



FN & C-line

Switch-Disconnectors

About Us

Larsen & Toubro is a technology-driven company that infuses engineering with imagination. The Company offers a wide range of advanced solutions in the field of Engineering, Construction, Electrical & Automation, Machinery and Information Technology.

L&T Switchgear, a part of the Electrical & Automation business, is India's largest manufacturer of low voltage switchgear, with the scale, sophistication and range to meet global benchmarks. With over seven decades of experience in this field, the Company today enjoys a leadership position in the Indian market with a growing international presence.

It offers a complete range of products including powergear, controlgear, industrial automation, building electricals & automation, power quality solutions, energy meters, and protective relays. These products conform to Indian and International Standards.





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Standards & Approvals

Switch-Disconnecter range comply with following standards

- **IEC 60947-1, EN 60947-1, IS/IEC 60947-1**
Low-voltage switchgear and controlgear, Part 1: General Rules
- **IEC 60947-3, EN 60947-3, IS/IEC 60947-3**
Low-voltage switchgear and controlgear, Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units

NABL



NABL accreditation is a formal recognition of the technical competence of testing, calibration or medical laboratory for a specific task following ISO/IEC 17025:2005 Standard. Accredited laboratories have the responsibility of satisfying the criteria of laboratory accreditation at all times, which are verified during Surveillance and Reassessment visits by NABL. Further the accredited laboratories should prove their technical competence by satisfactory participation in recognized Proficiency Testing Programmes.

L&T's Switchgear Testing Lab is NABL accredited subject to continued satisfactory compliance to above standard & additional requirements of NABL.

Switch-Disconnecter range is tested in L&T's NABL accredited Switchgear Testing Lab.

CE Marking



A CE marking is a European marking of conformity that indicates a product complies with the essential requirements of the applicable European laws or directives with respect to safety, health and environment and consumer protection. Generally, this conformity to the applicable directives is done through self-declaration and is required on products in the countries of the European Economic Area (EEA) to facilitate trade among the member countries. The manufacturer or their authorized representative established in the EEA is responsible for affixing the CE marking to their product. The CE marking provides a means for a manufacturer to demonstrate that a product complies with a common set of laws required by all countries in the EEA to allow free movement of trade within the EEA countries.

L&T's Switch-Disconnecter range conform to the Low voltage directive 73/23/EEC as amended by directive 93/68/EEC, provided it is used in the application for which it is made and is installed and maintained in accordance with professional practices with relevant installation standards and operating instructions.

FN & **C-line** offers you a unique series of Switch-Disconnectors combining compactness with high performance & Customer convenience.

Range covers ratings from 32 A to 2000 A in 6 frame sizes.

Versions

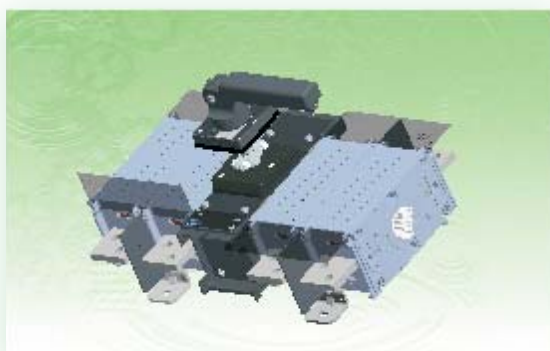


2P FN S-D suitable for open execution

The 2P FN S-D range is available from 32 A to 1000 A, suitable for 220V DC application.

TPN FN S-D suitable for open execution

The TPN FN S-D range is available from 32 A to 1000 A, suitable for 415/690V AC & 440V DC application.



TP & FP **C-line** S-D suitable for open execution

The 3P & 4P C-line S-D range is available from 1000 A to 2000 A, suitable for 690V AC & 440V DC application.

S-D Range

Type	Frame No.	Ratings (A)			
FN	I	32	63	-	-
	II	100	125	-	-
	III	200	250	-	-
	IV	315	400	-	-
	V	630	800	1000	-
C-line	VI	1000	1250	1600	2000

FN S-D Product Features



1. Handle

The FN Switch has a unique operating handle with the following features.

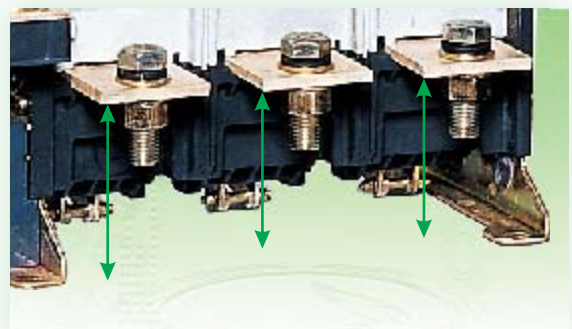
- Door interlock for safety of operating personnel when switch is 'ON'. The interlock can be defeated if required
- Built-in padlocking arrangement to lock the unit in 'OFF' position
- The handle coupling can take a mismatch or $\pm 3\text{mm}$ in all directions
- IP54 with extended operating handle

2. Maximum termination capacity

FN switch range provides generous terminal capacity in its compact size, facilitating aluminium termination.

3. 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.





4. Positive ON / OFF indication of S-D

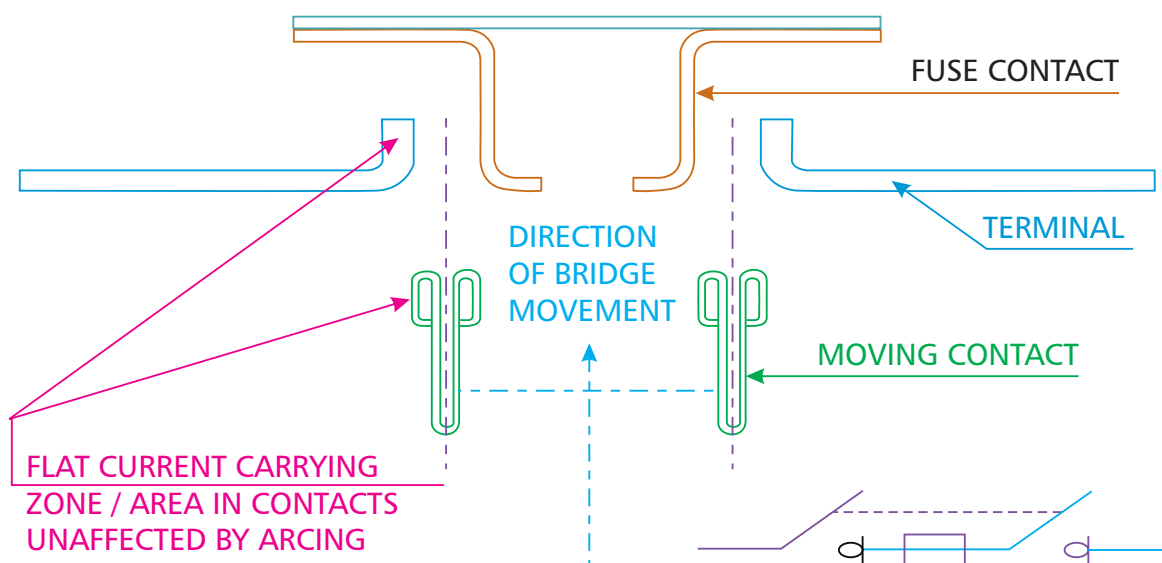
The FN Switch indicates true position of contacts. (By a red pointer)

5. Built-in neutral

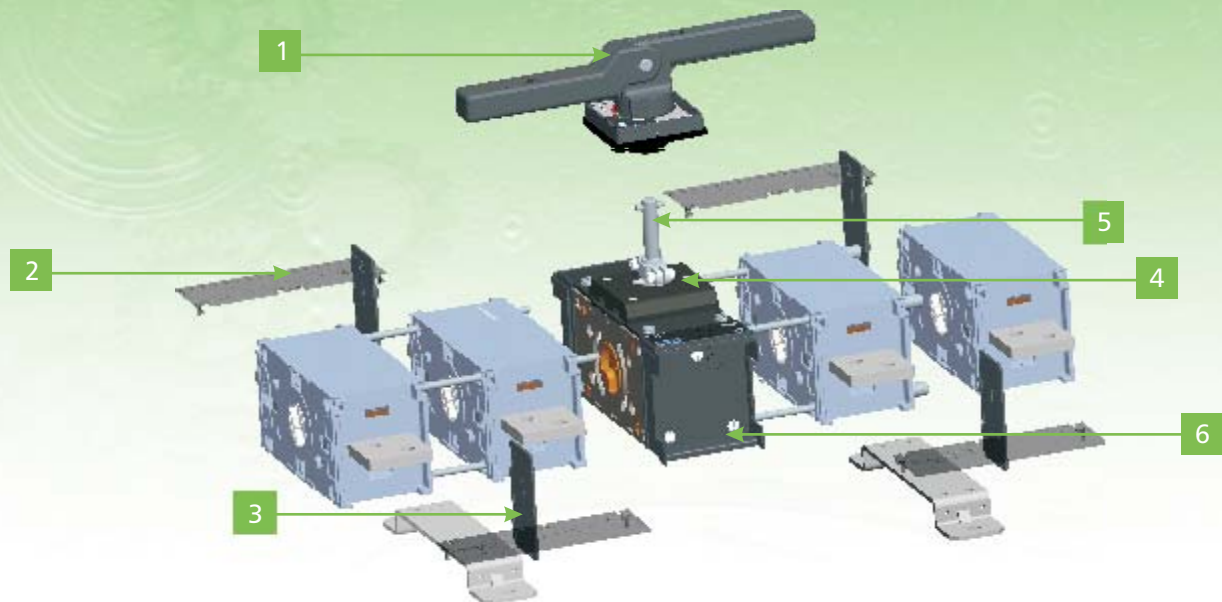
The FN TPN Switch consists of an integral neutral, making the units suitable for 3 phase, 4 - wire application. FN 32 / 63 has switched neutral while higher ratings have isolable neutral. (For higher ratings switchable neutral kit is available as an accessory)

6. Contact system

Contact system is QUAD BREAK. There are number of parallel moving contacts per pole per break. Hence, better arc quenching & more electrical life of contacts. Each pole has separate bridge carrying the moving contacts, achieving a high order of inter phase separation & avoiding phase-phase flash over.



C-line S-D Product Features



1. Handle

The C-line Switch has a unique flip-able operating handle which enables user to operate the switch with two hands. The handle also offers the following.

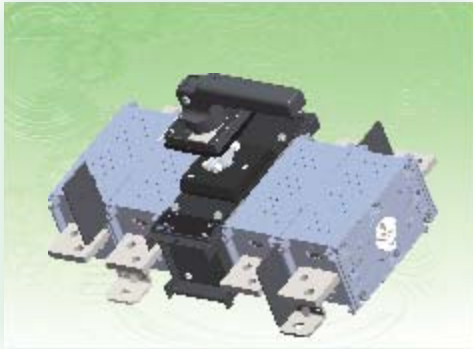
Features:

- Door interlock for safety of operating personnel when switch is 'ON'. The interlock can be defeated if required
- Built-in padlocking arrangement to lock the unit in 'OFF' position with 3 padlocks of Ø5 to Ø7
- IP54 with extended type operating handle



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.

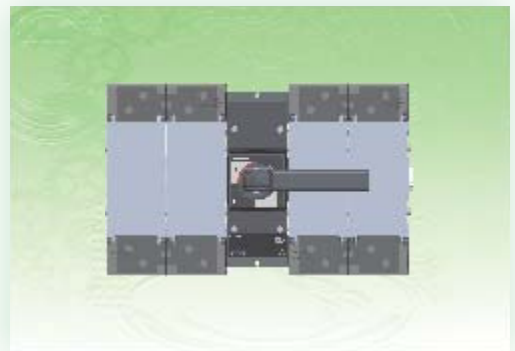


3. Inter-phase barriers

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

4. Positive ON / OFF indication of S-D

The C-line Switch indicates true position of contacts.



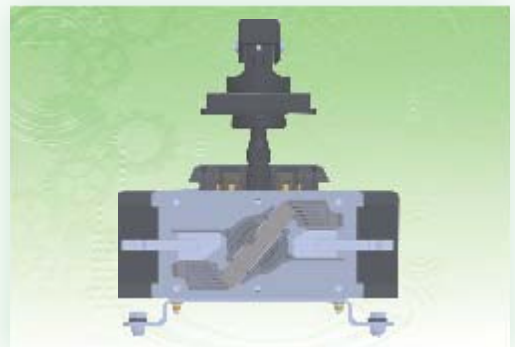
5. Depth adjustable operating shaft

The C-line Switch depth can be varied and fixed as per requirement during installation which is possible due to stepless adjustment of operating shaft.

6. Mechanism and Contact System

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 short-time withstand rating.

C-line switch offers high electrical and mechanical life in compact size. The electrical and mechanical life are two times the requirement of the standard.



Universal Mounting

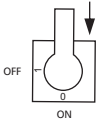
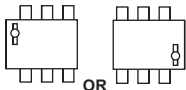
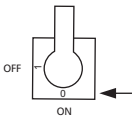
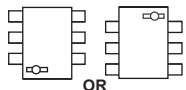
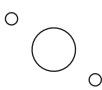
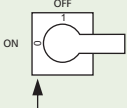
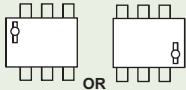
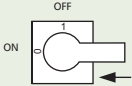
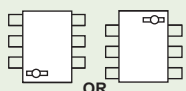
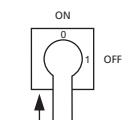
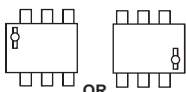
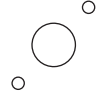
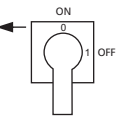
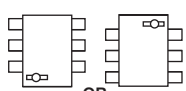
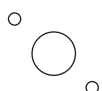
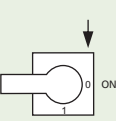
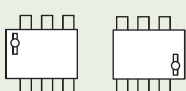
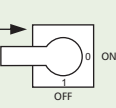
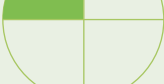
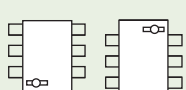
FN & C-line switch range offers a distinctive feature to mount S-D in different quadrants. This feature aids mounting flexibility.

FN S-D operating quadrant chart (Seen from front of the door)

In FN Switch universal mounting is achieved by Type A and Type B handle.

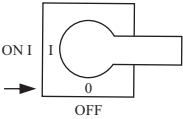
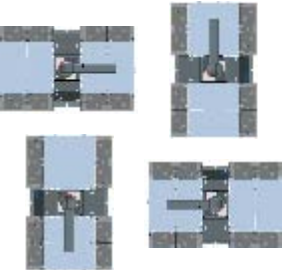
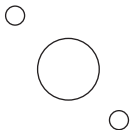
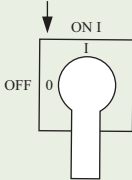
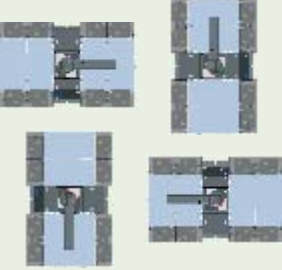
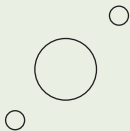
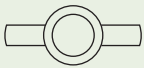
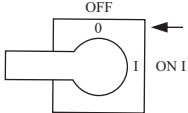
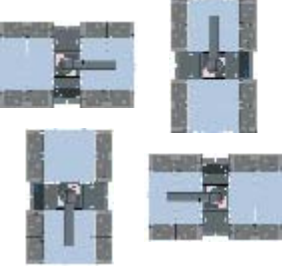
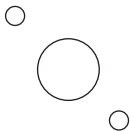
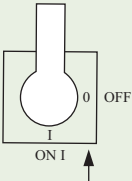
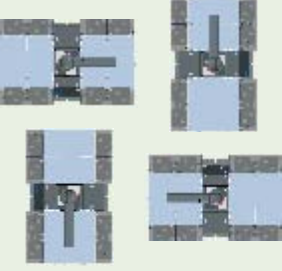
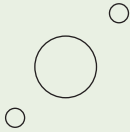
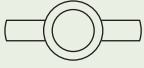
Type A : Supplied as standard with all Switches

Type B : Available as an accessory

Sr. No.	Handle (OFF) Position	Operating Quadrant (hand)	Switch Orientation	Door Cut-out	Handle Coupling Type
1					B
2					A
3					A
4					B
5					B
6					A
7					A
8					B

Note : Arrow (←) indicates position of Interlock defeat key

C-line S-D Operating Quadrant chart (Seen from front of the door)

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

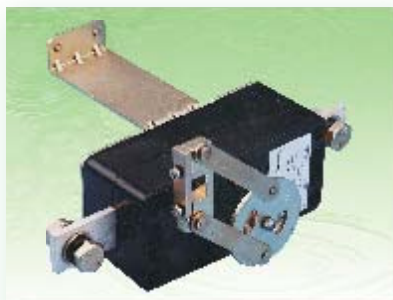
Technical Specifications

Frame Size		I		II		III		IV		V			VI			
Type Designation	Unit	FN 32	FN 63	FN 100	FN 125	FN 200	FN 250	FN 315	FN 400	FN 630	FN 800	FN 1000	COS SD 1000	COS SD 1250	COS SD 1600	COS SD 2000
Reference standards	-	IEC 60947- 3, EN 60947- 3, IS/IEC 60947 - 3														
No. of poles	-	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P+Neutral	3P / 4P	3P / 4P	3P / 4P	3P / 4P
Neutral	-	Switchable	Switchable	Isolable	Isolable	Isolable	Isolable	Isolable	Isolable	Isolable	Isolable	Isolable	-	-	-	-
Rated operational voltage (Ue)	(V AC)	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415
Rated insulation voltage (Ui)	(V AC)	690	690	690	690	690	690	690	690	690	690	690	1000	1000	1000	1000
Rated impulse withstand voltage (imp)	(kV AC)	8	8	8	8	8	8	8	8	8	8	8	12	12	12	12
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	50/60	50/60
Service temperature	(°C)	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50	-20 to 50
Pollution degree	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Conventional enclosed thermal current, I _{the} at 40 Deg C	(A)	32	63	100	125	200	250	315	400	630	800	1000	1000	1250	1600	2000
Conventional free air thermal current, I _{th} at 40 Deg C	(A)	32	63	100	125	200	250	315	400	630	800	1000	1000	1250	1600	2000
Rated operational current, I _e for AC 21A / AC 22A	(A)	32	63	100	125	200	250	315	400	630	800	1000	1000	1250	1600	2000
Rated operational current, I _e for AC 23A	(A)	32	63	100	125	200	250	315	400	630	800	1000	1000	1250	1250	1250
Rated breaking capacity (436 V, cosØ-0.35)	(A)	256	504	800	1000	1600	2000	2520	3200	5040	6400	8000	8000	10000	10000	10000
Rated making capacity (436 V, cosØ-0.35)	(A)	320	630	1000	1250	2000	2500	3150	4000	6300	8000	10000	10000	12500	12500	12500
Short time withstand, I _{cw} for 1 sec	(kA)	1.5	1.5	4	4	6	10	14	14	20	20	25	50	50	50	50
Rated operational power for AC 23A, cosØ-0.35	(kW)	15	29	47	58	93	117	147	187	294	374	374	467	584	748	934
Capacitor duty - 415 V 50 - 60 Hz	(kVAR)	12	23	36	45	72	90	113	144	226	288	288	546	682	874	1092
Mechanical endurance	(operating cycles)	15000	15000	15000	15000	10000	10000	10000	10000	10000	10000	5000	6000	6000	6000	6000
Operating torque	(N-m)	4	4	4	12	20	20	25	25	25	25	30	55	55	55	60
Terminal Capacity																
Terminal capacity (main)	(Sq mm)	35	35	95	95	240	240	400	2 x 400	2 x 625	2 x 625	2 x 625	2 x 5 x 80	2 x 5 x 80	2 x 5 x 100	3 x 5 x 100
Terminal capacity (neutral)	(Sq mm)	35	35	50	50	120	120	240	240	400	400	400	2 x 5 x 80	2 x 5 x 80	2 x 5 x 100	3 x 5 x 100
DC Rating for DC 22B																
Rated operational current, I _e at 220 V DC (2P in series)	(A)	32	63	100	125	200	250	315	400	630	800	1000	1000	1250	1600	2000
Rated operational current, I _e at 440 V DC (3P in series)	(A)	32	63	100	125	200	250	315	400	630	800	1000	1000	1250	1600	2000
AC Rating for 690 V AC Operational Voltage																
Rated operational current, I _e for AC 21A / AC 22B	(A)	32	63	63	100	160	200	250	315	400	800	1000	1000	1250	1250	1250

Spares and Accessories

Wide range of spares & accessories are available for Switch-Disconnecter units

Type FN Spares & Accessories

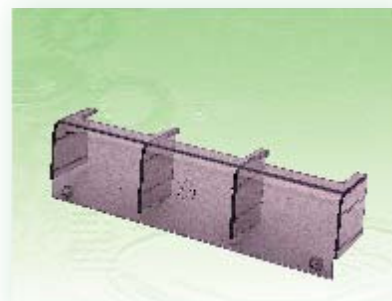


Switched neutral

In FN 32 / 63 Switched-Neutral pole is an integral part of the Switch-Disconnecter-Fuse. For higher ratings, a double break, site-fitted switched neutral pole can be provided. This is operated by the main mechanism.

Terminal shroud

The terminals can be shrouded for protection against phase-short circuit through an external conducting path and against accidental human contact with live terminals.



Castell interlock

Switch-Disconnecter-Fuse units can be locked on OFF position with help of castell interlock. Castell interlock can also be used to interlock two SDF units. (Different variety of locks are available).

Handle coupling (type A & B)

Irrespective of the switch orientation (vertical or horizontal), operation in any of the four quadrants is possible by selecting right handle coupling (Refer universal mounting table).



Auxiliary contacts

1 NO + 1 NC auxiliary contact is available as an accessory. This can be suitably wired in the control circuit.

- Rated operational current I_e (AC - 15) - 4 A
- Rated operational voltage U_e - 415 V

Type C-line Spares & Accessories

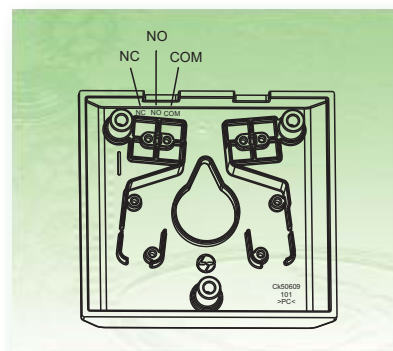


Handle

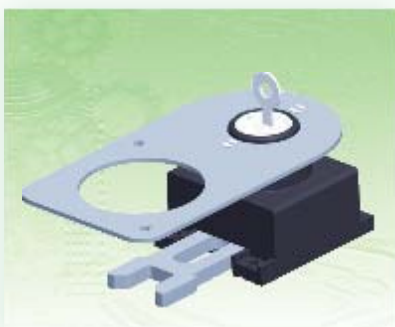
The C-line S-D has a unique flip-able operating handle which enables user to operate the switch with two hands. Irrespective of the orientation, operation in any of the four quadrants is possible. (refer universal mounting table)

Auxiliary contact kit

It consists of one set of changeover contacts. This kit is pre-wired with terminal blocks and can be fitted at the site without increasing overall dimension



Auxiliary Contact



Castell lock

Accessory to lock the switch in OFF state and using this can have interlocking schemes between multiple switches.

Ordering Information

FN S-D suitable for open execution :

Operating Current Rating (A)	32	63	100	125
2P S-D Version	SK904180000	SK904190000	SK904200000	SK904210000
TPN S-D Version	SK955410000	SK955400000	SK955710000	SK954050000

Operating Current Rating (A)	200	250	315	400
2P S-D Version	SK904500000	SK904540000	SK904650000	SK904660000
TPN S-D Version	SK956070000	SK956830000	SK956090000	SK956100000

Operating Current Rating (A)	630	800	1000
2P S-D Version	SK904670000	SK904680000	SK904690000
TPN S-D Version	SK956110000	SK955510000	SK957100000

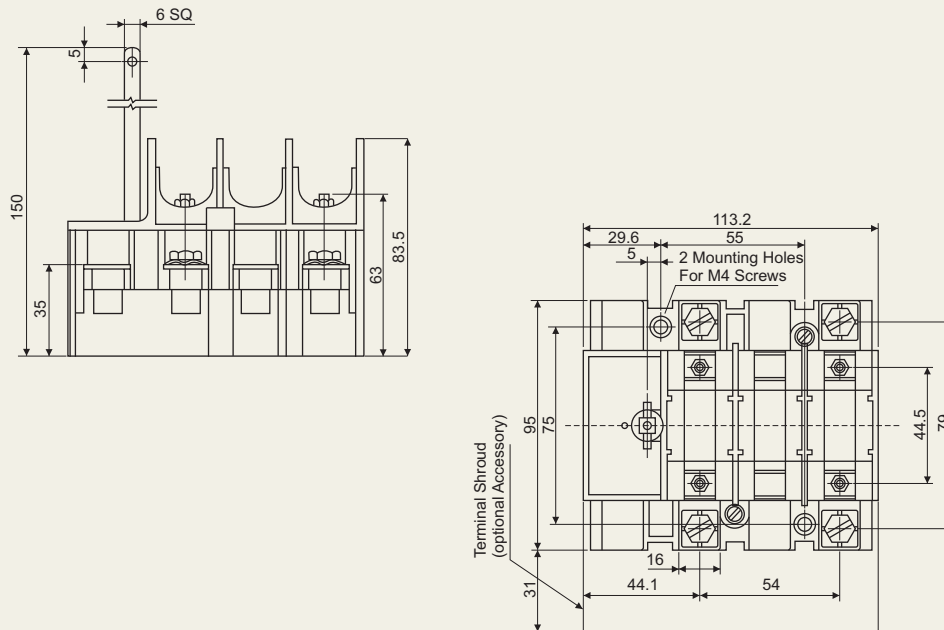
C-line S-D suitable for open execution :

Operating Current Rating (A)	1000	1250	1600	2000
TP S-D Version	COS10000040	COS12500040	COS16000040	COS20000040
FP S-D Version	COS10000030	COS12500030	COS16000030	COS20000030

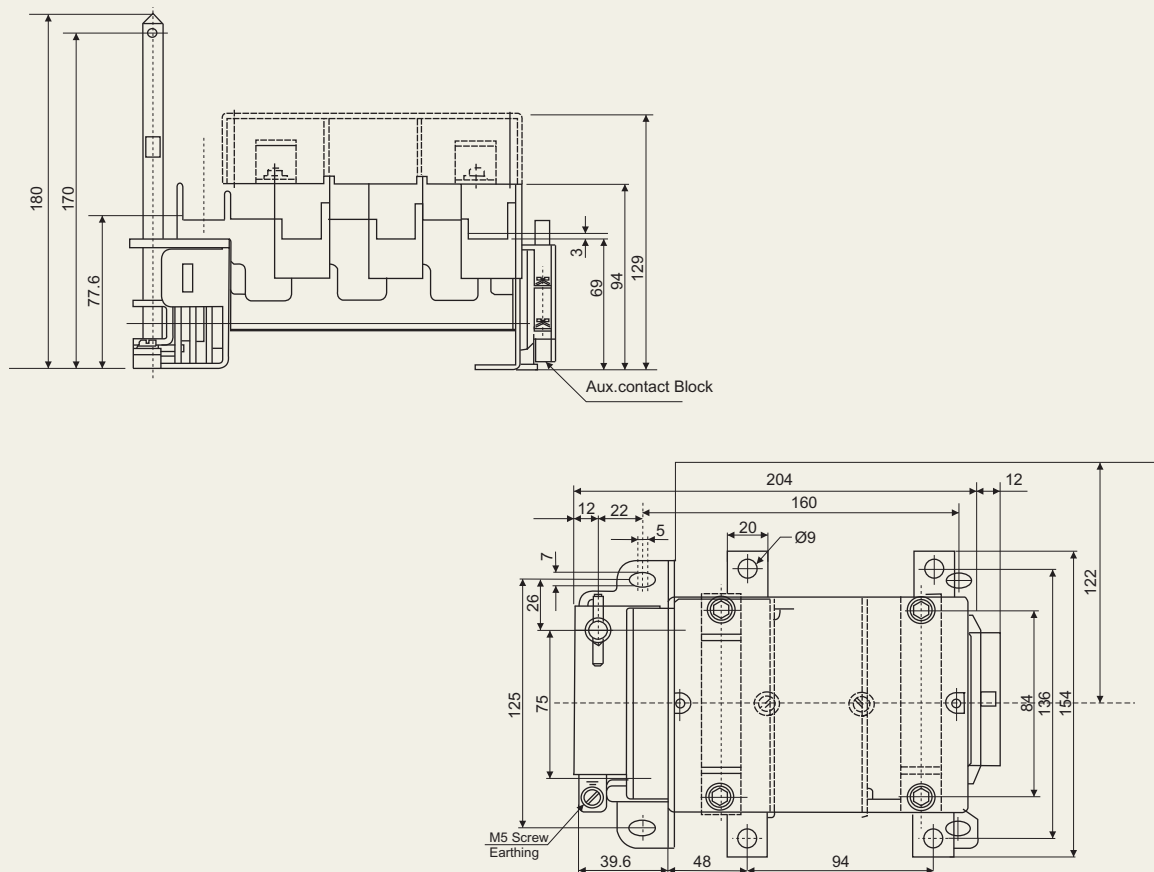
Note : All dimensions are in mm.

Overall Dimensions

Switch-Disconnecter Type FN32 / FN63 2P



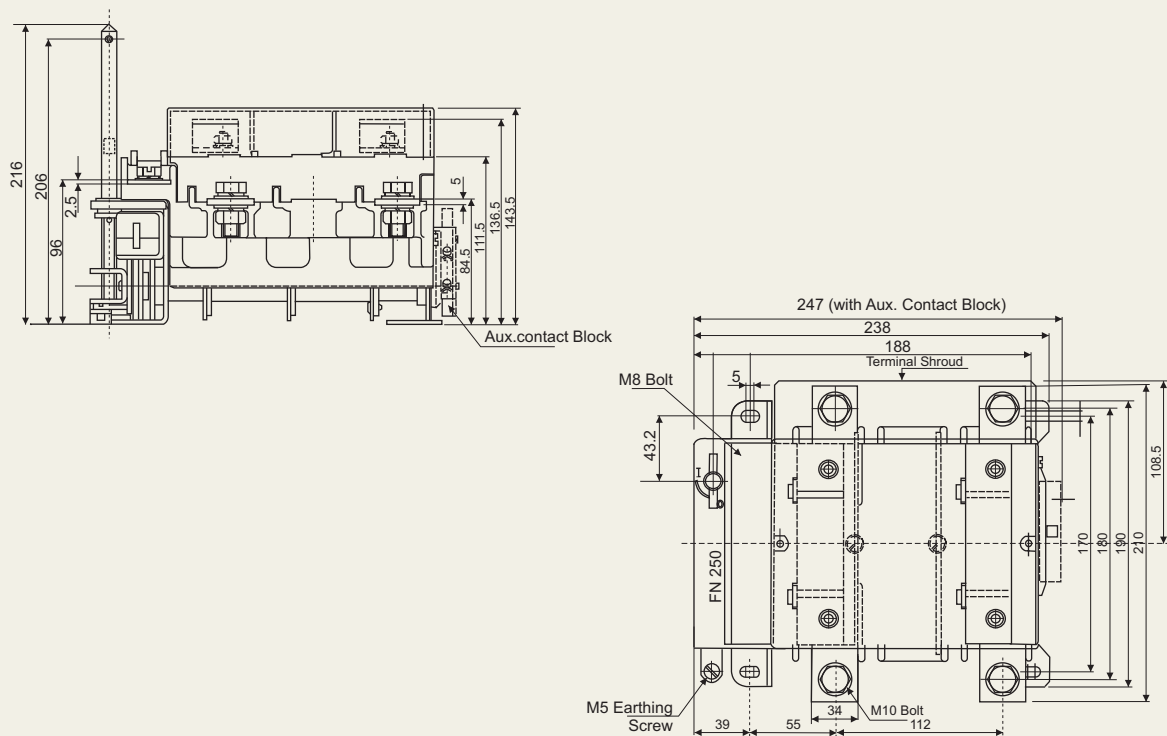
Switch-Disconnecter Type FN100 / FN125 2P



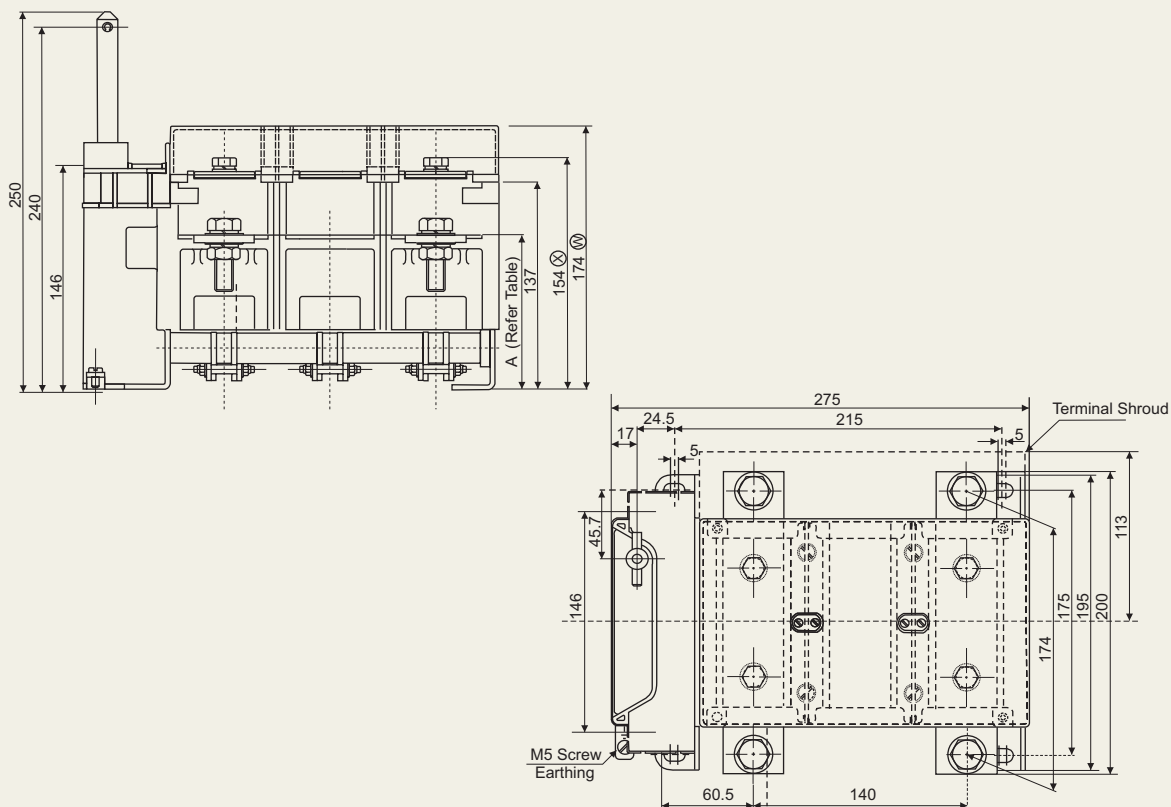
Note : All dimensions are in mm.

Overall Dimensions

Switch-Disconnecter Type FN200 / FN250 2P



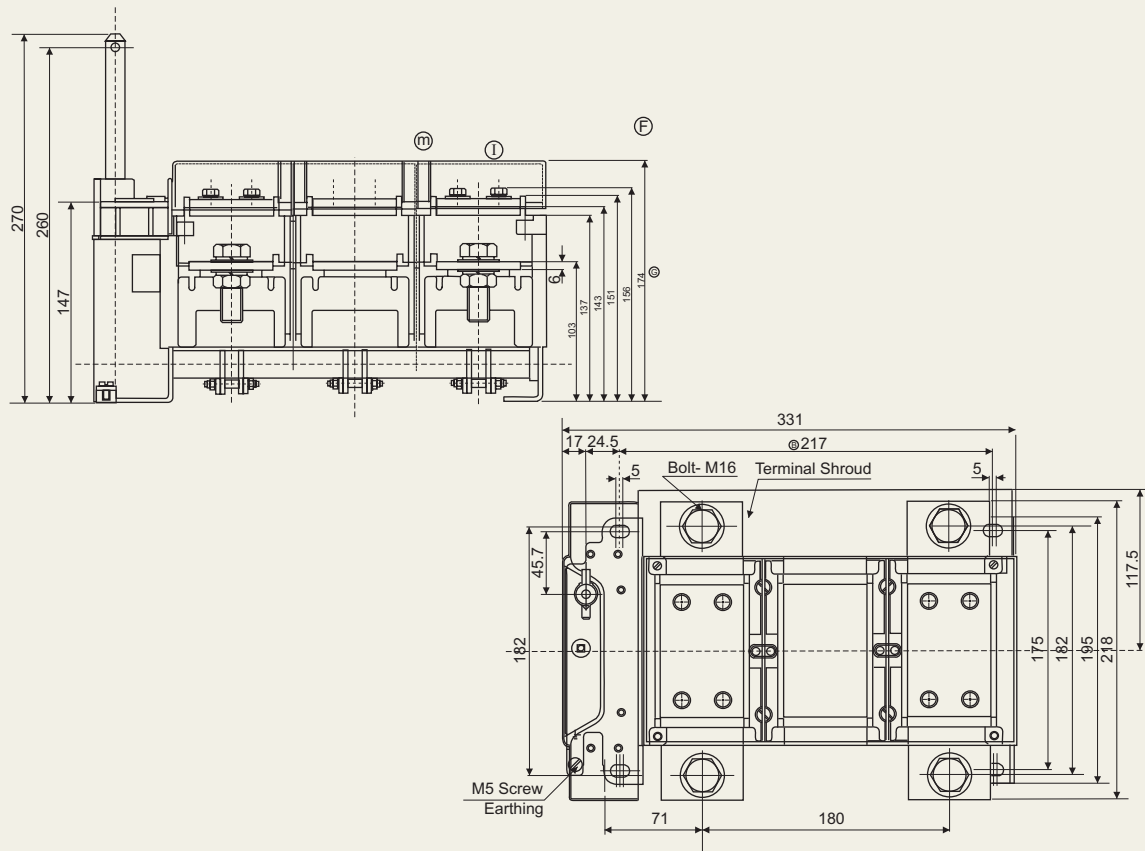
Switch-Disconnecter Type FN315 / FN400 2P



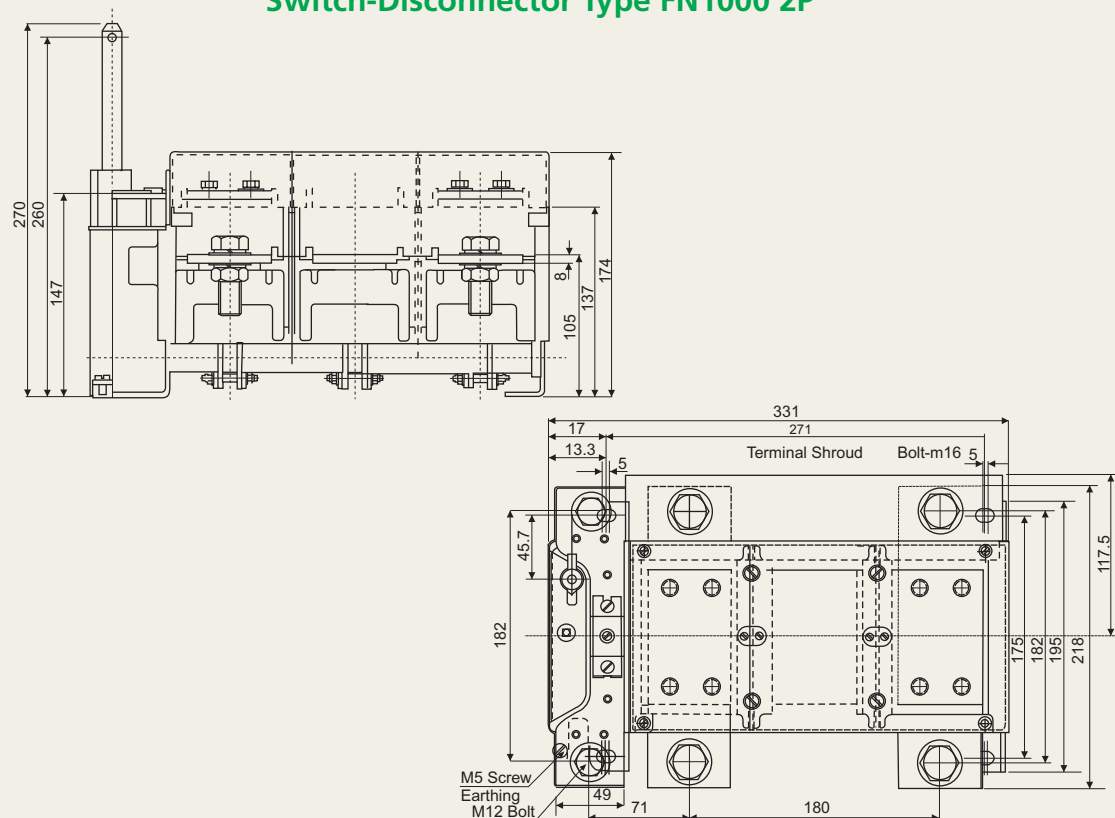
Note : All dimensions are in mm.

Overall Dimensions

Switch-Disconnecter Type FN630 / FN800 2P



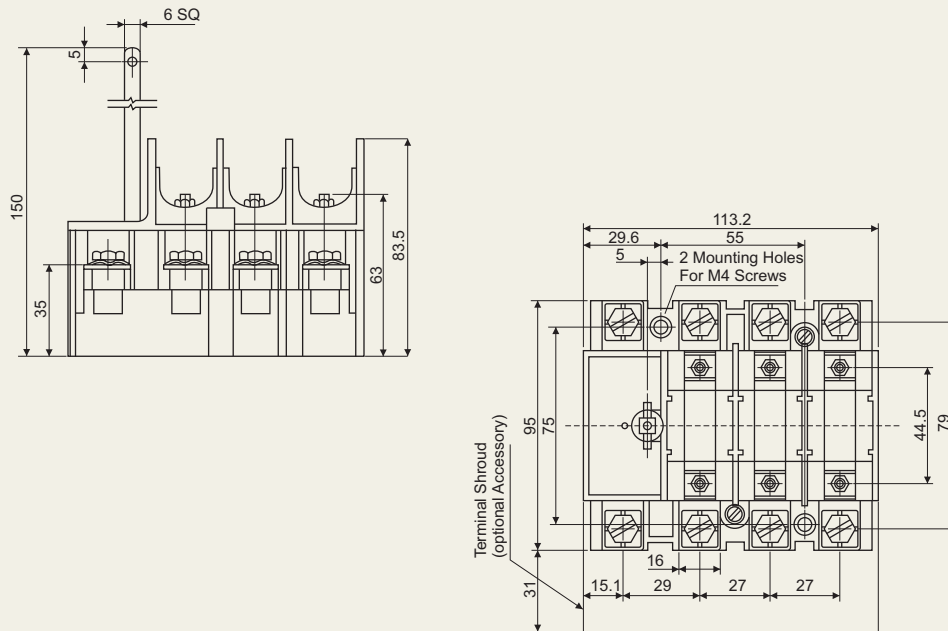
Switch-Disconnecter Type FN1000 2P



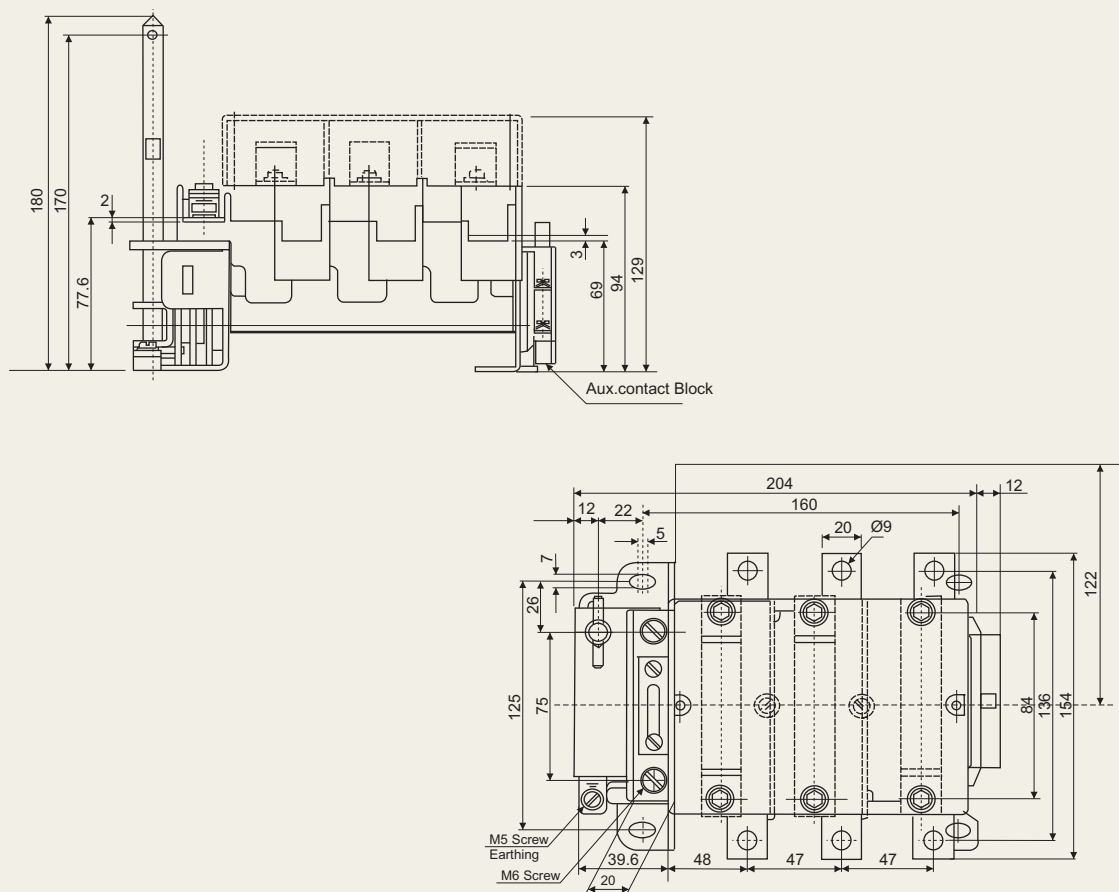
Note : All dimensions are in mm.

Overall Dimensions

Switch-Disconnecter Type FN32 / FN63 TPN



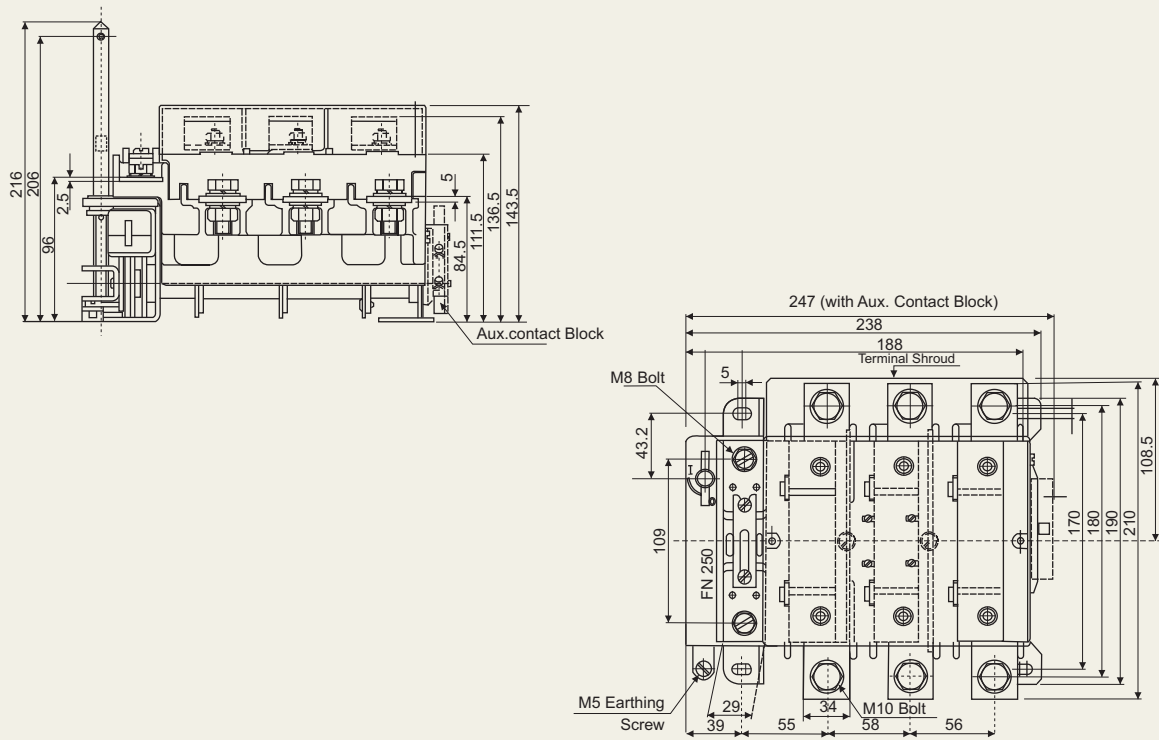
Switch-Disconnecter Type FN100 / FN125 TPN



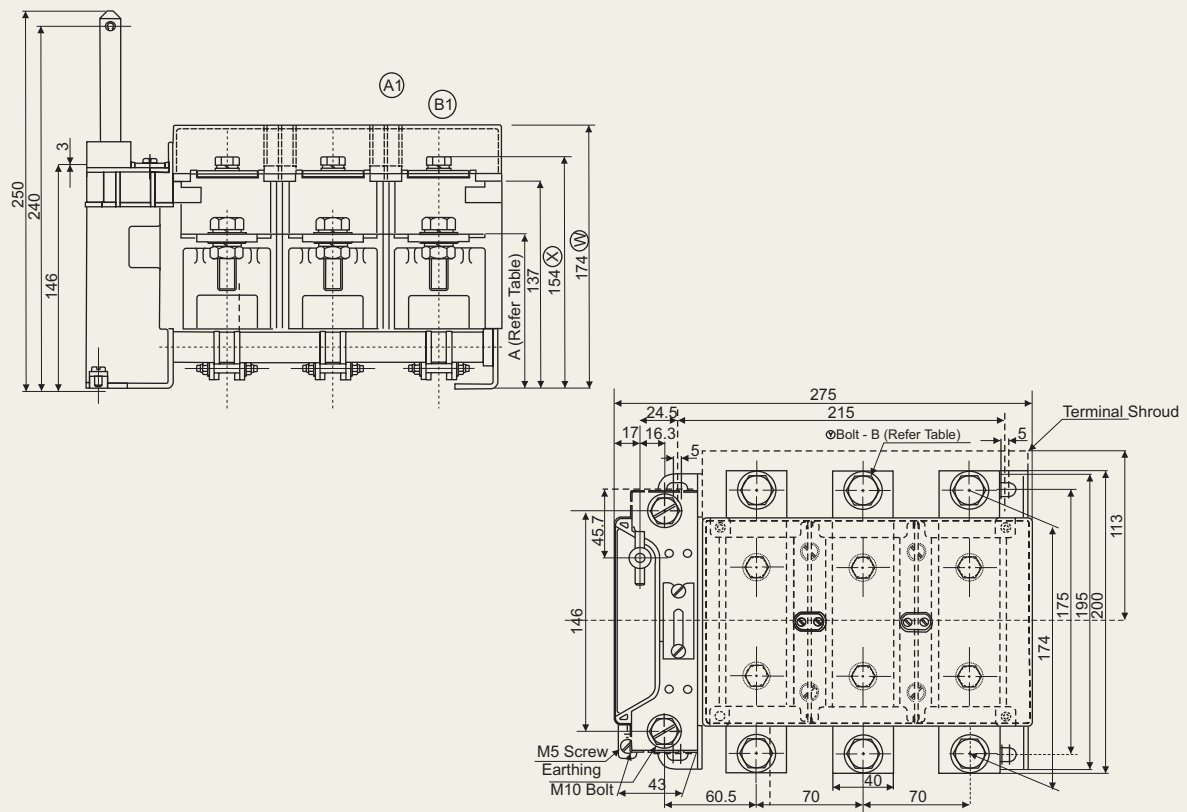
Note : All dimensions are in mm.

Overall Dimensions

Switch-Disconnecter Type FN200 / FN250 TPN



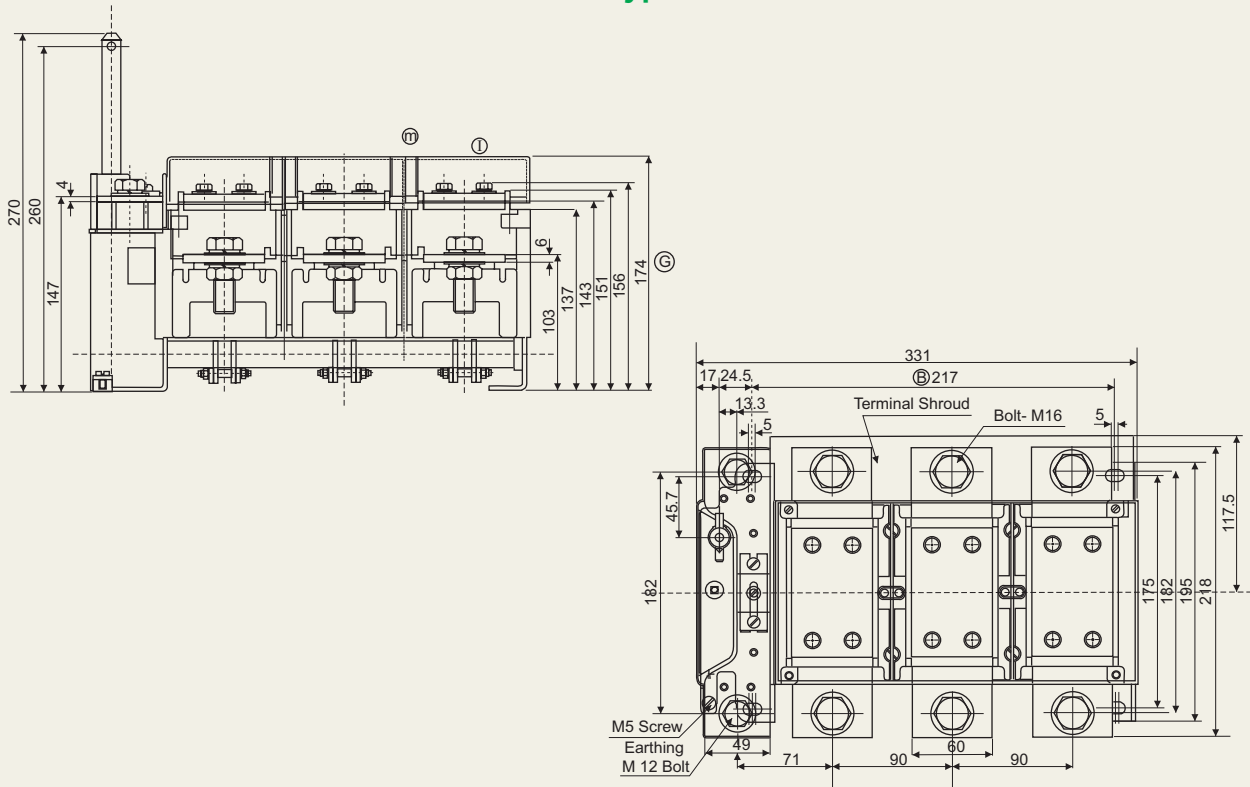
Switch-Disconnecter Type FN315 / FN400 TPN



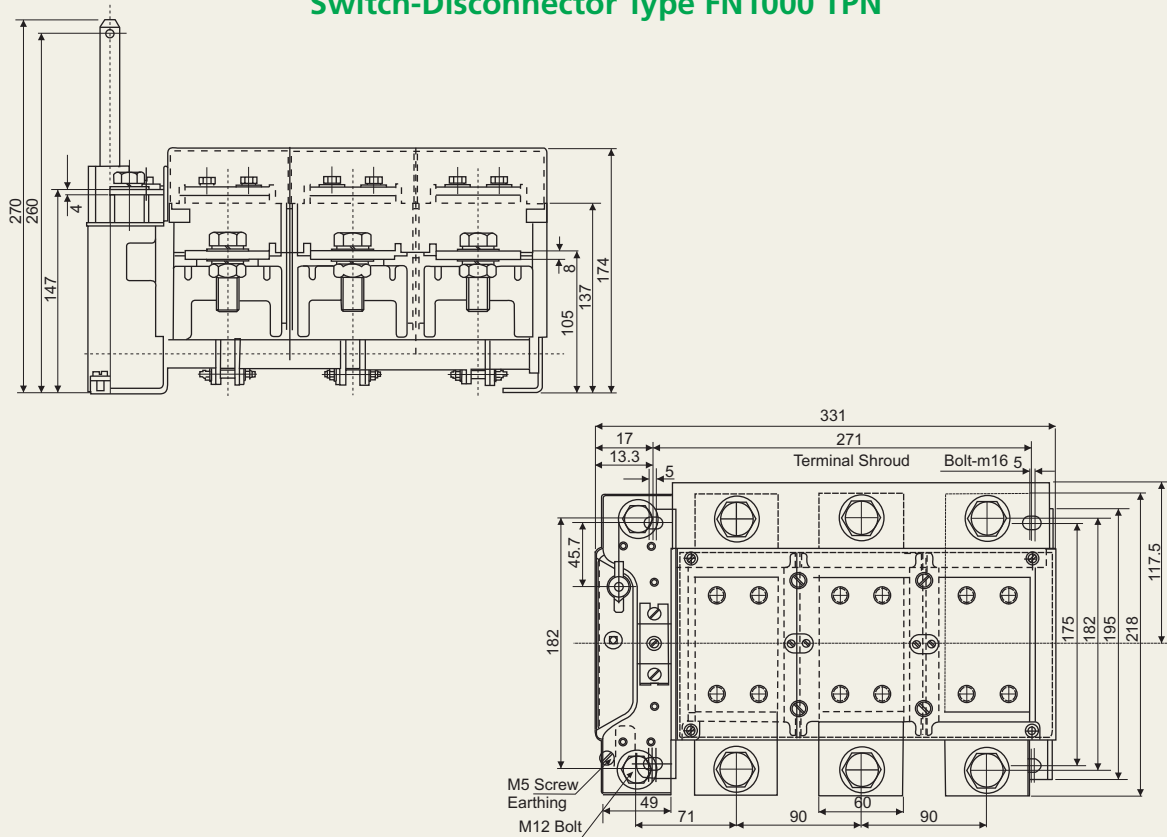
Note : All dimensions are in mm.

Overall Dimensions

Switch-Disconnecter Type FN630 / FN800 TPN



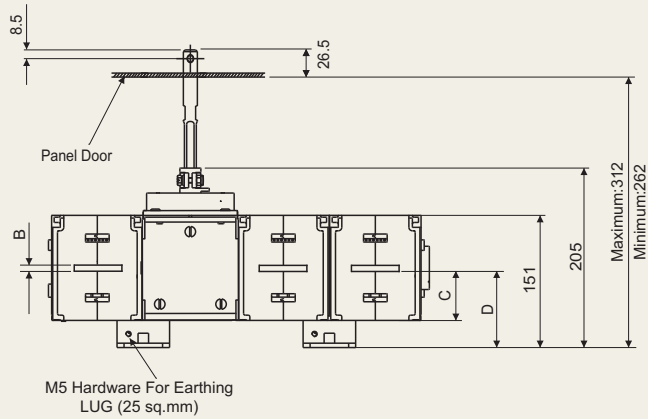
Switch-Disconnecter Type FN1000 TPN



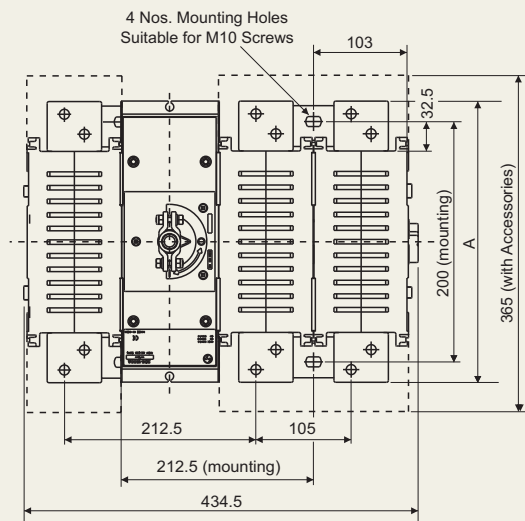
Note : All dimensions are in mm.

Overall Dimensions

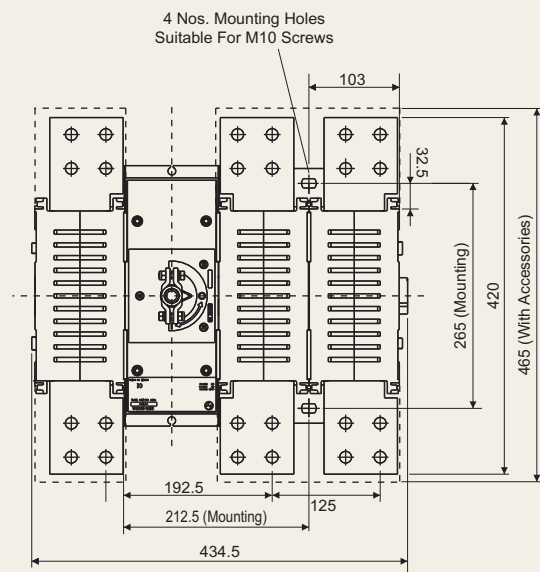
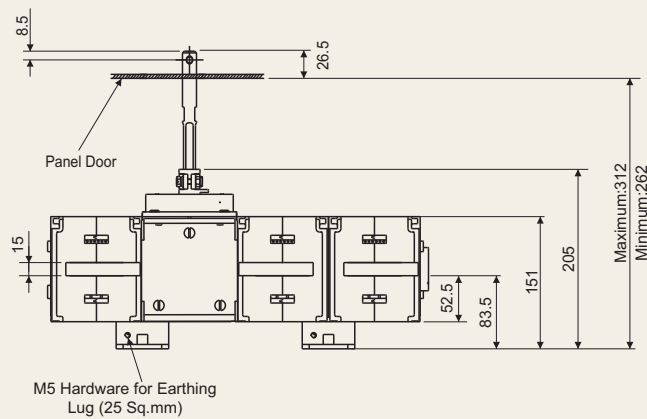
Switch-Disconnecter Type COS1000/COS1250/COS1600A 3P



Cat No.	Rating	A	B	C	D
COS1000OO3O	1000	310	8	56	87
COS1250OO3O	1250	310	8	56	87
COS1600OO3O	1600	330	12	54	85



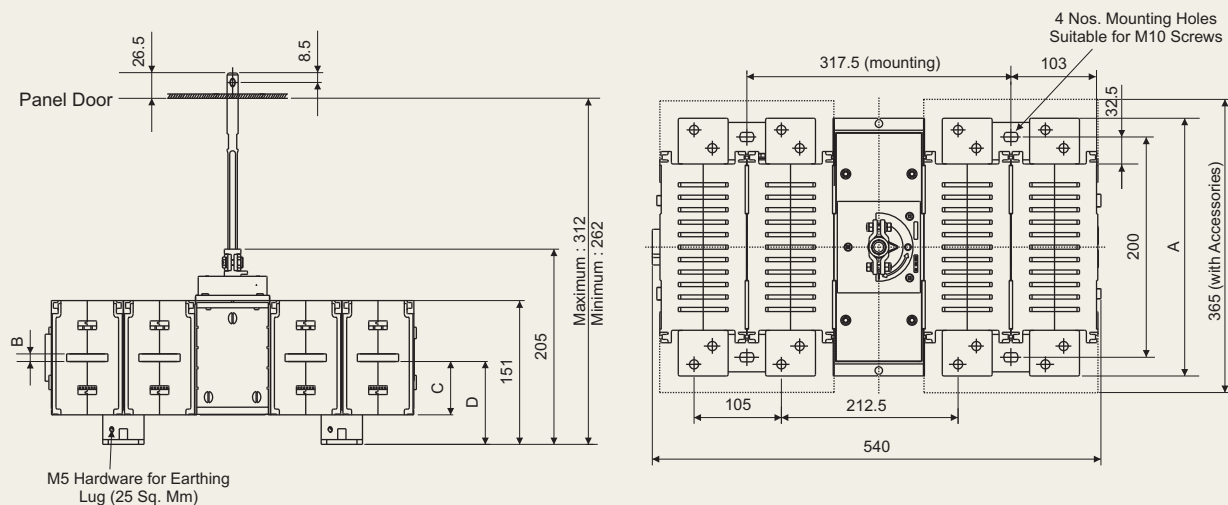
Switch-Disconnecter Type COS2000 3P



Note : All dimensions are in mm.

Overall Dimensions

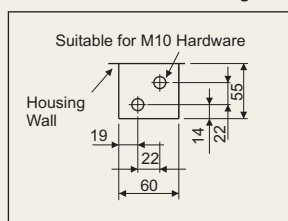
Switch-Disconnecter Type COS1000/COS1250/COS1600A 4P



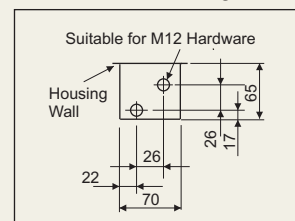
Type Designation	Terminal Screws	Tightening Torque
COS-1000	M10 Hexagonal Head Bolt	20 N-m
COS-1250	M10 Hexagonal Head Bolt	20 N-m
COS-1600	M12 Hexagonal Head Bolt	27 N-m

Cat. No.	Rating	A	B	C	D
COS1000OO4O	1000	310	8	56	87
COS1250OO4O	1250	310	8	56	87
COS1600OO4O	1600	330	12	54	85

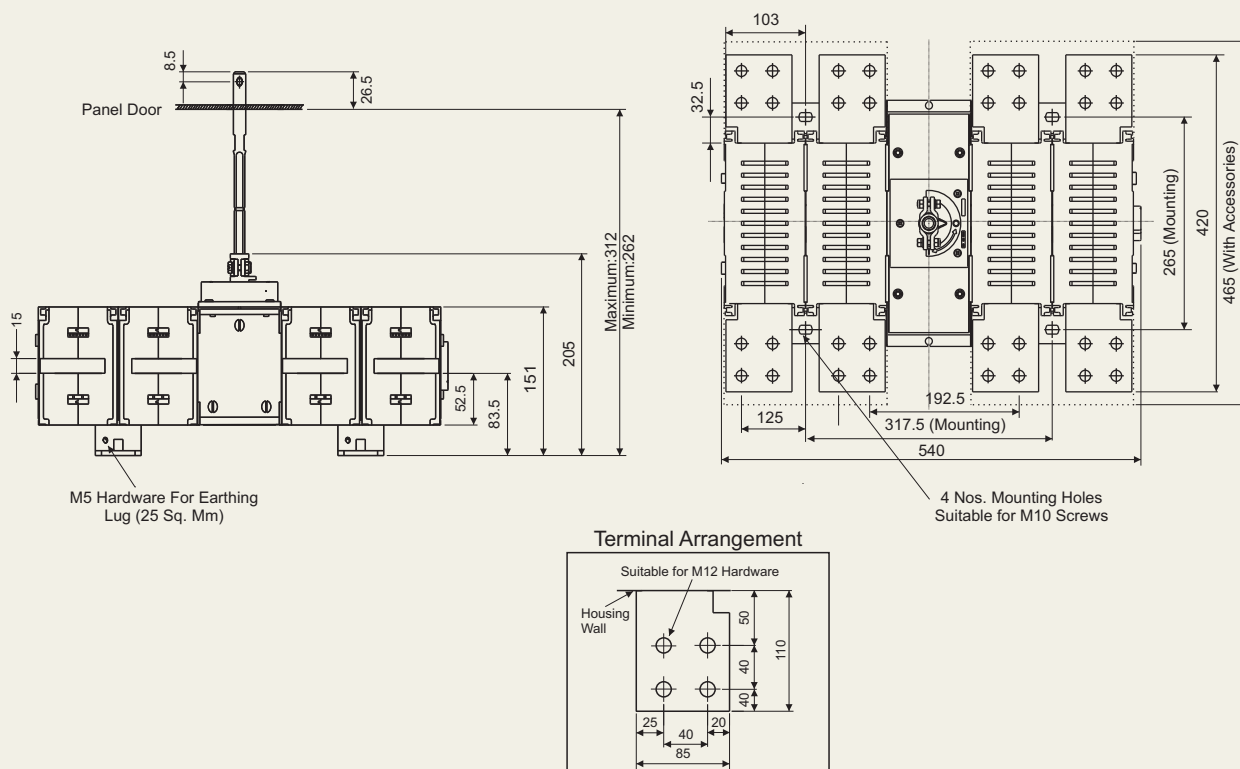
1000/1250 Terminal Arrangement



1600 Terminal Arrangement



Switch-Disconnecter Type COS2000 4P



Note : All dimensions are in mm.

Termination Arrangement

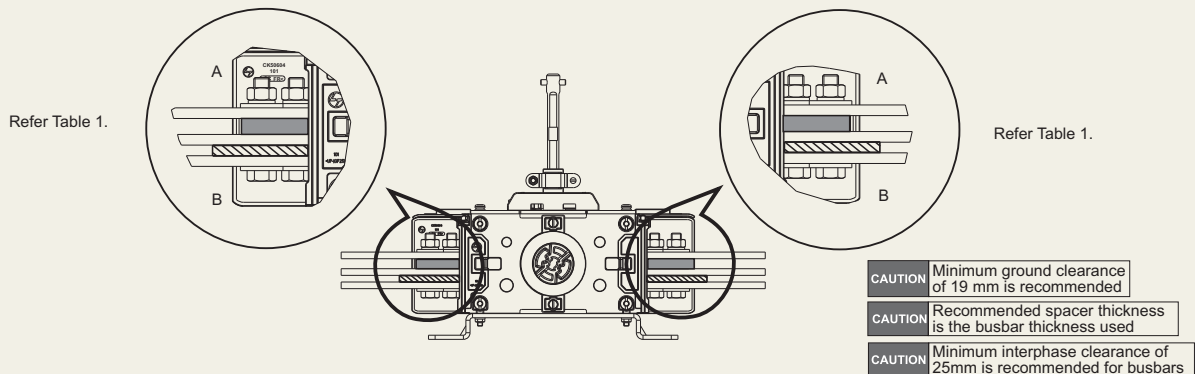
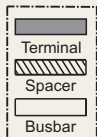


TABLE 1

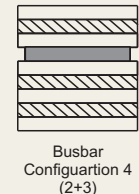
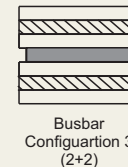
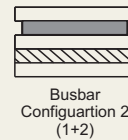
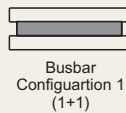
		1000/1250 A	1600 A	2000 A
Max Space for Bus Bar (mm)	A	25	22	20
Max Space for Bus Bar (mm)	B	31	30	48

Recommended Termination Practices for Busbar Width 60-80mm With Diagonal Hole Configuration



Busbar Sizes as Per Standard (Table 2) :

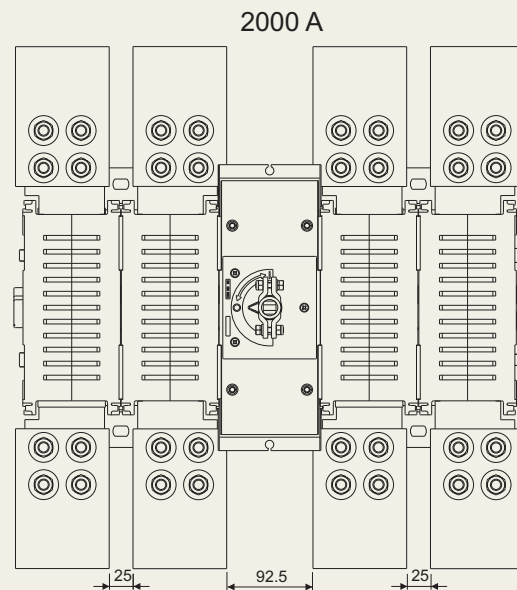
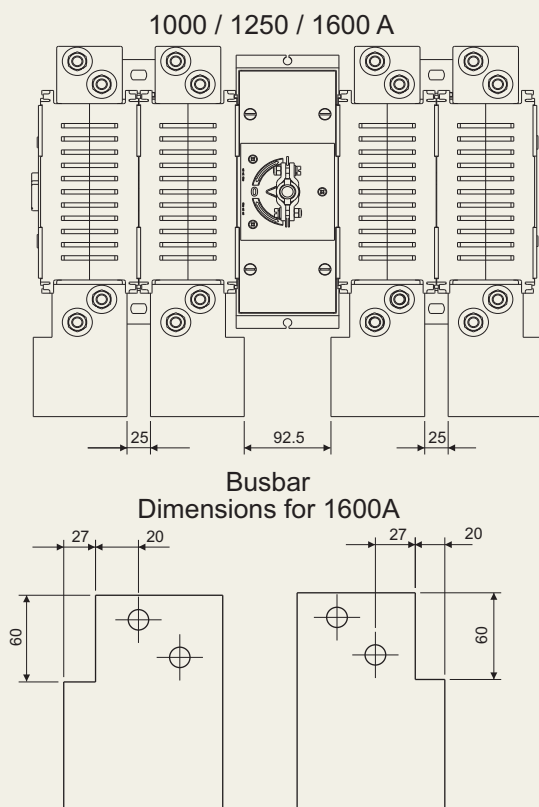
Busbar	1000 A	1250 A	1600 A	2000 A
Cu	60 x 5 x 2Nos	80 x 5 x 2Nos	100 x 5 x 2Nos	100 x 5 x 3Nos
* Al	50 x 10 x 2Nos	63 x 12 x 2Nos	50 x 8 x 4Nos	100 x 10 x 3Nos



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

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

Termination of 100 mm Bus Bar



Direct Termination of 100 mm Bus Bar Possible in Case of 2000 A.

Note : All dimensions are in mm.

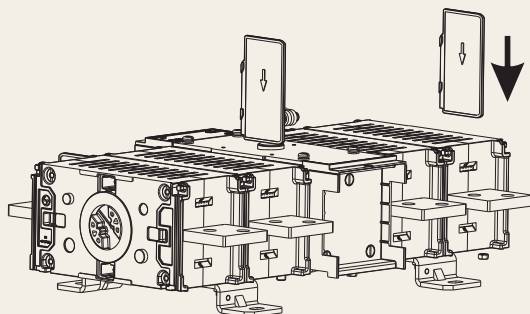
Overall Dimensions

Phase Barrier and Terminal Shroud Mounting

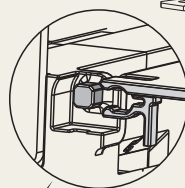
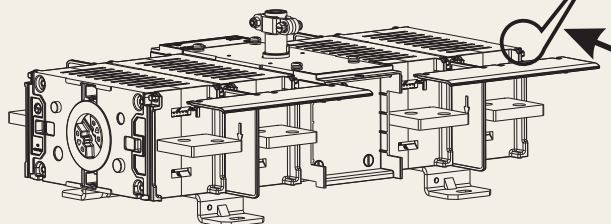
The accessories have to be fitted sequentially in the given order:

1. Phase barriers
2. Terminal shrouds *

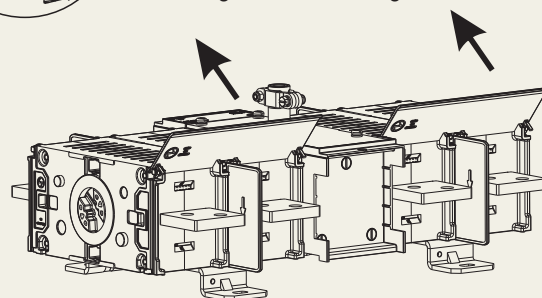
1 Phase Barrier Mounting



2 Terminal Shroud Mounting

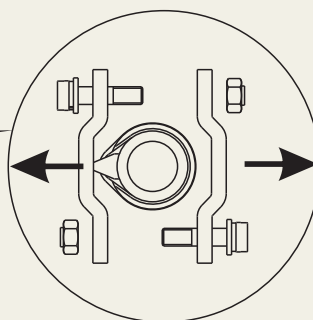
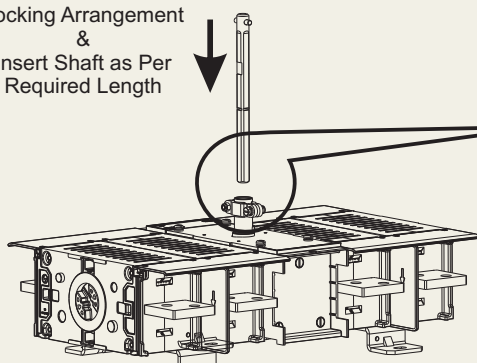


Swivelable Terminal Shrouds with Locking at 0° and 90° Angles



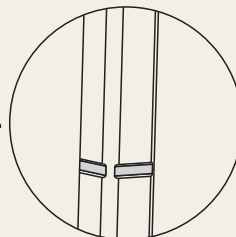
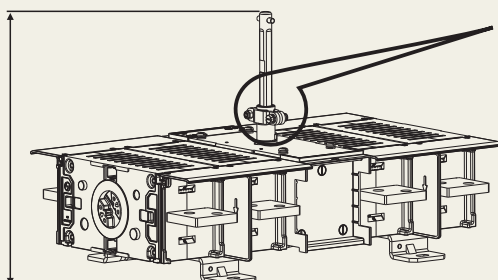
Shaft Adjustability

Unscrew Shaft Locking Arrangement & Insert Shaft as Per Required Length



After Inserting Shaft for Required Length, Lock the Shaft by Tightening the Screws

Required Depth
Minimum: 288.5mm
*maximum: 338.5mm



CAUTION

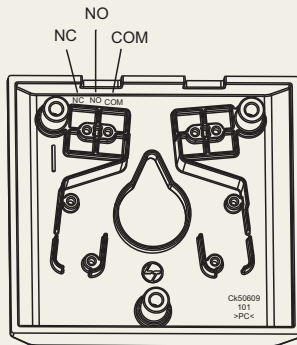
*Maximum depth of 338.5 mm is indicated by the red colour. Do not pull after the red mark.

Note : All dimensions are in mm.

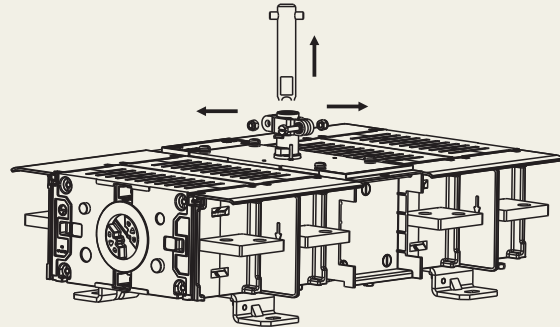
Overall Dimensions

Auxiliary Contact Mounting

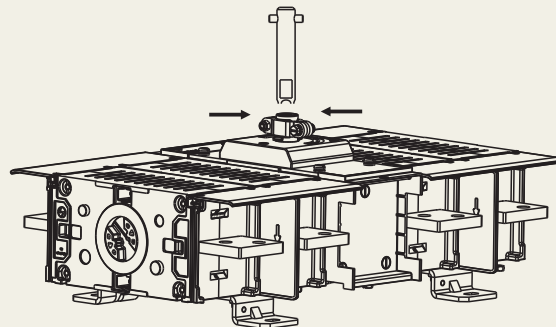
Auxiliary Contact



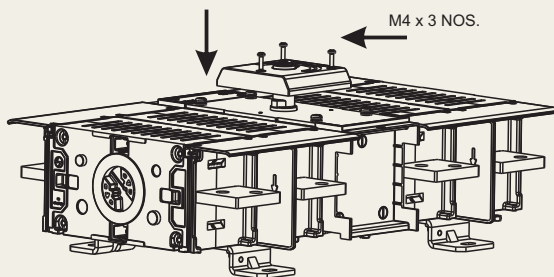
- ① Unscrew the Shaft Locking Arrangement and Remove Shaft



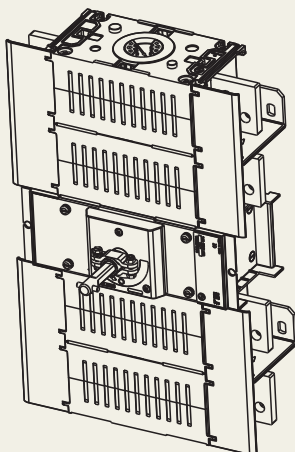
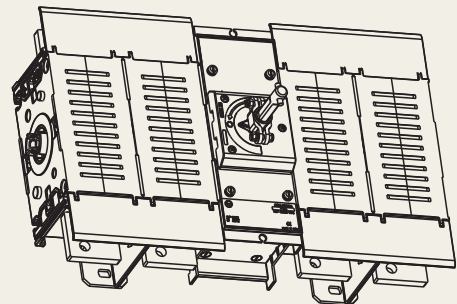
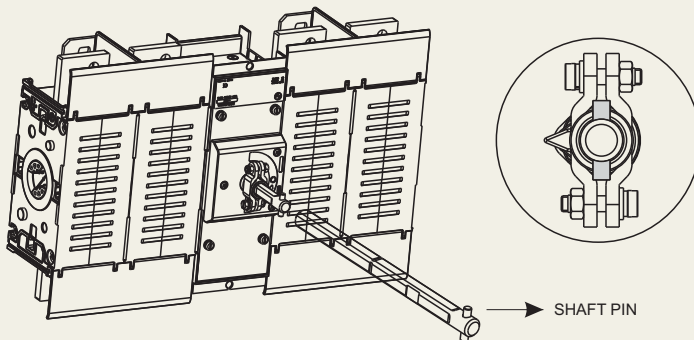
- ③ Insert Shaft to Required Length & Lock Shaft



- ② Assemble the Aux. Contacts as Shown.

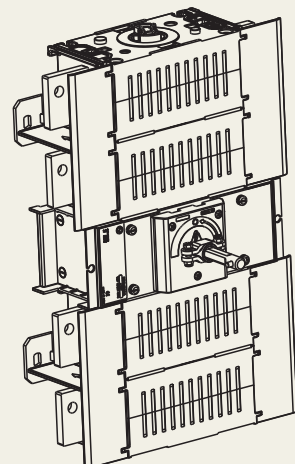


Mounting Orientation



CAUTION

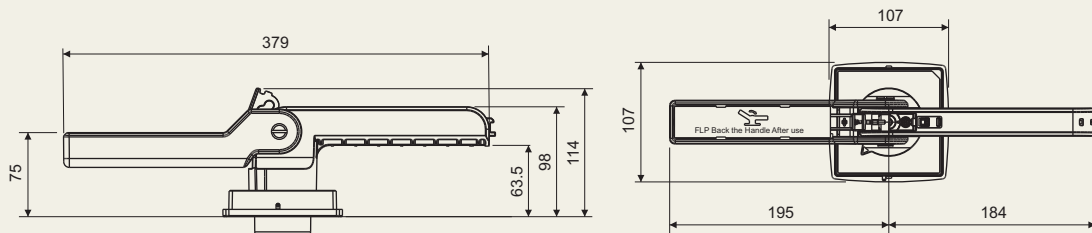
Ensure that the shaft pin is vertical for any mounting orientation of the switch



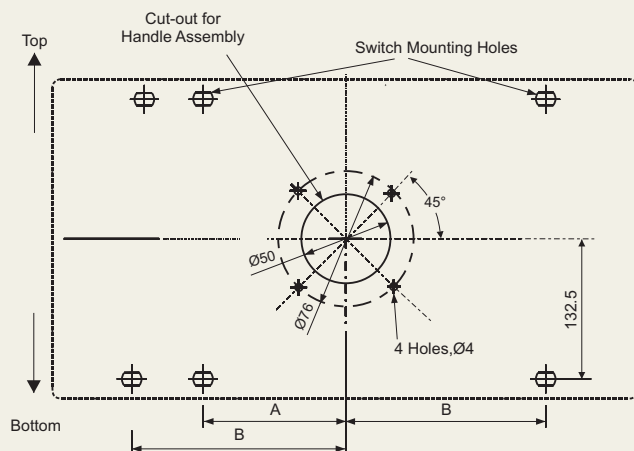
Note : All dimensions are in mm.

Overall Dimensions

Handle Overall Dimensions for Cos - 1000 / 1250 / 1600 / 2000

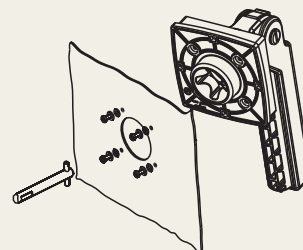


Handle Mounting



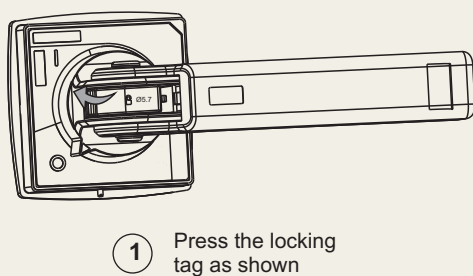
Mounting Dimensions

3-POLE	A:53.6 B:158.9	
4-POLE	B:158.9	

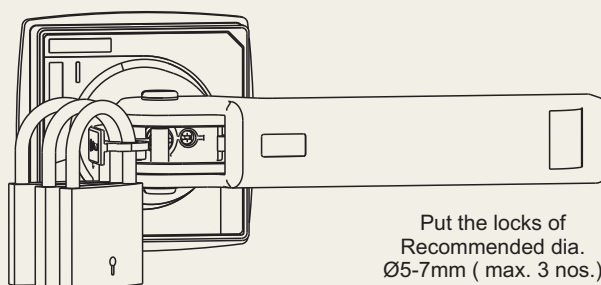
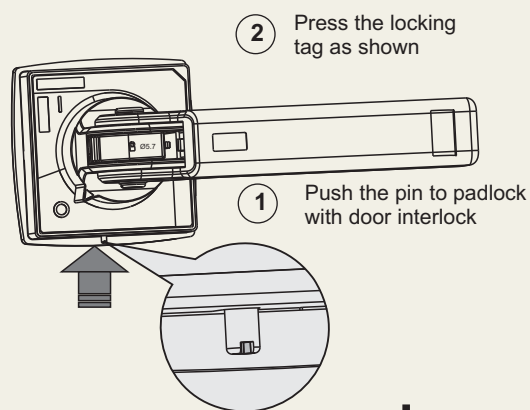


Handle Features

Padlock without door interlock



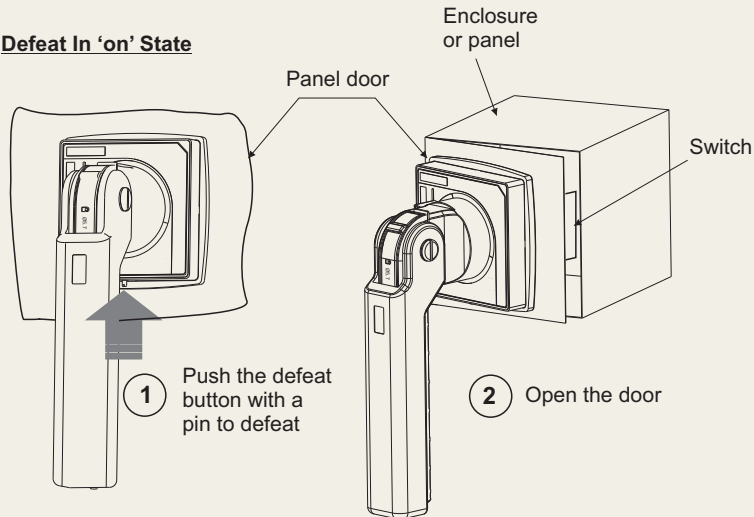
Padlock with door interlock



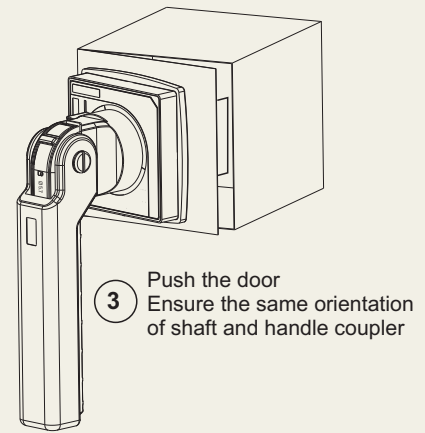
Note : All dimensions are in mm.

Handle Features

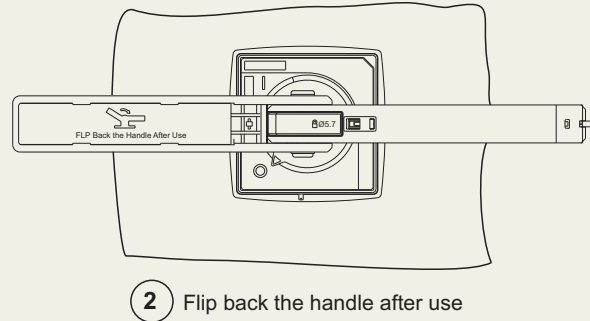
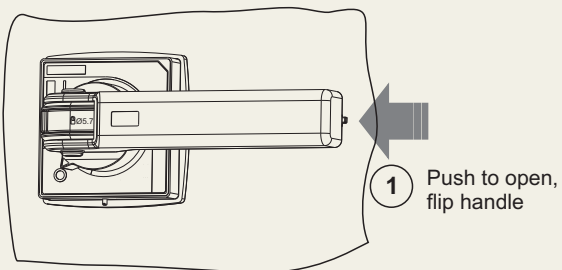
Defeat In 'on' State



AUTO RESTORATION



Handle Flipping



Notes:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Notes:

[illegible]

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