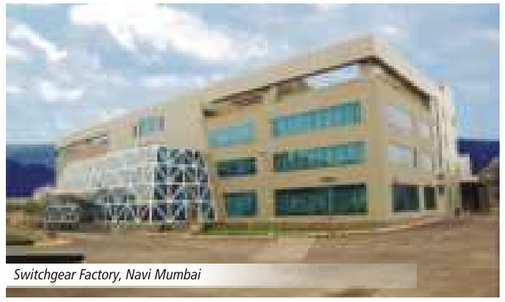
L&T Electrical & Automation

Solutions for Harsh Environments

Effective protection under abnormal conditions



Switchgear Factory, Navi Mumbai

Switchgear Factory, Ahmednagar

Switchgear Factory, Vadodara

L&T Electrical & Automation (E&A) is a market leader for electrical distribution, monitoring and control solutions in the low voltage category.

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

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

The HE Range –
Switchgear for Harsh Environments

C-POWER HE Air Circuit Breaker

FN BOLTED HE Switch-Disconnector-Fuse

L&T Electrical & Automation (E&A)'s Air Circuit Breakers have been meeting the needs of Indian industry for almost 50 years. Today, over half a million C-POWER ACBs are being used for diverse applications.

We also offer a unique series of Switch-Disconnector-Fuses – the FN range. It combines compactness with higher performance and customer convenience, and covers ratings from 32A to 630A in five frame sizes.

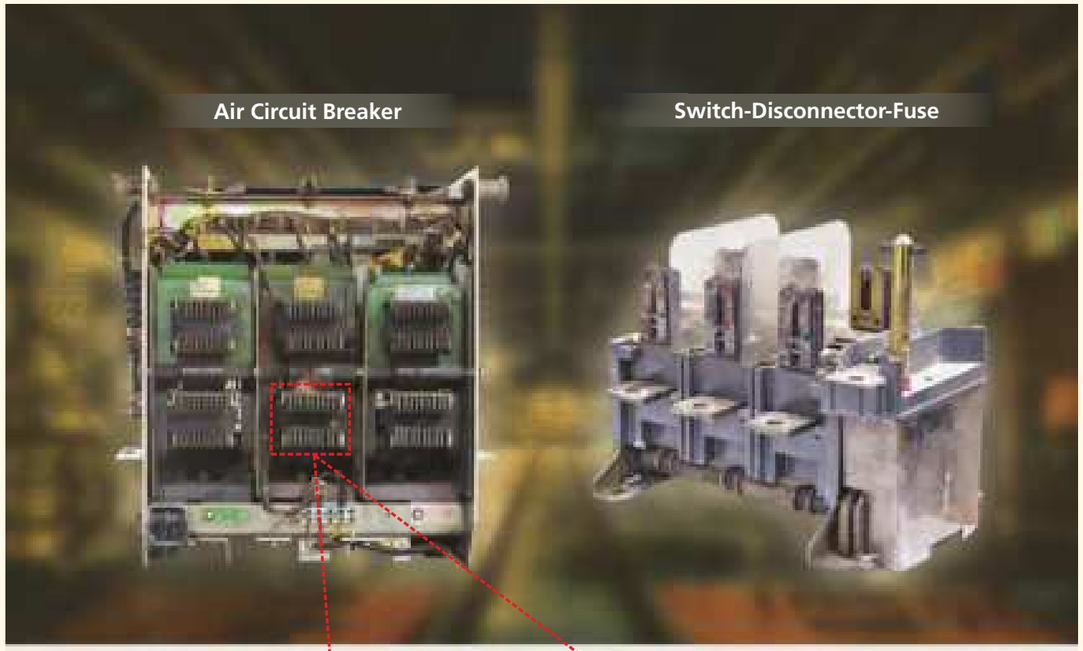
What is Corrosion?

Deterioration of a base metal resulting from a reaction with its environment. Influence of acid gases present in an environment results in corrosion.

The most serious degrading/affecting factors for silver plated parts are the sulphuric gases emitted in industrial environment. In a sulphur-rich environment, silver plated components rapidly turn black due to the formation of silver sulphate (AgS) on surface, these materials are non-conductive and the corrosion is invasive, causing deterioration. This causes subsequent increase in contact resistance, eventually leading to abnormal temperature rise in electrical contacts. In the long run, this phenomenon can have serious consequences on the electrical equipment.

Effects of a Harsh Environment on Electrical Equipment

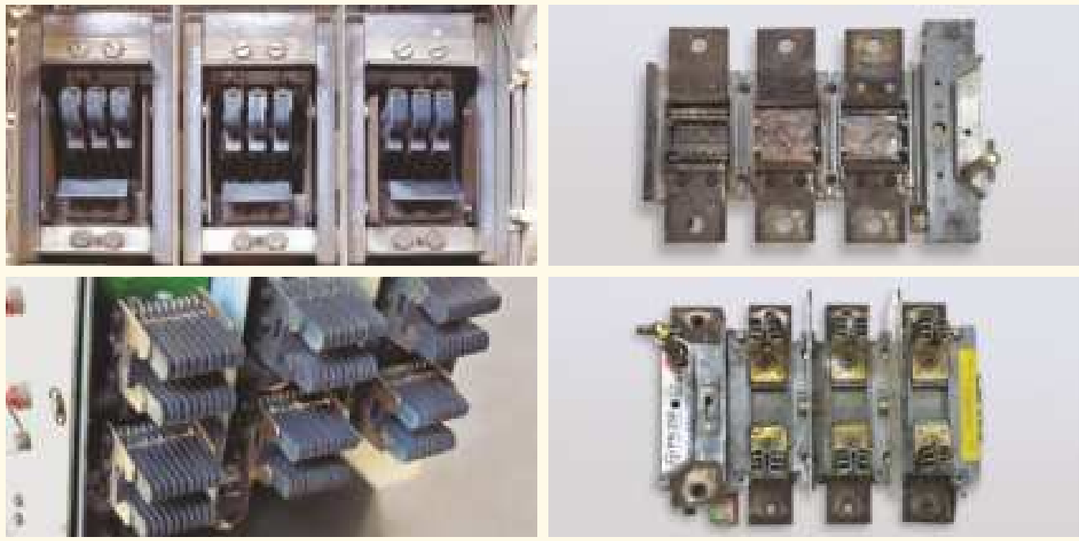
Effect on physical appearance of the product
- Blackening of exposed silver surface



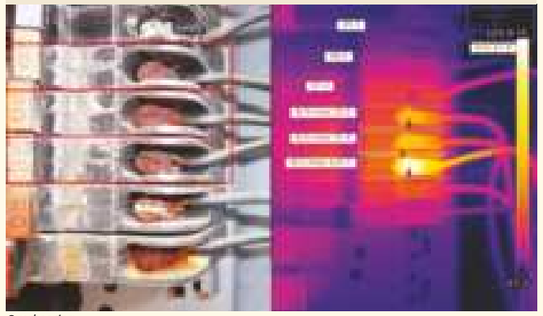
Condition of Silver Plated Contact Jaw in a non-harsh environment

Condition of Silver Plated Contact Jaw in a harsh environment

Effect on internal components of the product.



Effect on product performance
- Overheating
- Flashover



Overheating

Flashover

Effect on the product life/usage
- Reduced life of electrical equipment
- Frequent maintenance of electrical equipment
- Replacement of product

Formation of Whiskers

It has been observed that presence of Hydrogen Sulfide gas even in low concentration is enough to result in sulphurization of silver. This results in a higher operating temperature of the device, ultimately leading to development of small filaments (whiskers) on the component. These filaments, which can be as long as 1 cm, have the potential to result in phase-to -phase short circuits and can result in a life-threatening situation. Pre-requisite conditions will accelerate the growth of whiskers:
- Presence of Hydrogen sulfide gas.
- Temperature in excess of 140 °C.

International Electrotechnical Commission (IEC) Standards for Harsh Environment

- IEC 60721-3-3 - Classification of environmental condition.
- IEC 60068-2-42 - Sulphur dioxide test for contacts and connections.
- IEC 60068-2-43 - Hydrogen sulphide test for contacts and connections
- IEC 60068-2-30 - Damp heat, cyclic (12+12-hour cycle)
- IEC 60068-2-52 - Salt mist, cyclic

Designed for Harsh Environments
C-POWER HE ACB
and
FN BOLTED HE S-D-F

E&A's C-POWER breakers and FN S-D-F with corrosion protection have been designed for use in sulphur-rich environments. These include petroleum refineries, paper mills and water treatment, chemical and synthetic fibre plants – all of which produce large quantities of sulphur dioxide (SO_2) or hydrogen sulphate (H_2S).

Conventional circuit breakers used in such an environment require frequent maintenance. The E&A's C-POWER breaker and FN S-D-F with corrosion protection features a special surface treatment on all the parts that are exposed to gases in a corrosive environment.

These products do not require special maintenance and can operate reliably in the following environmental conditions:

- 3C4 for SO_2 (concentrations from 4.8 to 14.8 x 10^{-6})
- 3C4 for H_2S (concentrations from 9.9 to 49.7 x 10^{-6})

If your installation falls in the Environment category 3C3 or 3C4, we strongly recommend our HE range of C-POWER breakers and FN S-D-F .

Environment Categories as per IEC 60721-3-3 Standard

Environment Category			
3C1	3C2	3C3	3C4
Rural zones or urban zones with low industrial activity.	Urban zones with scattered industrial activity and heavy traffic.	Immediate vicinity of industrial pollution. For example, near paper mills, water treatment plants, chemical plants and synthetic fibre plants, etc.	Inside polluting industrial premises, like - paper mills, water treatment plants, chemical plants and synthetic fibre plants, etc.

Harsh Environments as defined by IEC 60721-3-3

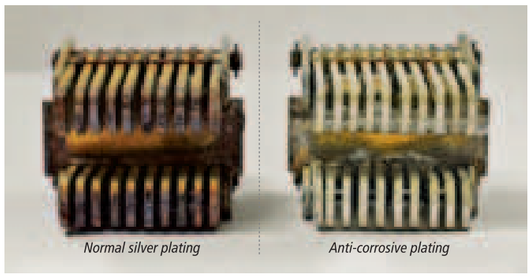
Harsh Atmosphere	Influence	Appearance	Consequences	Thresholds (ppm in volume) Average value
SO_2 Sulphur dioxide	Corrosion of silver, aluminum and bare copper. The phenomenon is accelerated at higher temperature and relative humidity	Blackening of exposed silver surfaces	Increased resistance of disconnecting contacts exposed to air Excessive device temperature rise	3C1: 0.037 3C2: 0.11 3C3: 1.85 3C4: 4.8
H_2S Hydrogen sulphide	Corrosion of silver. The phenomenon is accelerated at high temperature	Major blackening of exposed silver surfaces	Increased resistance of disconnecting contacts exposed to air. Excessive rise in device temperature	3C1: 0.0071 3C2: 0.071 3C3: 2.1 3C4: 9.9

Understanding the effects of environment on switchgear

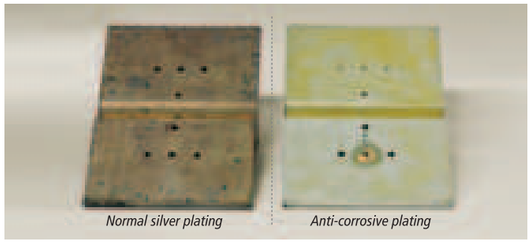
3C1	3C2	3C3	3C4
Presence of corrosive gases and its impact on switchgear			
Negligible	Low level	Significant level	High level
No impact on service life as concentration levels are very low	Moderate impact on service life	Major impact, particularly concerning temperature rise	Significantly reduced service life, if no particular precautions are taken

Rigorous testing at IIT Bombay - 3C4 (SO_2) and 3C4 (H_2S)

Test Chamber



Tested Components



Tested Components

Compliance Certificate

IIT Bombay
Prof. A. S. Khanna
(Fellow NACE, Fellow ASM, Fellow IIoH)

Telefax : (+91-22) 25767801 (O)
Fax : (+91-22) 25723480, 25726975
E-mail : khanna@iitb.ac.in
Chairman - SSPC 1994
President - Humboldt Academy of Bombay

Date: 17/03/2015

To
Larsen & Toubro Ltd.
Switchgear Design & Development Centre
Electrical & Automation IC
L&T Gate-5, Powai
Mumbai, Maharashtra

Reference No: Letter dated 13/04/2014

Job No: DRD/MT/ASK-2014-15

Subject: **Testing of L&T's HE Range of C-Power ACB and FN S-D-F**

This is to certify that **L&T's HE Range of C-Power ACB and FN S-D-F** are tested and confirm to the following standards.
(1) IEC 60068-2-42 – Sulphur Dioxide Test for Corrosive Environment.
(2) IEC 60068-2-43 – Hydrogen Sulfide Test for Corrosive Environment.
(3) IEC 60068-2-30 – Damp heat, cyclic (12+12- hour cycle).
(4) IEC 60068-2-52 – Salt mist, cyclic.
(5) IEC 60721-3-3 – Classification of environmental condition.

- IEC 60068-2-42 and IEC 60068-2-43 for corrosive environments

SO_2: tested to IEC 60068-2-42 in 3C4 environment as defined by IEC 60721-3-3.
3C4 for SO_2 (concentrations from 4.8 to 14.8 x 10^{-6})
H_2S: tested to IEC 60068-2-43 in 3C4 environment as defined by IEC 60721-3-3.
3C4 for H_2S (concentrations from 9.9 to 49.7 x 10^{-6})

A.S. Khanna

Corrosion Science & Engineering
Dept. of Met. Engg. & Material Science, Indian Institute of Technology, Bombay, Powai, Mumbai - 400076, India

Our product components were tested at IIT Bombay for conformance to 3C4 for SO_2 and 3C4 for H_2S. The components were placed in a gas chamber and were exposed to corrosive gases as per the testing procedure mentioned in the standard. The surface level analysis of components successfully passed all the test parameters to conform to the following standards:

(1) IEC 60068-2-42 – Sulphur dioxide (SO_2) test for corrosive environment
(2) IEC 60068-2-43 – Hydrogen sulphide (H_2S) test for corrosive environment
(3) IEC 60721-3-3 – Classification of Environmental Condition
(4) IEC 60068-2-30 – Damp heat, cyclic (12+12-hour cycle)
(5) IEC 60068-2-52 – Salt mist, cyclic

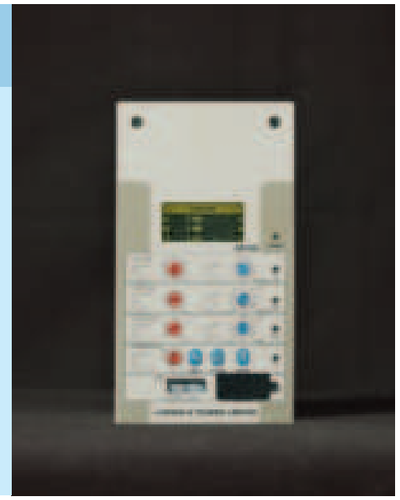
IEC 60068-2-42 and IEC 60068-2-43 for corrosive environments:

- SO_2: Tested to IEC 60068-2-42 in a 3C4 environment as defined by IEC 607213-3.
  3C4 for SO_2 (concentrations from 4.8 to 14.8 x 10^{-6})
- H_2S: Tested to IEC 60068-2-43 in a 3C4 environment as defined IEC 60721-3-3
  3C4 for H_2S (concentrations from 9.9 to 49.7 x 10^{-6})

The C-POWER HE Range

PROTECTION RELEASE

Microprocessor-based Release - SR18G with display



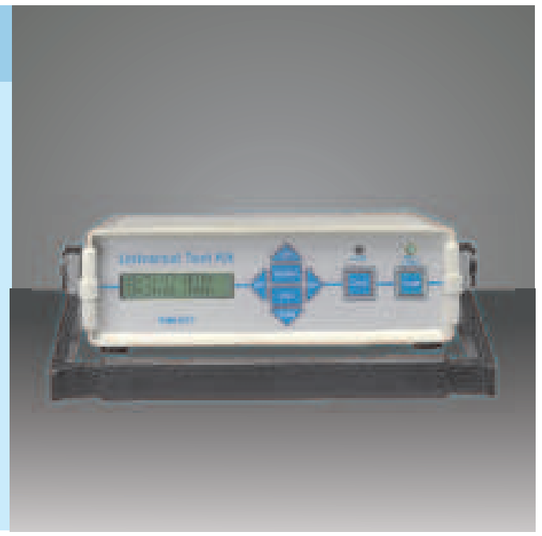
Features and Benefits

- Self-powered and True RMS sensing
- True hot and cold characteristics and switchable Thermal Memory
- Unique 3-line O-LED display (Organic LED)
- Offers comprehensive protection against overload - Phase and Neutral, Short-Circuit, Instantaneous, Earth Fault
- Settable Overload Delay
- Settable Instantaneous setting with provision of OFF
- I^2t ON/OFF for Short-Circuit and Earth Fault protection
- Individual Fault LED indication
- Provision for Self-diagnostic test
- Conformance to EMI/EMC standards
- Testing through Test kit

Type of Protection	Setting Range	
	Pick-up Current	Time Delay
Overload (Phase)	Ir - 0.5 to 1.0 times In Steps : 0.50, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 0.95, 1	0.2 to 30 sec at 6 times Ir Steps : 0.2, 0.5, 1.5, 2, 3.5, 6, 12, 17, 30 sec
Overload (Neutral)	IN - 50% to 200% times Ir Steps : 50%, 100%, 150%, 200%	Same as Overload (Phase)
Short-Circuit	2 to 10 times In Steps : 2, 3, 4, 5, 6, 7, 8, 9, 10	I2t ON = 0.02, 0.1, 0.2, 0.3, 0.4 sec I2t OFF = 0.02, 0.1, 0.2, 0.3, 0.4, sec
Instantaneous	2 to 16 times In Steps : 2, 3, 4, 6, 8, 10, 12, 14, 16, OFF	
Earth fault*	0.2 to 0.6 times In Steps : 0.2, 0.3, 0.4, 0.5, 0.6	I2t ON = 0.1, 0.2, 0.3, 0.4 sec I2t OFF = 0.1, 0.2, 0.3, 0.4, 1 sec

*In 3-phase, 4-wire system, Neutral CT is required for earth fault protection

Test kit UN-ES1



Salient Features

- Compatible with following E&A Protection Releases:
  - SR protection releases of C-Power ACB family
  - UNRS protection releases of U-Power ACB family
  - MTX and RC releases of D-Sine MCCB family
- Operates from 240V AC supply & generates single-phase voltage test signals Tests the release for
  - Phase fault i.e. for overload, short-circuit, instantaneous and Earth Fault protection
- ACB test current multiples
  - For O/L, S/C and Inst - 2.5 In to 13 In in steps of 0.05
  - For E/F - 0.25 In to 0.70 In in steps of 0.05
- MCCB test current multiples
  - For O/L – 2In, 4In, 6In and 8In
  - For S/C and Inst - 2.5 In to 13 In in steps of 0.05
  - For E/F - 0.25 In to 0.70 In in steps of 0.05
- LCD display indicated the trip time (three places after decimal)

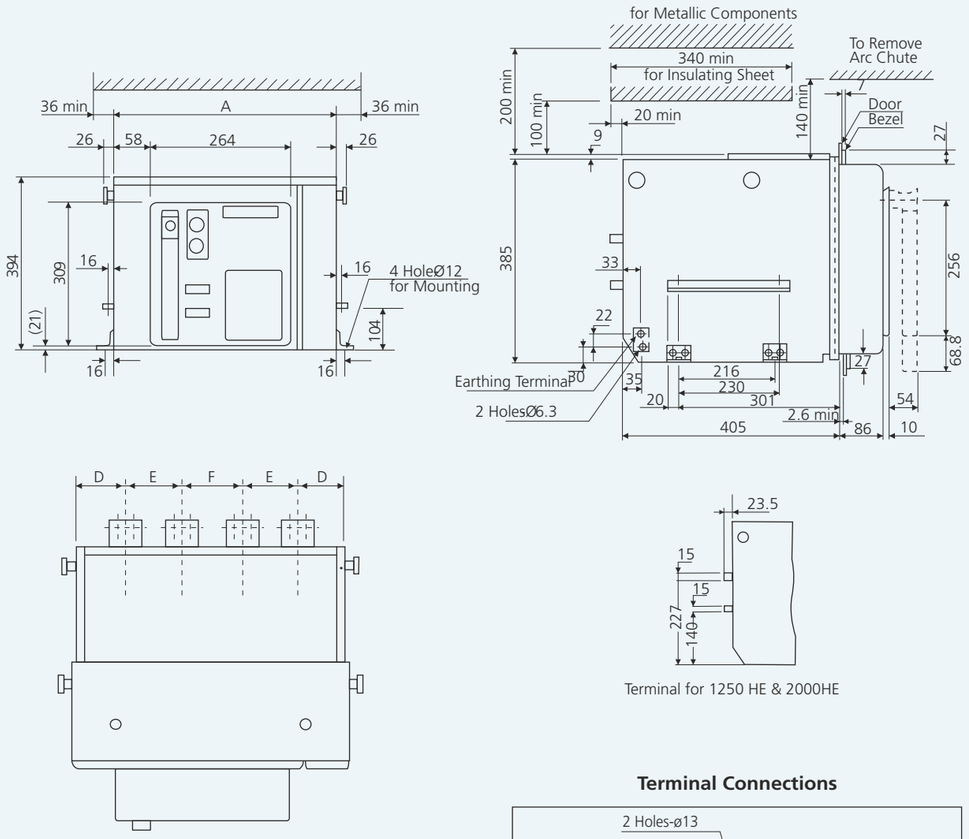
TECHNICAL DATA SHEET

Type Designation			C-POWER			
			1250 HE	2000 HE	3200 HE	5000 HE
Rated current (A) at 50 °C In			**800**	**1250**	**2000**	**3200**
Rated operational Voltage (V) 50/60 Hz Ue			415/690	415/690	415/690	415/690
Rated insulation Voltage (V) 50/60 Hz Ui			1000	1000	1000	1000
Rated ultimate short-circuit breaking capacity 50/60Hz (kA rms) Icu	380/415/500V		50	60	75	95
	690V		35	40	65	▲
Rated service short-circuit breaking capacity 50/60Hz (kA rms) Ics	380/415/500V		50	60	75	95
	690V		35	40	65	▲
Rated short time withstand capacity 50/60Hz (kA rms) Icw	1 sec		50	60	75	95
Rated making capacity 50/60Hz (kA peak) Icm	380/415/500V		105	132	165	209
	690V		73.5	84	143	▲
Rated impulse withstand voltage of main circuit (kV) Uimp			12			
Rated Impulse withstand voltage of aux. circuit (kV) Uimp			4			
Typical opening time (msec)			40			
Typical closing time (msec)			60			
Utilization category			B			
Suitability for isolation			√	√	√	√
Fixed version			√	√	NA	NA
Draw out version			√			
Manual version			√			
Electrical version			√			
Electrical and mechanical life (operating cycles)			20000		10000	5000
Electrical life without maintenance			7000	5000		2500
Dimensions in mm Fixed	H		394	394	NA	
	W	3-Pole	326	482		
		4-Pole	414	628		
	D		431	431		
Dimensions in mm Draw out	H		468	468	468	583
	W	3-Pole	399	555	701	913
		4-Pole	487	701	909	1182
	D		587	587	607	691

OVERALL DIMENSIONS

12.1 DIMENSIONAL DETAILS FOR FIXED BREAKERS - HE Range

12.1.6 For CN-CS 1250A 3P/4P HE, 2000A 3P HE

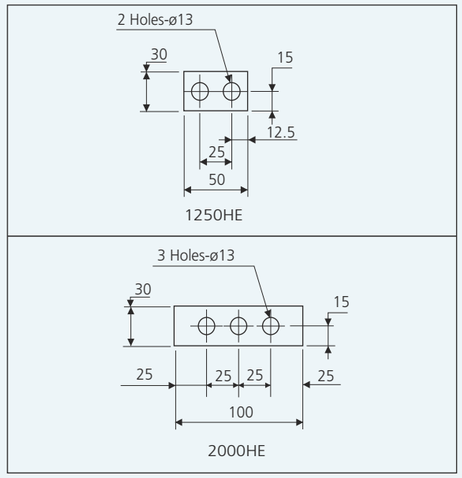


Terminal for 1250 HE & 2000HE

Ratings CN-CS	Dimensions(mm)			
	A	D	E	F
1250A HE 3P	326	57	102	-
1250A HE 4P	414	56	98	98
2000A HE 3P	482	83	154	-

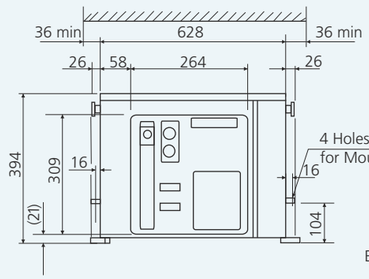
Note : All Dimensions are in mm.

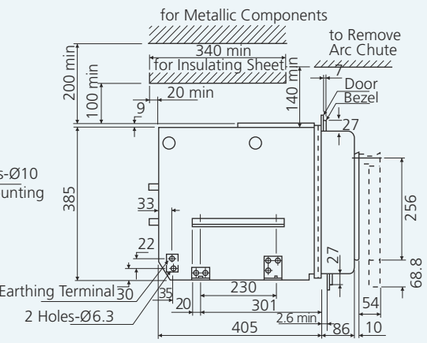
Terminal Connections

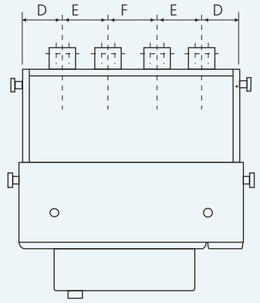


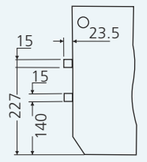
DIMENSIONAL DETAILS FOR FIXED BREAKERS - HE Range

12.1.7 For CN-CS 2000A 4P HE





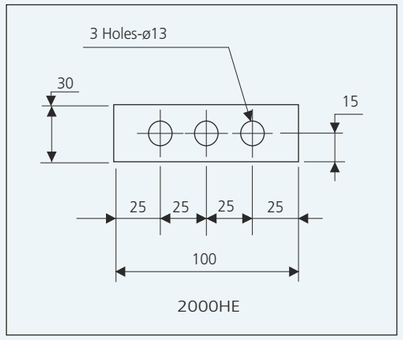




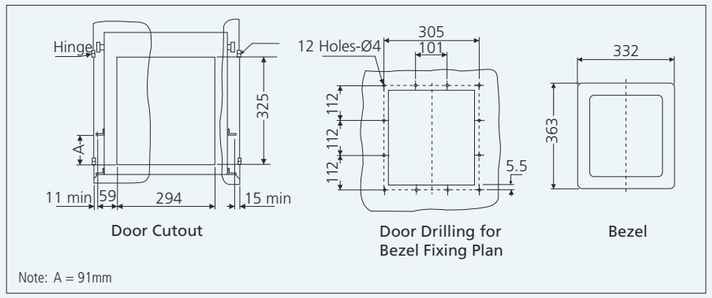
Terminal for 2000HE

Ratings CN-CS	Dimensions(mm)			
	A	D	E	F
3200D/4000A C 3P	628	82	150	156

Terminal Connections



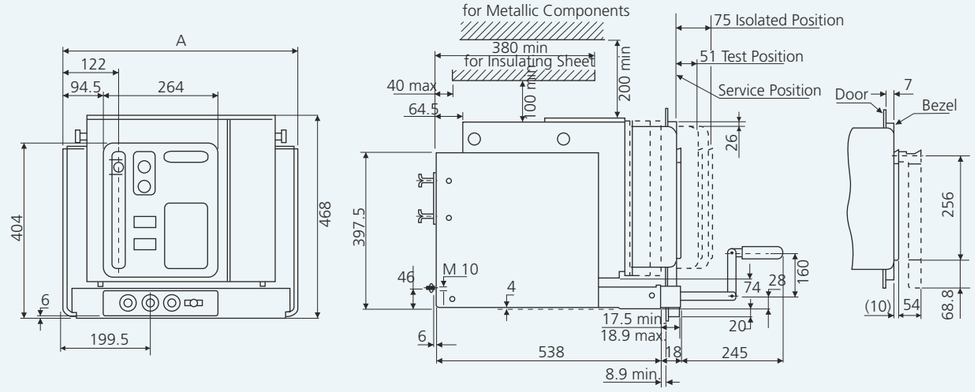
Bezel Fixing Plan for all Fixed Breakers

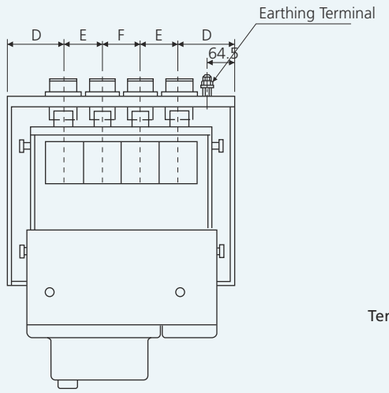


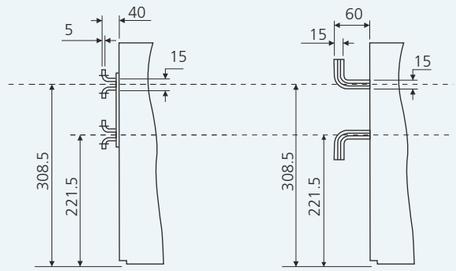
Note : All Dimensions are in mm.

12.2 DIMENSIONAL DETAILS FOR DRAW-OUT BREAKERS - HE Range

12.2.3 For CN-CS 1250A 3P/4P HE, 2000A 3P/4P HE, 3200A 3P/4P HE





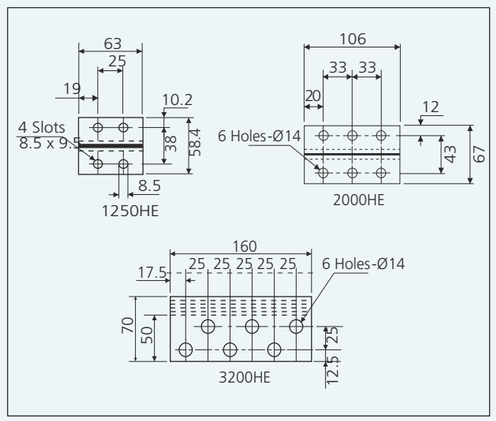


Terminal for 1250HE & 2000HE Terminal for 3200HE

Ratings CN - CS	Dimensions (mm)			
	A	D	E	F
1250A HE 3P	399	97.5	102	-
1250A HE 4P	487	96.5	98	98
2000A HE 3P	555	123.5	154	-
2000A HE 4P	701	122.5	150	156
3200A HE 3P	701	148.5	202	-
3200A HE 4P	909	151.5	202	202

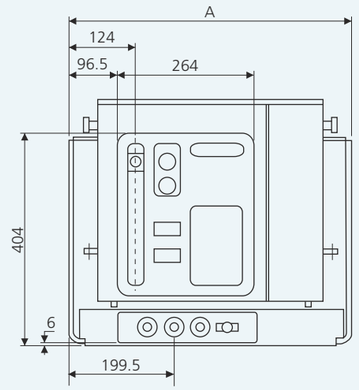
Note : All Dimensions are in mm.

Terminal Connections

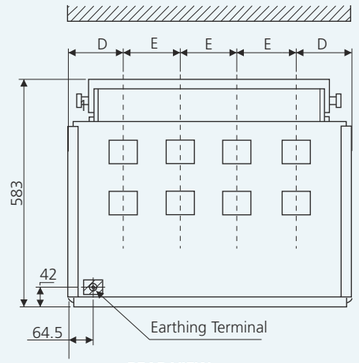


DIMENSIONAL DETAILS FOR DRAW-OUT BREAKERS - HE Range

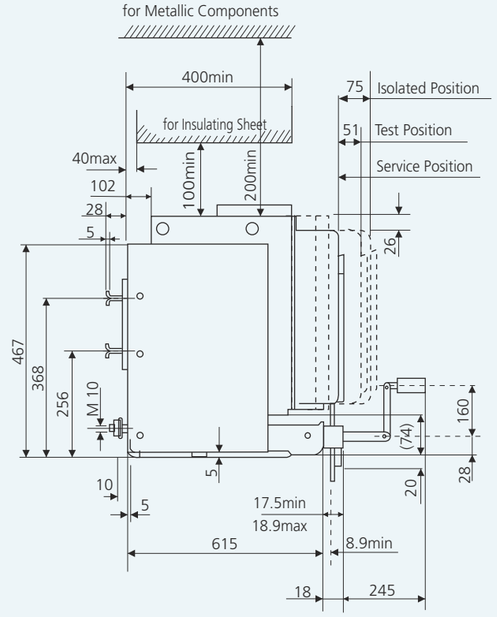
12.2.4 For CN-CS 5000A 3P/4P HE



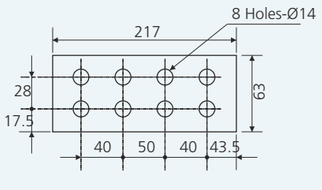
FRONT VIEW



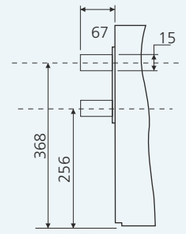
REAR VIEW



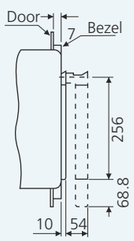
SIDE VIEW



Terminal Connections 5000HE



Terminal for 5000HE



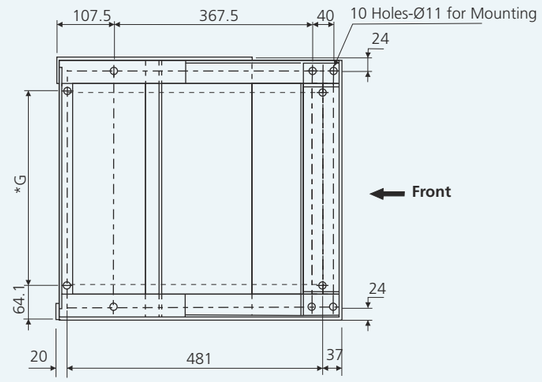
Ratings CN-CS	Dimensions (mm)		
	A	D	E
5000HE 3P	913	187.5	269
5000HE 4P	1182	187.5	269

Note : All Dimensions are in mm.

DIMENSIONAL DETAILS FOR DRAW-OUT BREAKERS

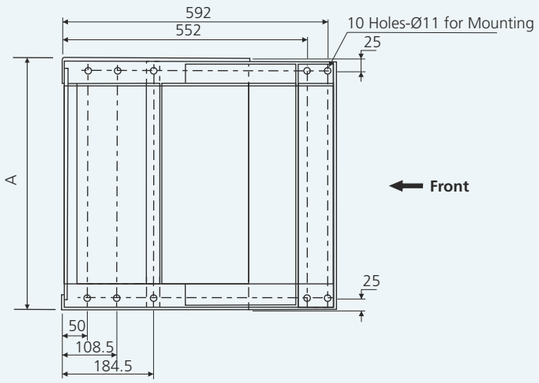
12.2.5 Mounting Details :- For Horizontal Mounting of all Draw-out Breakers

For 3P/4P 1250HE, 2000HE & 3200HE



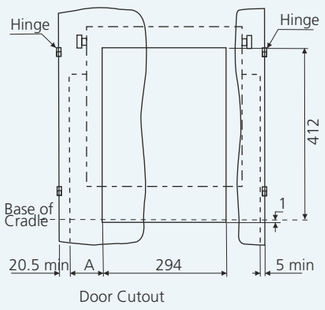
Ratings		Type	G (mm)
1250A	3P	HE	280.3
1250A	4P	HE	368.3
2000A	3P	HE	436.3
2000A	4P	HE	582.3
3200A	3P	HE	582.3
3200A	4P	HE	790.3

For 3P/4P 5000HE

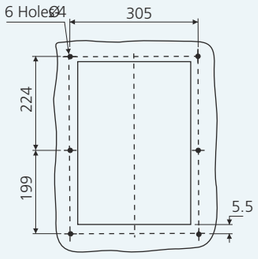


Ratings CN-CS		Dimensions
		A
5000HE	3P	913
5000HE	4P	1182

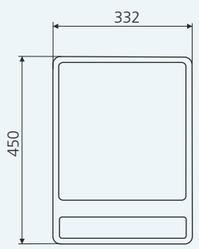
12.2.4 Bezel Fixing Plan for all Draw-out Breakers



Door Cutout



Door Drilling for Bezel Fixing Plan



Bezel

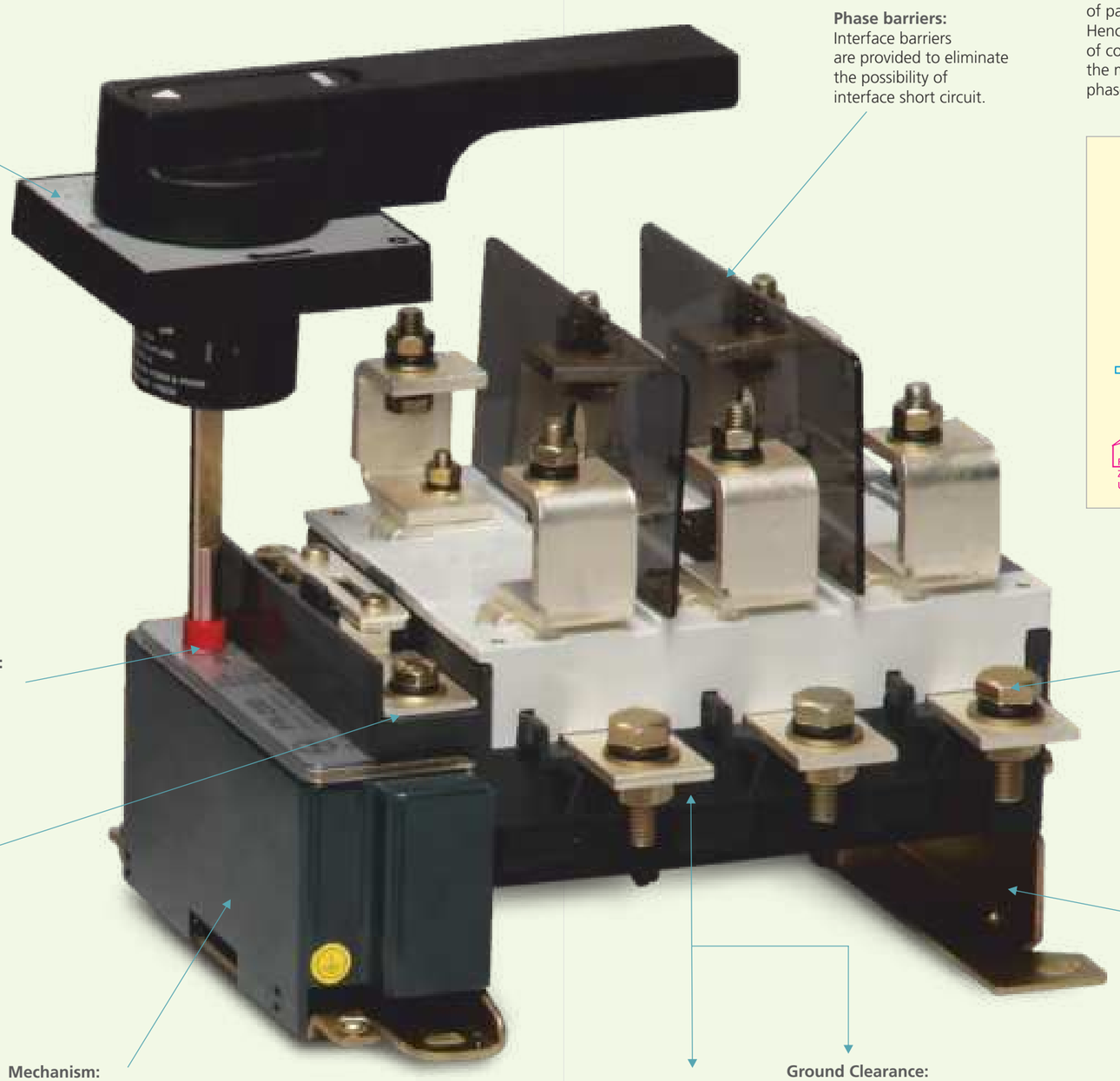
Note :For 5000HE 3P/4P ACB, A=81.5
For other Drawout Breakers A=79.5

Note : All Dimensions are in mm.

OVERALL DIMENSIONS

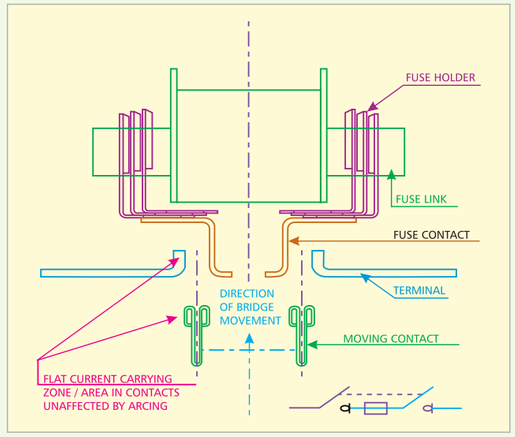
Handle:
The FN Switch has a unique operating handle with following features.

- 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 either 'ON' or 'OFF' position.
- The handle coupling can take a mismatch or ± 3mm in all directions.
- IP54 with extended operating handle



Phase barriers:
Interface barriers are provided to eliminate the possibility of interface short circuit.

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.



Positive ON / OFF indication of S-D-F:
The FN Switch indicates true position of contacts. (By a red pointer)

Maximum termination capacity:
The FN S-D-F range provides generous terminal capacity in its compact size, facilitating aluminium termination.

Built-in neutral:
FN S-D-F 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.

Mechanism:
This mechanism is front operated quick-make / quick-break and independent of speed of operation.

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.

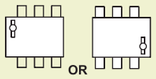
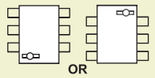
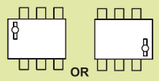
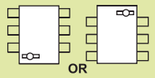
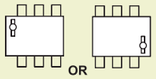
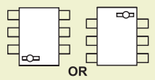
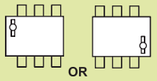
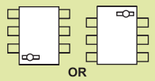
Universal Mounting:
FN S-D-F units can be mounted at any angle in a vertical plane.

UNIVERSAL MOUNTING

FN range offers a distinctive feature to mount S-D-F in different quadrants.
It is achieved by Type A and Type B handle. This feature aids mounting flexibility.

Type A : Supplied as standard with all Switches
Type B : Available as an accessory

FN S-D-F Operating Quadrant chart (Seen from front of the door)

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

SPARES AND ACCESSORIES

Wide range of spares & accessories are available for Switch-Disconnector-Fuse units type FN.

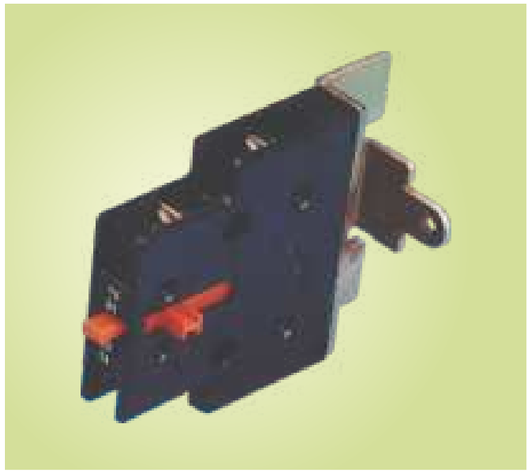
Accessories

Castell Interlock

Switch-Disconnector-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).

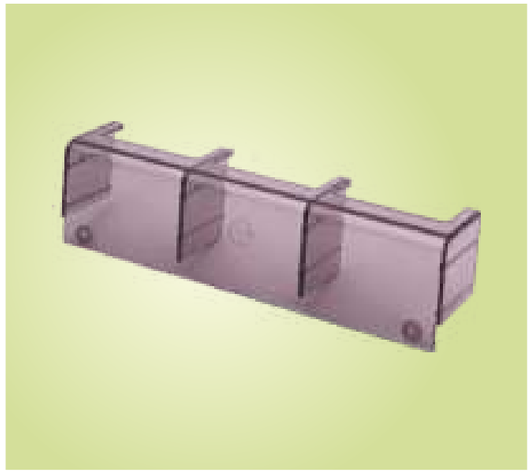
Handle Coupling (type A & B)

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



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 (AC - 15) - 4 A
Rated operational voltage U - 415 V



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.

TECHNICAL DATA SHEET

Type Designation	Unit	FN 32	FN 63	FN 125	FN 160	FN 200	FN 250	FN 315	FN 400	FN 630
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
Neutral	-	Switchable	Switchable	Isolable	Isolable	Isolable	Isolable	Isolable	Isolable	Isolable
Rated operational voltage (Ue)	(V AC)	415	415	415	415	415	415	415	415	415
Rated insulation voltage (Ui)	(V AC)	690	690	690	690	690	690	690	690	690
Rated impulse withstand voltage (imp)	(kV AC)	8	8	8	8	8	8	8	8	8
Rated frequency	(Hz)	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Service temperature	(0 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
Pollution degree	-	3	3	3	3	3	3	3	3	3
Conventional enclosed thermal current, Ithe at 40 Deg C	(A)	20	32	63	100	125	160	200	250	400
Conventional free air thermal current, Ith at 40 Deg C	(A)	20	32	63	100	125	160	200	250	400
Rated operational current, Ie for AC 21A / AC 22B	**(A)**	**20**	**32**	**63**	**100**	**125**	**160**	**200**	**250**	**400**
Rated making capacity (436 V, cosØ-0.35)	(A)	160	256	504	800	1000	1280	1600	2000	3200
Rated breaking capacity (436 V, cosØ-0.35)	(A)	200	320	630	1000	1250	1600	2000	2500	4000
Short time withstand, Icw for 1 sec	(kA)	1.5	1.5	4	4	6	10	14	14	20
Rated operational power for AC 23A	(kW)	12	23	45	58	72	90	113	144	226
Capacitor duty - 415 V 50 - 60 Hz	(kVAR)	14	29	57	57	92	115	145	175	270
Mechanical Endurance	(operating cycles)	15000	15000	15000	15000	10000	10000	10000	10000	10000
Type and size of Fuse	BS	Size A1L	Size A1L	Size A4	Size A4	Size B1/B2	Size B2/B3	Size B3	Size B4	Size C2
Operating torque	(N-m)	4	4	12	12	20	21	25	25	25
Terminal Capacity										
Terminal capacity (main)	(Sq mm)	35	35	95	95	240	240	400	2 x 400	2 x 625
Terminal capacity (neutral)	(Sq mm)	35	35	50	50	120	120	240	240	400

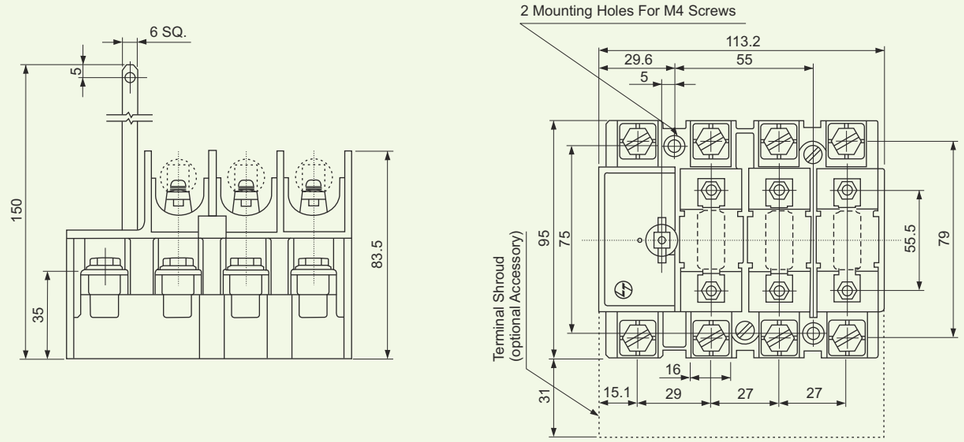
ORDERING INFORMATION

Type Designation	FN 32	FN 63	FN 125	FN 160	FN 200	FN 250	FN 315	FN 400	FN 630
Rated operational current, Ie (A)	**20**	**32**	**63**	**100**	**125**	**160**	**200**	**250**	**400**
Cat. No.	SK90133OOOO	SK90134OOOO	SK90069OOOO	SK90130OOOO	SK90416OOOO	SK90417OOOO	SK90132OOOO	SK90099OOOO	SK90128OOOO

OVERALL DIMENSIONS

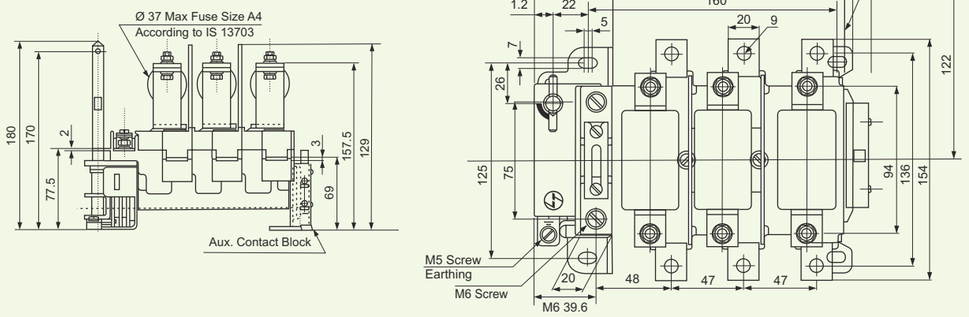
FN 32/63

Open Execth Extution wiended Handle Switch-Disconnector-Fuse



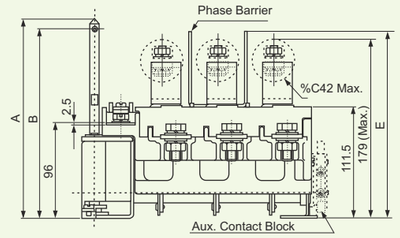
FN 125/160

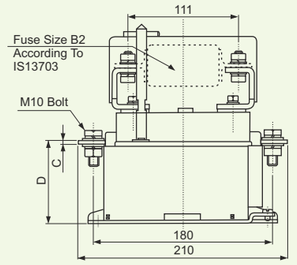
Open Execution with Extended Handle Switch-Disconnector-Fuse

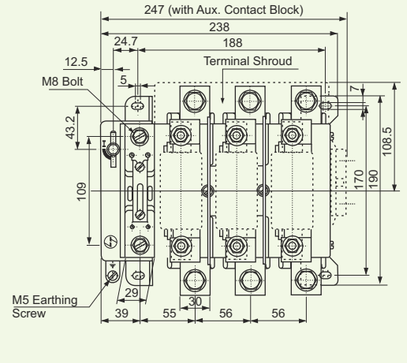


FN 200/250

Open Execution with Extended Handle Switch-Disconnector-Fuse





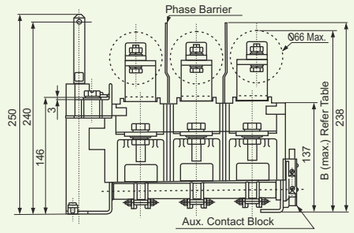


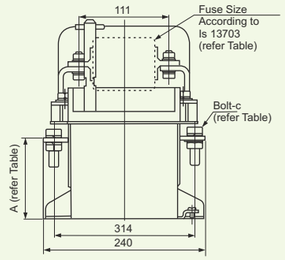
DIM	A	B	C	D	E	Fuse
FN 200	200	190	4	83.5	187.5	200 A
FN 250	216	206	5	84.5	204	250 A

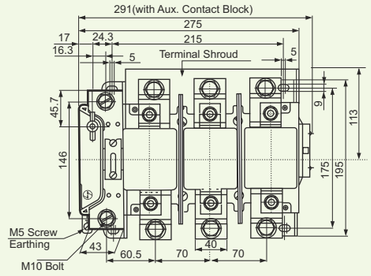
Note : All dimensions are in mm.

FN 315/400

Open Execution with Extended Handle Switch-Disconnector-Fuse

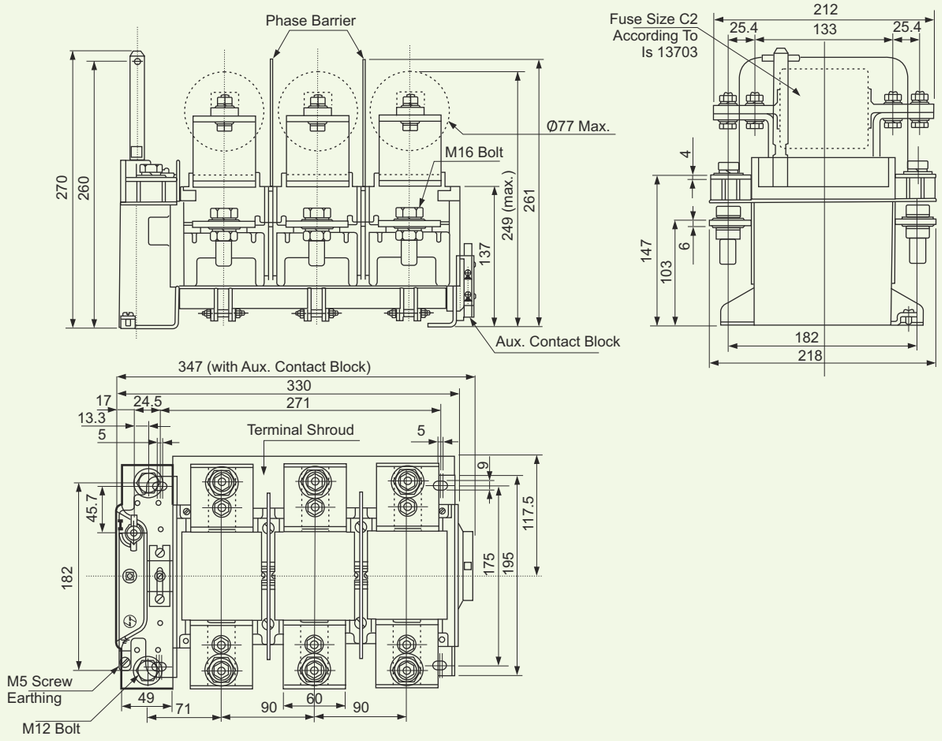






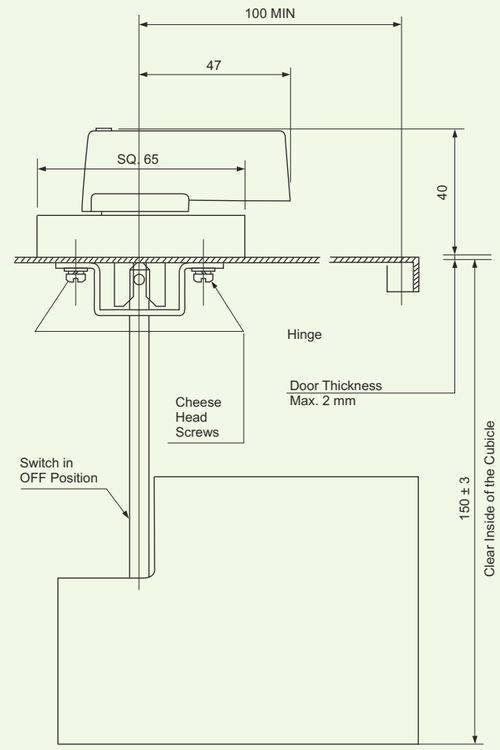
FN 630

Open Execution with Extended Handle Switch-Disconnector-Fuse

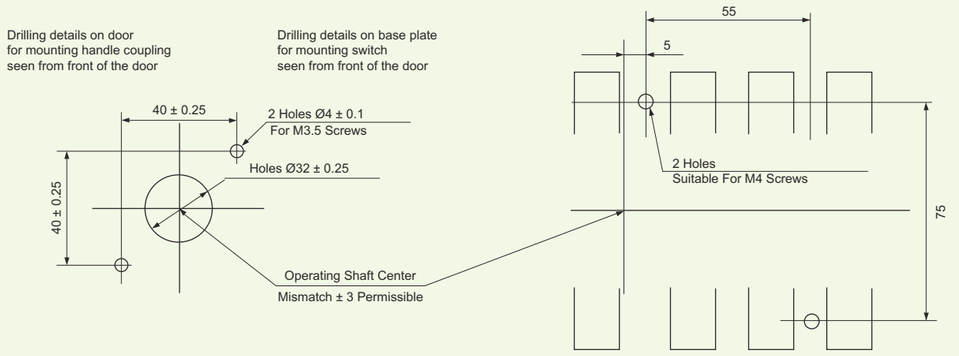


FN 32/63

Assembly of Handle Coupling on Door & Drilling details



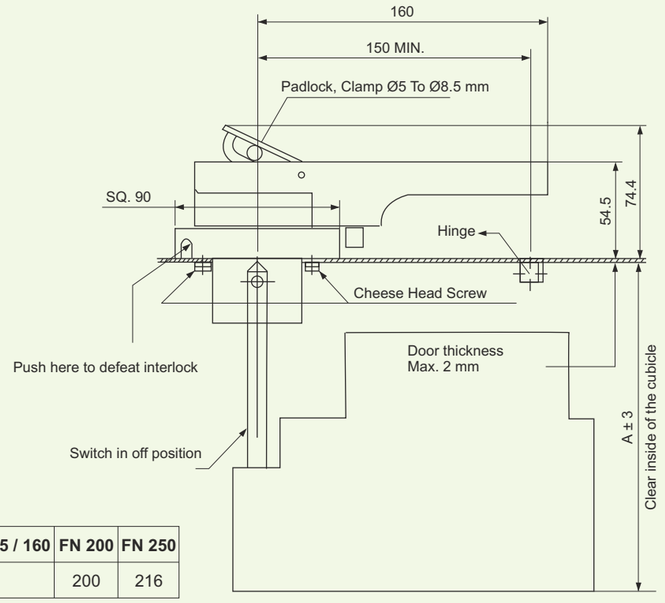
Drilling details FN 32 / 63



Note : All dimensions are in mm.

FN 125 / 160 / 200 / 250

Assembly of Handle Coupling on Door & Drilling details

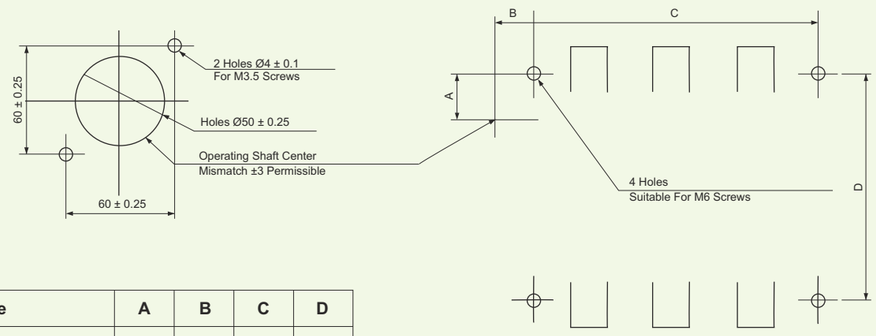


Dimension	FN 100 / 125 / 160	FN 200	FN 250
A	180	200	216

Drilling details FN 125 / 160 / 200 / 250

Drilling details on door
for mounting handle coupling
seen from front of the door

Drilling details on base plate
for mounting switch
seen from front of the door

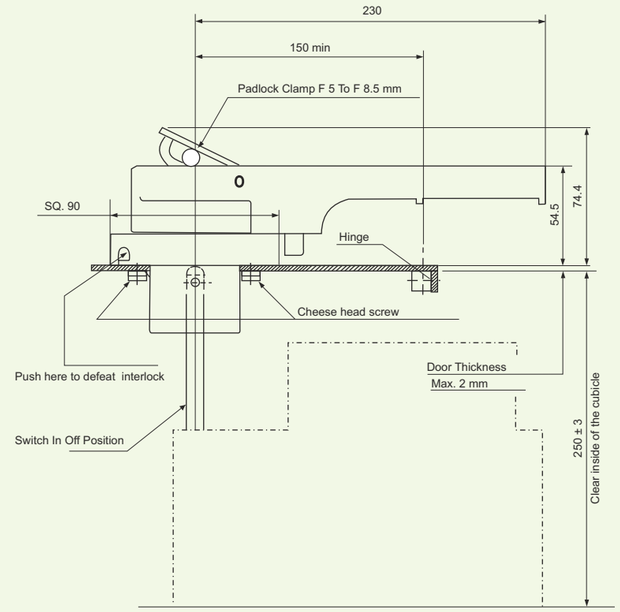


Type	A	B	C	D
FN 100 / 125 / 160	26	22	160	125
FN 200	43.2	24.7	188	170
FN 250	43.2	24.7	188	170

Note : All dimensions are in mm.

FN 315 / 400 / 630

Assembly of Handle Coupling on Door & Drilling details

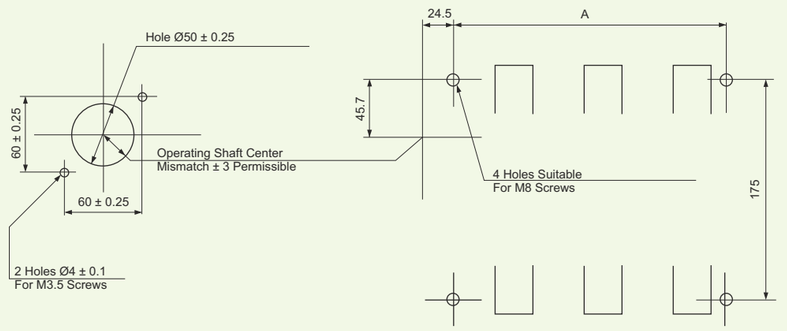


Type	A
FN 315 / FN 400	250
FN 630 / FN 800	270

Drilling details FN 315 / 400 / 630

Drilling details on door
for mounting handle coupling
seen from front of the door

Drilling details on base plate
for mounting switch
seen from front of the door



Type	A
FN 315 / FN 400	215
FN 630 / FN 800	271

Note : All dimensions are in mm.

BOLTED FUSE LINKS - TYPE HQ

Features offered BS fuse link
- Conforms to IEC 60269-2, IS 13703 part 2
- Range: 20A to 630A, 415V, AC 50Hz
- High breaking capacity: 80kA

Fixing Method	Size	Rating (A)	Description	Cat. No.	Power loss (W)	Watt loss limits as per IS 13703
Offset	A1L	20	Suitable for type FN 32/63 S-D-F	ST34527OOOO	2.4	20 A, Fuse - 3.2 W
		25		ST34528OOOO	3.1	
		32		ST34529OOOO	3.4	
		50		ST35827OOOO	4	
		63		ST30767OOOO	4.7	
	A4	80	Suitable for type FN 100/125/160 S-D-F	ST30768OOOO	9.1	100 A, Fuse - 9.1 W
		100		ST30769OOOO	9.5	
		125		ST35829OOOO	14	
		160		ST35829OOOO	-	
Centre Tag, 2 holes	B1	80	Suitable for type FN 200 S-D-F	ST30774OOOO	9.2	100 A, Fuse - 9.1 W
		100		ST30775OOOO	10.5	
		125		ST30776OOOO	16	
	B2	125	Suitable for type FN 200/250 S-D-F	ST30777OOOO	15	200 A, Fuse - 17 W
		160		ST30778OOOO	19.5	
		200		ST30779OOOO	20.5	
	B3	250	Suitable for type FN 250/315 S-D-F	ST30781OOOO	28	250 A, Fuse - 32 W
		315		ST30782OOOO	32	
	B4	355	Suitable for type FN 400 S-D-F	ST30783OOOO	34	400 A, Fuse - 40 W
		400		ST30784OOOO	38	
Centre Tag, 4 holes	C2	400	Suitable for type FN 630 S-D-F	ST30785OOOO	38	630A, Fuse - 55 W
		500		ST30786OOOO	50	
		630		ST30787OOOO	55	


A1 L


A4


B1


B2


B3


B4


C2

Notes

Electrical Standard Products (ESP) Offices:

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e-mail: cic@LNTEBG.com

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