distinctive feature to mount CO SD in different quadrants. This feature aids mounting flexibility.

Operating Quadrant chart (Seen from front of the door)

Sr. No.	Operating Quadrant	Handle (OFF) Position	Switch Orientation	Shaft Position	Door Cut-out
1					
2					
3					
4					

Automatic Source Transfer System

Illuminated Push button assembly with Wire harness

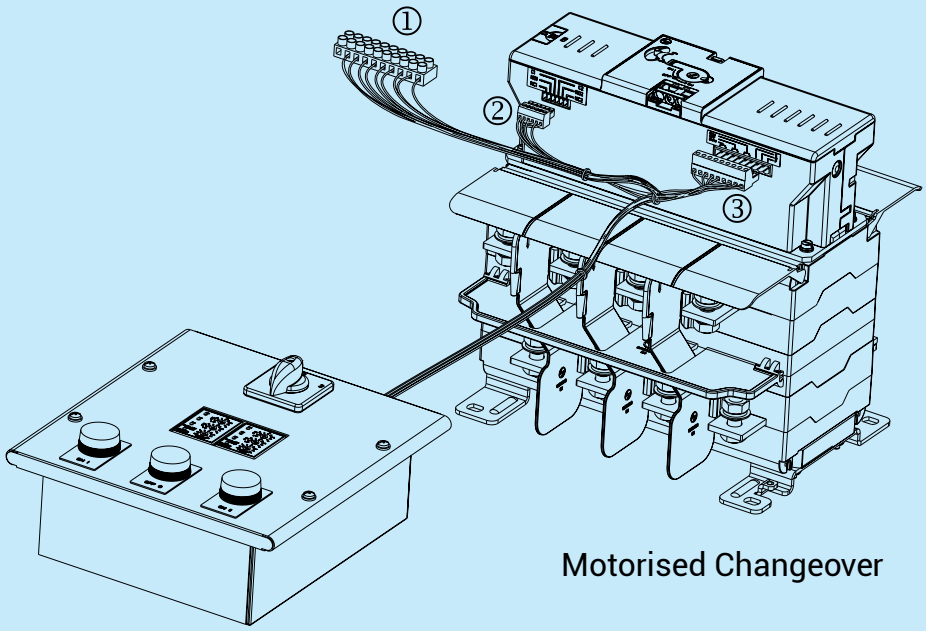
UV/OV based AST Controller with Wire Harness

- Option of controlling Motorised Changeover through Illuminated push button or UV/OV relay
- Sensing of three-phase voltage controls
- Protects against under voltage and over voltage
- Option of programming of minimum voltage, maximum voltage and time delay

AuxC-2000 Controller with Wire Harness

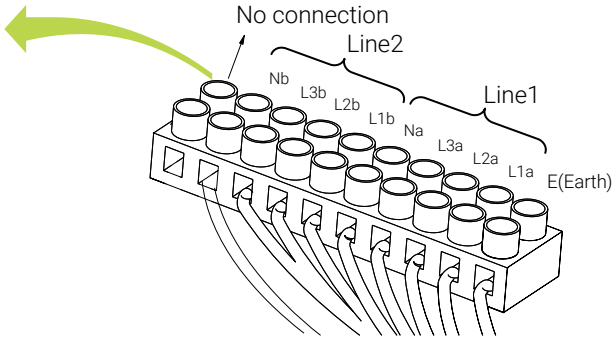
- Option of sensing : Three-phase, two-phase or single-phase voltage controls
- Option of Measuring : Phase-phase voltage and/or phase-neutral voltage control
- Protects against under voltage, over voltage, phase loss, asymmetry, under frequency, over frequency, with independent enable and delay voltage thresholds with programmable hysteresis
- 6 programmable digital inputs & relay outputs (5NO + 1 C/O)

ASTS with AST Controller



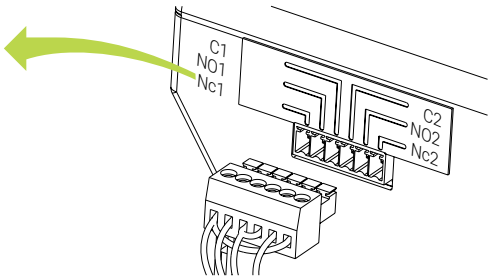
1. Control supply terminal block

Source I & II sensing inputs are to be connected for continuous monitoring by AST controller.



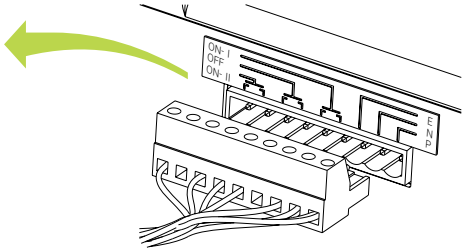
2. Auxiliary contact Set connection

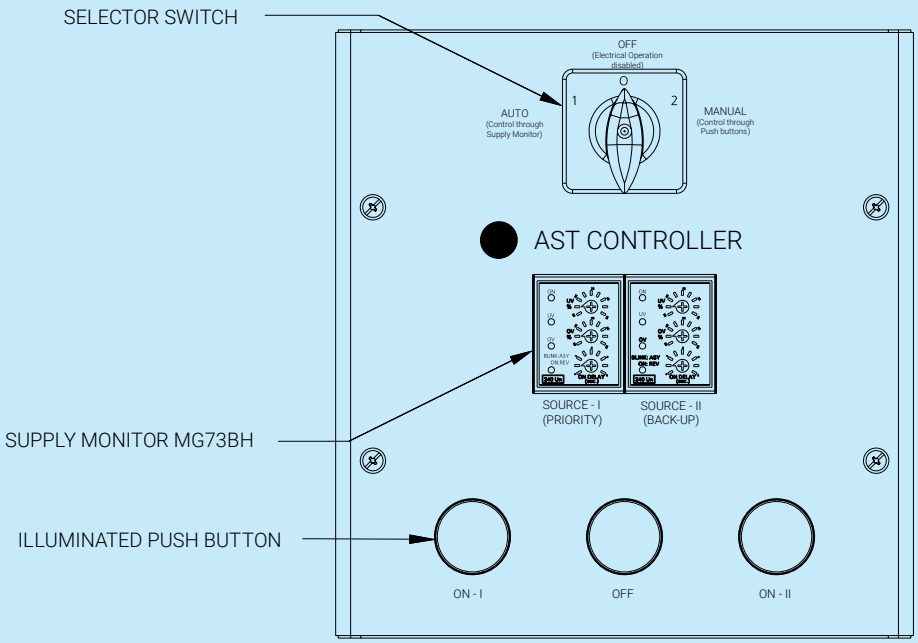
Two sets of pre-wired changeover auxiliary contacts one for each S-D. Same is used for power contact position feedback & status indication



3. Main terminal connection

Control inputs to motorised changeover through AST controller





User Interface

Auto Mode

In auto mode Source-I (priority source) is continuously monitored, in case of Source-I failure AST controller checks for Source-II (back-up source). If it is available then AST controller gives command to motorised changeover to shift on Source-II.

On restoration of Source-I (priority source) motorised changeover moves back to it. Illumination in the push buttons will be functional indication of the the motorised changeover switch position.

Option of setting over voltage : Recommended setting 110% of the supply voltage

Option of setting under voltage : Recommended setting 85% of the supply voltage

Option of setting time delay : 0 -15 seconds

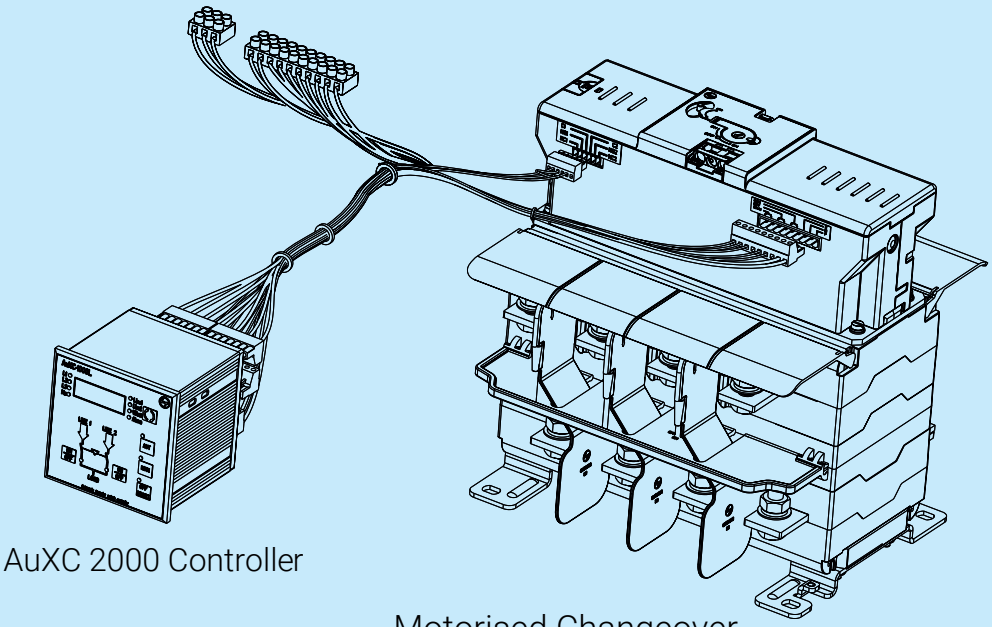
Manual Mode (Electrical)

Control of motorised changeover switch using illuminated push buttons.

Manual Mode (Operating handle)

Manual control using operating handle, as a safety feature the control supply of motorised changeover is automatically cut off during the insertion of handle.

ASTS with AuXC 2000 Controller



AuXC 2000 Controller

Motorised Changeover

Modes of Operation

OFF Mode:

In this mode, the automatic control is disabled and the controller does not take any action. All views of the measures and the status of the LEDs remain active.

To access the programming/settings menu, it is mandatory to operate in OFF mode.

Pressing the OFF-RESET button resets the retentive alarms, provided the conditions that generated the alarm have been removed.

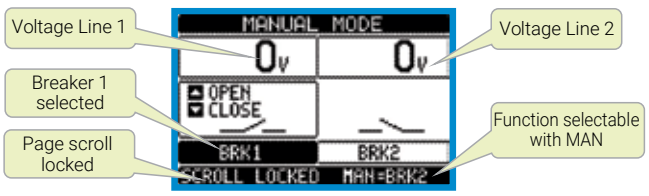
Manual Mode:

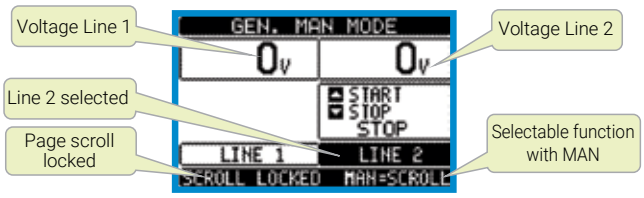
In this mode, the MCO can be manually controlled by the pressing the MAN key.

Closing/opening operation can be achieved by :

- Selecting the switch position
- Pressing the p and q buttons, for a minimum time of 300ms,to confirm the closing or opening operation

The generators can also be controlled manually by moving on the page start/stop groups.



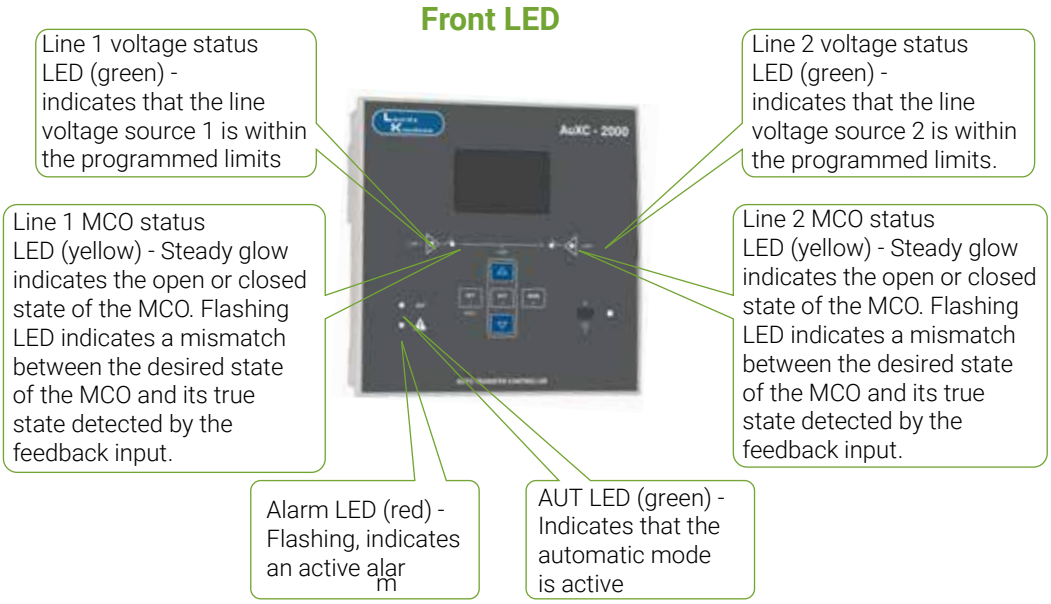


AuxC-2000 Controller

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



Auto Mode:

The AUTO mode is indicated by the green LED for AUT. In automatic mode, the controller automatically gives command for opening & closing of the MCO. When the priority line voltage is out of bounds for a time longer than that specified(line presence green LED turns off), the unit disconnects the load from the priority line and connects it to secondary line considering start-up of generator(if programmed) and interlock time delay. When the priority line returns within the programmed limits, the controller will switch back the load on it.

The cycles of automatic operation vary according to the type of application (utility-utility, utility-generator, generator-generator).

Other Benefits & Features in Auto Mode

- Protection against UV, OV, phase loss, asymmetry, under frequency and over frequency
- 6 programmable digital inputs & relay outputs (5NO + 1C/O)
- Measuring and sensing of system variables
- DG set start/stop control
- Priority source swap

Enclosed Automatic Transfer Switch

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)

Performance

- Double-Break Contact System offering High Short-time withstand (ICW)
- High Mechanical & Electrical Life: Double than

Safety

- Protections : UV/OV, Phase Sequence, Single Phasing, Frequency
- Authorized Access Control through Password Protection

Convenience

- Ample Space for Cable Termination, No need of Separate Cable Gland Box
- Ease of Generator Control (ON-OFF Cooling Cycle, Self-Test)

Enclosed Automatic Transfer Switch

Pre-programmed Parameters

Programing	Connection Terminal	Code	Setting (Description)
Inputs	15(INP1)	M10>> P * 10.01 * 0.01	Line 1 closed (Feedback 1)
	16(INP2)	M10>> P * 10.02 * 0.01 Line	Line 2 closed (Feedback 2)
Outputs	25(OUT4)	M11>> P * 11.04 * 0.01	Close line 1
	27(OUT5)	M11>> P * 11.05 * 0.01	Open line 1/ line 2
	30(OUT7)	M11>> P * 11.07 * 0.01	Close line 2
Others	-	M 05>>P05.07	Changeover Pulse

Time Delay Setting

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

General Control Setting

Parameter	Code	Default Setting	Comments
Select Nominal Voltage	M02>>P02.01	400	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

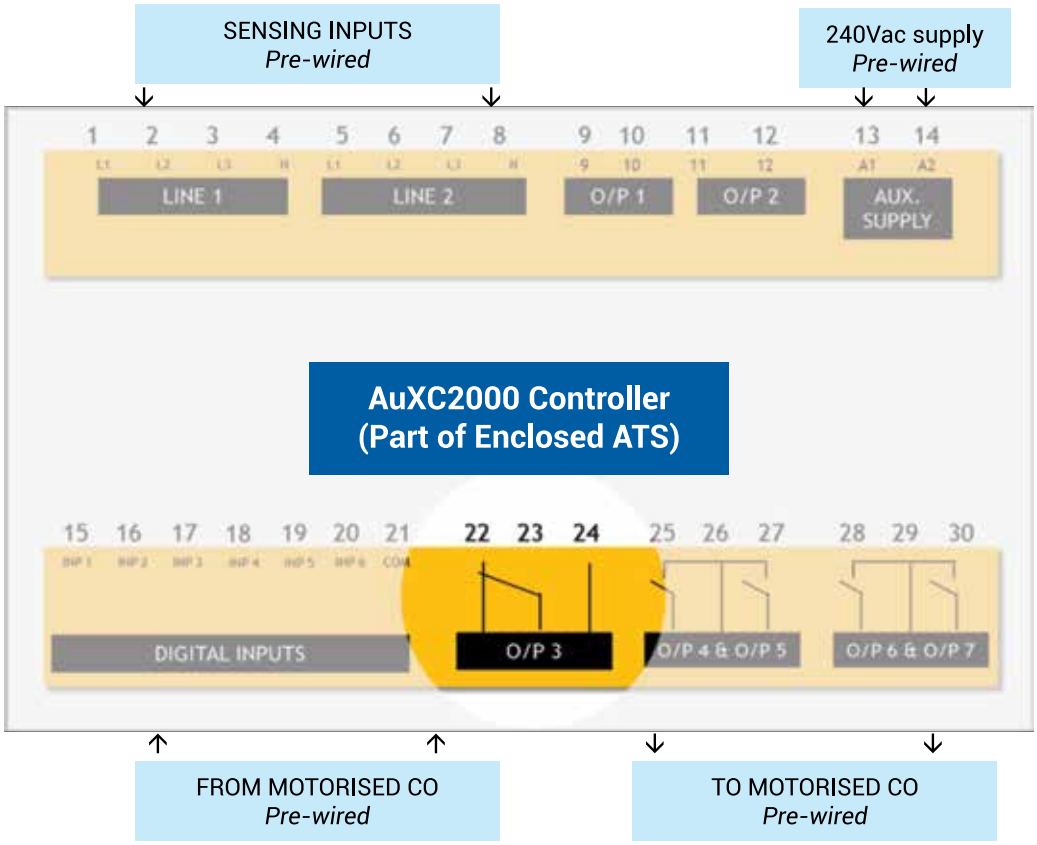
Parameter	Code	Default Setting	Comments
Digital Output 3 (Terminal No. 22 & 23)	15(INP1)	M10>> P * 10.01 * 0.01	Hardwire to general controller for ON/OFF Control
Digital Input 6 (Terminal No. 20 & 21)	M10>> P10.06.01	Generator ready 2	Hardwire for generator status feedback

START/STOP SIGNAL

GENERATOR ON - OFF CONTROL THROUGH ATS

An Automatic Transfer System means that right from sensing of abnormal 'main supply' voltage to transfer to the healthy 'back-up' source must be automatic without any manual intervention.Thus, one of the important aspects of an ATS is to be able to give ON/OFF signal to the DG set controller so that it starts automatically in case of main supply failure.

Programming Settings and Hardwiring



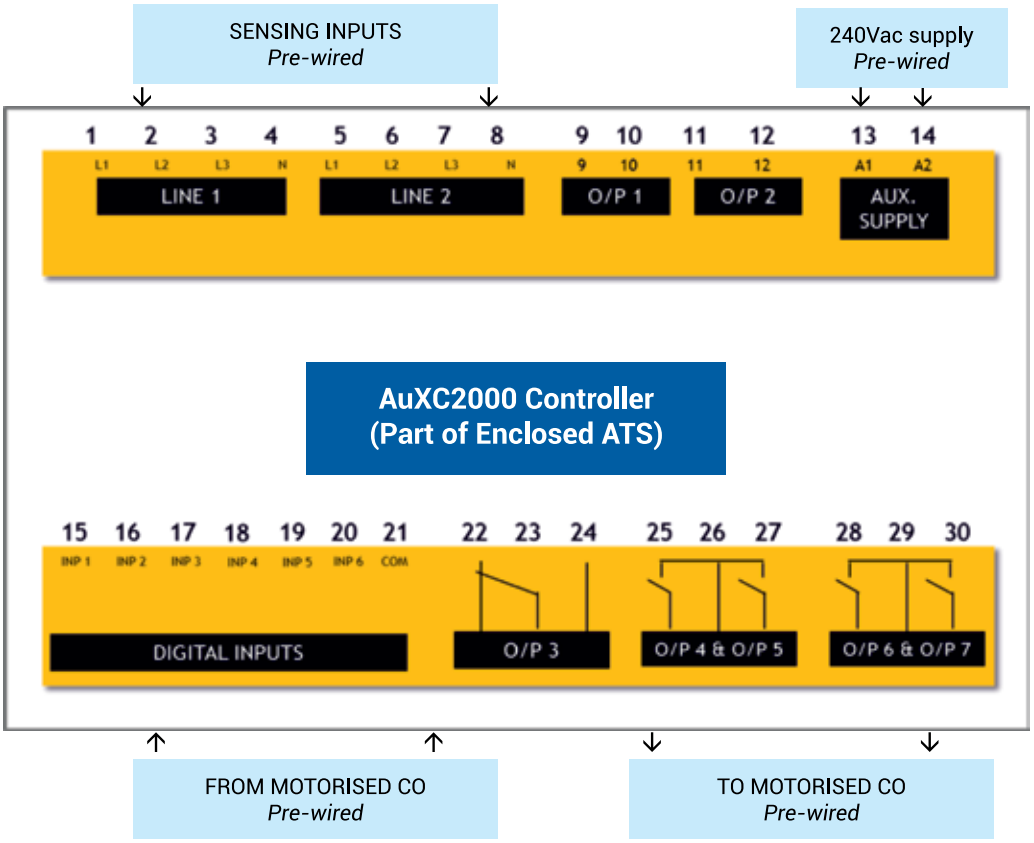
TO DIGITAL INPUTS TERMINALS OF DG SET CONTROLLER
TO BE WIRED

GENERATOR ON-OFF CONTROL THROUGH ATS

Digital Output 3(O/P3) of the ATS is to be configured and output across Pins 22 & 23 is to be physically hardwired to the Digital Input of the DG set (configured as 'Remote Start')

Digital Output	Parameter	Programming	Remarks
Digital Output 3(O/P3) (Pin 22 & 23)	M11 >> P11.03.01	Start/Stop Remote Control of Line 2 Generator	Hardwired to Generator Controller for ON/OFF Control

Working Principle



GENERATOR ON-OFF CONTROL THROUGH ATS

In normal working condition(Load powered by 'main' or 'primary supply') the contact 22 and 23 is open.

When 'main' supply fails, the contact 22 and 23 is closed (which is programmed for remote signal to DG set). This 'closed' contact is to be wired as Digital Input (programmed as 'Remote Start') of the DG Set controller. This 'closed' contact continuously remains available.

When the 'main' supply resumes, the contact 22 and 23 opens after the set DG cooling time (set as 120 secs by default).

The unavailability of 22 and 23 contact acts as a 'OFF' signal for the DG set controller and thus DG set stops.

Enclosed Automatic Transfer Switch

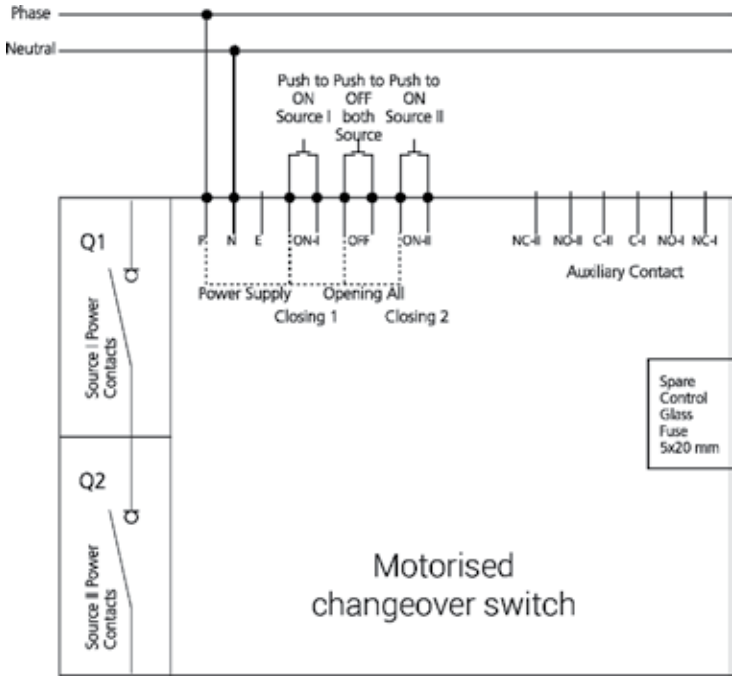
Rating(A)		Unit
Reference Standards		
Type Designation		
No. of Poles		
Rated Operationall Voltage(Ue) (power circuit)		
Rated Impulse Withstand Vollatge (Uimp) (power circuit)		(V)
Rated Operational Voltage(Ue) (control circuit)		(kV)
Rated Impulse Withstand Volatge (Uimp) (control circuit)		(kV)
Rated Frequency		(Hz)
Pollution Degree		
Conventional endosed thermall current at 40°(Ithe)		(A)
Rated Operational Current(I the) according to IS/MEC: 60947-3		
415Vac, AC-21A/AC-22A/AC-23A		(A)
Rated Operational Current(I the) according to IS/MEC: 60947-6		
415Vac, AC-318		(A)
415Vac, AC-31A		(A)
415Vac, AC-328		(A)
Rated breaking capacity for AC-23A		(A)
Rated making capacity for AC-23A		(A)
Short time withstand, Icw	1 sec	(kA rms)
	0.2 sec	(kA rms)
Short-circuit making capacity, Icm		(kA peak)
Endurance (category AC 23A) Endurance (category AC 23A) Rated fused short-circuit current at 415V, 50/60 Hz	Mechanical	(0-1-0-11-0 cycle)
	Electrical	(0-1-0-11-0 cycle)
	DIN/Cylin	(kA rms)
Operating torque		(N-m)
Weight		(kg)
Rated Control Voltage		(M
Control Voltage Range		(%)
Max. Current at 240V ac		(A)
Operating time	0-I / I-0	(sec)
	I-II / II-I	(sec)
Black out time		(sec)
Termination		
Maximum Al. cable with lug		(sq. mm)
Maximum link width		(mm)
Maximum link thickness		(mm)
Termination tightening torque		(N-m)

Enclosed Automatic Transfer Switch

Frame 2			Frame 3		Frame 4	
125A	160A	200A	250A	315A	400A	630A
IS / IEC 60947-3, EN 60947-3, IS / IEC 60947-6-1, EN 60947-6-1						
ATS-125	ATS-160	ATS-200	ATS-250	ATS-315	ATS-400	ATS-630
4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole	4 Pole
415	415	415	415	315	400	630
12	12	12	12	12	12	12
4	4	4	4	4	4	4
50/60	50/60	50/60	50/60	50/60	50/60	50/60
3	3	3	3	3	3	3
125	160	200	250	315	400	630
125	160	200	250	315	400	630
125	160	200	250	315	400	500
125	160	200	250	315	400	500
125	160	200	250	315	400	500
1000	1280	1600	2000	2520	3200	5040
1250	1600	2000	2500	3150	4000	6300
8	8	10	16	18	22	26
18	18	18	28	28	35	35
14	14	17	32	36	46	55
16000	16000	16000	16000	16000	10000	10000
2000	2000	2000	2000	2000	2000	2000
100	100	100	100	100	100	100
10	10	10	20	20	28	28
18.2	18.2	19.0	29.5	30.0	41.3	41.6
240	240	240	240	240	240	240
85%-110%	85%-110%	85%-110%	85%-110%	85%-110%	85%-110%	85%-110%
2	2	2	2	2	2	2
1.5	1.5	1.5	1.6	1.6	1.7	1.7
2.5	2.5	2.5	2.5	2.5	2.5	2.5
2.2	2.2	2.2	2.2	2.2	2.2	2.2
95	95	150	185	240	2 X 300	2 X 300
30	30	30	40	40	50	50
5	5	5	8	8	8	2*8
10	10	10	20	20	27	27

Wiring Diagrams

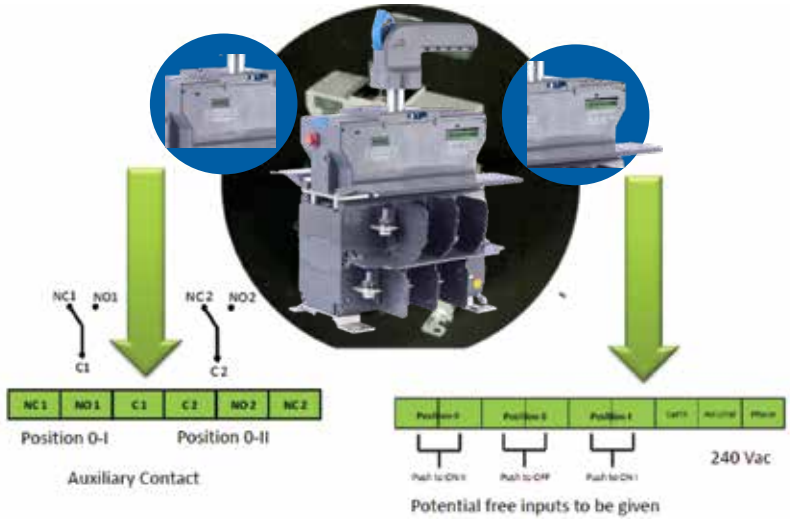
Motorised Changeover Switch



Auxiliary Voltage requirements for Motorised Transfer Systems:

Reliable and regulated control supply is required for proper functioning of electronic components.

Our Motorised transfer systems consist of several such components which are sensitive to voltage fluctuations.

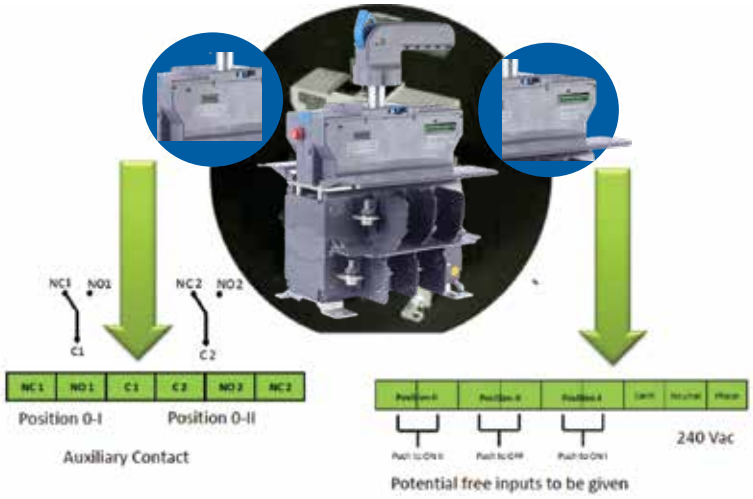


Motorised Changeover Switches:
The Electrically Operated Mechanism (EOM) of Motorised Changeover Switch has a nine pin control terminal block. Before installation of Motorised Changeover Switches at site, it is imperative to be aware of the prevailing voltage conditions. At sites wherein huge voltage drops or over voltage surges are expected, we recommend to use a voltage stabilizer or an Incoming Supply Monitor like MD21DF.
The voltage stabilizer must be in series with the supply which is fed to the Ph-N terminals of the EOM and must be capable of giving steady 240V ac supply.

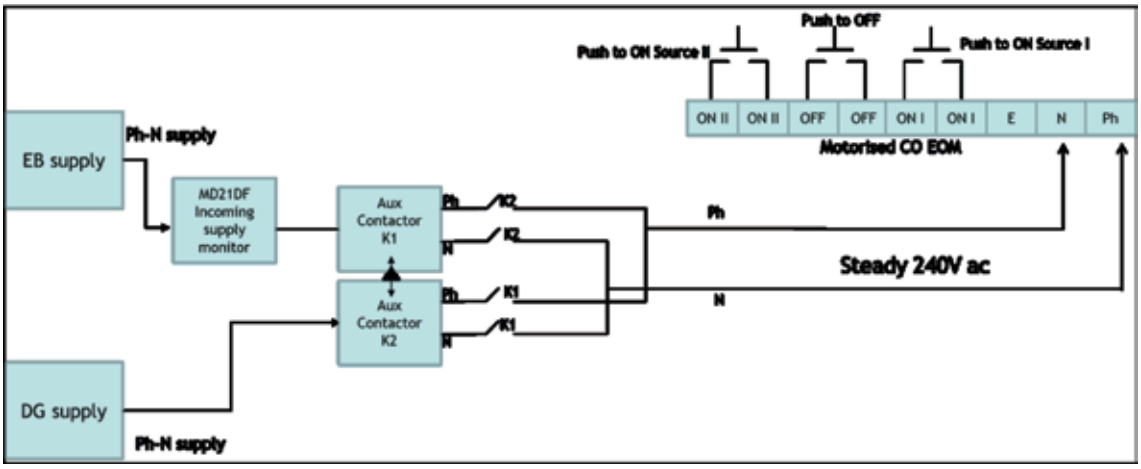
Wiring Diagrams

Pin 1-2(Ph-N):	As depicted in the above image, 240V ac supply is to be given to Ph-N terminals (1-2 pin from the right). This 240V ac supply can either be derived from any the available healthy sources by employing two mechanically interlocked con-tactors OR can be through AC UPS. The allowable voltage band is between 180V ac to 264V ac, not adhering to which can cause mal-operation or non-functioning of the EOM
Pin 3(Earth):	This is provided to connect the connector block to the earth. It is essential to properly connect this pin to proper ground to ensure there is no leakage of current.
Pin 4-5(ON I):	These are potential free contacts for giving command to the Mo-torised Changeover to shift to position I. Please ensure to not to give any power supply to these pins.
Pin 6-7(OFF):	These are potential free contacts for giving command to the Motorised Changeover to shift to position O. Please ensure to not to give any power supply to these pins.
Pin 8-9(ON II):	These are potential free contacts for giving command to the Motorised Changeover to shift to position II. Please ensure to not to give any power supply to these pins.

Auxiliary supply circuit with Voltage Stabilizer

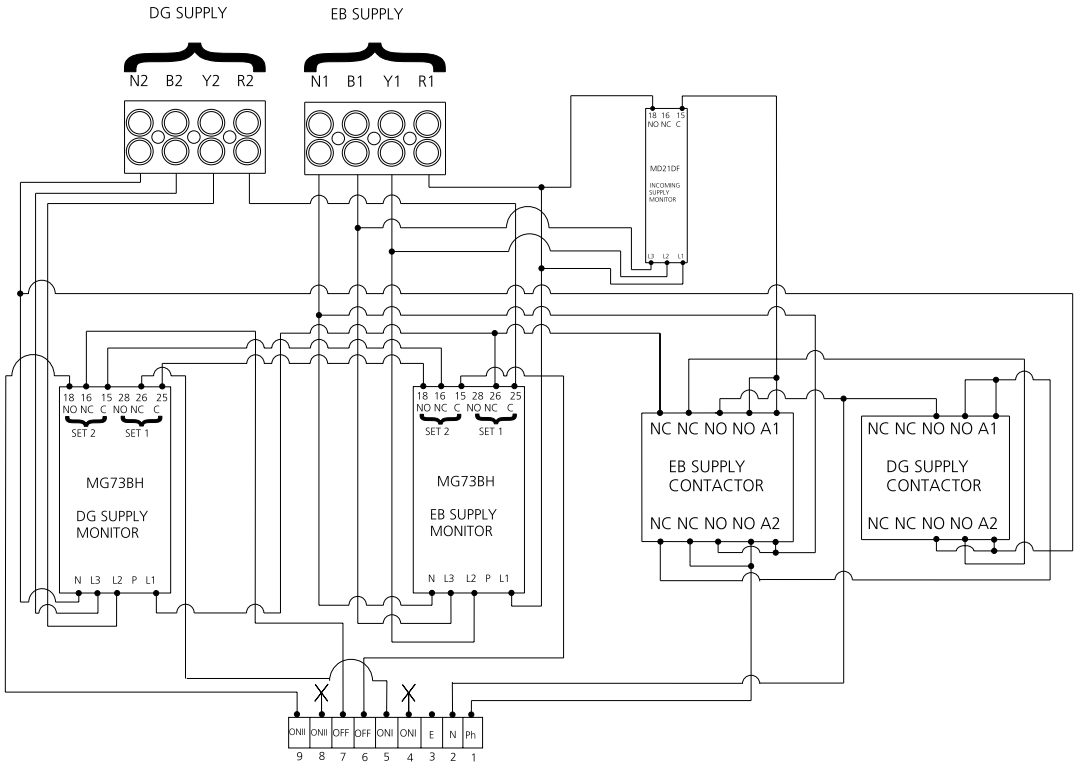


Auxiliary supply circuit with Incoming Supply Monitor



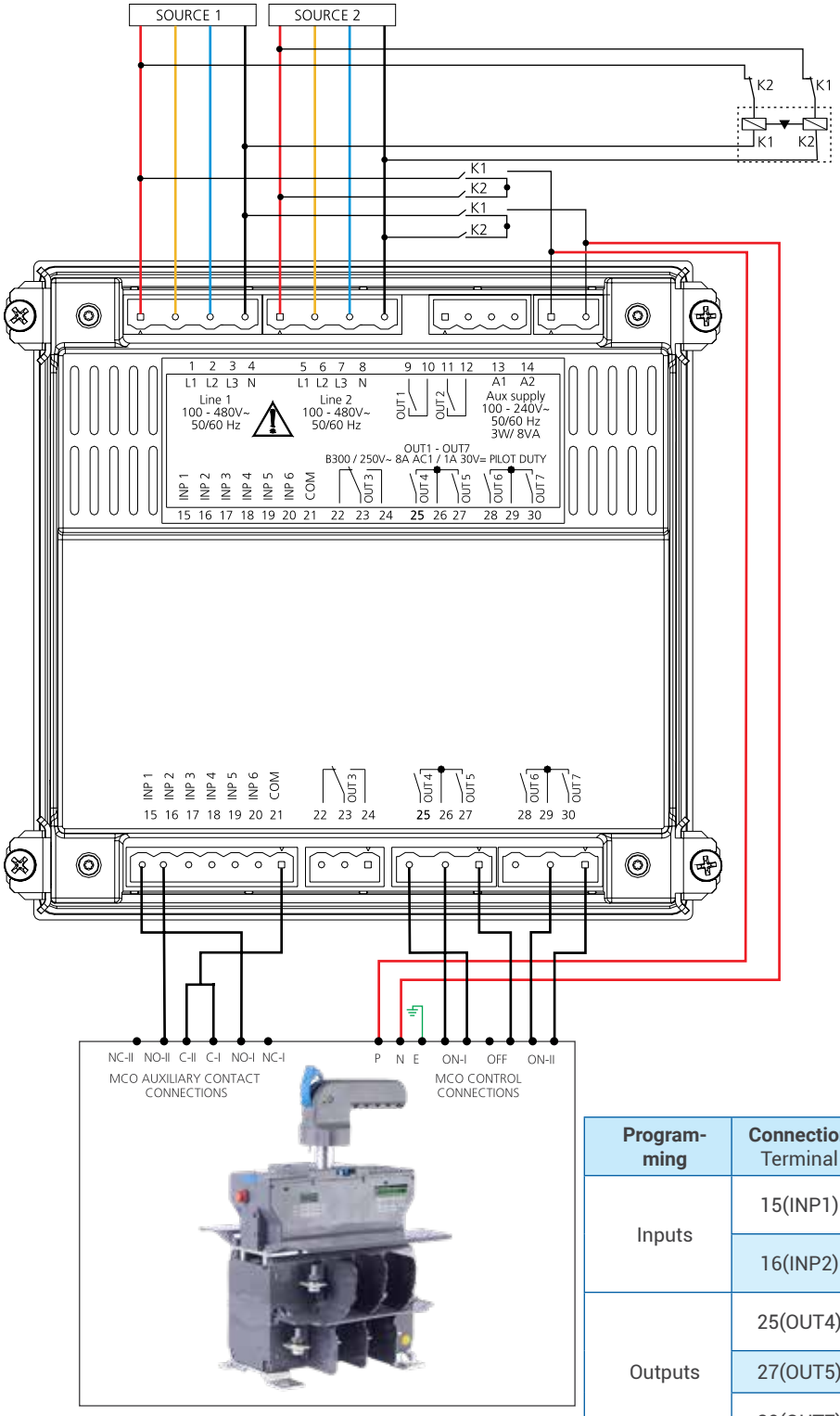
Wiring Diagrams

Control of Motorised Changeover Switch through Supply Monitor - MG73BH



Wiring Diagrams

Control of Motorised Changeover Switch Disconnector AuXC-2000



Program-ming	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 pulse

Ordering Information




Frame	Rating (A)	Manual open execution version	Manual SS enclosure version	Motorised Open Execution Version	Enclosed ATS
Control Voltage		-	-	240 V ac	240 V ac
1	40 A	-	-	CK90944B000	-
	63 A	CO106300000	CO106300SOO	CK90945B000	-
		CO106300OOD*			
	100 A	CO110000000	CO110000SOO	CK90946B000	
		CO11000000D*			
	125 A	CO112500000	CO112500SOO	CK90947B000	
2	125 A	CO212500000	CO212500SOO	CK90161BOOO	CK90161BSOO
	160 A	CO216000000	CO216000SOO	CK90162BOOO	CK90162BSOO
	200 A	CO22000000A	CO220000SOO	CK90163BOOO	CK90163BSOO
3	250 A	CO325000000	CO325000SOO	CK90164B000	CK90164BSOO
	315 A	CO331500000	CO331500SOO	CK90165B000	CK90165BSOO
4	400 A	CO440000000	CO440000SOO	CK90166BOOO	CK90166BSOO
	630 A	CO463000000	CO463000SOO	CK90167BOOO	CK90167BSOO
5	630 A	C0563000000	-	CK90168BOOO	-
	800 A	CO580000000	CO580000SOO	CK90169BOOO	
	1000 A	CO510000000	CO510000SOO	CK90170BO00	
6	1250 A	CO612500000	-	CK90081BOOO	-
	1600 A	CO616000000	-	CK90082BOOO	
	2000 A	CO620000000	-	CK90083BOOO	






Frame	Rating (A)	Auxiliary contact for manual version (2 sets of changeover contact)	Operating handie suitable for		Operating push button assembly with Wire harness	UV/OV based AST Controller with Wire harness	AuXC 2000 controller with Wire harness
			Manual version	Motorised version			
	63 A, 100 A, 125 A	CX100020000	CX100010000	-	-	-	-
	125 A, 160 A, 200 A	CX200020000	CX300010000	CK903740000	CK901950000	CK901920000	AuXC2000 Controller ATC20000000 Wire Harness CK900990000
	250 A, 315 A	CX300020000	CK903920000#				
	400 A, 630 A	CX400020000	CX400010000	CK903780000			
	800 A, 100 0A	CX500020000	CX500010000				
	1250 A, 1600 A, 2000 A	CX600020000	CX600010000	CK906450000			

Output shorting link CO1-(63-100A) Top Side	CX1000500OT
Output shorting link CO1-(63-100A) Bottom Side	CX1000500OB

CZ Bypass Switches

Bypass Switches are meant for special application and help to maintain continuity of supply to the load in case of breakdown/ maintenance of UPS or Servo stabilizer used in the circuit.

These simply 'bypass' the UPS/ Servo stabilizer, in case it needs maintenance or in case of breakdown. The removal of the UPS/ Servo stabilizer is safe as it is now isolated from both input and output side.

Available in open version, the CZ Bypass Switches are easy to install, operate and inspect. Armored with safety features like terminal shrouds, phase barriers & door interlock, the CZ Bypass Switches are designed to battle against accidental faults and inadvertent operations. Robust construction allows to withstand higher fault currents without any deterioration.

Time-Saving Convenient solution

No hassle of operating multiple devices for safe and positive isolation on both sides of Servo/UPS.

Designed for Indian ambient conditions

CZ Bypass Switches are rugged and suitable to carry rated current at high temperatures experienced in Indian Sub-Continent. Also, the terminals are designed to accommodate Aluminum cables/bus bars.

Safety guaranteed

There is no benefit of the doubt allowed when it comes to safety. Terminal shrouds protect against accidental human contact with the live terminals, phase barriers stand in line of any phase to phase flashovers and high ground clearance eliminates any possibility of grounding live cables/links

Accessories

a) Auxiliary Contacts

Upto 2nos. 1NO + 1NC can be fitted for ON/OFF status indication. The auxiliary contacts module is front mounted, plug-in type and can be fitted at the site. Auxiliary contacts actuation is from the main mechanism shaft. Addition of auxiliary contacts does not alter over-all dimensions of the switch.

b) Castell Key Lock

The CZ SDs can be interlocked with the help of Castell locks

Contact System & Mechanism

CZ Bypass Switches have modular construction with separate cassettes for mechanism and contact system. Contact system cassette (pole assembly) consists of rotor assembly housing moving contacts, terminals and arc-chutes.

The contact system is double break, knife type having self wiping action. Mechanism is quick make-quick break and multi-cams type for smooth and efficient operation torque transmission. Moreover, the contacts are visible through transparent window section to know actual status of contact system.

For A Sustainable Future

All the materials used for components, welding and plating on metallic components are RoHS compliant. Material used for packaging is recyclable.

Salient Features

Suitable for Aluminum Termination

Entire range is suitable for Aluminum cable/link termination as per the size prescribed by the standards

Mounting flexibility

Suitable for mounting in horizontal as well as vertical orientation. Also, the shaft is 'cut-able' and can be adjusted to suit different panel depth requirements

Phase Barriers

Easy to fit and long phase barriers for complete isolation between phases

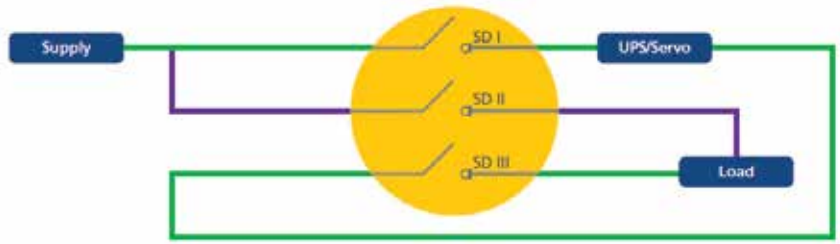
Safety interlock and padlocking

Door interlock is provided in ON position with defeat feature Also, Bypass Switch can be padlocked in OFF position; upto 3 padlocks can be fitted

Finger proof protection (IP30)

Terminal Shrouds provide protection against accidental contact with live terminals. As it is swivellable, there is no need to remove during termination/inspection

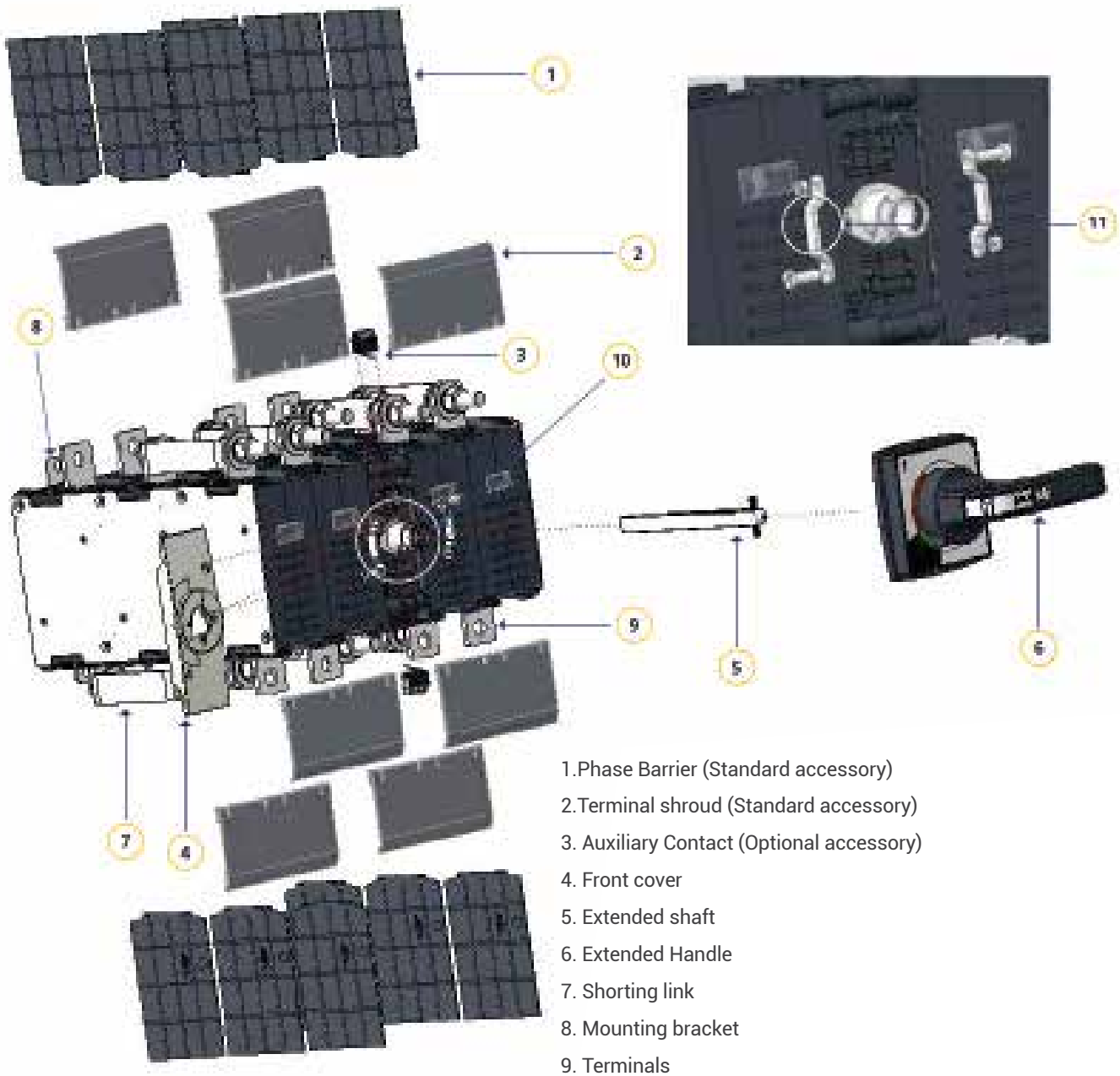
Working Principle



Normal Mode(Green Path) : SD I and SD III are closed, SD II is open, the load is fed through UPS or Servostabilizer

Bypass Mode(Purple Path): SD I and SD III are open, UPS and Servo can be taken out for maintenance in this mode. SD II is closed and the load is fed directly from supply 'bypassing' the UPS or Servo

Detailed View



1.Phase Barrier (Standard accessory)
2.Terminal shroud (Standard accessory)
3. Auxiliary Contact (Optional accessory)
4. Front cover
5. Extended shaft
6. Extended Handle
7. Shorting link
8. Mounting bracket
9. Terminals
10. Shaft locking arrangement
11. Detailed view of shaft locking arrangement

CZ Bypass Switches Technical Specifications

			125A	
Model			**CZ-1**	
No. of Poles			4	
Conventional enclosed thermal current (Ithe)	40 C	A	125	
	50 C	A	125	
Rated Operational Voltage (Ue, Max)		Vac	440	
Rated Impulse withstand voltage (Uimp)		kV	12	
Rated Insulation Voltage (Ui)		Vac	1250	
Rated Operational Current (Ie)	AC-23A at 440Vac	A	125	
Rated Operational Current Per Pole in series; DC-21B	220Vdc	A	125/1	
	440Vdc	A	125/2	
Rated Short Time Withstand Current (Icw, rms)	1 Sec	KA	8	
	0.15 sec	kA	15	
	0.25 Sec	kA	15	
Rated Short Circuit Making Capacity (Icm, Peak)		kA	30	
Rated Conditional Short-Circuit Current (Icm, Peak)		kA	100	
Rated Breaking Capacity	AC-23A at 440 Vac	KA	1.0	
Rated Operational Power, AC-23A	At 415V	kW	75	
Power Loss/Pole		W	1.8	
Operational Performance capability	Electrical	No of operations	2000	
	Mechanical	No of operations	20000	
Operating Torque		N-m	18	
Maximum Termination Capcity	Lug Size	mm2	2X185	
	Al Link Size	mm2	2X35X10	
Terminal Bolt size			M10	
Terminal Tightening Torque		N-m	20	
Weight	4P switch	kg	7.5	

160A	200A	250A	315A	315A	400A	630A
CZ-1	CZ-1	CZ-1	CZ-1	CZ-2	CZ-2	CZ-2
4	4	4	4	4	4	4
160	200	250	315	315	400	630
160	200	250	315	315	400	630
440	440	440	440	440	440	440
12	12	12	12	12	12	12
1250	1250	1250	1250	1250	1250	1250
160	200	250	315	315	400	630
160/1	200/1	250/1	315/1	315/1	400/1	630/1
160/2	200/2	250/2	315/2	315/2	400/2	630/2
8	8	8	10	16	16	20
15	15	15	15	31	31	38
15	15	15	15	24	24	36
30	30	30	30	45	45	45
100	100	100	100	100	100	100
1.3	1.6	2.0	2.5	2.5	3.2	5.0
90	110	132	160	160	200	355
2.9	4.6	7.1	11.33	7.5	12.2	23.8
2000	2000	2000	2000	2000	2000	2000
20000	20000	20000	20000	20000	20000	20000
18	18	18	18	36	36	40
2X185	2X185	2X185	2X240	2X300	2X300	2X300
2X35X10	2X35X10	2X35X10	2X35X10	2X50X12	2X50X12	2X50X12
M10	M10	M10	M12	M12	M12	M12
20	20	20	20	27	27	27
7.5	7.5	7.5	7.5	18.6	18.6	

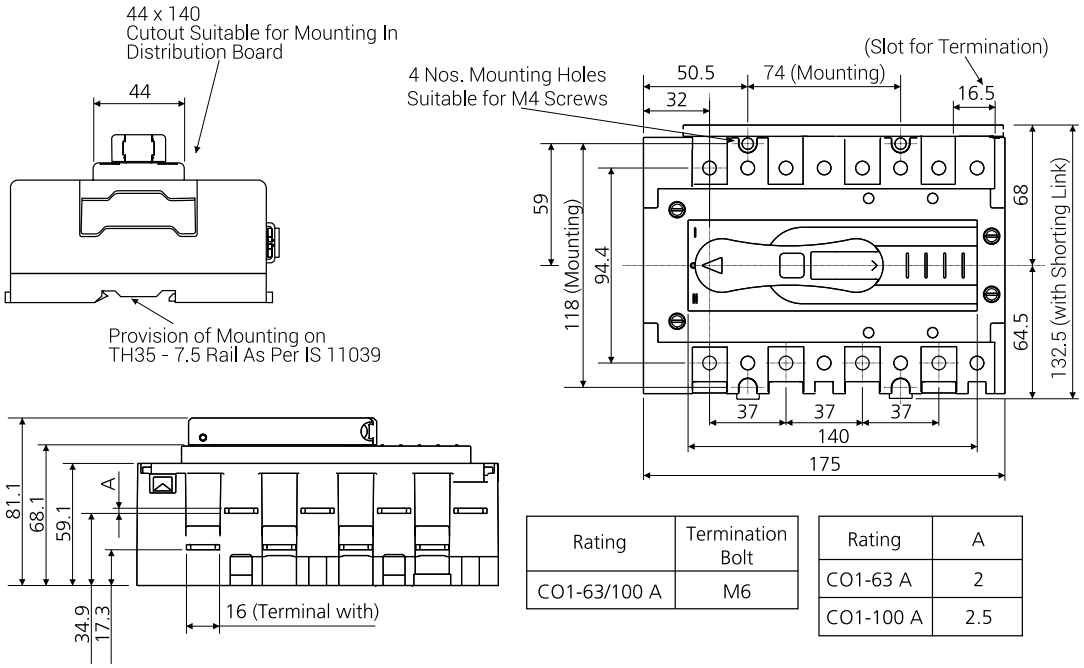
Ordering Information

Model	Frame Size	Current Rating(A)	Voltage	No. of poles	Handle type	Mechanism Position	CAT no.
CZ	1	125A	440 Vac	4P	Extended	Middle	CK908130000
	1	160A	440 Vac	4P	Extended	Middle	CK908140000
	1	200A	440 Vac	4P	Extended	Middle	CK908150000
	1	250A	440 Vac	4P	Extended	Middle	CK908160000
	1	315A	440 Vac	4P	Extended	Middle	CK908170000
	2	315A	440 Vac	4P	Extended	Middle	CK908750000
	2	400A	440 Vac	4P	Extended	Middle	CK908760000
	2	630A	440 Vac	4P	Extended	Middle	CK908770000
CZ Auxiliary Contact Kit (1 C/O contact)	1&2	125A to 630A	-	-	-	-	CZ

Dimensions

CO1-63/100

Open Execution with Direct Handle Manual Changeover Switch

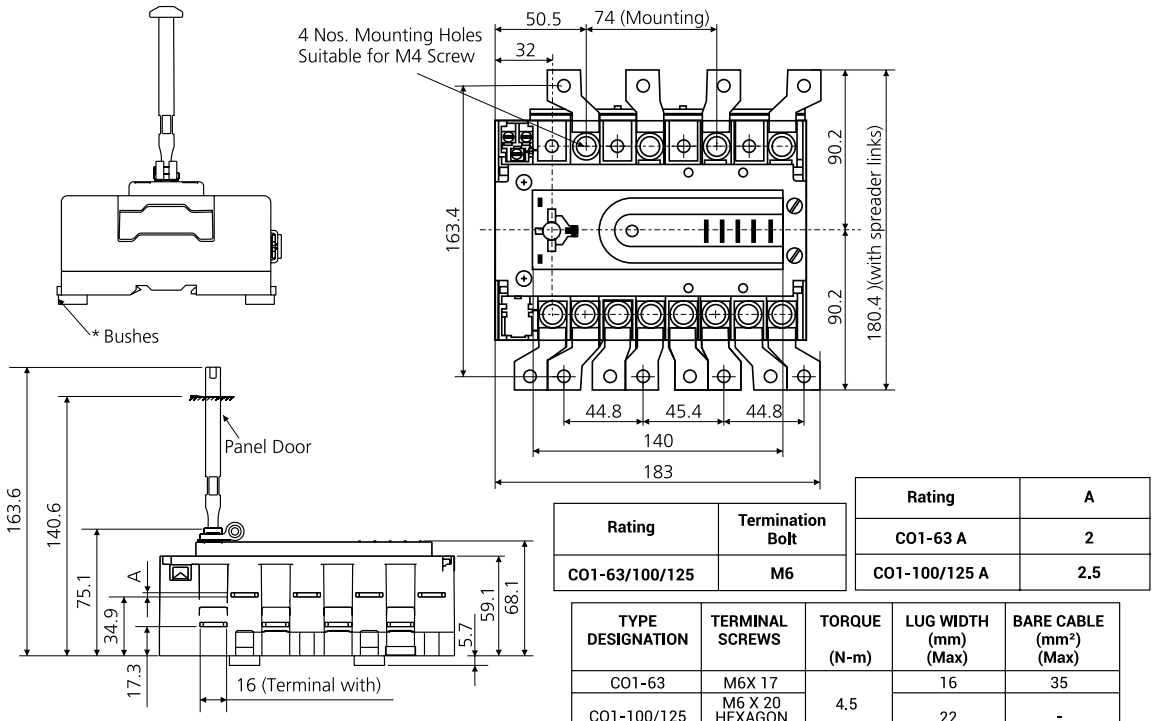


Rating	Termination Bolt
CO1-63/100 A	M6

Rating	A
CO1-63 A	2
CO1-100 A	2.5

CO1-63/100/125

Open Execution with Extended Manual Changeover Switch



Rating	Termination Bolt
CO1-63/100/125	M6

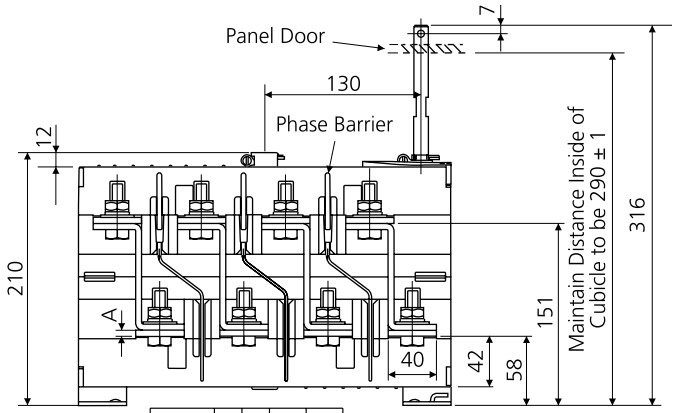
Rating	A
CO1-63 A	2
CO1-100/125 A	2.5

TYPE DESIGNATION	TERMINAL SCREWS	TORQUE (N-m)	LUG WIDTH (mm) (Max)	BARE CABLE (mm^2) (Max)
CO1-63	M6X 17	4.5	16	35
CO1-100/125	M6 X 20 HEXAGON HEAD BOLT		22	-

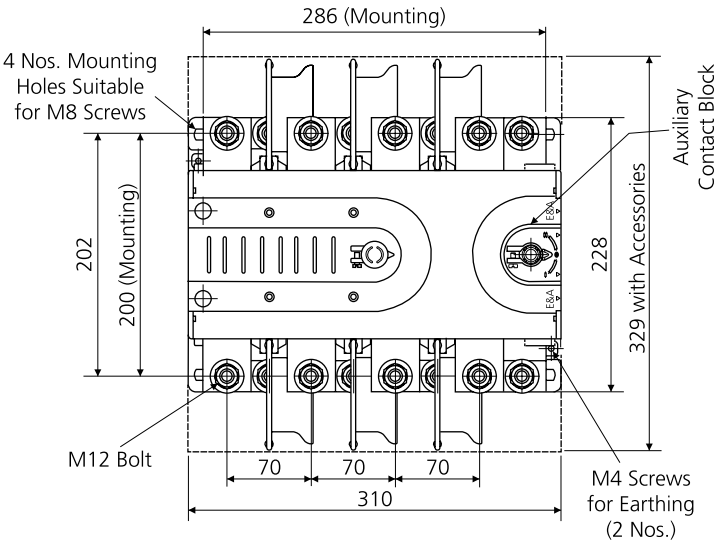
All dimensions are in mm
Assemble bushes for higher ground clearance.

CO2-125/160/200

Open Execution with Extended Handle Manual Changeover Switch



	A	B	C	D
CO2-125	22	3	138	121
CO2-160	22	3	138	121
CO2-200#	22	3	138	121
CO2-200	26	5	145	124

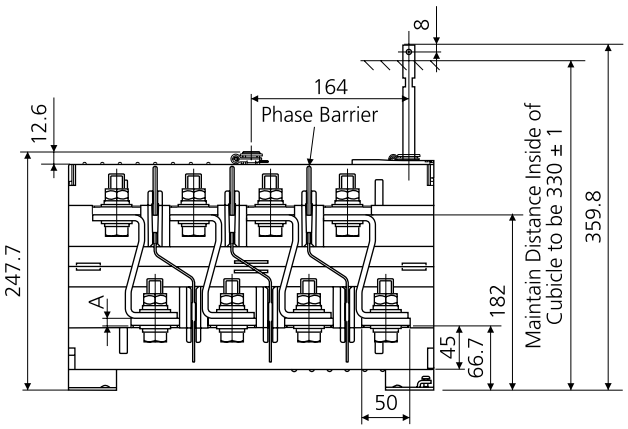


Termination Details

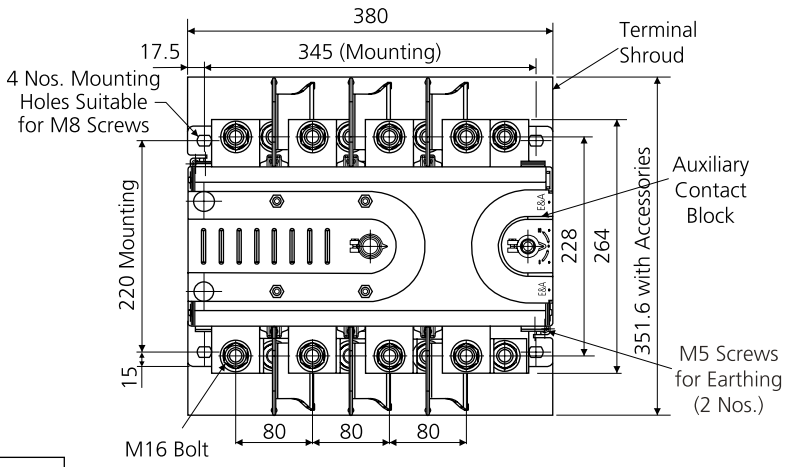
TYPE DESIGNATION	TERMINAL SCREWS	TORQUE (N - m)	TERMINAL CAPACITY		
			Al LUG (Sq.mm) (Max)	LINK WIDTH (mm) (Max)	THICKNESS (mm) (Max)
CO2 - 125	M8X25 HEXAGON HEAD BOLT	10	95	30	5
CO2 - 160	M8X25 HEXAGON HEAD BOLT	10	95	30	5
CO2 - 200 #	M8X25 HEXAGON HEAD BOLT	10	150	30	5

CO3-250/315

Open Execution with Extended Handle Manual Changeover Switch



	A	B	C	D
CO3-250	29	4.5	182	156
CO3-315	35	5	198	164

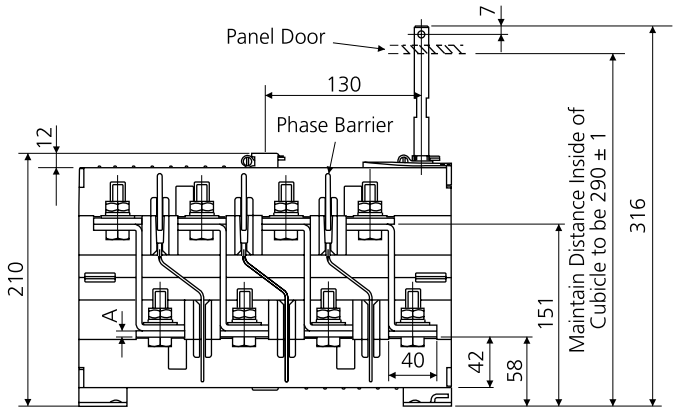


Termination Details

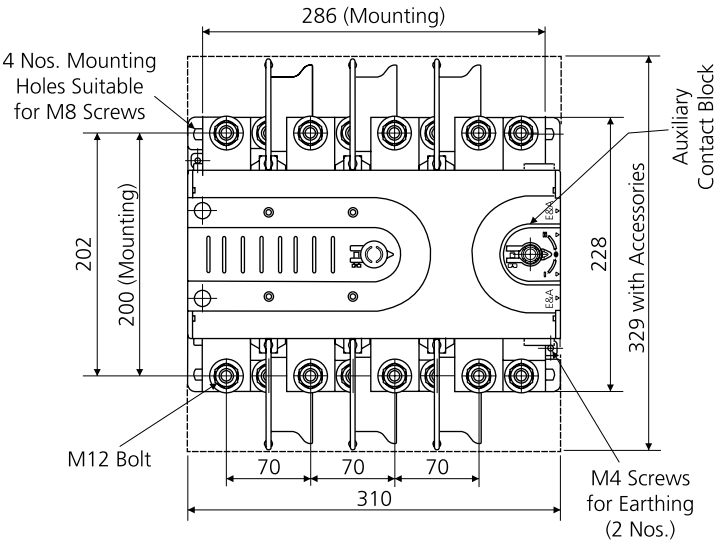
TYPE DESIGNATION	TERMINAL SCREWS	TORQUE (N - m)	TERMINAL CAPACITY		
			Al LUG (Sq.mm) (Max)	LINK WIDTH (mm) (Max)	THICKNESS (mm) (Max)
CO3 - 250	M10X 30 HEXAGON HEAD BOLT	20	185	40	8
CO3 - 315			240		

CO4-400/630

Open Execution with Extended Handle Manual Changeover Switch



Rating	A
CO4-400	5
CO4-630	6

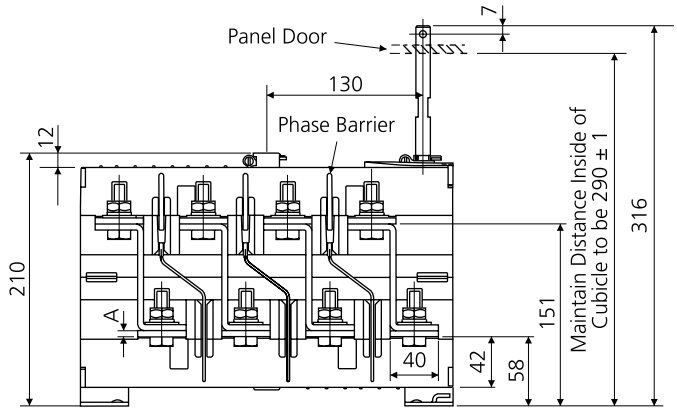


Termination Details

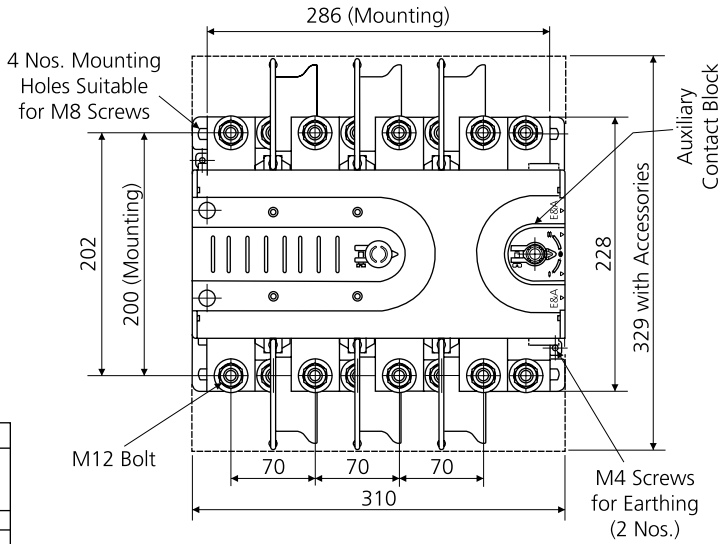
TYPE DESIGNATION	TERMINAL SCREWS	TORQUE (N - m)	TERMINAL CAPACITY		
			Al LUG (Sq. mm) (Max)	LINK WIDTH (mm) (Max)	THICKNESS (mm) (Max)
CO4 - 400	M12X40 HEXAGON HEAD BOLT	27	300	50	8
CO4 - 630			2 X 300		2 X 8

CO5-630/800/1000

Open Execution with Extended Handle Manual Changeover Switch



RATING	CAT. NO.	A
CO5-630	CO563000000	6
CO5-800	CO580000000	8
CO5-1000	CO510000000	8

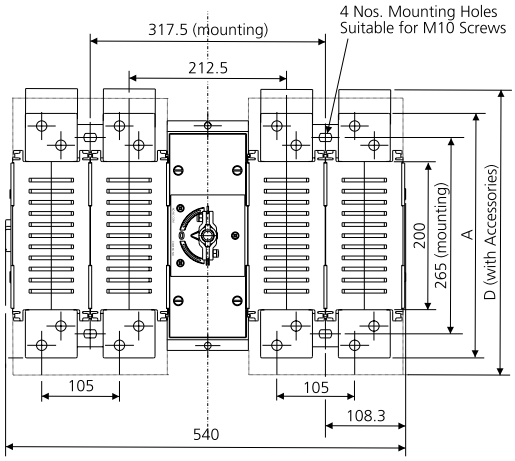


Termination Details

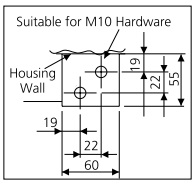
TYPE DESIGNATION	TERMINAL SCREWS	TORQUE (N - m)	TERMINAL CAPACITY		
			Al LUG (Sq. mm) (Max)	LINK WIDTH (mm) (Max)	THICKNESS (mm) (Max)
CO5-630	M16 X 55	45	2X400	60	10 x 2 nos.
CO5-800	HEXAGON	45	2X400	60	10 x 2 nos.
CO5-1000	HEAD BOLT	45	-	60	10 x 2 nos.

CO6-1250/1600

Open Execution with Extended Handle Manual Changeover Switch
With center operation

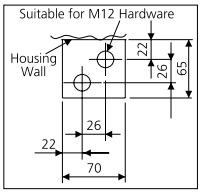


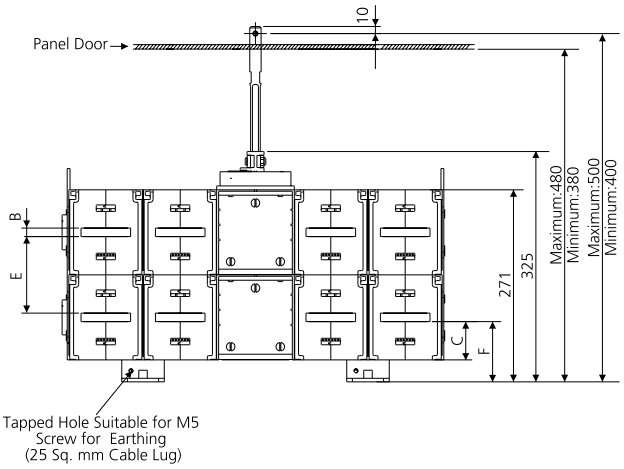
1250A Terminal Arrangement



Type Designation	Terminal Screws	Tightening Torque
CO6-1250	M10 Hexagonal Head Bolt	20 N-m
CO6-1600	M12 Hexagonal Head Bolt	27 N-m

1600A Terminal Arrangement

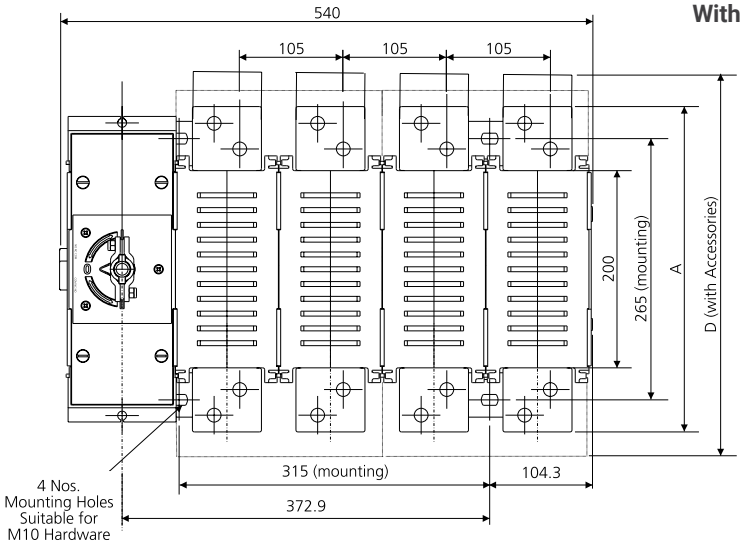


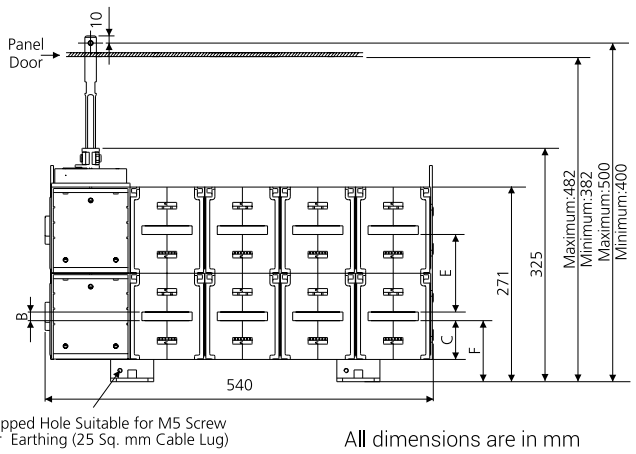


Cat. No.	Rating	A	B	C	D	E	F
CO61250OOOO	CO6-1250	310	8	56	339	112	87
CO61600OOOO	CO6-1600	330	12	54	347	108	85

CO6-1250/1600

Open Execution with Extended Handle Manual Changeover Switch
With center operation



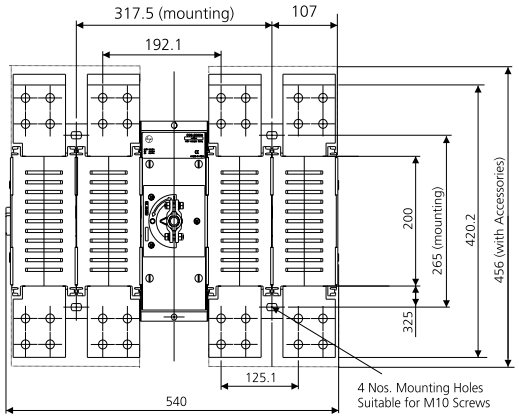


Cat. No.	Rating	A	B	C	D	E	F
CO61250OOSO	CO6-1250	310	8	56	339	112	87
CO61600OOSO	CO6-1600	330	12	54	347	108	85

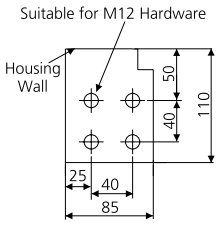
All dimensions are in mm

CO6-2000

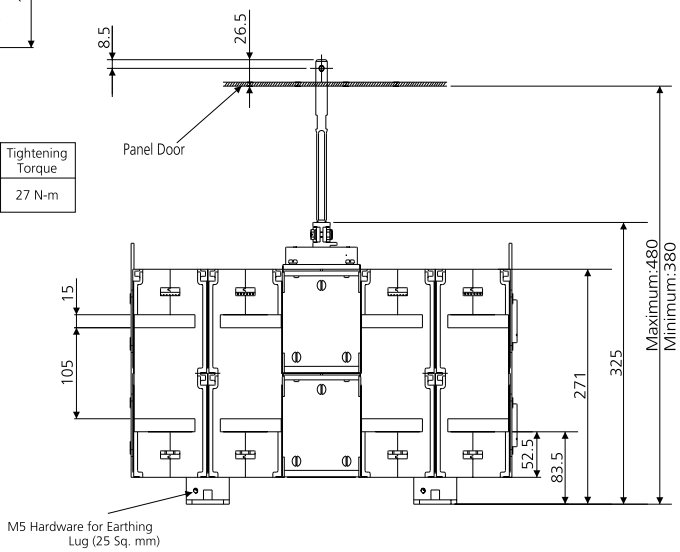
Open Execution with Extended Handle Manual Changeover Switch
With center operation



Terminal Arrangement

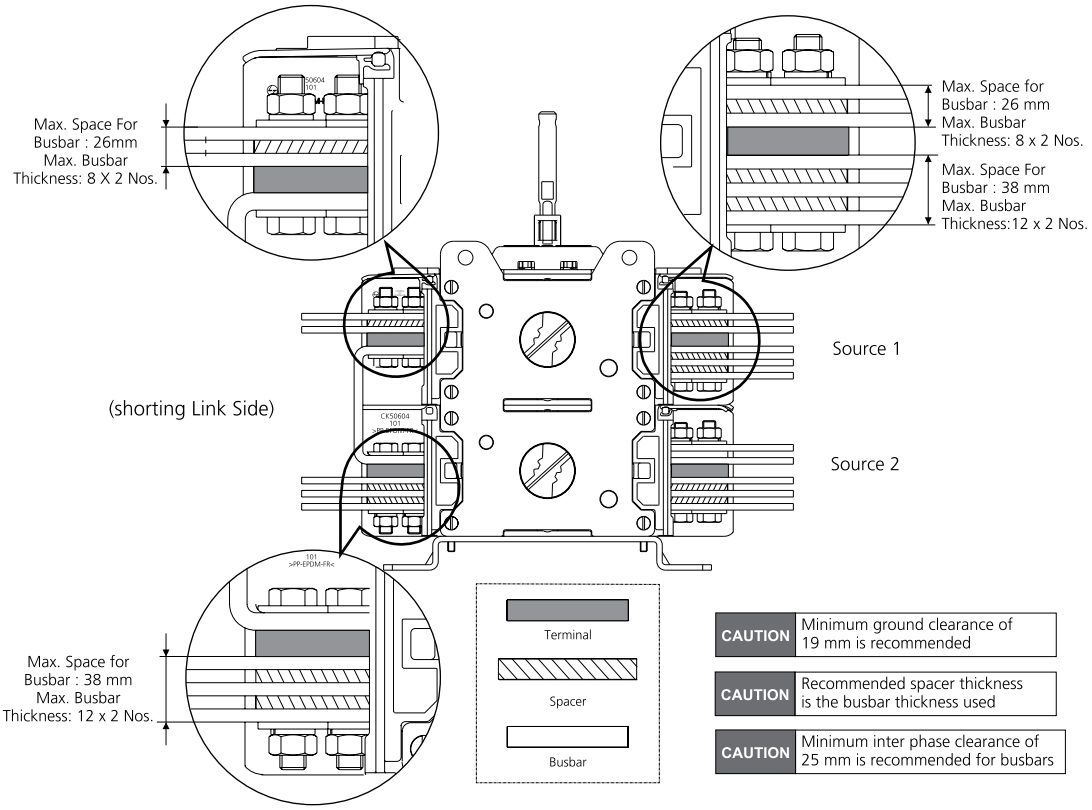


Type Designation	Terminal Screws	Tightening Torque
CO6-2000	M12 Hexagonal Head Bolt	27 N-m



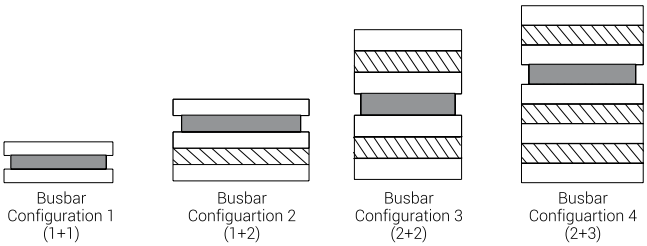
CO6-2000A

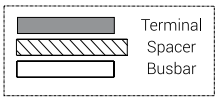
Termination of 100 mm Bus Bar



CAUTION	Minimum ground clearance of 19 mm is recommended
CAUTION	Recommended spacer thickness is the busbar thickness used
CAUTION	Minimum inter phase clearance of 25 mm is recommended for busbars

Recommended termination practices for busbar width 60-80 mm with diagonal hole configuration





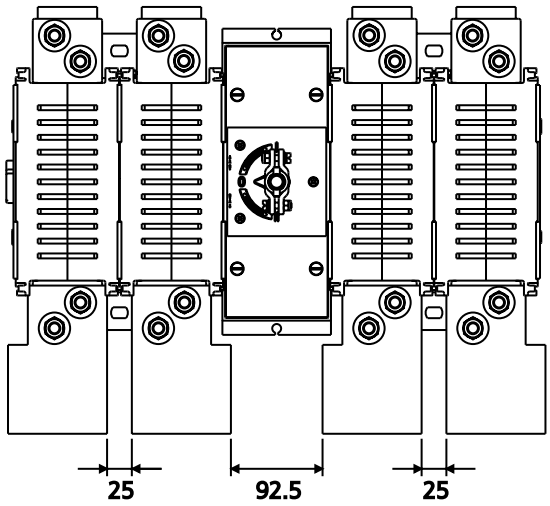
Busbar sizes as per standard

Busbar	1250 A	1600 A	2000 A
Cu	80 x 5 x 2nos	100 x 5 x 2nos	100 x5 x3nos
Al	63 x 12 x 2nos	50 x 8 x 4nos	100 x 10 x 3nos

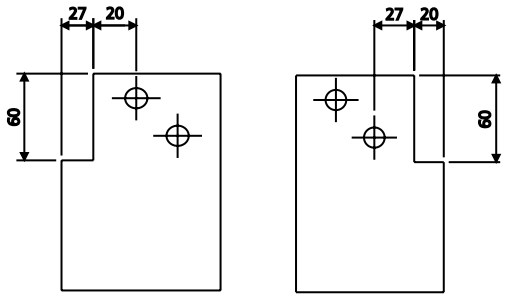
*For Aluminium termination as per standard:
1250A: Factory fitted hardware to be used,
1600/2000A: Bolt length of 85 mm to be used.

Note:
1. Different configurations of busbars can be used maintaining minimum cross section areas as specified in the table
2. Factory supplied bolt length caters to the copper bus bar termination as per standard. In case of different configurations & cross section areas, bolt of higher length may be required

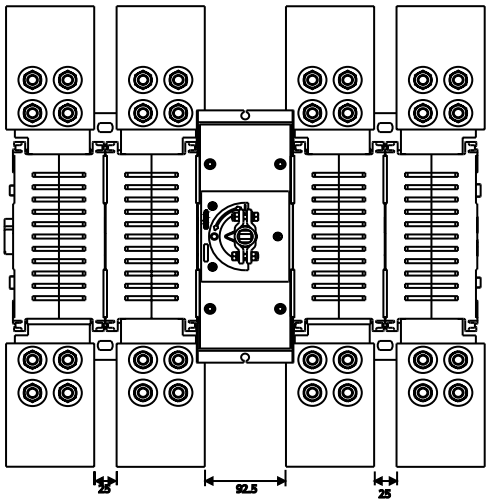
Termination of 100 mm Bus Bar 1600 A



Busbar cut-out dimensions



CO6-2000 A Termination of 100 mm Bus Bar



Termination Details

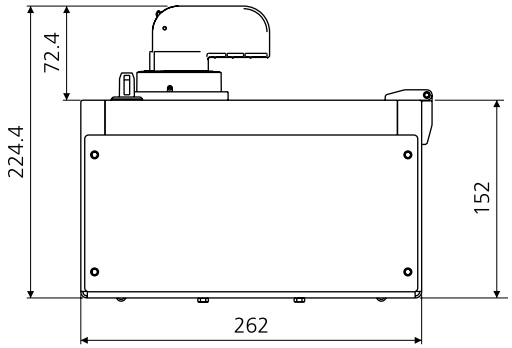
TYPE DESIGNATION	TERMINAL SCREWS	TIGHTENING TORQUE
COS-1000	M10 HEXAGONAL HEAD BOLT	20 N-m
COS-1250	M10 HEXAGONAL HEAD BOLT	20 N-m
COS-1600	M12 HEXAGONAL HEAD BOLT	27 N-m

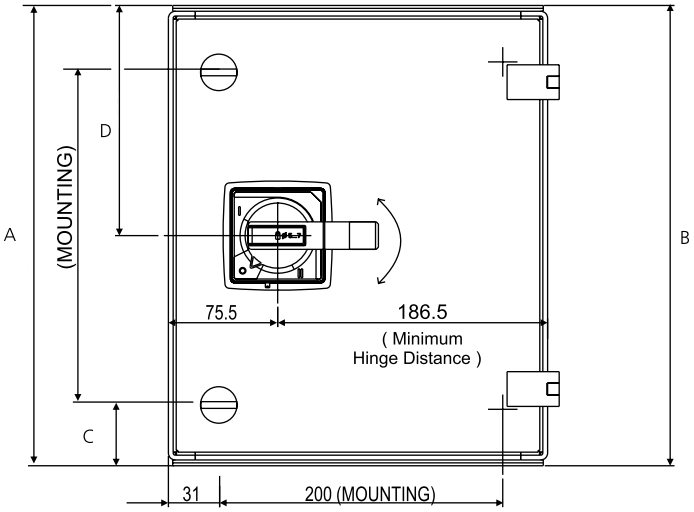
Direct termination of 100 mm bus bar possible in case of 2000 A.

All dimensions are in mm

CO1-63/100/125

Manual Changeover Switch In Sheet Steel Enclosure



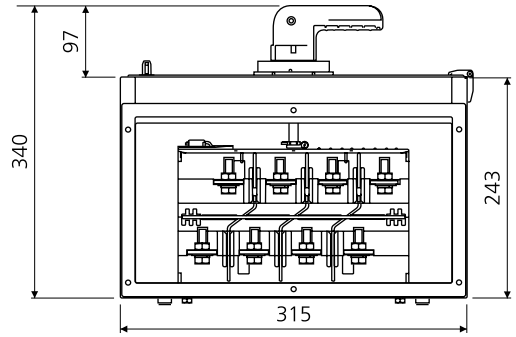


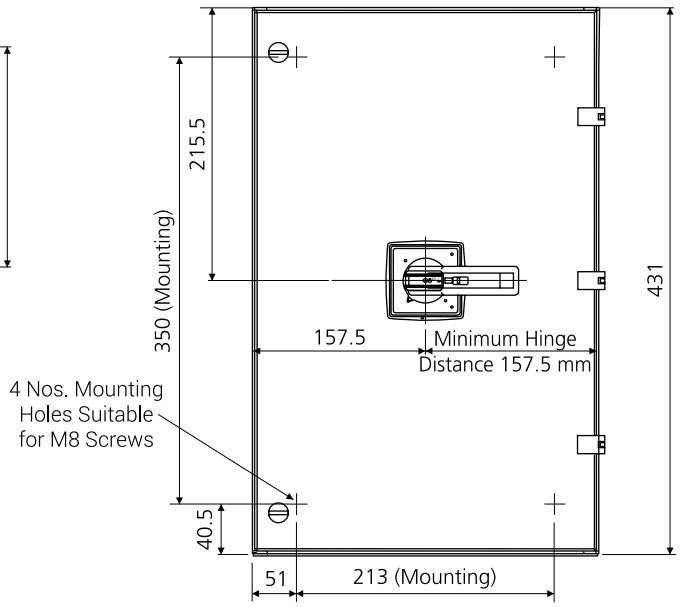
Rating	Termination Bolt
CO1-63/100/125 A	M6

Rating	A	B	C	D
CO1-63A	240	310	35	155
CO1-100A	240	310	35	155
CO1-125A	350	431	40.5	215.5

CO2-125/160/200

Manual Changeover Switch In Sheet Steel Enclosure

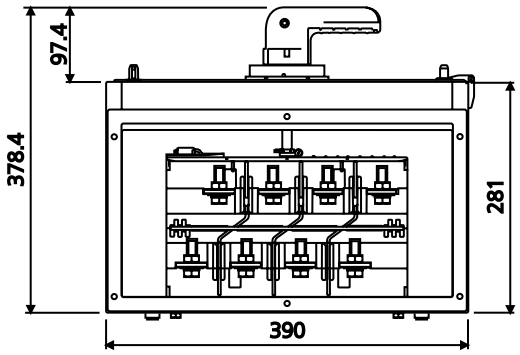


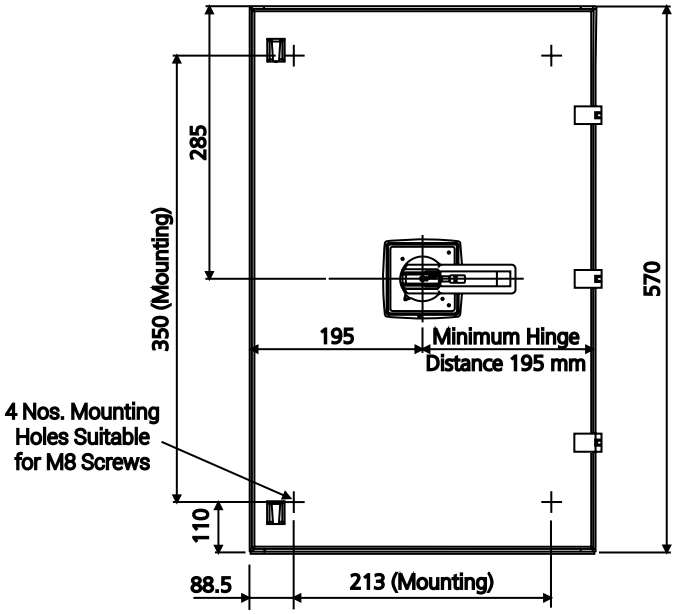


All dimensions are in mm

CO3-250/315

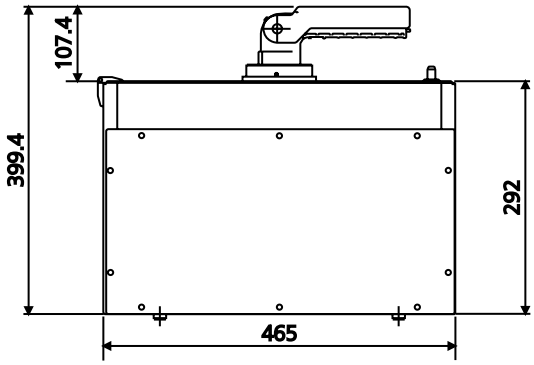
Manual Changeover Switch In Sheet Steel Enclosure

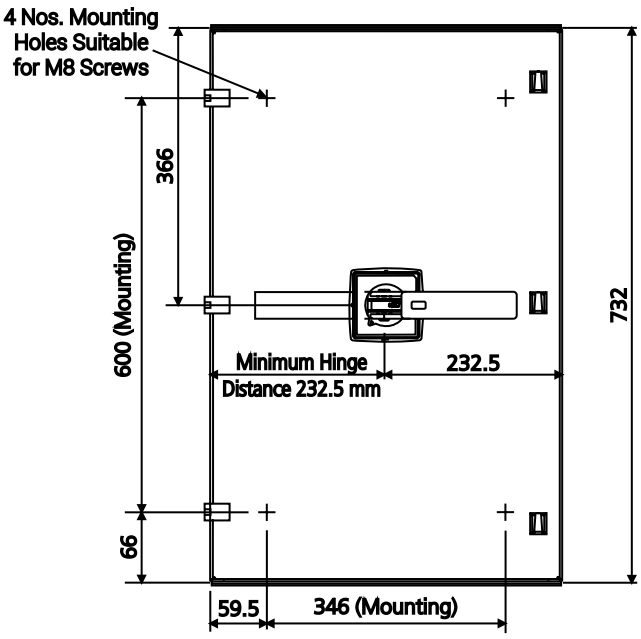




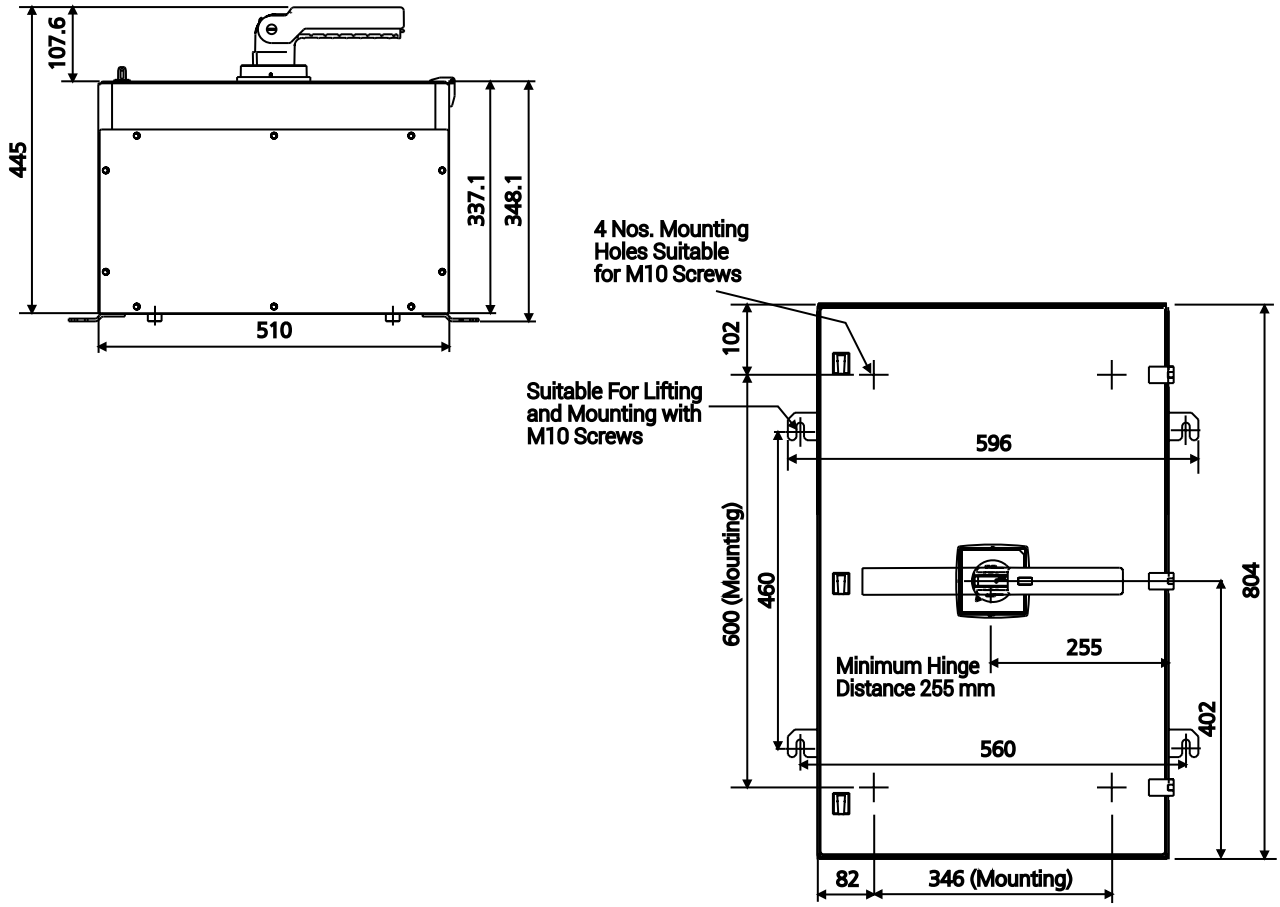
CO4-400/630

Manual Changeover Switch In Sheet Steel Enclosure

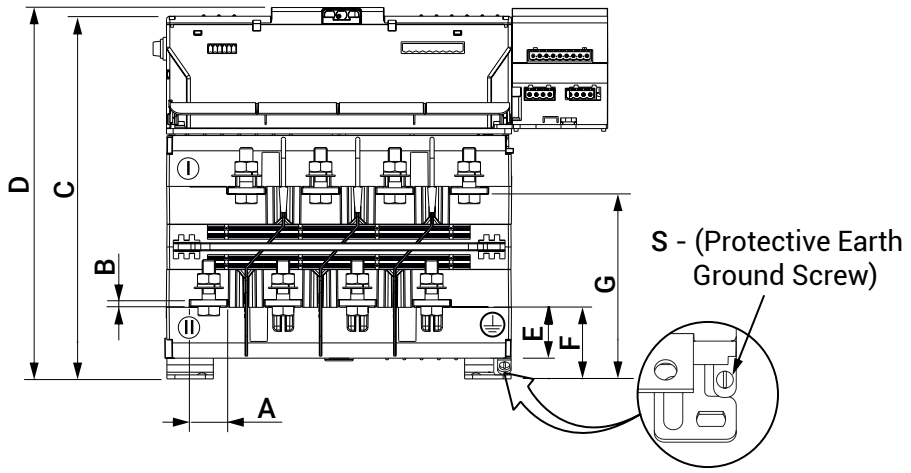




Manual Changeover Switch In Sheet Steel Enclosure

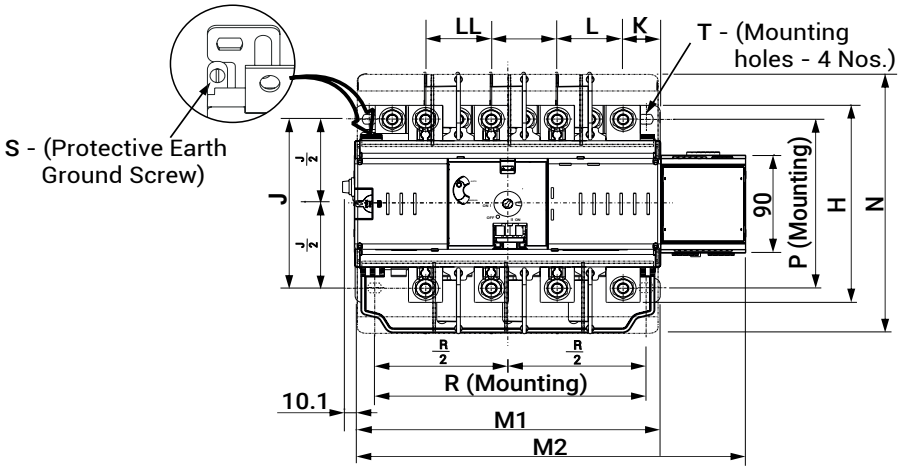


OVERALL DIMENSIONS: FRAME-2



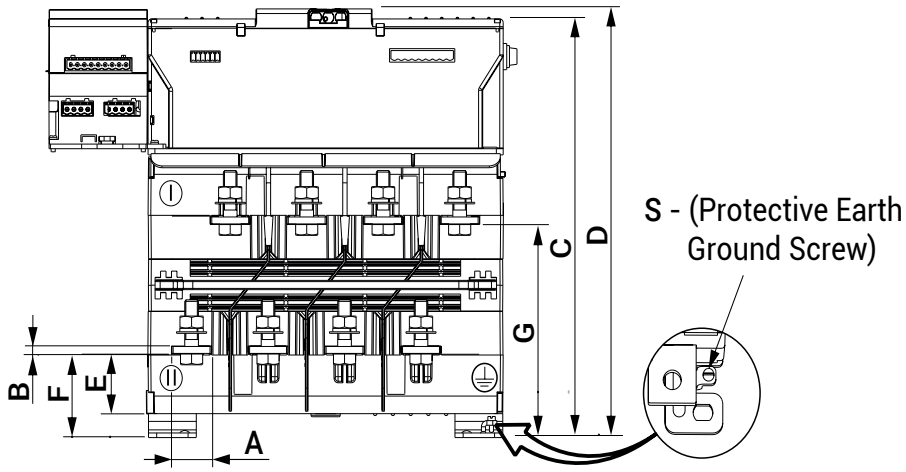
RATING (A)	FRAME		A	B	C	D	E	F	G1	G2	H	J	K
	CO	EOM											
125	CO2	CX2	22	3	138	121	28	44	210	282	211	120	190
160			22	3	138	121	28	44	210	282	211	120	190
200			26	5	150	121	28	44	210	282	211	120	190

OVERALL DIMENSIONS: FRAME-2 CONTINUED



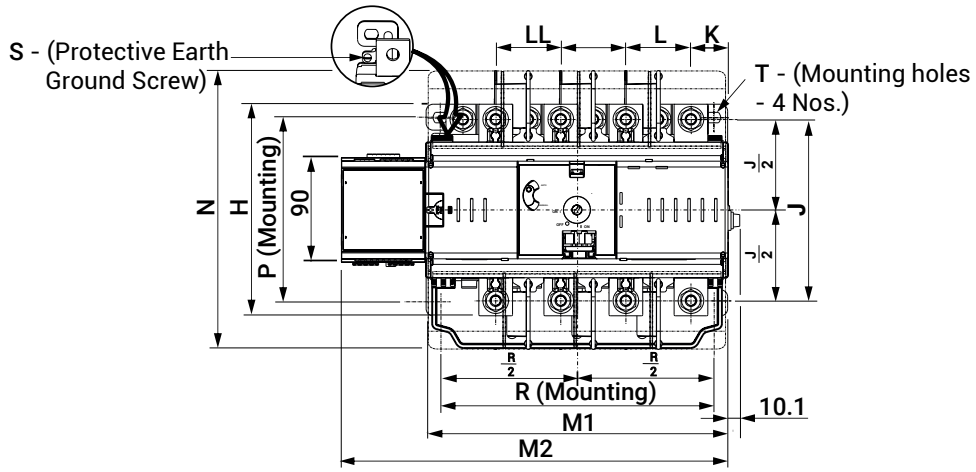
FRAME		L	M	N	P	R	MOUNTING HOLE SIZE	EARTHING SCREW SIZE
CO	EOM							
CO2	CX2	22	3	138	121	28	44	210

OVERALL DIMENSIONS: FRAME-3 TO FRAME-5



RATING (A)	FRAME		A	B	C	D	E	F	G1	G2	H	J	K
	CO	EOM											
250	CO3	CX3	29	4.5	182	156	32	56	260	332	239	159	235.4
315			35	5	198	164	32	56	260	332	239	159	235.4
400	CO4	CX4	40	5	228	202	32.3	70	310	358	329	200	286
630			40	6	228	202	32.3	70	310	358	329	200	286
630	CO5	CX5	50	6	264	228	-	80	380	393	351.6	220	345
800			50	8	264	228	-	80	380	393	351.6	220	345
1000			50	8	264	228	-	80	380	393	351.6	220	345

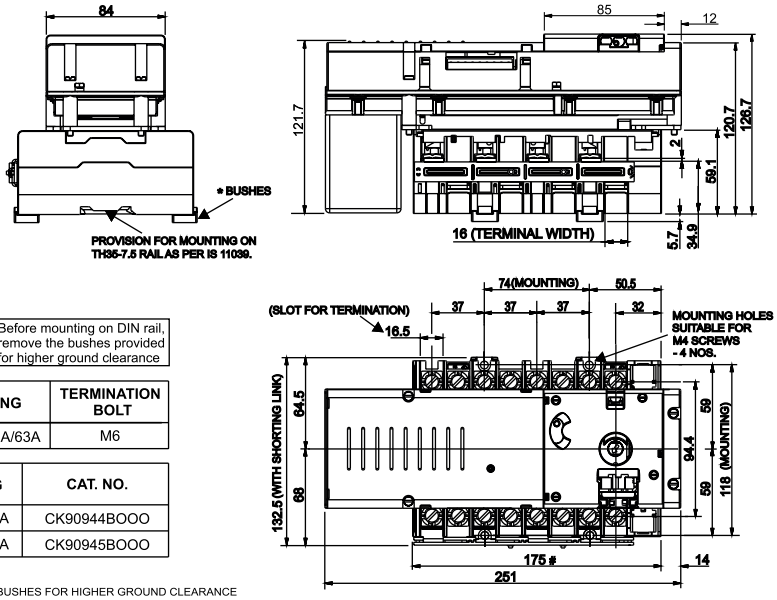
OVERALL DIMENSIONS: FRAME-3 TO FRAME-5 CONTINUED



FRAME		L	M	N	P	R	MOUNTING HOLE SIZE	EARTHING SCREW SIZE
CO	EOM							
CO3	CTX3	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	M4

CX1-40/63

Motorised Changeover Switch - Disconnector



CAUTION	Before mounting on DIN rail, remove the bushes provided for higher ground clearance

RATING	TERMINATION BOLT
CX1 - 40A/63A	M6

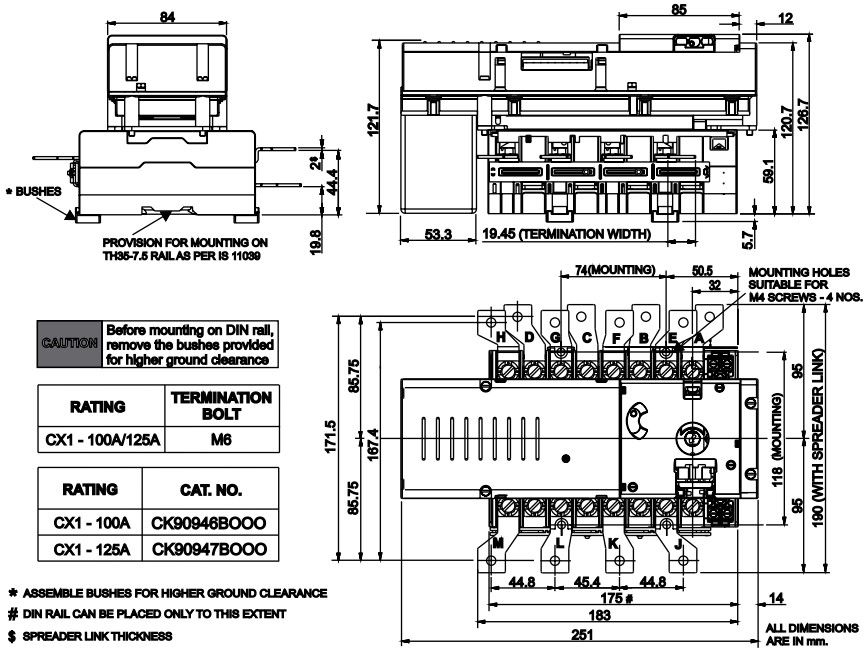
RATING	CAT. NO.
CX1 - 40A	CK90944BOOO
CX1 - 63A	CK90945BOOO

* ASSEMBLE BUSHES FOR HIGHER GROUND CLEARANCE

DIN RAIL CAN BE PLACED ONLY TO THIS EXTENT

CX1-100/125

Motorised Changeover Switch - Disconnector



CAUTION	Before mounting on DIN rail, remove the bushes provided for higher ground clearance

RATING	TERMINATION BOLT
CX1 - 100A/125A	M6

RATING	CAT. NO.
CX1 - 100A	CK90946BOOO
CX1 - 125A	CK90947BOOO

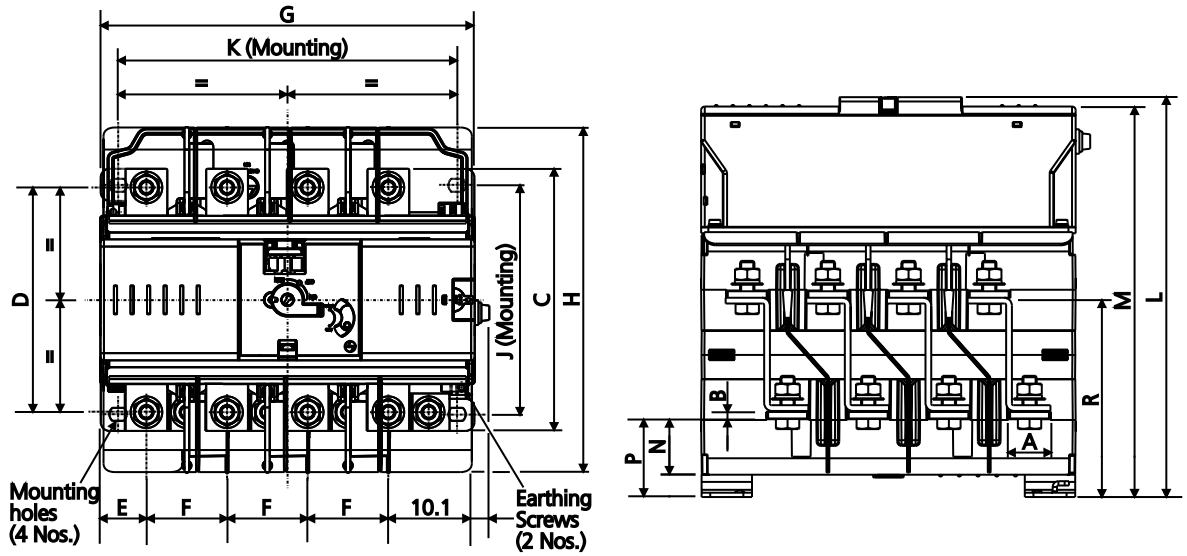
* ASSEMBLE BUSHES FOR HIGHER GROUND CLEARANCE

DIN RAIL CAN BE PLACED ONLY TO THIS EXTENT

$ SPREADER LINK THICKNESS

CO2 to CO5 (125-1000A)

Motorised Changeover Switch

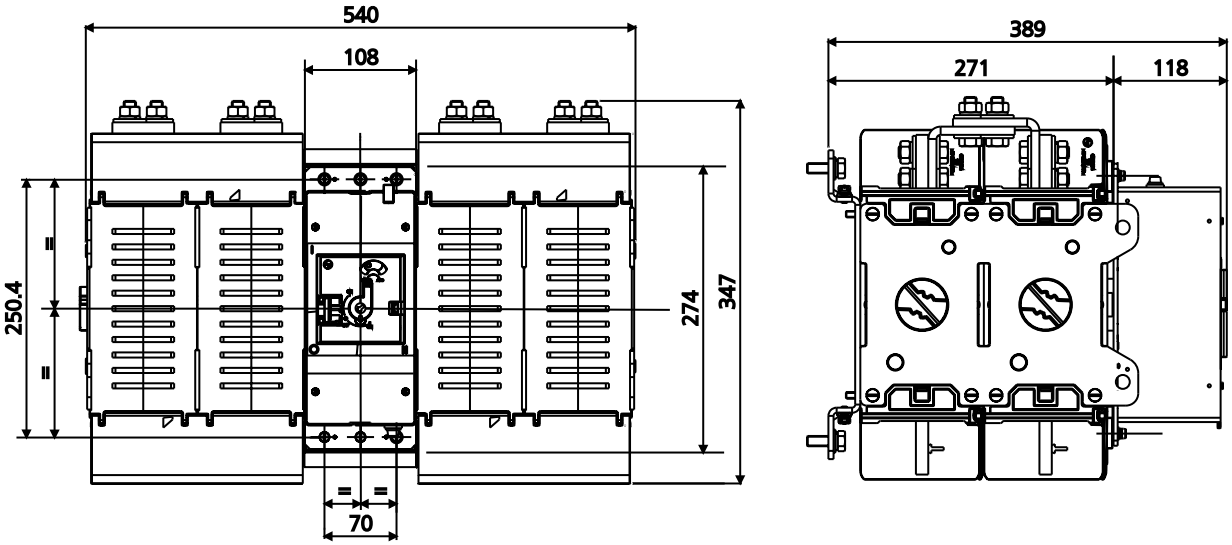


Rating (A)	Frame		A	B	C	D	E	F	G	H	J	K
	CO	EOM										
125	CO2	CX2	22	3	138	121	28	44	210	211	120	190
160			22	3	138	121	28	44	210	211	120	190
200			22	3	138	121	28	44	210	211	120	190
250	CO3	CX3	29	4.5	182	156	32	56	260	239	159	235.4
315			35	5	198	164	32	56	260	239	159	235.4
400	CO4	CX4	40	5	228	202	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			M	N	P	R	Mounting Hole Size	Earthing Screw Size
CO	EOM L							
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

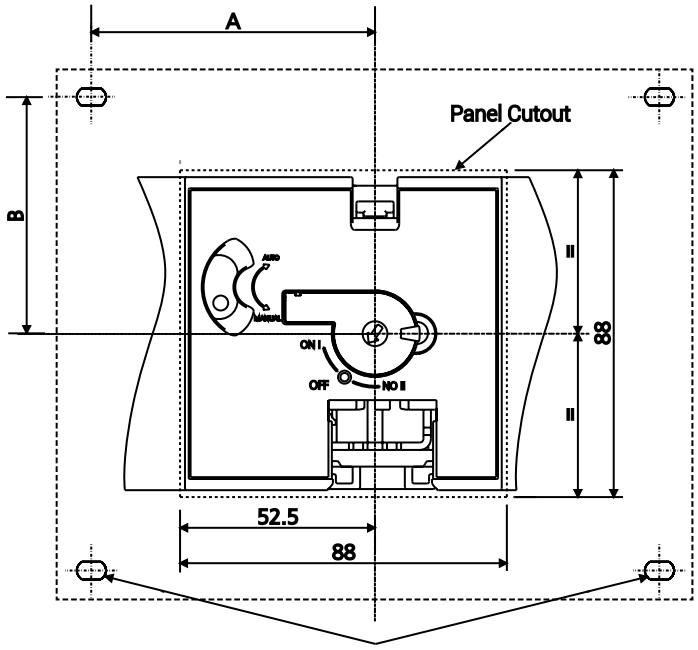
CO2 to CO5 (125-1000A)

Motorised Changeover Switch



Panel Cutout

Motorised Changeover Switch

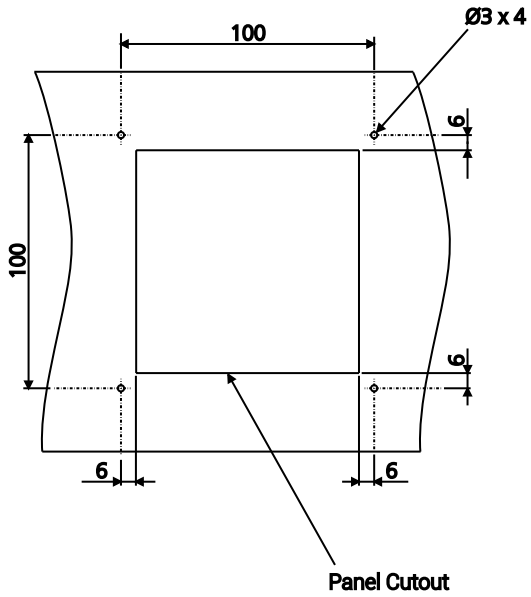


Type	A	B
CO1 with CX1	9.5	59
CO2 with CX2	95	60
CO3 with Cx3	117.7	79.5
CO4 with CX4	143	100
CO5 with CX5	172.5	110

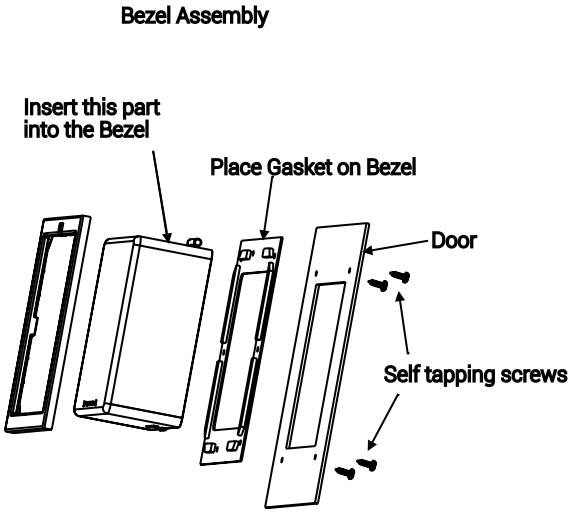
Mounting Holes of Respective Changeover Switch

Drilling Plan for Mounting Bezel*

Motorised Changeover Switch



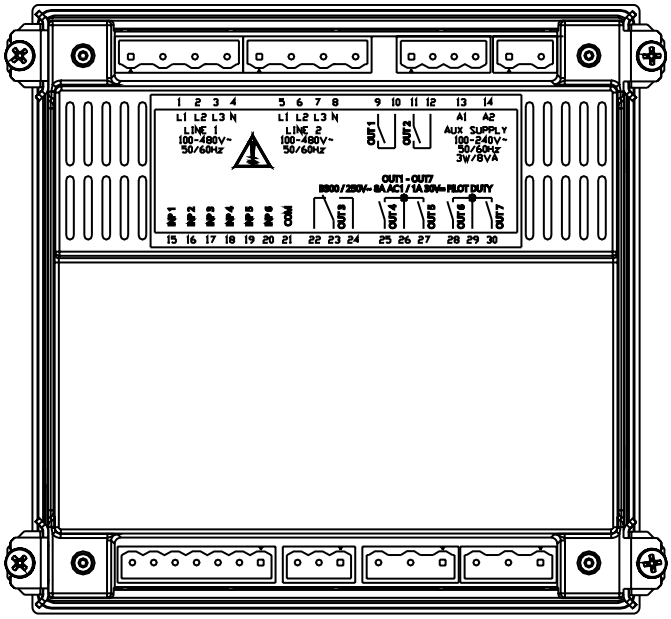
Bezel Assembly



*Available with standard product.

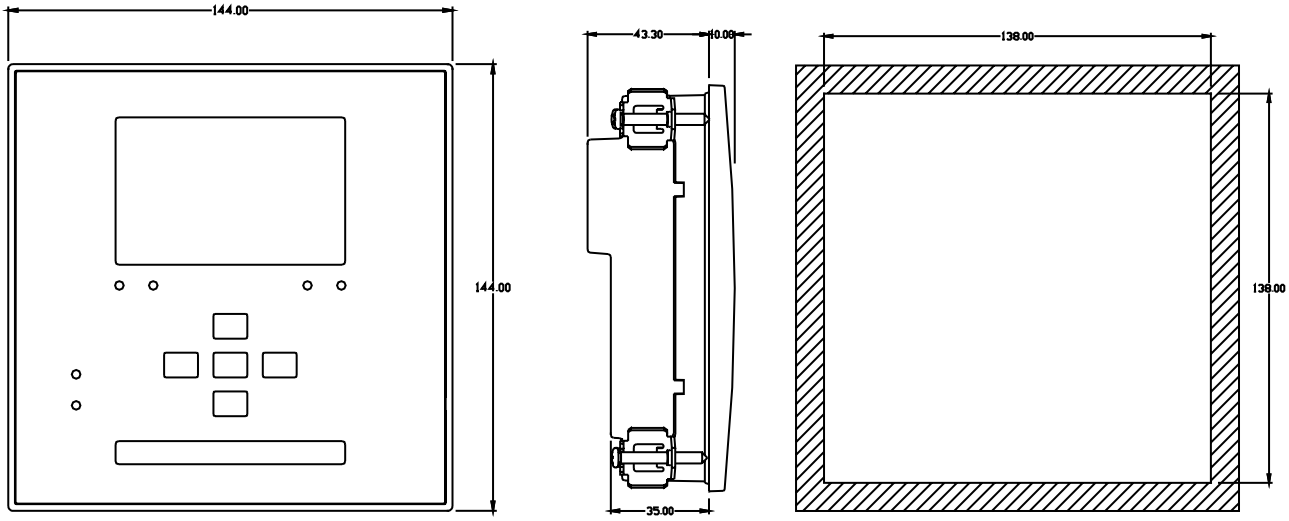
AuXC-2000

Rear Terminal Connections

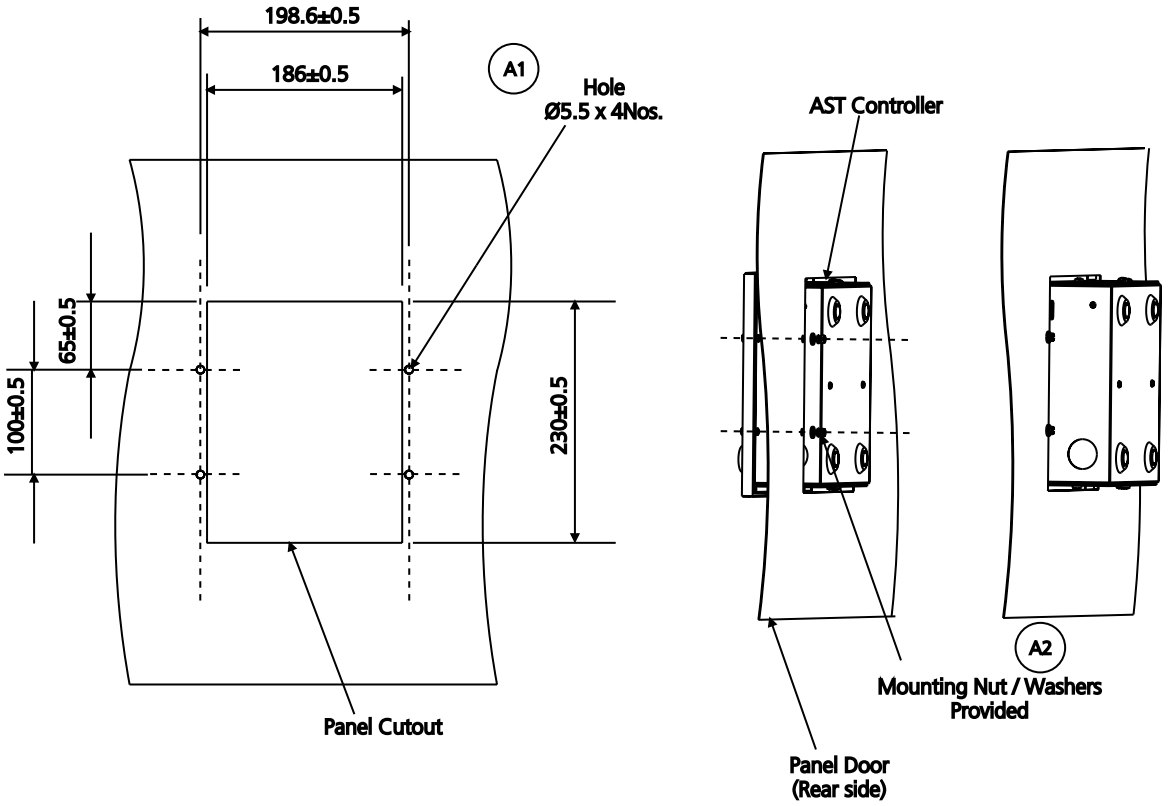


AuXC-2000

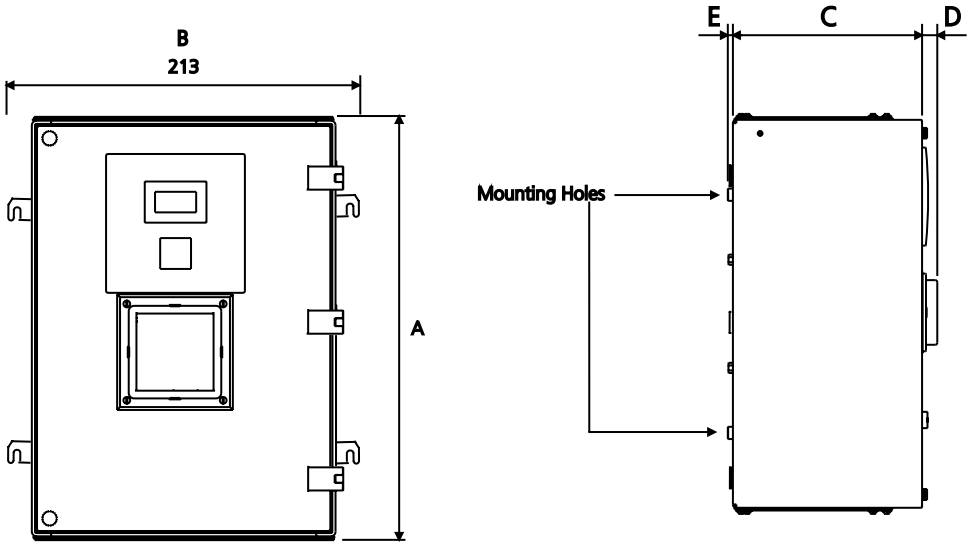
Panel cut-out



Panel Cutout & Drill Plan for Flush Mounting



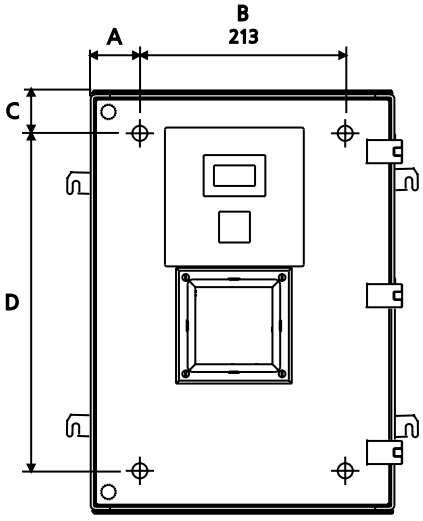
Enclosed ATS
Overall Dimensions



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

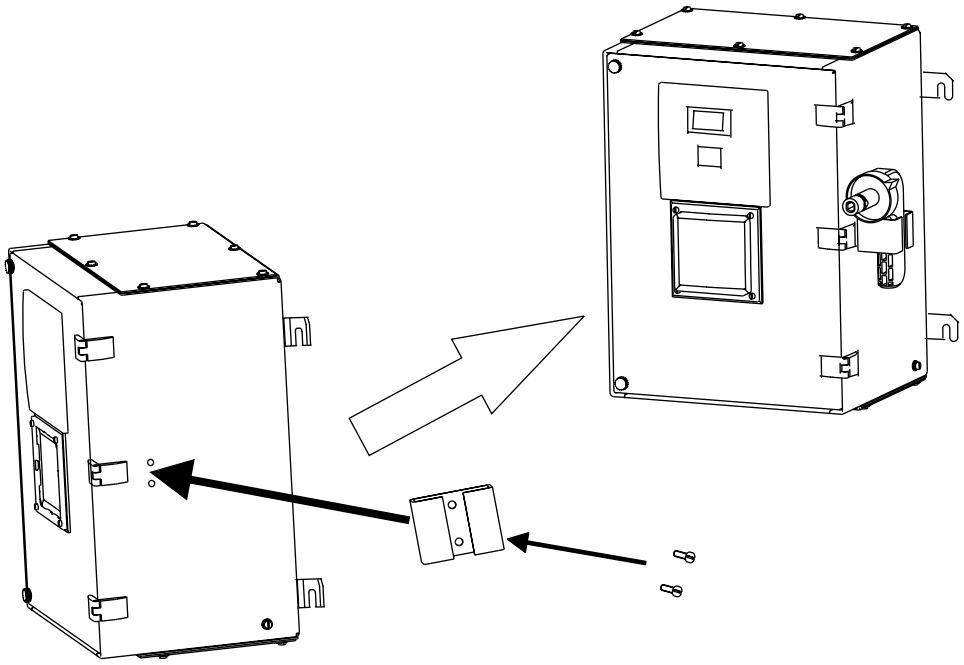
Dimensions for Enclosure Mounting

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

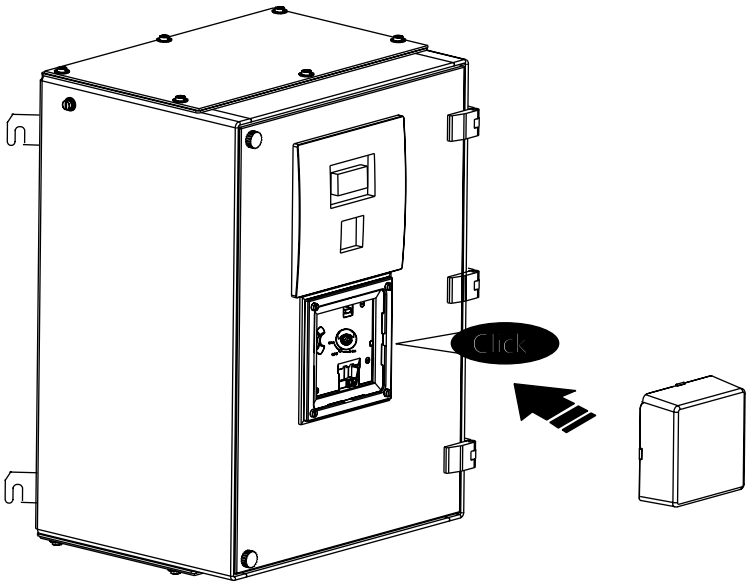


Enclosed ATS
Handle Clamp & IP Cover Mounting

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.



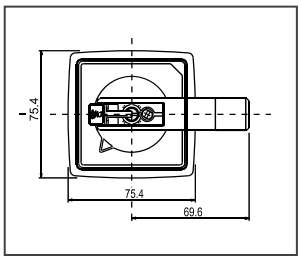
IP Cover Mounting
Insert the IP cover as shown

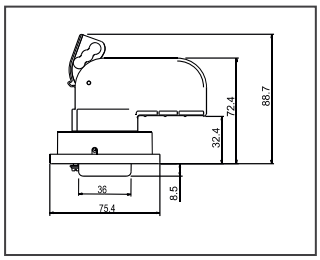


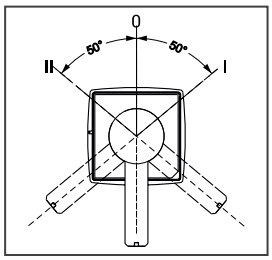
Caution: Remove IP cover for manual operation.

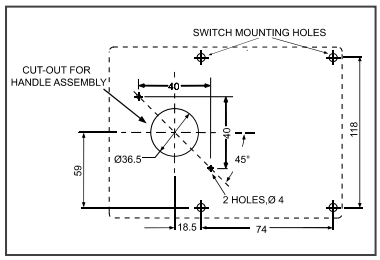
Panel Cutout

Co 1
HANDLE DIMENSIONS

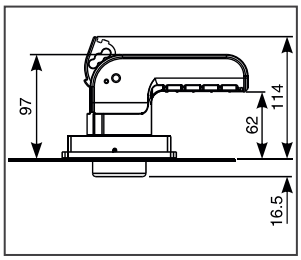


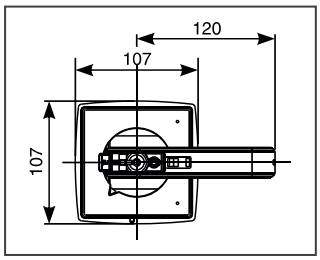


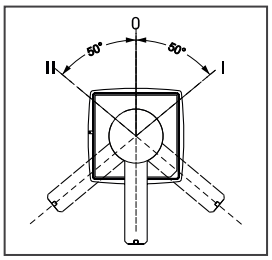


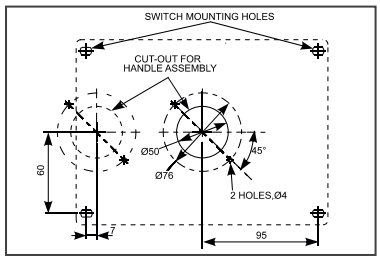


Co 2
HANDLE OVERALL DIMENSIONS

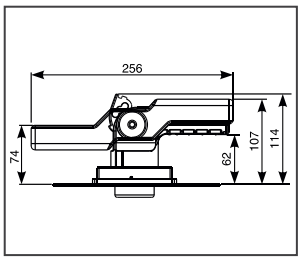


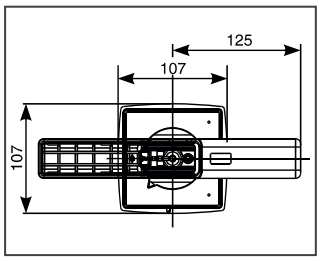


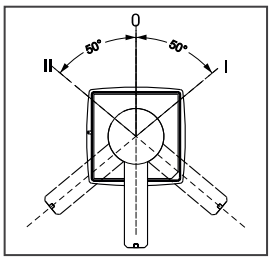


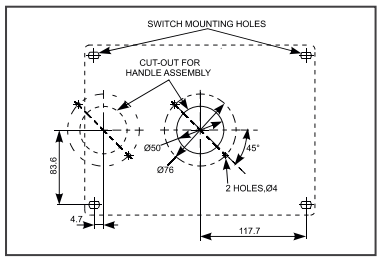


Co 3
HANDLE OVERALL DIMENSIONS

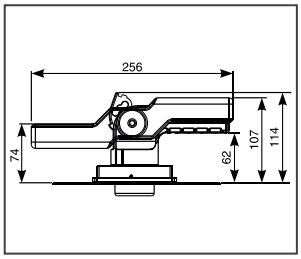


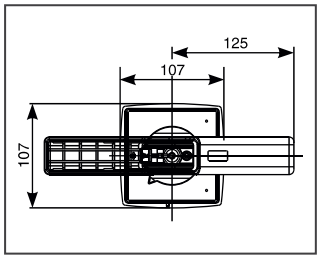


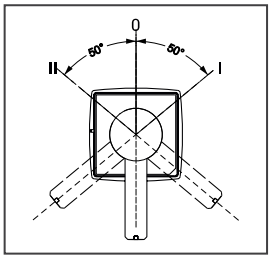


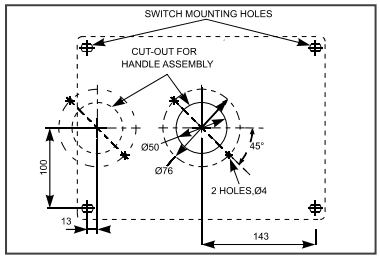


Co 4
HANDLE OVERALL DIMENSIONS

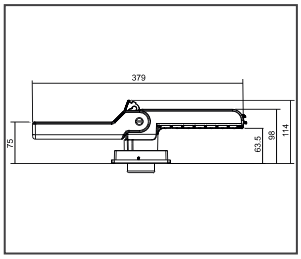


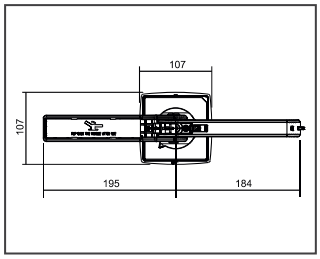


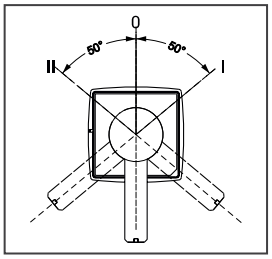


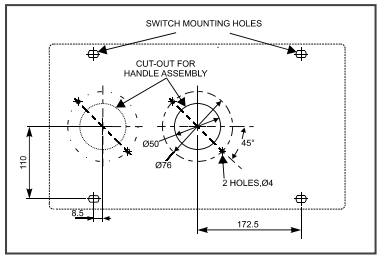


Co 5

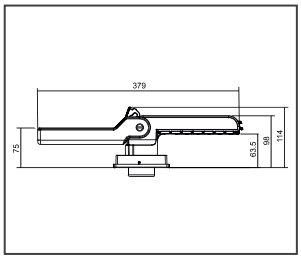


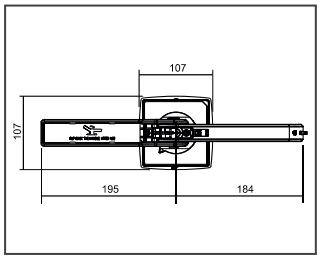


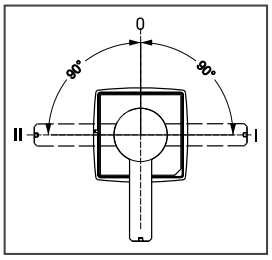


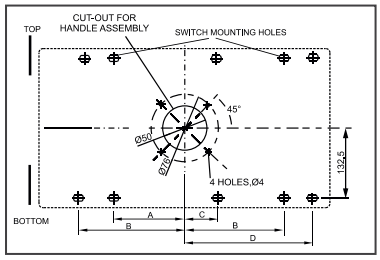


Co 6



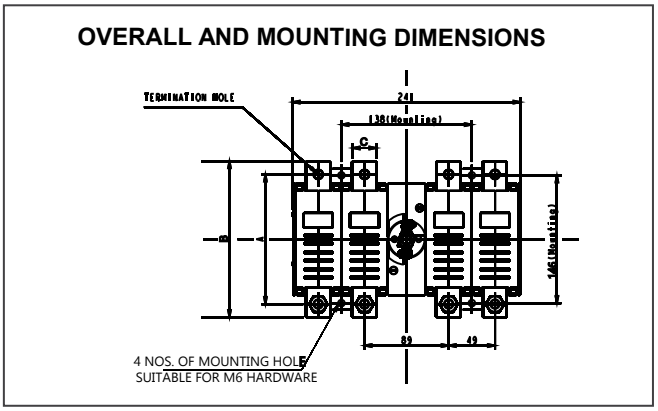


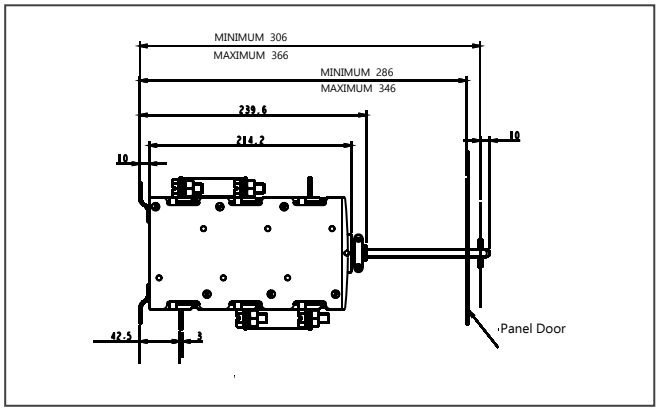




Dimension

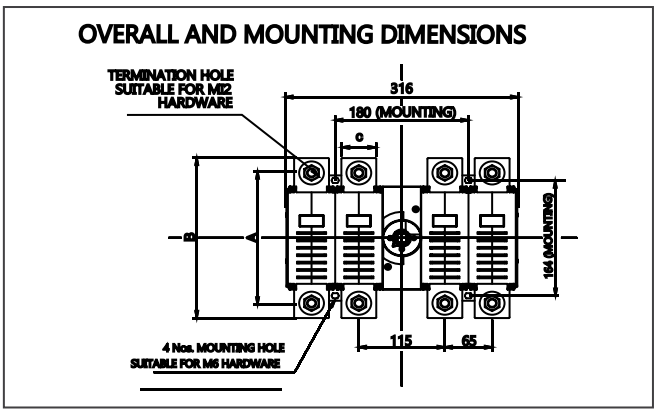
CZ 1 Bypass

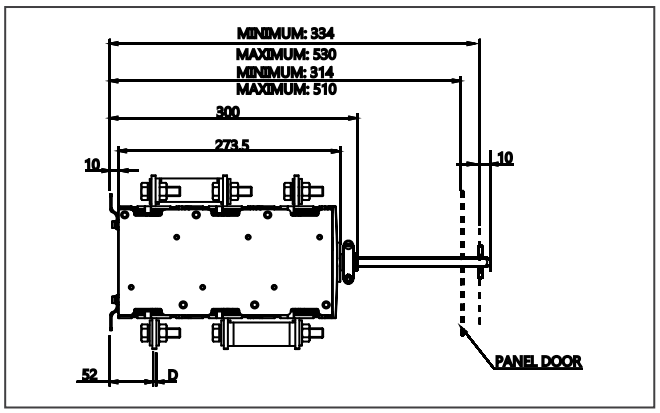




Rating (A)	A	B	C	Termination Hardware
125/250	137	161	25	M10
315	150	180	35	M12

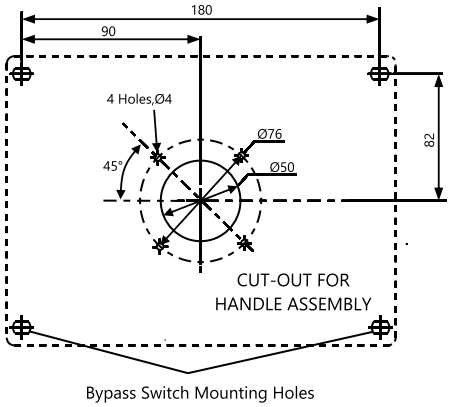
CZ 2 Bypass

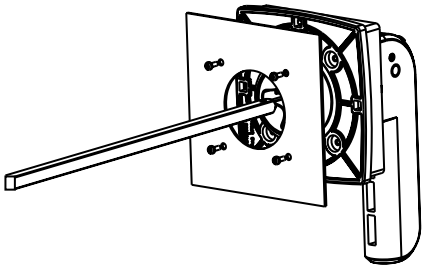




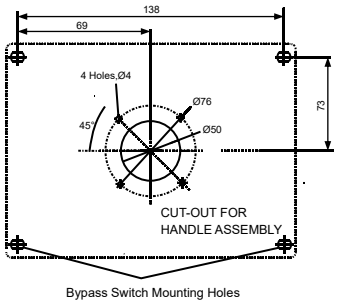
Rating (A)	A	B	C	D
315/400	181	206	32	4
630	184	222	45	5

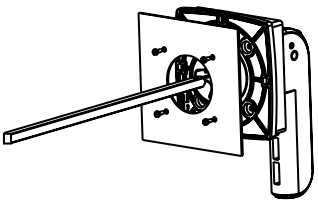
Panel Cutout





Accessories & Features- BYPASS SWITCH Cz1 125/160/200/315A





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

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