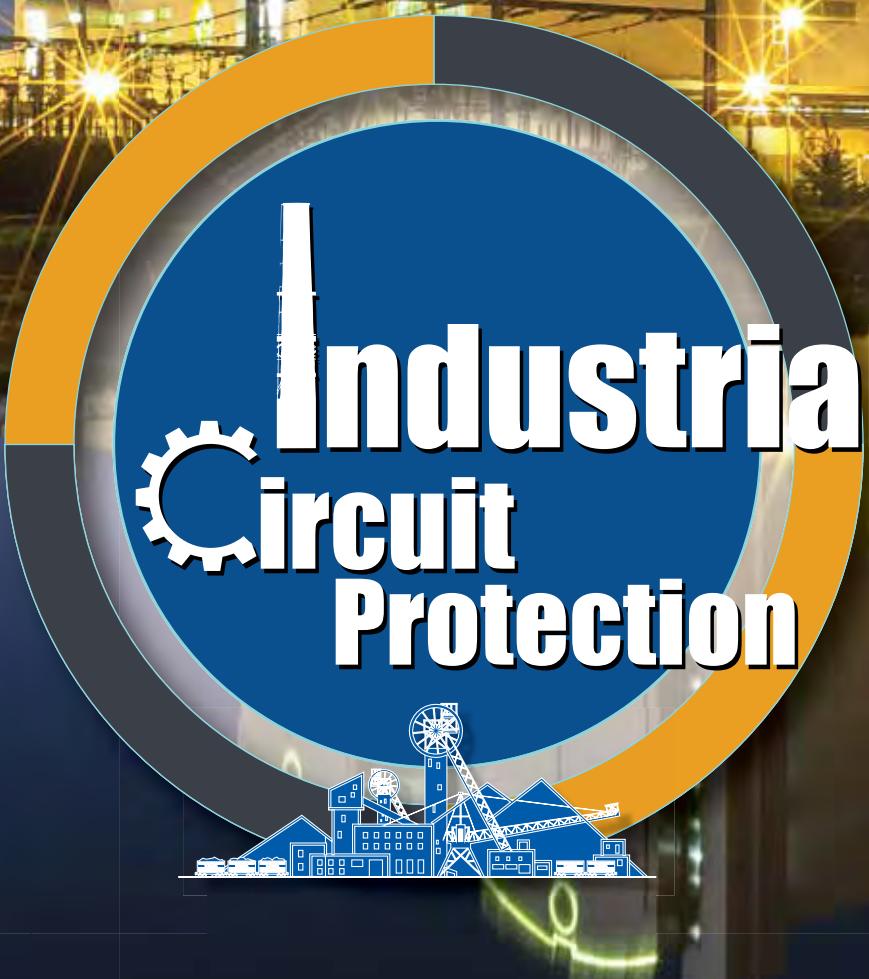




**HAVELLS**



Catalogue 2019

ORG  
GROUP





A company with an unflinching commitment to quality, innovation, and customer satisfaction, Havells India Limited has today emerged as a dominant player in the Fast Moving Electrical Goods industry. The company manufactures a number of products ranging from Cables, Wires and Switchgear in domestic and industrial segments, to Fans, Water Heaters, Small Appliances, Air coolers, Personal Grooming, Home Automation, Switches, LED lighting & fixtures in the consumer facing segments. With the acquisition of Lloyd, and the entry into the Water Purifier category, the company has become a fine example of successful transition and transformation from a Fast Moving Electrical Goods manufacturer to a true Consumer Durables company, steadily spreading its operations across India.

Havells started its operations in the 1970s and since then, the company has used a judicious mix of organic growth and inorganic opportunities to boost revenues and scale up business. The company today owns a range of established and prestigious brands like Havells, Lloyd, Crabtree and Standard that are sold through its extensive network of dealers and retailers spread across the country. Havells has 12 state-of-the-art manufacturing units in the country located at Haridwar, Baddi, Sahibabad, Faridabad, Assam, Alwar and Neemrana. These units manufacture globally acclaimed products, synonymous with excellence and precision.

The company has a strong domestic presence with 43 Branch offices employing close to 6,500 professionals across the country supported by over 7,600 dealers and distributors with world-class service network in 400 cities across India. Given the enormous size, scale and reach of the operations, Havells today boasts of more than 400 exclusive brands shop known as Havells Galaxies to provide better shopping experience to our consumers.



**HAVELLS**



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Havells Introduces New **HIM Series** Moulded Case Circuit Breaker is designed and manufactured to world class standard, keeping in mind the complex requirement of electrical system of present and future ensuring reliability which can give uninterrupted service through out product life, meeting all the stresses that the system encounters.

**HIM Series** MCCB, perfect blend of aesthetics, features and performance, covers a range of 16 A to 800 A with the high breaking capacity upto 85 kA with  $I_{cu}=I_{cs}=100\%$  that fully complies with National and International standards. These MCCBs along with the high level of breaking capacity are thermal adjustable and of compact size that makes it compatible for various load requirements to meet varied application needs in distribution networks.

## Features:

- High breaking capacity up to 85 kA with  $I_{cs}=100\% I_{cu}$
- Thermal Adjustability in entire range
- Rated Insulation Voltage,  $U_i = 1000$  V
- Rated Operational Voltage,  $U_e = 690$  V
- Impulse Withstand Voltage,  $U_{imp} = 8$  kV
- Standardized Height of Products by Frame (AF)

## Range :

- 16 A - 800 A in 5 Frame (AF) Sizes

## Specification :

IS / IEC 60947-1 & 2





## HIM Series

Moulded Case Circuit Breakers



# Essential for Today, Potential for Tomorrow

Advanced Breaking Performance and Various Selectivity

- Product Range: 16 A - 800 A in 5 Frame (AF) Sizes
- High breaking capacity up to 85 kA with Ics=100% Icu
- Thermal Adjustability in entire range
- Rated Insulation Voltage, Ui = 1000 V
- Rated Operational Voltage, Ue = 690 V
- Impulse Withstand Voltage, Uimp = 8 kV
- Standardized Height of Products by Frame (AF)

Dimensions in (mm)

100 AF (16-100A)

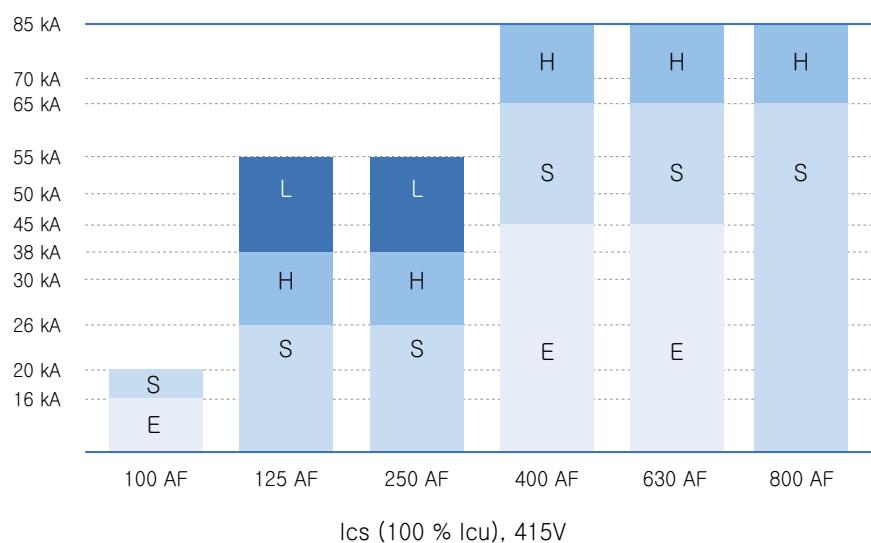


125 AF (16-125A)



250 AF (150-250A)



Rated Short-Circuit Current by AF, ( $I_{cs} = 100\% I_{cu}$ )

400 AF (300-400A)



630AF (500-630A)

800 AF (700-800A)



280



## Advanced Breaking Performance and Various Selectivity

### Product Range

- Frame 1: 100 AF (16-100 A)
- Frame 2: 125 AF (16-125 A)
- Frame 3: 250 AF (150-250 A)
- Frame 4: 400 AF (300-400 A)
- Frame 5: 630 AF (500-630 A), 800 AF (700-800 A)

### Maximized Insulation Performance

- Rated insulation voltage,  $U_i$ : 1,000 V
- Rated operational voltage,  $U_e$ : 690 V
- Rated impulse withstand voltage,  $U_{imp}$ : 8 kV
- Double Insulation

### High Breaking Capacity

- $I_{cs} = 100\% I_{cu}$
- 16 - 20 kA (100 AF)
- 20 - 55 kA (125 - 250 AF)
- 45 - 85 kA (400 - 800 AF)

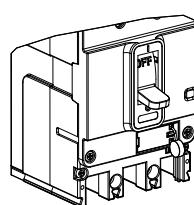
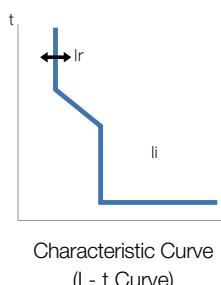
### Cable Insulation Performance Suitability

In case of continuing abnormal conditions such as welding of main contact after trip, handle is not available to move from 'OFF position' in accordance with IEC 60947-2 cable insulation performance. Also, it is possible to maintain easily by checking a contact condition by the handle.

### Adjustable Rated Current

As applying to adjustable rated current design, it is possible to protect circuit optimally according to the load factor. Adjustable range of rated currents.

- 100 - 250 AF: 80 % - 90 % - 100 % of rated current
- 400 - 800 AF: 63 % - 80 % - 100 % of rated current



### Dial Sealing Device (Option)

Prevent removal of the protection cover from body and any operating of current setting value.





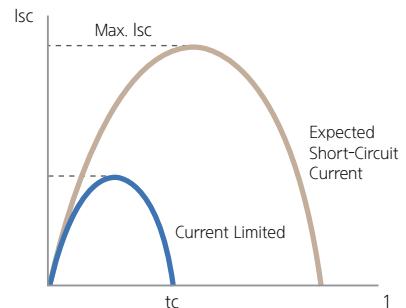
## HIM Type Molded Case Circuit Breakers

### High Performance & Coordination

#### Service Breaking Capacity ( $I_{cs} = 100\% \times I_{cu}$ )

Service breaking capacity, '100 % X Icu' is realized by enlarging breaking capacity with internal limit current device.

- 16 - 55 kA (Up to 250 AF)
- 45 - 85 kA (400 - 800 AF)



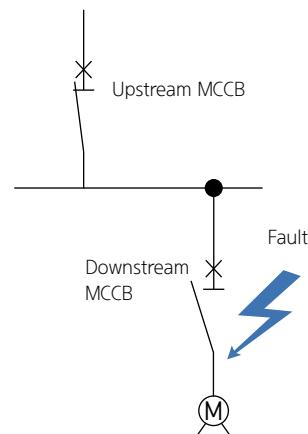
Current Limiting Characteristics

#### Available to Various Low Voltage System Protections

It is available to adapt various low voltage system protections such as 'Discrimination' and 'Cascading' with limit current characteristic and high breaking capacity.

#### Discrimination

It is a low voltage system protection to selectively separate fault point from system to minimize influence of fault. In this protection type, only circuit breaker installed at a fault point is operated while the other feeder can be used continuously.



#### Cascading

In this protection type, upstream circuit breakers can be tripped earlier than downstream circuit breaker for back up protection. So, it is applied to the smaller breaking capacity than the calculated value at down stream circuit.



## External Structure and Contents of Nameplate

Molded  
Case Circuit  
Breakers



HIM 400 H	
400AF	50/60Hz
Ui 1000V	Uimp 8kV
Ue(V)	Icu(kA)
660 / 690V	~ 10kA
480 / 500V	~ 50kA
440 / 460V	~ 70kA
380 / 415V	~ 85kA
220 / 240V	~ 100kA
250V	= 40kA
Ics = Icu 100%	

### Contents of Nameplate

- Ui: Rated insulation voltage
- Uimp: Rated impulse withstand voltage
- Ue: Rated operational voltage
- Icu: Rated short-circuit breaking capacity
- Ics: Service short-circuit breaking capacity

## Molded Case Circuit Breakers (MCCB)

- |                    |                        |                                 |
|--------------------|------------------------|---------------------------------|
| 1 Model Name       | 5 Load Side Terminal   | 9 Trip Button                   |
| 2 Operating Handle | 6 Line Side Terminal   | 10 Cable Insulation Performance |
| 3 Rated Current    | 7 CE Marking           | Suitability                     |
| 4 Adjusting Knob   | 8 Utilization Category | 11 Standards                    |



## Technical Information

### MCCB (HIM Series): 16-800A

Rated Insulation Voltage, $U_i$	1,000 V
Rated Operational Voltage, $U_e$	690 V
Impulse Withstand Voltage, $U_{imp}$	8 kV
Protective Function	Overload, short-circuit and instantaneous protection
Suitability for Isolation	Yes
Utilization Category	A
Polution Degree	3
Reference Standard	IEC 60947-1 & 2



Model	SI Unit	HIM100	HIM125			HIM250				
Frame (AF)		100	125			250				
Pole (P)		2, 3, 4 <sup>1)</sup>	2, 3, 4 <sup>1)</sup>			3, 4 <sup>1)</sup>				
Rated current, at 40 °C	A	16, 20, 25, 32, 40, 50, 63, 80, 100	16, 20, 25, 32, 40, 50, 63, 80, 100, 125			150, 160, 200, 225, 250				
Rated short-circuit breaking capacity [Icu] (kA rms)	Recognition code for order	E	S	S	H	L	E	S	H	L
AC660 V / 690 V	2.5		5	7.5	8	10	7.5	8	8	10
AC480 V / 500 V	7.5		10	14	26	35	14	20	26	35
AC440 V / 460 V	16		20	26	38	55	20	26	38	55
AC380 V / 415 V	16		20	26	38	55	20	26	38	55
AC220 V / 240 V	35		50	65	85	100	50	65	85	100
DC250 V (2P)	5		10	15	20	30	10	15	20	30
Service breaking capacity [Ics = % Icu]	100		100	100	100	100	100	100	100	100
Endurance (Durability)	Mechanical		30,000	30,000			25,000			
	Electrical		10,000	10,000			10,000			

#### Trip Device

Thermal magnetic	Long time [LT]	Fixed (1.0) x In	(1.0) x In	(1.0) x In
	Adjustable	(0.8 - 0.9 - 1.0) x In	(0.8 - 0.9 - 1.0) x In	(0.8 - 0.9 - 1.0) x In
	Instantaneous [INST]	16 - 32 A: 400 A, 40 - 100 A: 10 x In	16 - 32 A: 400 A, 40 - 125 A: 10 x In	10 x In

#### Accessory

Internal	Auxiliary switch	AUX	●	●	●
	Alarm switch	ALT	●	●	●
	Shunt trip	SHT	●	●	●
	Undervoltage trip	UVT	●	●	●
	Auxiliary + Alarm Switch	AXT	●	●	●
External	Rotary handle	Front contact Extended	TFG TFH	● ●	● ●
	Motor operator	MOT	●	●	●
	Mechanical interlock	MIF	●	●	●
	Padlock device	PLD	●	●	●
	Din Rail Adaptor	DRA	●	●	●
	Terminal cover	TCF	●	-	-
	Phase barrier	TQQ	●	●	●
	Terminal extention	TBB	-	-	●

#### Installation and Dimensions

Connection/Installation	Front connection		Terminal screw	Terminal screw, Terminal busbar
	Rear connection		Horizontal/Vertical	
	DIN rail installation		Possible for using DIN rail adapter	-
Dimensions (mm)	W (2/3/4P)	50/75/100	60/90/120	105/105/140
	H	130	155	165
	D	68	68	68
Weight (kg)	2/3/4P	0.6/0.8/1.0	0.8/1.0/1.3	1.1/1.3/1.7

● 4 pole arrangement: Basic specification is R-S-T-N



## Approvals and Certifications

HIM Series MCCB has acquired the certification from the TEST Agency registered in STL

<ul style="list-style-type: none"> <li>• CB certification (DEKRA)</li> <li>• Safety certification scheme for electrical applications</li> <li>• KS (Korean industrial standards)</li> <li>• Marine approvals (8's classifications)</li> </ul>	    
	     

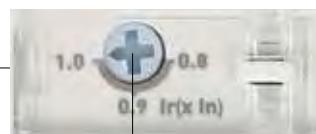
## Vibration/Shock Withstand Test Certification Acquisition

HIM Series MCCB has acquired the vibration/shock withstand test certification in accordance with IEC 60068-2-6 standard which is the required level of IACS, international vessel inspection institute.

Model	SI Unit	HIM400			HIM 630			HIM800	
Frame (AF)		400			630			800	
Pole (P)		3, 4 <sup>①)</sup>			3, 4 <sup>①)</sup>			3, 4 <sup>①)</sup>	
Rated current, at 40 °C	A	300, 350, 400			500, 630			700, 800	
Rated short-circuit breaking capacity [Icu] (kA rms)	Recognition code for order	E	S	H	E	S	H	S	H
AC660 V / 690 V		5	8	10	5	8	10	8	10
AC480 V / 500 V		18	35	50	25	45	50	45	50
AC440 V / 460 V		38	50	70	38	50	70	50	70
AC380 V / 415 V		45	65	85	45	65	85	65	85
AC220 V / 240 V		50	75	100	50	75	100	75	100
DC250 V (2P)		20	25	40	20	25	40	25	40
Service breaking capacity [Ics = % Icu]		100	100	100	100	100	100	100	100
Endurance (Durability)	Mechanical	4,000			2,500			2,500	
	Electrical	1,000			1,000			500	
<b>Trip Device</b>									
Thermal magnetic	Long time [LT]	Fixed	(1.0) x In			(1.0) x In			(1.0) x In
	Adjustable		(0.63 - 0.8 - 1.0) x In			(0.63 - 0.8 - 1.0) x In			(0.63 - 0.8 - 1.0) x In
	Instantaneous [INST]		10 x In			10 x In			10 x In
<b>Accessory</b>									
Internal	Auxiliary switch	AUX	●		●			●	
	Alarm switch	ALT	●		●			●	
	Shunt trip	SHT	●		●			●	
	Undervoltage trip	UVT	●		●			●	
	Auxiliary + Alarm Switch	AXT	-		-			-	
External	Rotary handle	Front contact	TFG	●		●		●	
		Extended	TFH	●		●		●	
	Motor operator	MOT	●		●			●	
	Mechanical interlock	MIF	●		●			●	
	Pad Lock device	PLD	●		●			●	
	Din Rail Adaptor	DRA	-		-			-	
	Terminal cover	TCF	●		●			●	
	Phase barrier	TQQ	●		●			●	
	Terminal extention	TBB	●		●			●	
<b>Installation and Dimensions</b>									
Connection/Installation	Front connection		Terminal Screw			Terminal Screw, Terminal Busbar			Terminal screw, Terminal busbar
	Rear connection		Horizontal/Vertical wiring			Horizontal/Vertical wiring			Horizontal/Vertical wiring
Dimensions (mm)	W (2/3/4P)		140/140/184			210/210/280			210/210/280
	H		257			280			280
	D		110			110			110
Weight (kg)	2/3/4P		4/4.5/5.4			8.7/9.5/12.5			8.7/9.5/12.5

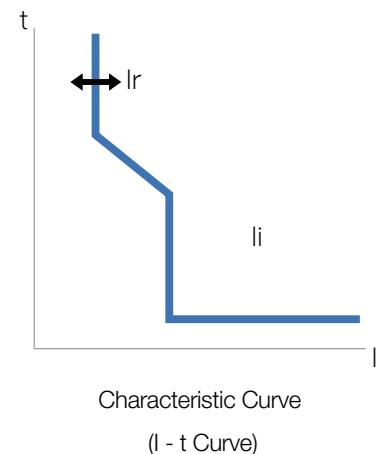
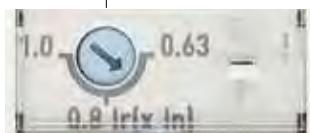


100 - 250 AF



Overload Protection (Thermal)  
Setting Dial, ( $I_r$ )

400 - 800 AF



### Trip Unit Characteristics - Thermal Magnetic

Rated Current (A) [ $I_n$ ]		16	20	25	32	40	50	63	80	100	125
MCCB	HIM100	•	•	•	•	•	•	•	•	•	
	HIM125	•	•	•	•	•	•	•	•	•	•

#### Time Pick-Up Characteristics [ $I_r$ ]

Settings (A)		16	20	25	32	40	50	63	80	100	125
	0.8 x $I_n$	12.8	16	20	25.6	32	40	50.4	64	80	100
	0.9 x $I_n$	14.4	18	22.5	28.8	36	45	56.7	72	90	112.5
	1.0 x $I_n$	16	20	25	32	40	50	63	80	100	125

#### Instantaneous Pick-Up Characteristics [ $I_i$ ]

Settings (A)	10 x $I_n$	400			400	500	630	800	1,000	1,250
	Instantaneous pick-up characteristics (A)	320			320	400	504	640	800	1,000
	The minimum operating current (A)	480			480	600	756	960	1,200	1,500

#### Neutral Pole Protection

4P3D	Unprotected
4P4D	-



Rated Current (A) [In]		150	160	200	225	250
MCCB	HIM250	•	•	•	•	•

**Time Pick-Up Characteristics [I<sub>r</sub>]**

Settings (A)	Fixed	150	160	200	225	250
	0.8 x In	120	128	160	180	200
	0.9 x In	135	144	180	202.5	225
	1.0 x In	150	160	200	225	250

**Instantaneous Pick-Up Characteristics [I<sub>i</sub>]**

Settings (A)	10 x In	1,500	1,600	2,000	2,250	2,500
	Instantaneous pick-up characteristics (A)	1,200	1,280	1,600	1,800	2,000
	The minimum operating current (A)	1,800	1,920	2,400	2,700	3,000

**Neutral Pole Protection**

4P3D	Unprotected
4P4D	-

Rated Current (A) [In]		300	350	400	500	630	700	800
MCCB	HIM400	•	•	•				
	HIM630				•	•		
	HIM800						•	•

**Time Pick-Up Characteristics [I<sub>r</sub>]**

Settings (A)	Fixed	300	350	400	500	630	700	800
	0.63 x In	189	221	252	315	397	441	504
	0.8 x In	240	280	320	400	504	560	640
	10 x In	300	350	400	500	630	700	800

**Instantaneous Pick-Up Characteristics [I<sub>i</sub>]**

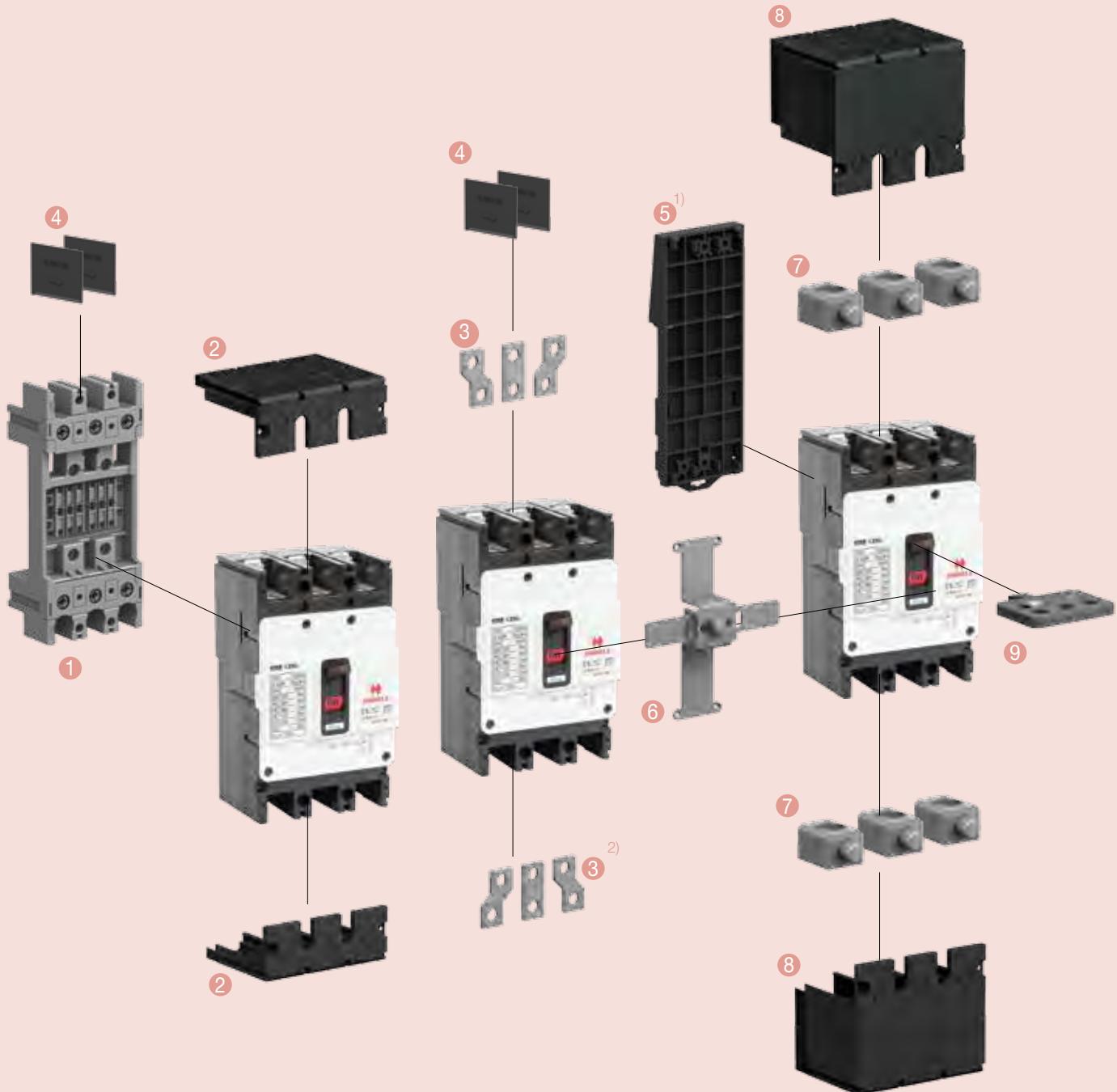
Settings (A)	10 x In	3,000	3,500	4,000	5,000	6,300	7,000	8,000
	Instantaneous pick-up characteristics (A)	2,400	2,800	3,200	4,000	5,040	5,600	6,400
	The minimum operating current (A)	3,600	4,200	4,800	6,000	7,560	8,400	9,600

**Neutral Pole Protection**

4P3D	Unprotected
4P4D	-



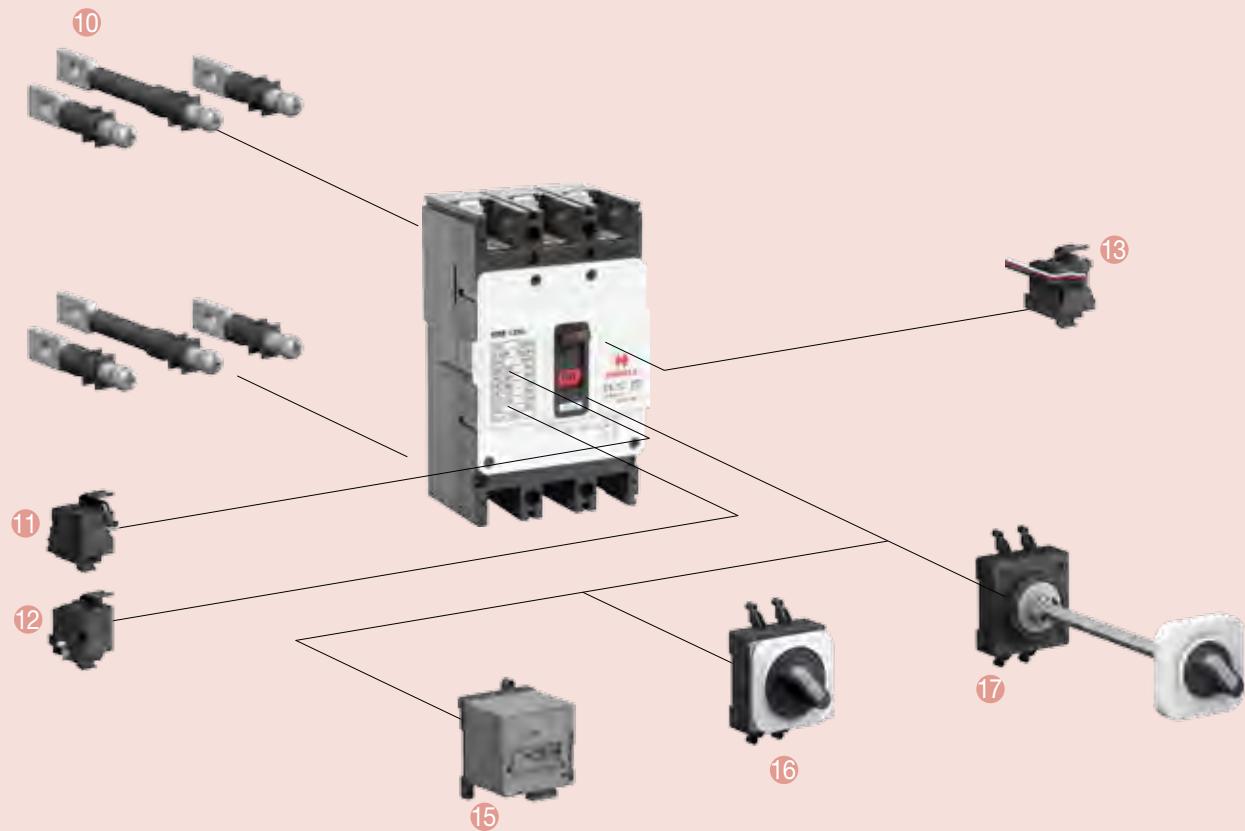
## Accessories



1) DIN rail adaptor (DRA): HIM 100 only  
2) Busbar (TBB): HIM 250 only

## HIM Series MCCB

- |                                   |                        |                             |
|-----------------------------------|------------------------|-----------------------------|
| ① Plug in Devices                 | ④ Insulation Barrier   | ⑦ Lug Terminal              |
| ② Terminal Cover for Plug-In Type | ⑤ DIN Rail Adaptor     | ⑧ Terminal Cover            |
| ③ Busbar                          | ⑥ Mechanical Interlock | ⑨ Padlock for Rotary Handle |



⑩ Rear Connection Terminal

⑪ Shunt Trip Coil

⑫ Undervoltage Trip Coil

⑬ Auxiliary Switch

⑭ Trip Alarm Switch

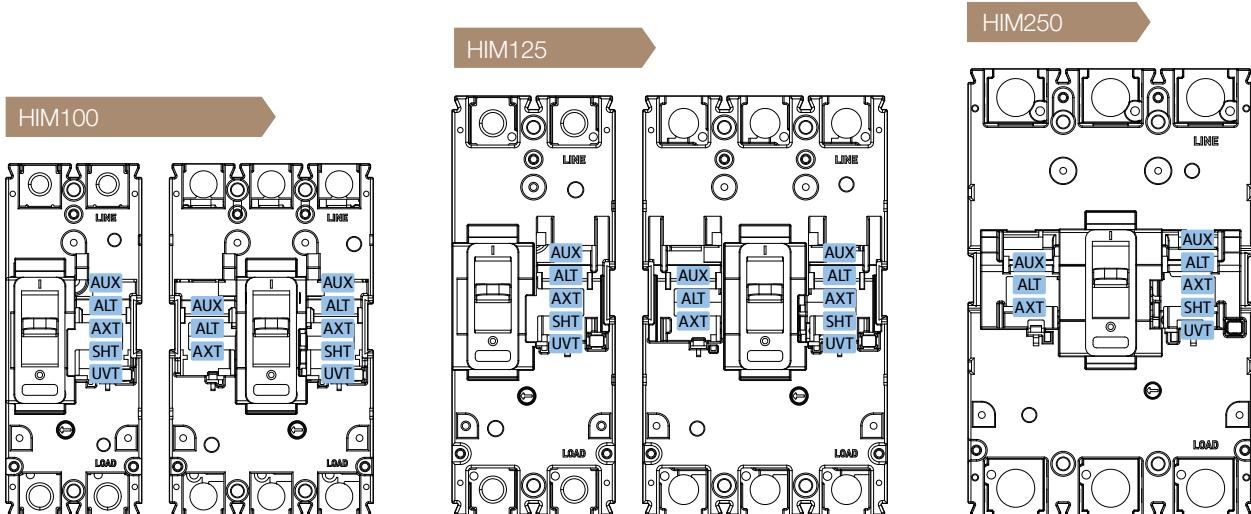
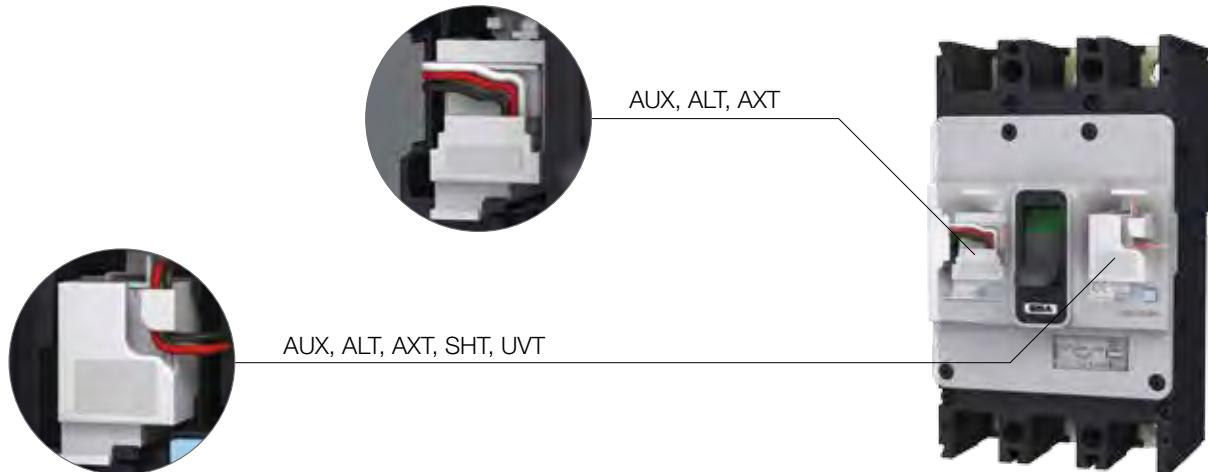
⑮ Motor Operator

⑯ Direct Rotary Handle

⑰ Extended Rotary Handle



## Internal Accessories



### Combinations of Internal Accessories (250 A or less)

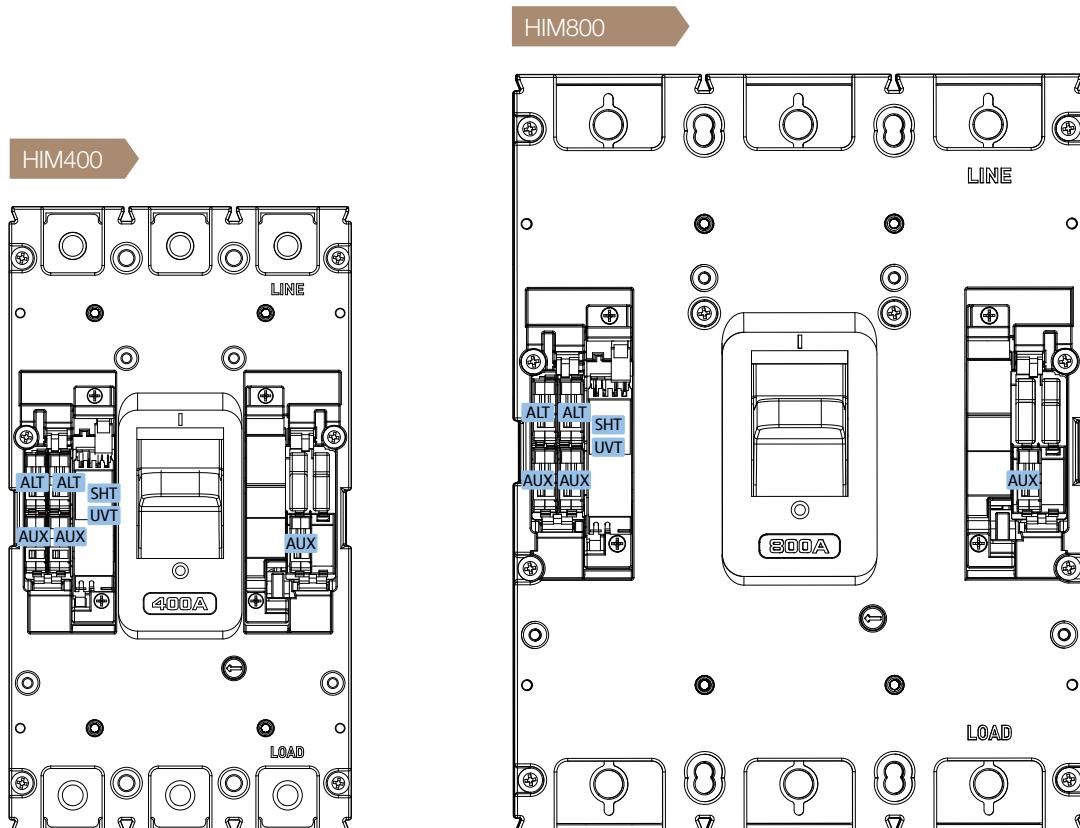
Type	Pole	AUX	ALT	SHT	UVT	AXT	AUX ALT	AUX ALT	SHT AUX	UVT AUX	SHT ALT	UVT ALT	SHT AXT	UVT AXT
HIM100 HIM125	2													
HIM100 HIM125 HIM250	3/4													

● AUX: Auxiliary switch □ / ALT: Alarm switch ■ / SHT: Shunt trip ☐ / UVT: Under-voltage trip ☑ / AXT: Auxiliary alarm switch □■



## Installation of Internal Accessories

- Auxiliary switch (AUX)
- Alarm switch (ALT)
- Auxiliary + Alarm switch (AXT)
- Shunt trip (SHT)
- Undervoltage trip (UVT)



Combinations of Internal Accessories (above 250 A)

Left Side of Handle      Right Side of Handle  
Handle

Type	Pole	AUX		ALT		SHT		UVT		AUX		SHT		UVT		SHT		UVT	
HIM400	2/3/4																		
HIM630, 800	2/3 4RSTN																		
HIM630, 800	4NRST																		

- AUX: Auxiliary switch ■ / ALT: Alarm switch ■ / SHT: Shunt trip □ / UVT: Under-voltage trip □



## Internal Accessories

### Auxiliary Switch (AUX), Alarm Switch (ALT)

Indicates the status of circuit breaker contacts from a remote position as well as using for electric locking.

#### Auxiliary Switch (AUX)

- Indicating ON/OFF status of circuit breaker.
- Status is OFF when TRIP.
- Consists of C contact.



#### Alarm Switch (ALT)

- Activated when the circuit breaker has tripped due to an overload, short circuit or ground fault, excepting manual ON/OFF operation.
- Return to original state, when circuit breaker reset.
- Consist of C contact.



#### Auxiliary + Alarm Switch (AXT)

- Combined auxiliary switch (AUX.) and Alaram Switch (ALT)

## Contact Circuit Diagram

	Auxiliary Switch (AUX)	Alarm Switch (ALT)
MCCB ON		
MCCB OFF		
MCCB TRIP		

## Possible Location for Installation

Type	Pole	AUX.	ALT	AXT
HIM100 HIM125	2			
HIM100 HIM125 HIM250	3/4			
HIM400	2/3/4			
HIM630, 800	2/3/4			

- AUX: Auxiliary switch □
- ALT: Alarm switch ■
- AXT: Auxiliary alarm switch □■



## Rating of Contact

Rated Conventional Thermal Current		5 A	
Minimum Load		160 mA, 5 VDC	
Rated Operational Current		Resistive load	Inductive Load
AC125 V		5 A	3 A
AC250 V		3 A	2 A
DC30 V		4 A	3 A
DC125 V		0.4 A	0.4 A
DC250 V		0.2 A	0.2 A

## Shunt Trip (SHT)

Remotely trip circuit breakers by voltage shunt trip (SHT) device.

### Operation Condition:

- $U \geq 0.7 \times U_n$  (Apply more than 70 % of the rated voltage.)
- In case of impulse type voltage, apply more than 20 ms



## Rated Voltage and Characteristics (100 - 250 AF)

Rated Voltage ( $U_n$ )		Power consumption	
		VA (W)	A (A)
DC	24 V	50.2	2.1
	48 V	94.6	1.97
	60 V	91.2	1.52
	100 - 120 V	11.8	0.1
	125 V	58.1	0.47
AC (50/60 Hz)	100 - 120 V	75.2	0.63
	200 - 250 V	64.8	0.26
	380 - 480 V	131	0.27
Rated Operational Voltage		0.7 - 1.1 $\times U_n$	
Operating Time		50 ms	



## Possible Location for Installation

Type	Pole	SHT	UVT
HIM100 HIM125	2		
HIM100 HIM125 HIM 250	3/4		
HIM400	2/3/4		
HIM630, 800	2/3/4		

- SHT: Shunt trip
- UVT: Under-voltage trip



## Internal Accessories

### Undervoltage Trip (UVT)

In case circuit voltage is less than the reference value, the circuit breaker will not trip or ON. If circuit voltage falls less than 35 % of Rated voltage ( $U_n$ ), UVT initiates a trip automatically to prevent damage to the load.



#### Opening Conditions:

- Operating characteristics are based on IEC 60947-2 standard criteria.
- Trip condition:  $U \leq 0.35 \times U_n$
- Fixed: 50 ms (400 - 800 AF)
- Time Delay: 500 - 1,000 ms (Up to 250 AF)
- No Trip condition:  $U \geq 0.7 \times U_n$
- In  $U = 0.35 \times U_n - 0.7 \times U_n$  interval, circuit breaker can be tripped but, does not warrant the operation.



UVT

#### Closing Conditions:

- For the circuit breakers installed with UVT, when voltage is not applied to the UVT, the circuit breaker is possible to OFF/RESET but can not be ON.
- Voltage must be applied at UVT for closing (ON).
- Closing condition:  $U \geq 0.85 \times U_n$



UVT Controller

#### Time Delay Function:

To prevent a mal-function in the short time voltage drop of less than 500 ms.  
(Up to 250 AF)

#### Rated Voltage and Characteristic (Up to 250 AF)

Rated Voltage ( $U_n$ )		Power consumption	
DC	24 V	0.96	40
	48 V	1.1	22.7
	100 - 110 V	2.2	20
AC (50/60 Hz)	100 - 120 V	5.1	42
	200 - 230 V	6	26
	380 - 415 V	9.6	23
	440 - 480 V	12.5	26
Operating	In the Case of Trip	0.35 - 0.7 x $U_n$	
Inception Voltage	In the Case of Closing	0.85 x $U_n$	
Rated Operational Voltage		0.85 - 1.1 x $U_n$	
Operating Time		500 - 1,000 ms	

- Be sure not to use UVT for the electrical interlock system.



## External Accessories

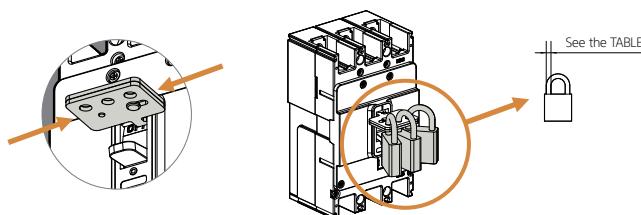
### Locking Device

#### Padlock Device for Handle (PLD)

This device is used for locking the handle of circuit breakers to OFF position by using padlock. Key lock is applicable upto 3 EA and not be supplied additionally.

Ratings of keylock are as below.

Type	Application	Padlock Diameter
ISSLEU0844	HIM100 - HIM250	5 mm
ISSLEU0845	HIM400 - HIM800	6 mm



#### Mechanical Interlock

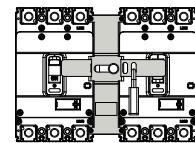
This device interlocks two circuit breakers mechanically.

##### Features:

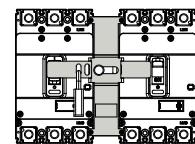
- It prevents two breakers from closing at the same time.
- It turns two breakers all OFF.

Ratings of keylock are as below.

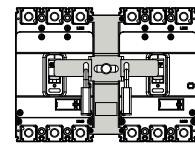
Type			Application	Padlock Diameter
2P	3P	4P (NRST)		
ISSLEU0825	ISSLEU0826	ISSLEU0828	HIM100	5 mm
ISSLEU0829	ISSLEU0830	ISSLEU0832	HIM125	
-	ISSLEU0833	ISSLEU0835	HIM250	
-	ISSLEU0836	ISSLEU0837	HIM400	6 mm
-	ISSLEU0838	ISSLEU0843	HIM630, 800	



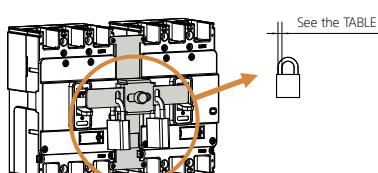
Right Off Lock



Left Off Lock



Double Off Lock





## External Accessories

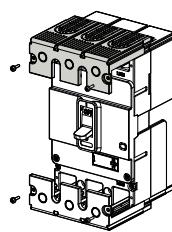
### Terminal Cover

Terminal cover is the device to insulate circuit breaker terminal from the outside for safety. It is possible to apply IP40 as protection degree of power parts. The connecting method is of long type which is suitable for front connection using wires, busbar.

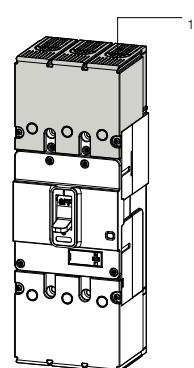


Long Type

Type						Application	Pitch (mm)
2P		3P		4P			
Short	Long	Short	Long	Short	Long		
ISSLEU0855	ISSLEU0858	ISSLEU0856	ISSLEU0859	ISSLEU0857	ISSLEU0860	HIM100	25
ISSLEU0861	ISSLEU0864	ISSLEU0862	ISSLEU0865	ISSLEU0863	ISSLEU0866	HIM125	30
ISSLEU0867	ISSLEU0869	ISSLEU0868	ISSLEU0869	-	ISSLEU0870	HIM250	35
ISSLEU0871	ISSLEU0873	ISSLEU0872	ISSLEU0873	-	ISSLEU0874	HIM400	44
ISSLEU0876	ISSLEU0877	ISSLEU0877	ISSLEU0877	-	ISSLEU0878	HIM 630, 800	70



Drawings



Long Type  
(Front Connection)

- 1) For front connection, please use it after removing the mark 1)

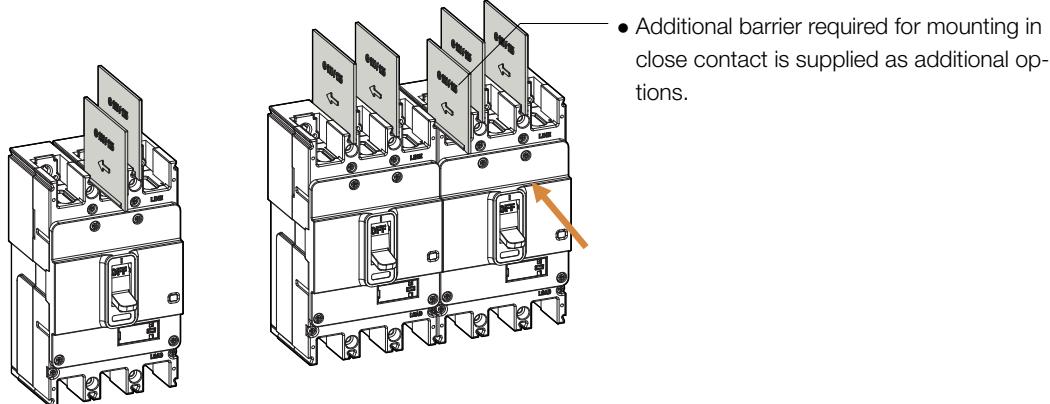


## Phase Barrier

Insulation barrier is used for preventing short-circuit fault due to dielectric breakdown between circuit breaker terminals. It improves the performance of terminal phase-to-phase insulation if installed at groove between the terminal of two circuit breakers. It can be easily assembled after the installation of the circuit breaker. In addition, it is used in terminal cover.



Type			Application	Number of Parts (EA/Set)		
2P	3P	4P		2P	3P	4P
ISSLU0879	ISSLU0880	ISSLU0881	HIM100	1	2	3
ISSLU0879	ISSLU0880	ISSLU0881	HIM125	1	2	3
ISSLU0882	ISSLU0883	ISSLU0884	HIM250	1	2	3
-	ISSLU0885	ISSLU0886	HIM400	1	2	3
-	ISSLU0885	ISSLU0886	HIM630, 800	1	2	3





## External Accessories

### Rotary Handle

Rotary handle is the device to check for MCCB's ON/OFF/TRIP status from outside of switchgear. There are two types of rotary handle-extended type and direct type. All the rotary handles provide panel door locking and handle locking function by rotating clockwise the rotary handle, the circuit breaker operates "ON". Each rotary handle is divided into these three types the upper line, the right line, and the left line-according to attachment direction of MCCB.

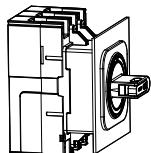
### Direct Rotary Handle (TFG Type)

- 32 - 250 AF: Attach handle directly to the circuit breaker.
- 400 - 800 AF: Attach handle to the door of switchgear.

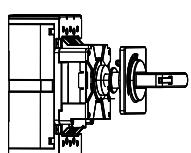
Type	Application
Upper Line	
ISSLU0806	HIM100
ISSLU0809	HIM125
ISSLU0812	HIM250
ISSLU0815	HIM400
ISSLU0916	HIM630, 800



Direct Rotary Handle



HIM100  
HIM125  
HIM250



HIM400  
HIM800

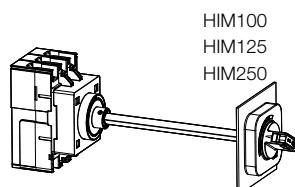
### Extended Rotary Handle (TFH Type)

Suitable for the case where the distance between circuit breaker and door switchgear is long. The handle is attached to the door of switchgear so there is no trip-button function.

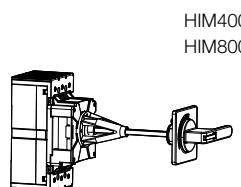
Type	Application
ISSLU0820	HIM100
ISSLU0821	HIM125
ISSLU0822	HIM250
ISSLU0823	HIM400
ISSLU0824	HIM630, 800



Extended Rotary Handle



HIM100  
HIM125  
HIM250

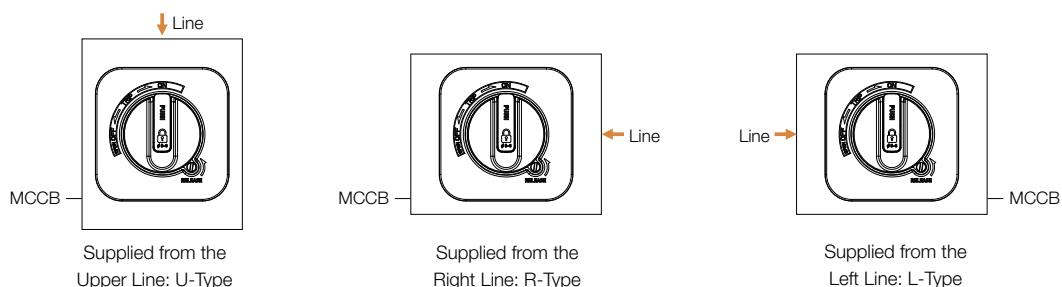


HIM400  
HIM800



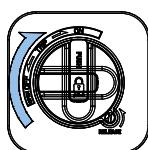
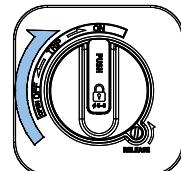
## Category of Handle in Accordance with Circuit-Breaker's Installation Type

Rotary handle is divided into the following three types according to the direction of power supply.

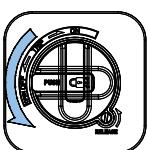


## How to Operate Handle

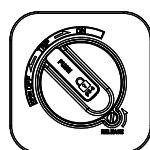
- Operating direction: To turn 'ON' the circuit breaker function, rotate handle clockwise.
- Circuit breaker ON: Rotating the handle to ON position. (Figure 1)
- Circuit breaker OFF: Rotating the handle to OFF position. (Figure 2)
- Circuit breaker TRIP: If the circuit breaker is tripped, the handle will be switched to automatically TRIP position. (Figure 3)
- If you rotate the handle to RESET position first after the circuit breaker is tripped (Figure 4) and then rotate the handle to ON position, the circuit breaker is operated ON (Figure 1).
- If you need to open door when handle is in the ON state, rotate the RELEASE screw to direction of the arrow first and then open the door (Figure 5).



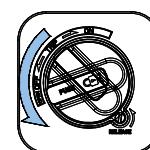
(Figure 1)



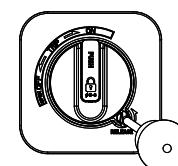
(Figure 2)



(Figure 3)



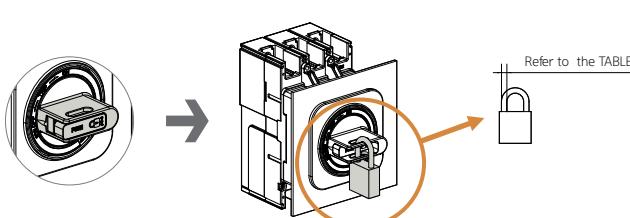
(Figure 4)



(Figure 5)

## Locking Device

Locking Function	OFF State Door Lock	ON State Door Lock	Reverse Interlock	Handle Padlock
Contents	<ul style="list-style-type: none"> <li>Impossible to open the switchgear door when the circuit breaker is in the OFF state.</li> <li>Possible at RESET position</li> <li>It is possible to open the switchgear door after rotating the handle to RESET.</li> </ul>	<ul style="list-style-type: none"> <li>Impossible to open the switchgear door when the circuit breaker is in the ON state.</li> <li>It is possible to open the switchgear door after rotating the RELEASE screw.</li> </ul>	<ul style="list-style-type: none"> <li>Impossible to put the circuit breaker in the state "ON" when the switchgear door is open.</li> </ul>	<ul style="list-style-type: none"> <li>Padlocking function for prevention of handle operation.</li> <li>Padlock is not supplied separately and the number of usable padlock is decided in accordance with padlock diameter. (Refer to the following table)</li> <li>The specifications of the applicable padlock are referred to as the following table.</li> </ul>
Direct type (TFG)	●	●	● (100/125/250 AF)	●
Extended type (TFH)	●	●	-	●



Application	Padlock Diameter	Padlock Quantity
HIM100, 250	6 - 8 mm	Ø6, Ø7: 2 EA Ø8: 1 EA
HIM400, 800	5 - 7 mm	3 EA



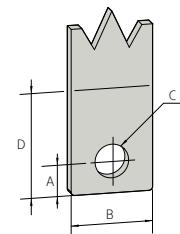
## External Accessories

### Front Connection of Fixed Devices

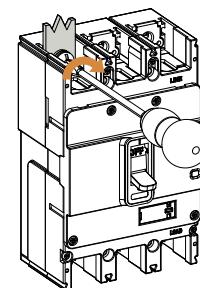
Select and use the busbar according to specification of busbar and cable connected to circuit breaker.

#### Insulated Bar Connection

If busbar pitch of switchgear is equal to circuit breaker, it is possible to connect the circuit breaker directly using a insulation tube. When connected to the busbar, refer to the specification chart as below. Use the insulation barrier and terminal cover where applicable.



Application	Connection Busbar Dimensions (mm)				Applicable Bolt and Tightening Torque	
	A	B	C	D	Bolt Spec.	Maximum Tightening Torque (kgf x cm)
HIM100	< 7.5	< 17	$\varnothing \geq 5.5$ ( $\leq 50$ A)	A + 7.5	M5 Screw ( $\leq 50$ A)	28.5
	< 7.5	< 17	$\varnothing \geq 9$ ( $> 50$ A)	A + 7.5	M8 Screw ( $> 50$ A)	110
HIM125	< 7.5	< 20	$\varnothing \geq 9$	A + 7.5	M8 Screw	110
HIM250	< 10	< 27	$\varnothing \geq 9$	A + 10	M8 Hex Socket	110
HIM400	< 12.5	< 30	$\varnothing \geq 11$	A + 12.5	M10 Hex Socket	270
HIM630, 800	< 12.5	< 45	$\varnothing \geq 13$	A + 12.5	M12 Hex Socket	470



### Busbar

#### Straight Busbar

- Used to meet the size of the cable or standards of the switchgear. (No change of the pitch between the poles)

#### Extended Busbar

- Used to extend the insulation distance. (Extension of the pitch between the poles)

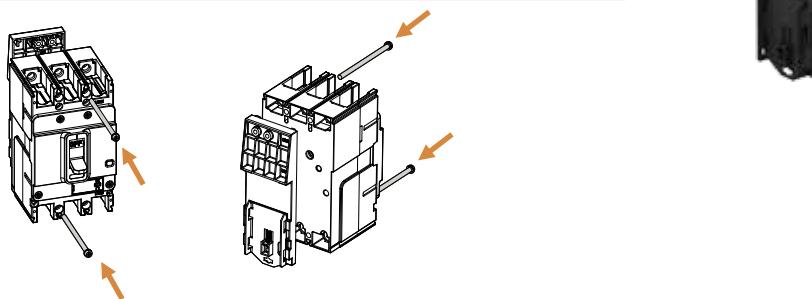
Application		Straight Busbar		Extended Busbar (Spreader)	
Type	Pole	Type	Pitch	Type	Pitch
HIM250	3	ISSLEU0851	35 mm	ISSLEU0853	45 mm
	4	ISSLEU0852		ISSLEU0854	
HIM400	3	ISSLEU0849	44 mm	ISSLEU0847	59 mm
	4	ISSLEU0850		ISSLEU0848	
HIM630	3	ISSLEU0849	70 mm	-	-
	4	ISSLEU0850		-	
HIM800	3	ISSLEU0849	70 mm	-	-
	4	ISSLEU0850		-	



## DIN Rail Adaptor

This device is used for DIN rail mounting of MCCB. (HIM100 Only)

Application		DIN Rail Adapter	Quantity
Type	Pole		
HIM100	2	ISSLEU0887	1
	3	ISSLEU0887	1
	4	ISSLEU0887	2

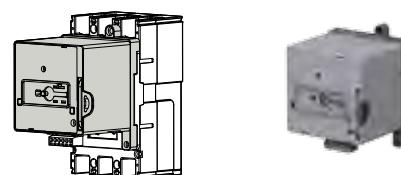


## Motor Operator

This device is used for turning ON/OFF circuit breakers from remote position.

It can be applied at low-voltage automation system or emergency power system.

Application		Motor Operator	Control Voltage
Type	Pole		
HIM100	3, 4	HIM 100 Motor operator	
HIM125	3, 4	HIM 125 Motor operator	DC24 V
HIM250	3, 4	HIM 250 Motor operator	AC/DC110 V
HIM400	3, 4	HIM 400 Motor operator	AC/DC240 V
HIM630, 800	3, 4	HIM 800 Motor operator	



- Note

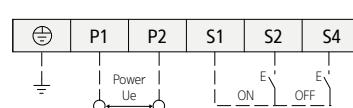
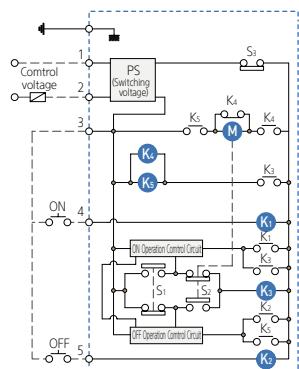
- Motor operator should be attached only when MCCB's handle is OFF.
- If not, there is possibility of burning the motor.

## Ratings

Application	Mechanical Lifetime	Control Voltage	Operating Current	Operation Time (ms)		Power Consumption (W)
				Closing	Opening	
HIM 100 Motor operator	10,000	DC24 V	≤ 2.5	310	200	14
		AC/DC110 V	≤ 0.5			
		AC/DC240 V	≤ 0.5			
HIM 125 Motor operator	10,000	DC24 V	≤ 2.5	350	230	14
		AC/DC110 V	≤ 0.5			
		AC/DC240 V	≤ 0.5			
HIM 250 Motor operator	8,000	DC24 V	≤ 2.5	350	230	14
		AC/DC110 V	≤ 0.5			
		AC/DC240 V	≤ 0.5			
HIM 400 Motor operator	5,000	DC24 V	≤ 6.0	500	350	14
		AC/DC110 V	≤ 3.0			
		AC/DC240 V	≤ 2.0			
HIM 630, 800 Motor operator	5,000	DC24 V	≤ 6.0	500	350	35
		AC/DC110 V	≤ 3.0			
		AC/DC240 V	≤ 2.0			

- Voltage range: 85 - 110 % (DC24 V: 95 - 110 %)

## Control Circuit Diagram



M: Motor  
K1: ON Relay  
K2: OFF Relay

K3: Relay for Motor  
K4: ON Relay  
K5: OFF Relay

S1: ON Limit Switch  
S2: OFF Limit Switch  
S3: AUTO/Manual Limit Switch



## Technical Information

### Standard Use Environment

#### Temperature De-rating

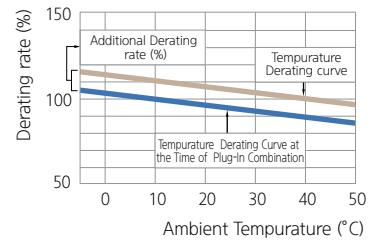
Over-current characteristics of MCCB has been set to the ambient temperature 40 degrees celsius. If the ambient temperature is less or more than 40 degrees celsius, the over-current characteristics can be changed.

##### If the Ambient Temperature is less than 40 Degrees Celsius

In order to ensure that circuit breaker's over-current meet the de-rating curve at the given ambient temperature, the rear current ( $I_r$ ) should be adjusted. The temperature correction ratio for each MCCB is shown on the circuit breaker de-rating curve.

##### If the Ambient Temperature is more than 40 Degrees Celsius

If the internal temperature of the MCCB is over 40 degrees, thermal damage to the insulating material inside the MCCB can occur causing the circuit breaker to trip at an early stage. When applying ambient temperatures at higher than 40 degrees celsius, you must adjust the rated current as shown in the rated current correction table below.



$I_n$  (Rated Current): Circuit breaker's rating at about ambient temperature 40 C

$I_r$  (Real Current): Circuit breaker's rating at about ambient temperature

$$I_r = \text{Correction ratio (\%)} \times I_n$$

#### Rated Current De-rating Table: Standard Mounting (Fixed)

Model	Rated Current (A)	Ambient Temperature (°C)									
		(A)	20	30	40	45	50	55	60	65	70
HIM100	16	18.9	18.6	17.8	16	15.2	14.6	14.1	13.6	13.2	12.8
	20	23.58	23.3	22.2	20	19.1	18.3	17.6	17.0	16.5	16.0
	25	26.8	26.2	25.6	25	24.7	24.4	24.1	23.8	23.5	23.2
	32	34.3	33.5	32.8	32	31.6	31.3	30.9	30.5	30.1	29.7
	40	42.9	41.9	41.0	40	39.5	39.0	38.6	38.1	37.6	37.1
	50	53.6	52.4	51.2	50	49.4	48.8	48.2	47.6	47.0	46.4
	63	67.5	66.0	64.5	63	62.2	61.5	60.7	60.0	59.2	58.5
	80	85.8	83.8	81.9	80	79.0	78.1	77.1	76.2	75.2	74.2
	100	107.2	104.8	102.4	100	98.8	97.6	96.4	95.2	94.0	92.8
	125	136.7	132.8	128.9	125	123.1	121.1	119.1	117.2	115.1	113.1
HIM125	16	18.9	18.6	17.8	16	15.2	14.6	14.1	13.6	13.2	12.8
	20	23.6	23.3	22.2	20	19.1	18.3	17.6	17.0	16.5	16.0
	25	27.3	26.6	25.8	25	24.6	24.2	23.8	23.4	23.0	22.6
	32	35.0	34.0	33.0	32	31.5	31.0	30.5	30.0	29.5	29.0
	40	43.8	42.5	41.3	40	39.4	38.8	38.1	37.5	36.8	36.2
	50	54.7	53.1	51.6	50	49.2	48.4	47.7	46.9	46.1	45.3
	63	68.9	66.9	65.0	63	62.0	61.0	60.1	59.1	58.0	57.0
	80	87.5	85.0	82.5	80	78.8	77.5	76.3	75.0	73.7	72.4
	100	109.4	106.3	103.1	100	98.4	96.9	95.3	93.8	92.1	90.5
	125	136.7	132.8	128.9	125	123.1	121.1	119.1	117.2	115.1	113.1
HIM250	150	161.7	157.8	153.9	150	144.0	141.0	138.0	132.0	128.3	124.5
	160	172.5	168.3	164.2	160	153.6	150.4	147.2	140.8	136.8	132.8
	200	215.6	210.4	205.2	200	192.0	188.0	184.0	176.0	171.0	166.0
	225	242.6	236.7	230.9	225	216.0	211.5	207.0	198.0	192.4	186.8
	250	269.5	263.0	256.5	250	240.0	235.0	230.0	220.0	213.8	207.5





## Rated Current De-rating Table: Standard Mounting (Fixed)

Model	Rated current (A)	Ambient temperature (°C)									
		10	20	30	40	45	50	55	60	65	70
HIM 400	300	324	316.5	309	300	291	282	273	264	255	246
	350	378	369.25	360.5	350	340	330	320	310	300	290
	400	432	422	412	400	388	376	364	352	340	328
HIM 630, 800	500	540	527.5	515	500	485	470	455	440	425	410
	630	680.4	664.65	648.9	630	611	592	573	554	535	516
	700	756	738.5	721	700	679	658	637	616	595	574
	800	864	844	824	800	776	752	728	704	680	656



## Altitude De-rating

It does not affect the characteristics of circuit breaker at an altitude of less than 2000 m. Characteristics of insulation and air cooling are reduced at an altitude of more than 2000 m. You should adjust rated current and rated voltage as shown in the table below at an altitude of more than 2000m. However, this will not change the characteristics of the circuit breaker.

Circuit Breaker	Altitude		2,000 m	3,000 m	4,000 m	5,000 m
HIM type MCCB 100 - 800 AF	Withstand voltage (V)		3,000	2,500	2,100	1,800
	Insulation voltage (V)	Ui	1,000	850	750	600
	Maximum operational voltage (V)	Ue	690	590	520	460
	Average through-current (A) at the temperature of 40 °C	In x	1	0.96	0.93	0.9

## Vibrations

The excessive vibration makes some troubles in the breakage of circuit breaker, the dynamic strength of failure, electric current, carrying and the safety operating characteristics, so, for choosing the circuit breaker, you need proper consideration in these environmental stress. This stress is generated by the magnetic impact of operating open and close test, vibration during transport, and the influence of adjacent equipment. Our circuit breaker is verified by test in accordance with standard of internal impulse performance.

## Vibrations Test

Vibration test is carried out in compliance to the IEC 60068-2-6 standards for vibration to ensure the level that the shipping certificate authority requests. The test verifies the resonance performance and vibration durability based on the following

### Resonance Test

You can alter the frequency as shown in the following range of sinusoidal wave to see if there is any occurrence of vibration on a specific part of MCCB.

- 5 - 13.2 (Hz): Displacement amplitude 1 mm
- 3.2 - 100 (Hz): Acceleration amplitude 0.7 g

### Vibration Durability Test

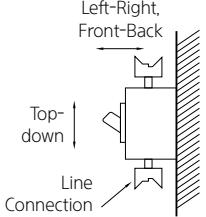
A sinusoidal wave with frequency of 30 Hz is manually created to check the operational status for 90 minutes.

- 30 (Hz): Acceleration amplitude 0.7 g



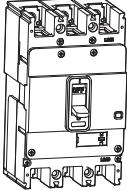
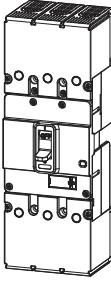
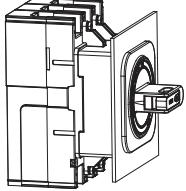
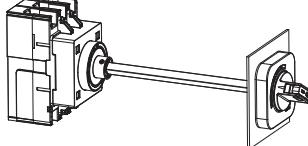
## Technical Information

### Seismic Performance and Shock Tolerance Chart

Part		Seismic Performance
Test condition	Vibration posture, Direction of impulse	<ul style="list-style-type: none"> <li>Vertical mounting</li> <li>Top-down, Left-right, Front-back</li> </ul> 
	Status of MCCB	<ul style="list-style-type: none"> <li>Non-conduction (ON or OFF status)</li> <li>Status where rated current has been conducted on until the temperature of MCCB becomes constant and continuous.</li> </ul>
Test result	Judgement condition	<ul style="list-style-type: none"> <li>If it is ON, it should not be OFF</li> <li>If it is OFF, it should not be ON</li> <li>No abnormal status such as damage, transformation, or annealing of nut part</li> <li>The characteristics of switch and trip after the test must be normal</li> </ul>

### Degree of Protection

By stipulating the IP degree of MCCB based on IEC 60529 standard, the IP degree is changed according to the product condition.

Condition	Circuit Breaker	Circuit Breaker + Terminal Cover	Circuit Breaker + Terminal Cover + Rotary Handle (Front Contact)	Circuit Breaker + Terminal Cover + Rotary Handle (Extended)
Exteriors				
Degree of protection	IP20	IP40	IP40	IP40



## Power Consumption & Resistance

### HIM Type MCCB

Type	Rated Current (A)	HIM100		HIM125		HIM250		HIM400		HIM630, 800	
		R/Pole (mΩ)	P/Pole (W)								
Fixed / Adj	16	16.0	4.10	17.0	4.35						
	20	16.0	6.40	17.0	6.80						
	25	4.0	2.50	4.3	2.69						
	32	4.0	4.10	3.0	3.07						
	40	2.9	4.64	2.6	4.16						
	50	2.3	5.75	1.7	4.25						
	63	1.7	6.75	1.3	5.16						
	80	0.9	5.76	1.0	6.40						
	100	0.9	9.00	0.7	6.50						
	125			0.6	9.38						
	150					0.4	8.55				
	160					0.3	8.70				
	200					0.3	10.80				
	225					0.3	13.67				
	250					0.2	13.75				
	300							0.2	18.90		
	350							0.2	23.28		
	400							0.2	27.20		
	500									0.1	32.50
	630									0.1	43.20
	700									0.1	53.90
	800									0.1	64.00

### Cascading Table

AC 440/460 V

Upstream: HIM100  
Downstream: HIM100

Upstream	HIM100	
	E	S
Breaking capacity [Icu] (kA r.m.s.)	16	20
Downstream breaking capacity [Icu] (kA r.m.s.)		Enhanced breaking capacity
HIM100E	16	20
HIM100S	20	



## Technical Information

### AC 440 V /460 V

Upstream: HIM100, HIM125, HIM250, HIM400, HIM630, HIM800

Downstream: HIM100, HIM250, HIM400, HIM630, HIM800

Upstream	HIM125			HIM250			HIM400		
	E	S	H	S	H	L	E	S	H
Breaking capacity [kcu] (kA r.m.s.)	20	26	38	26	38	55	38	50	70
Downstream breaking capacity [kcu] (kA r.m.s.) Enhanced breaking capacity									
HIM100E	16	20	26	26	26	30	26	26	30
HIM100S	20		26	30	26	30	26	30	30

Upstream	HIM125			HIM250			HIM400		
	E	S	H	S	H	L	E	S	H
Breaking capacity [kcu] (kA r.m.s.)	20	26	38	26	38	55	38	50	70
Downstream breaking capacity [kcu] (kA r.m.s.) Enhanced breaking capacity									
HIM125E	20		26	30	26	30	38	26	30
HIM125S	26			38		38		38	50
HIM125H	38						55		50

Upstream	HIM250			HIM400			HIM630			HIM800	
	S	H	L	E	S	H	E	S	H	S	H
Breaking capacity [kcu] (kA r.m.s.)	26	38	55	38	50	70	38	50	70	50	70
Downstream breaking capacity [kcu] (kA r.m.s.) Enhanced breaking capacity											
HIM250S	26		38	50	30	38	50	30	38	50	38
HIM250H	38			55		50	70		50	70	50
HIM250L	55					70			70		70
HIM400E	45				50	70		50	70	50	70
HIM400S	50					70			70		70
HIM400H	70										
HIM630E	45						50	70	50	50	70
HIM630S	50							70			70
HIM630H	70										
HIM800S	50										70
HIM800H	70										

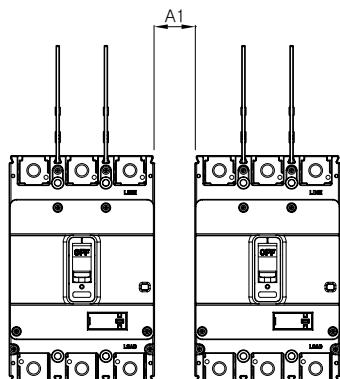


## Installation

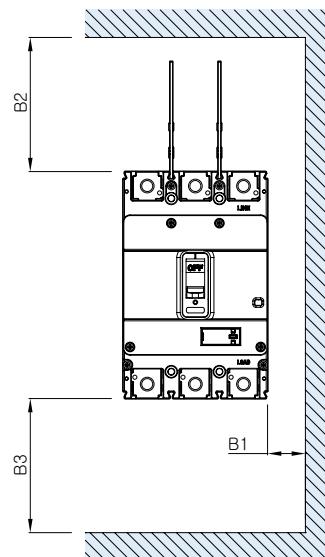
### Insulation Distance

When installing a circuit breaker, safety clearances must be kept among the breakers, panels, busbars and other protection devices installed nearby. When a short circuit interruption occurs, high temperature gas occurs and the gas is expelled above the arc chambers of the circuit breaker. In order to allow the gas to be distributed and to prevent fire and arcing or short-circuit currents, safety clearances are required.

The separation distance in the case the circuit breaker is installed side by side.

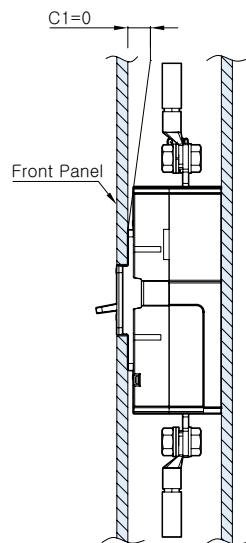


In the case of iron panels, the distance between the upper and base side or the right and left side.

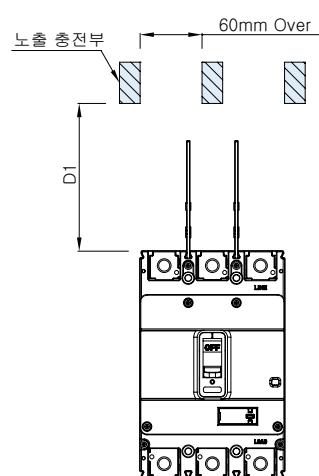


- Using minimum separation distance ( $A=0$ ), you should assemble terminal cover and phase barrier between the product.

In the case of iron panels, the distance between the front and back.



In the case that the live part is exposed, the distance from the circuit breaker.



- If the distance of both conductors is less than 60mm, please insulate the charging part.

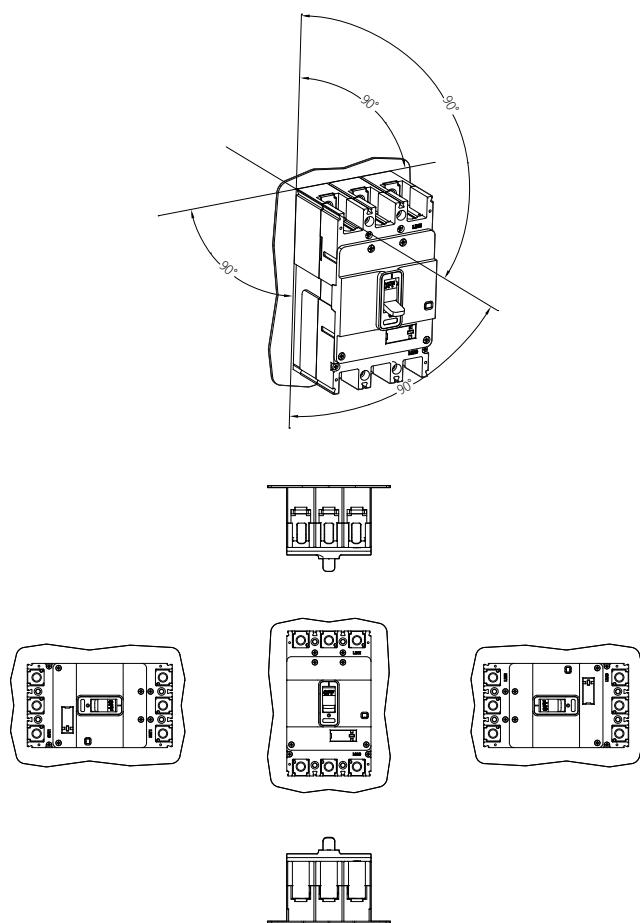


## HIM Type's Minimum Insulation Distance

Type	Minimum Clearance (mm)											
	460V						240V					
	A1	B1	B2	B3	C1	D1	A	B1	B2	B3	C1	D1
HIM100 E/S	0	25	50	25	0	85	0	15	50	25	0	70
HIM125 S/H/L	0	25	50	25	0	85	0	15	50	25	0	70
HIM250 E/S	0	25	80	40	0	140	0	15	80	40	0	110
HIM250 H/L	0	40	80	40	0	140	0	20	80	40	0	110
HIM400 E/S	0	60	120	60	0	200	0	30	120	60	0	160
HIM400 H	0	80	120	60	0	200	0	40	120	60	0	160
HIM630, 800 E/S	0	60	120	60	0	200	0	30	120	60	0	160
HIM630, 800 H	0	80	120	60	0	200	0	40	120	60	0	160

## Installation Angle

The HIM circuit breakers can be installed vertically or horizontally without changing any characteristics.

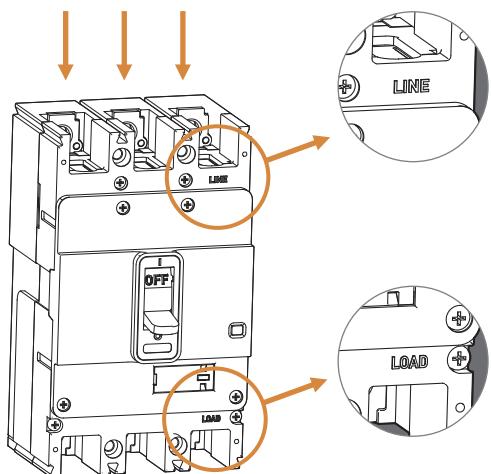




## Direction of Power Supply

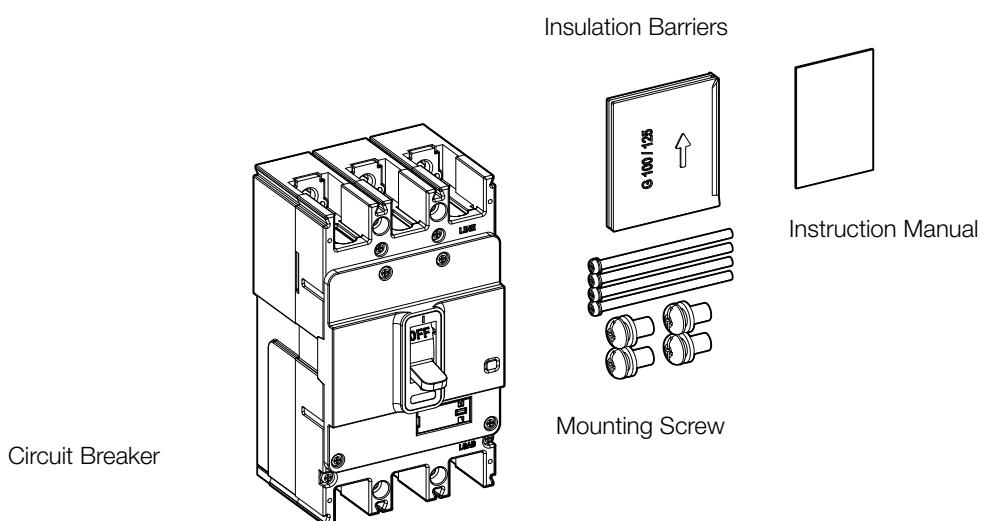
### HIM Type

Please confirm LINE/LOAD mark at circuit breaker's front cover before connecting terminal wire.



## Standard Configuration

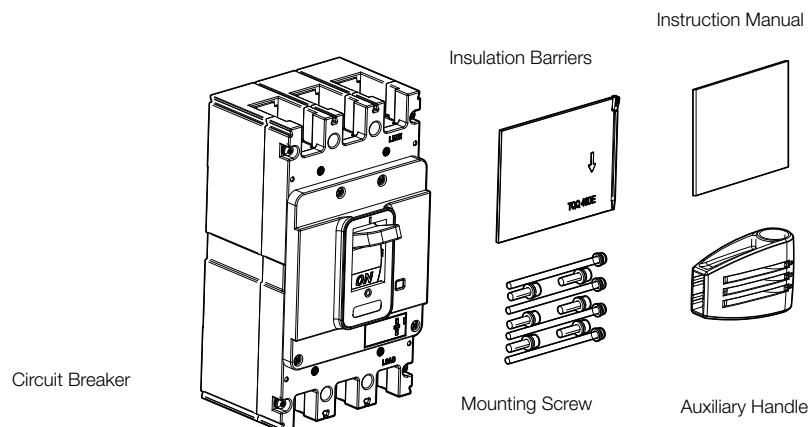
HIM 100 - 250





Type	Part							
HIM 100	2P	2 EA (M4 x L70)	4 EA	(M5 x L15) (15 - 50 A)	(M8 x L15) (60 - 100 A)	1 EA		
	3P	4 EA (M4 x L70)	6 EA			2 EA		
	4P	6 EA (M4 x L70)	8 EA			3 EA		
HIM 125	2P	2 EA (M4 x L70)	4 EA (M8 x L15)			1 EA		
	3P	4 EA (M4 x L70)	6 EA (M8 x L15)			2 EA		
	4P	6 EA (M4 x L70)	8 EA (M8 x L15)			3 EA		
HIM 250	2P	4 EA (M4 x L70)	4 EA (Hex socket M8 x L15)			1 EA		
	3P	4 EA (M4 x L70)	6 EA (Hex socket M8 x L15)			2 EA		
	4P	6 EA (M4 x L70)	8 EA (Hex socket M8 x L15)			3 EA		

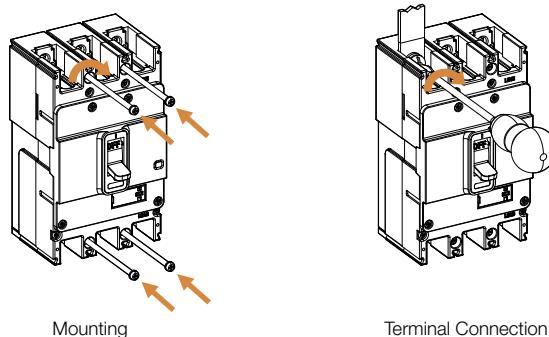
## HIM 400 - 800



Type	Part				
HIM 400	2P	4 EA (M6 x L103)	4 EA (M10 x L30)	1 EA	1 EA
	3P	4 EA (M6 x L103)	6 EA (M10 x L30)	2 EA	1 EA
	4P	6 EA (M6 x L103)	8 EA (M10 x L30)	3 EA	1 EA
HIM 630, 800	2P	4 EA (M6 x L103)	4 EA (M12 x L30)	1 EA	1 EA
	3P	4 EA (M6 x L103)	6 EA (M12 x L30)	2 EA	1 EA
	4P	6 EA (M6 x L103)	8 EA (M12 x L30)	3 EA	1 EA



## MCCB Assembly and Terminal Mounting Specification

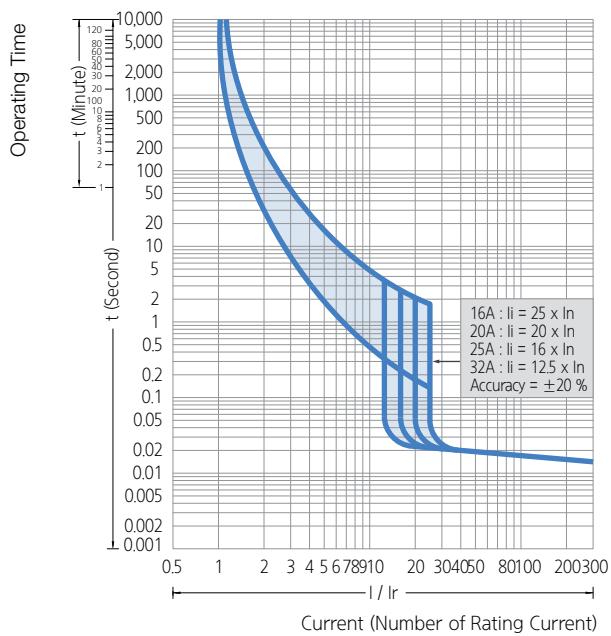


No	Type	Panel Mounting		Connection Terminal		
		Screw	Terminal (mm)	Screwing Torque	Conductor	Mounting Torque
1	HIM 100	M4: 13 kgf.cm				M5: 28.5 kgf.cm M8: 110 kgf.cm
2	HIM 125	M4: 13 kgf.cm				M8: 110 kgf.cm
3	HIM 250	M4: 13 kgf.cm				Hex M8: 110 kgf.cm
4	HIM 400	M6: 45 kgf.cm				Hex M10: 270 kgf.cm
5	HIM 630, 800	M6: 45 kgf.cm				Hex M12: 470 kgf.cm

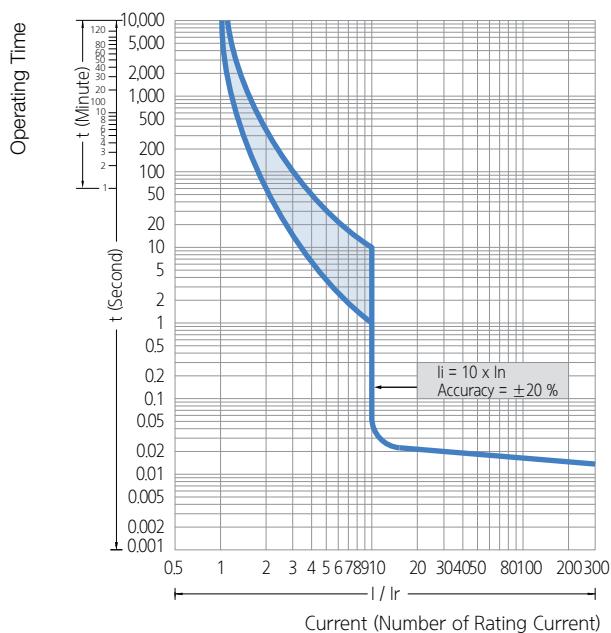


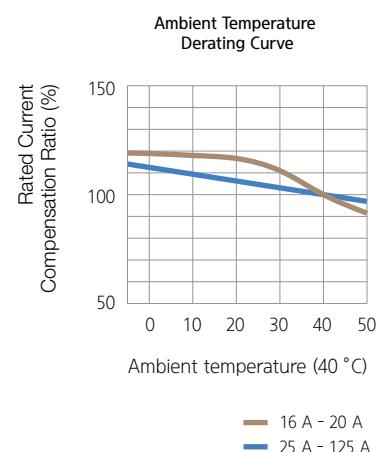
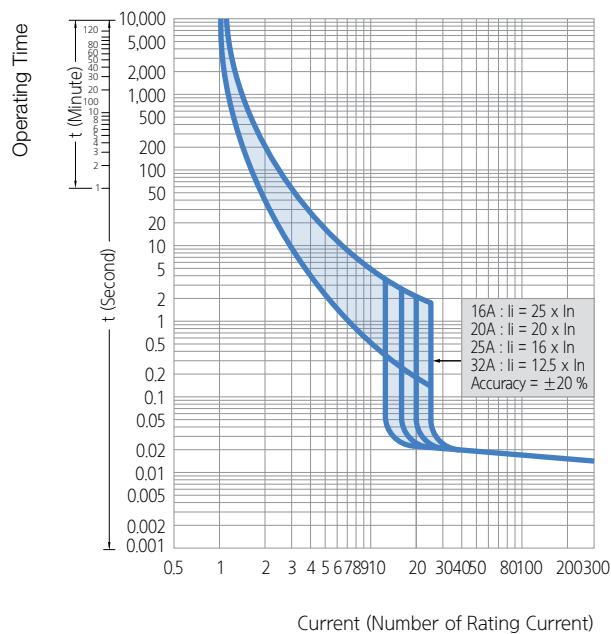
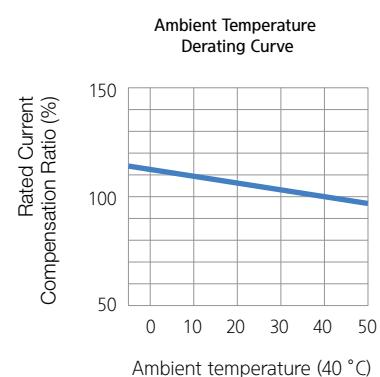
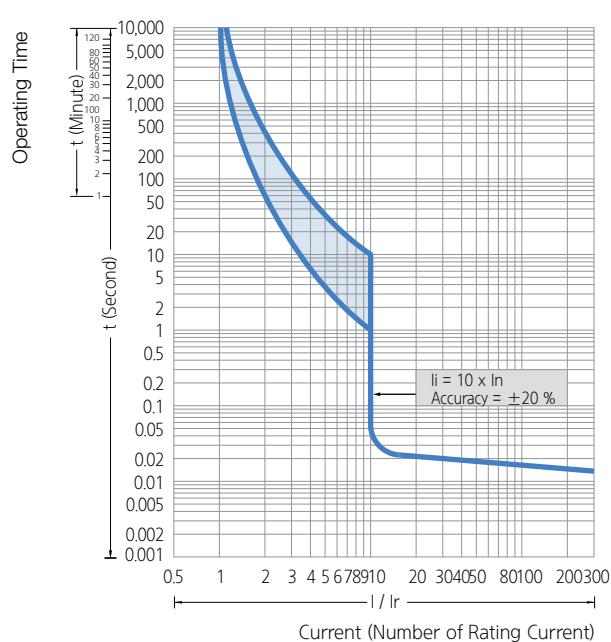
## Operation Characteristic Curve

HIM100 (16 - 32 A)



HIM100 (40-100 A)

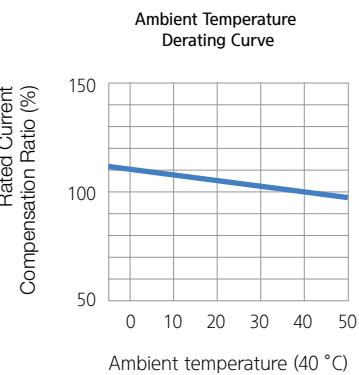
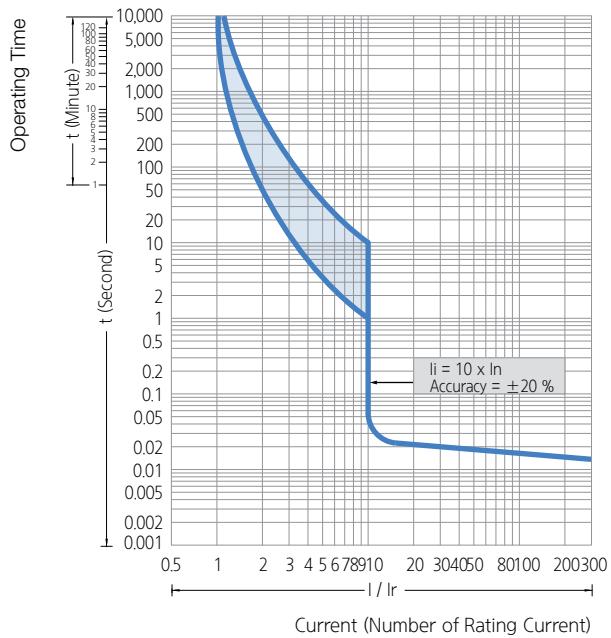


**HIM125 (16 - 32 A)****HIM125 (40 - 125 A)**

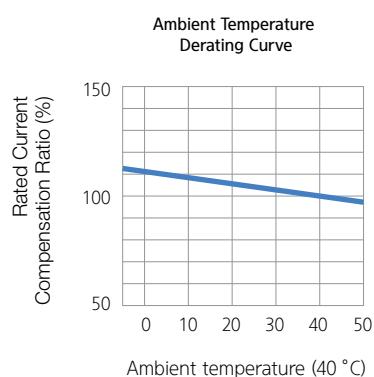
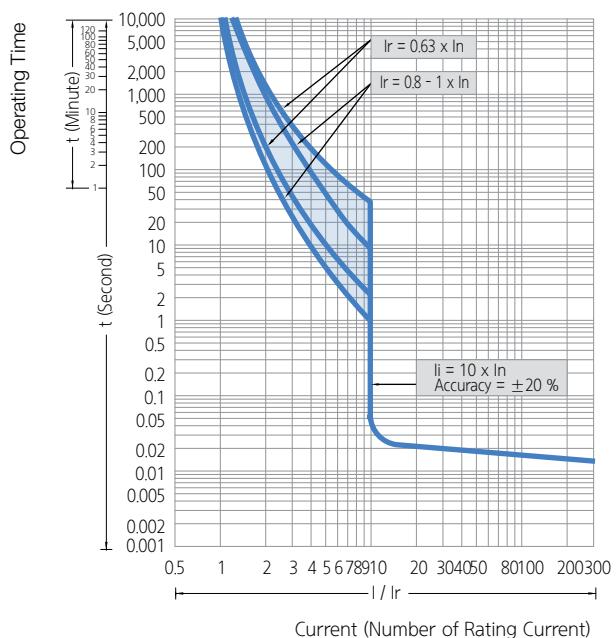


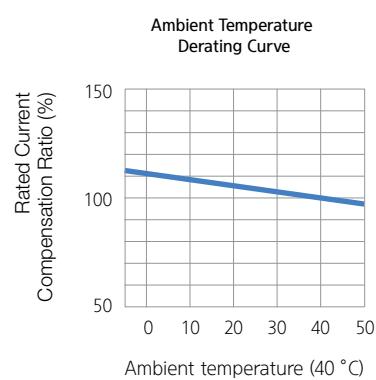
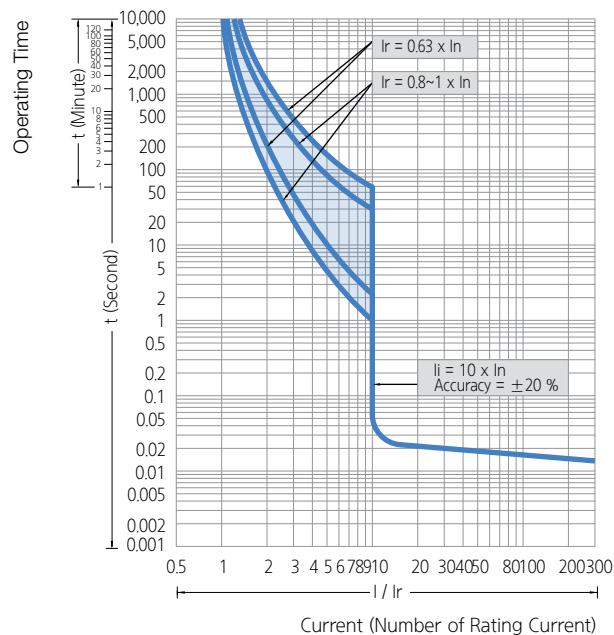
## Operation Characteristic Curve

HIM250 (150 - 250 A)



HIM400 (300 - 400A)



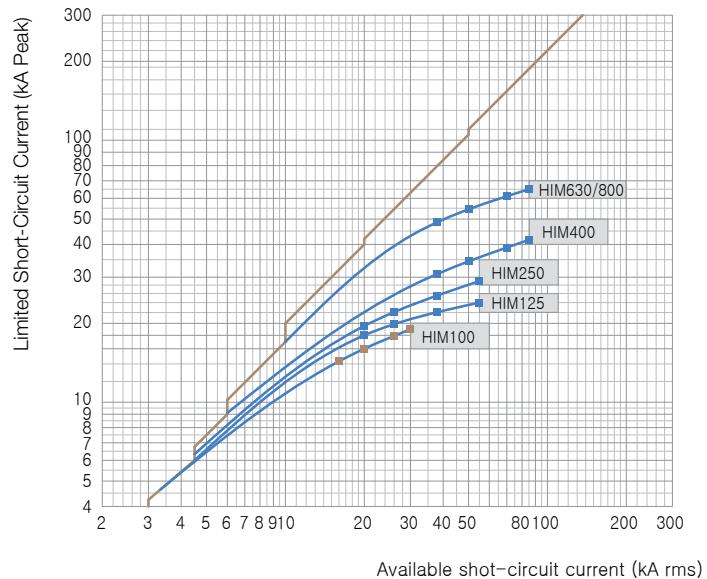
**HIM630, HIM800 (630 - 800 A)**



## Current & Energy-Limiting Characteristic Curve

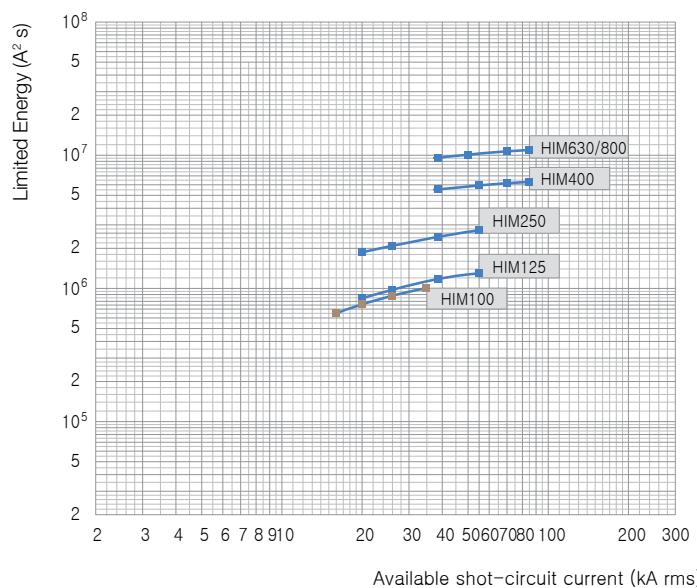
### Current-Limiting Characteristic Curve

400/460V



### Energy-Limiting Characteristic Curve

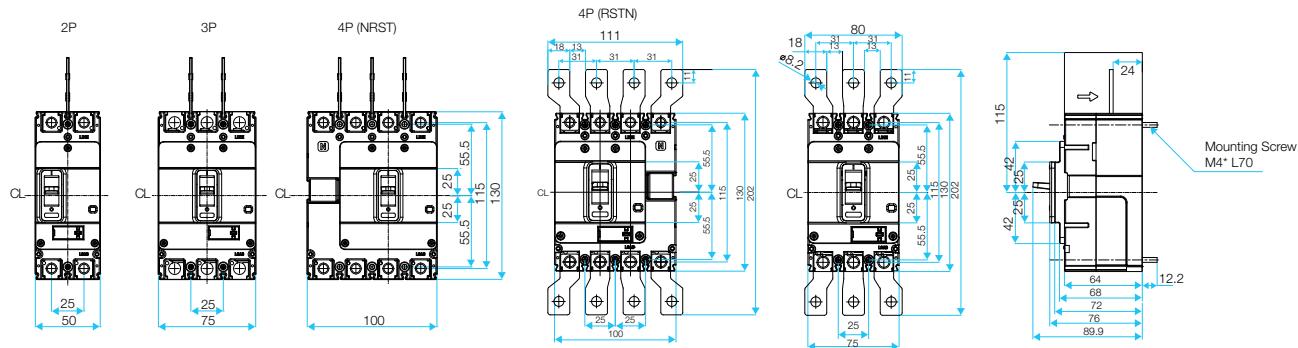
400/460V





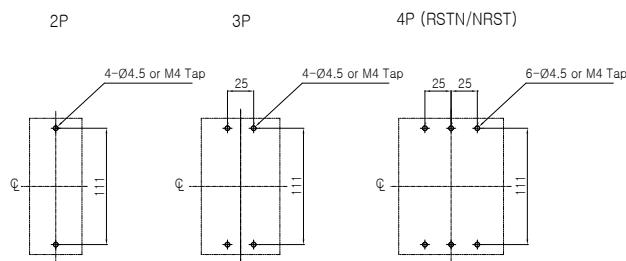
## Dimensions

### Front Connection Type HIM 100

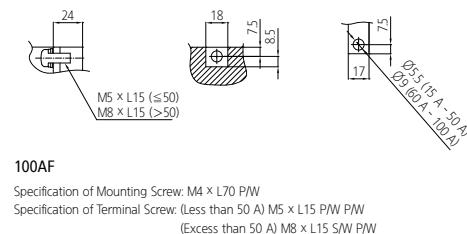


- Insulation barriers for line side are provided as basic option.

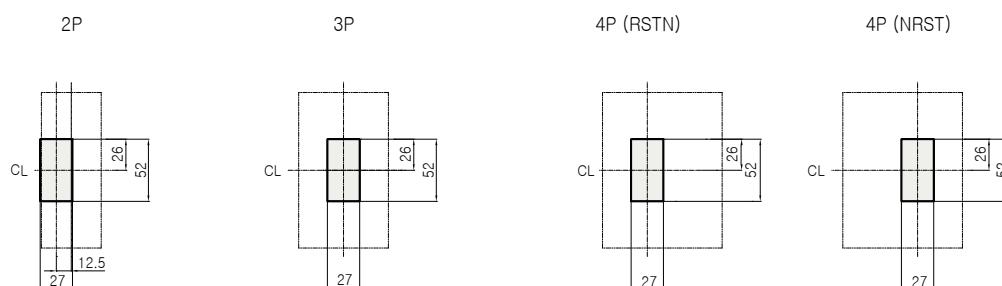
### Dimensions for Mounting Body



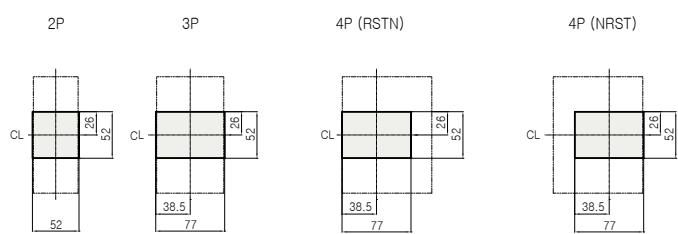
### Terminal/Connection Bus Dimension



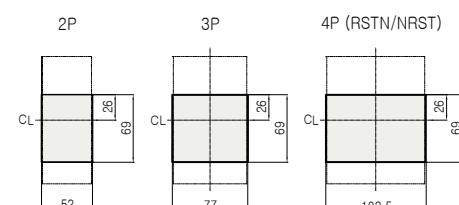
### Panel Cover Cutting Dimensions for Handle



### Panel Cover Cutting Dimensions for Handle/Test Button



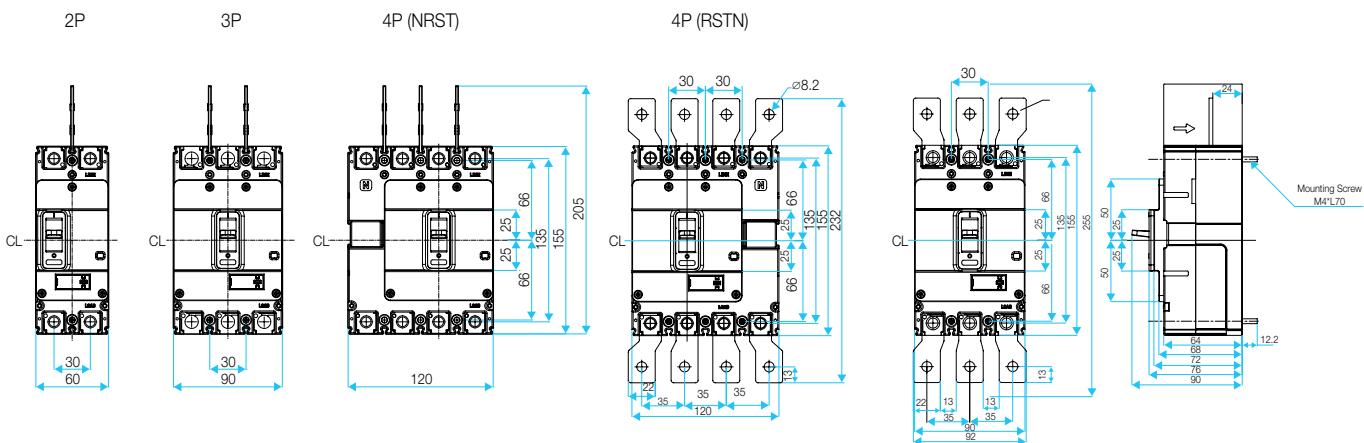
### Panel Cover Cutting Dimensions for Handle/Trip Unit





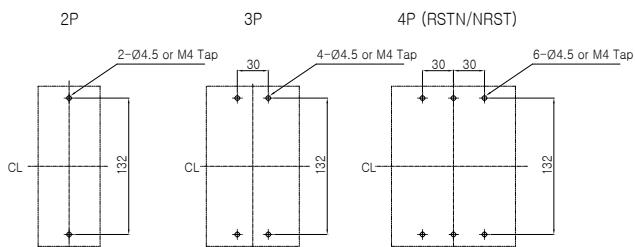
## Dimensions

### Front Connection Type HIM 125

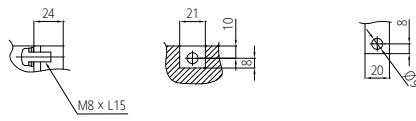


- Insulation barriers for line side are provided as basic option.

### Dimensions for Mounting Body



### Terminal/Connection Bus Dimension

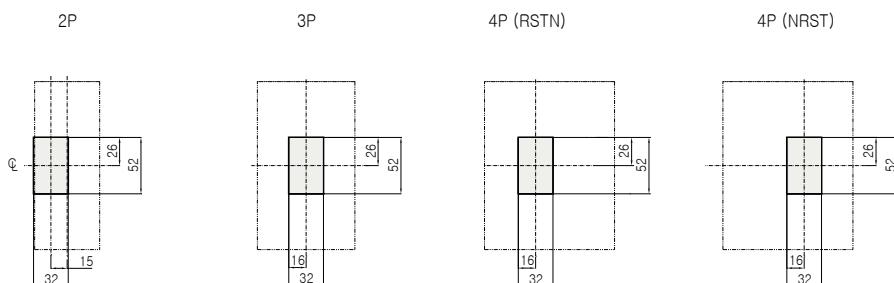


125AF

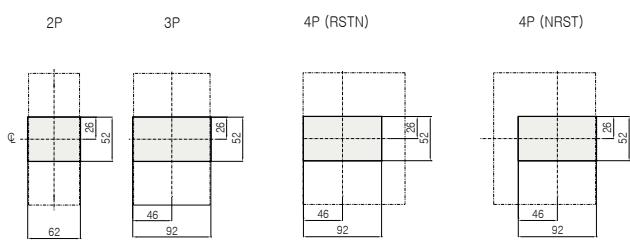
Specification of Mounting Screw: M4 x L70 P/W

Specification of Terminal Screw: M8 x L15 SW PW

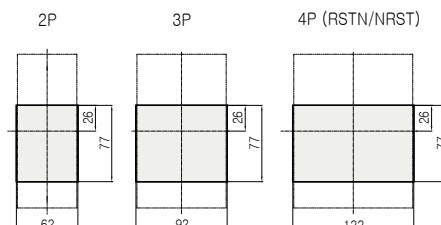
### Panel Cover Cutting Dimensions for Handle



### Panel Cover Cutting Dimensions for Handle/Test Button

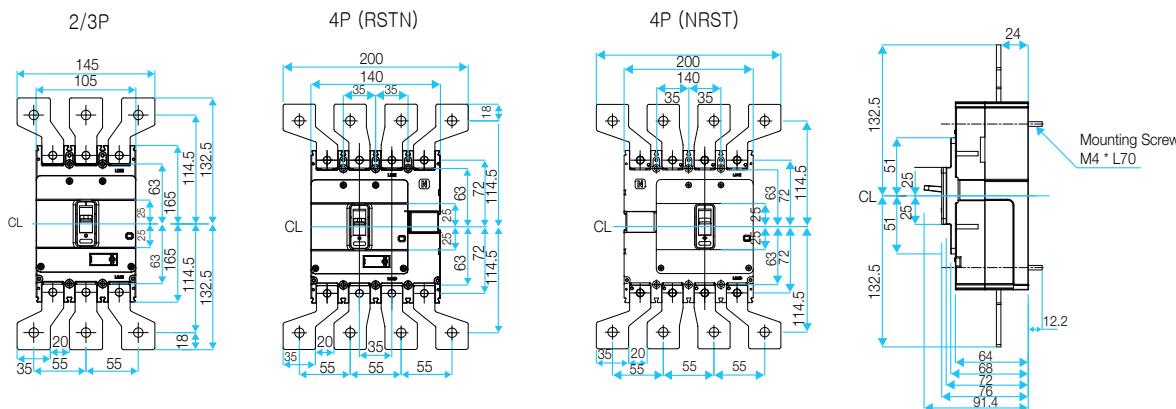


### Panel Cover Cutting Dimensions for Handle/Trip Unit



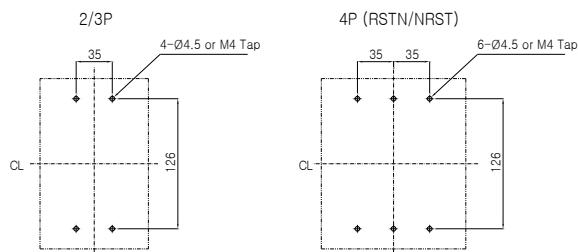


## Front Connection Type HIM 250

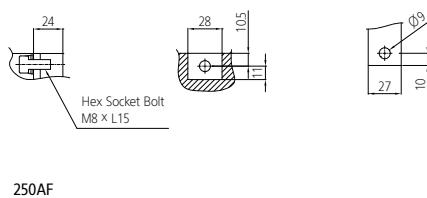


- Insulation barriers for line side are provided as basic option.

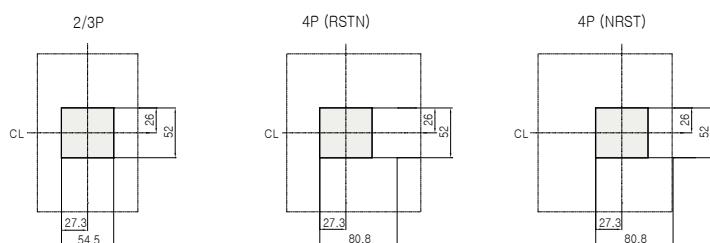
### Dimensions for Mounting Body



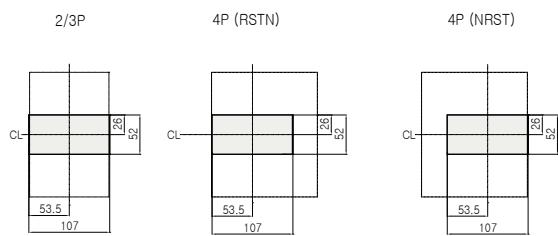
### Terminal/Connection Bus Dimension



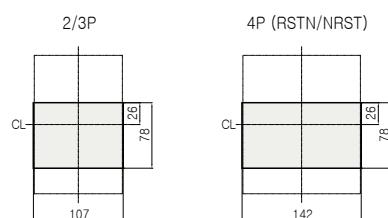
### Panel Cover Cutting Dimensions for Handle



### Panel Cover Cutting Dimensions for Handle/Test Button



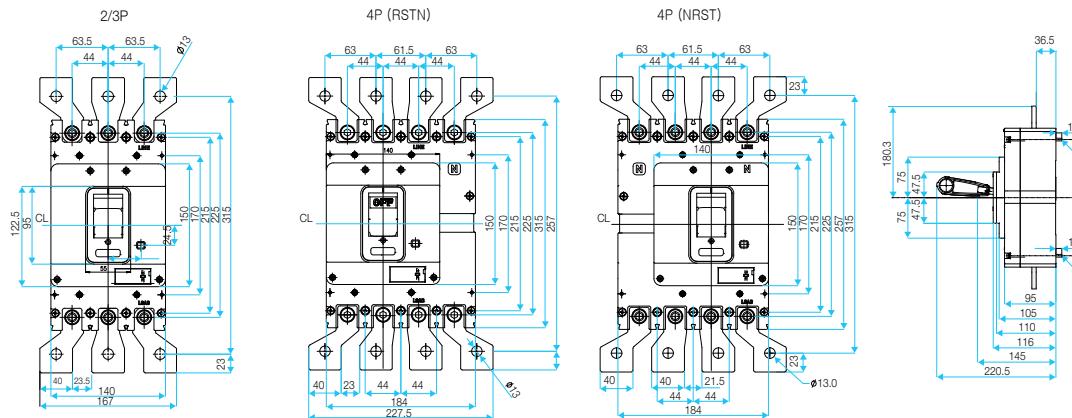
### Panel Cover Cutting Dimensions for Handle/Trip Unit





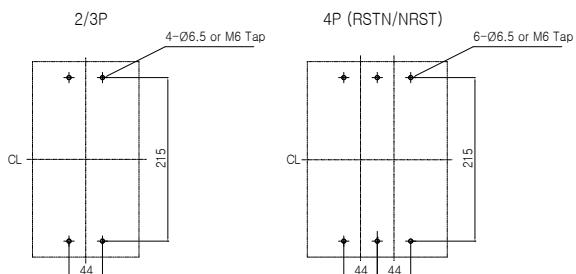
## Dimensions

### Front Connection Type HIM 400

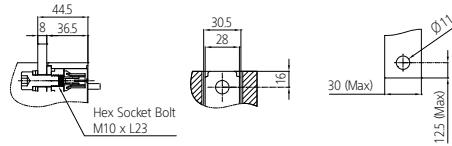


- Insulation barriers for line side are provided as basic option.

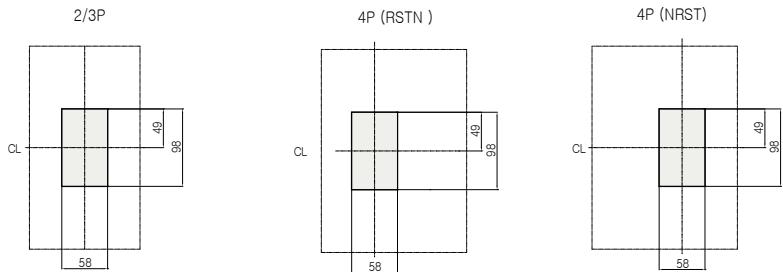
### Dimensions for Mounting Body



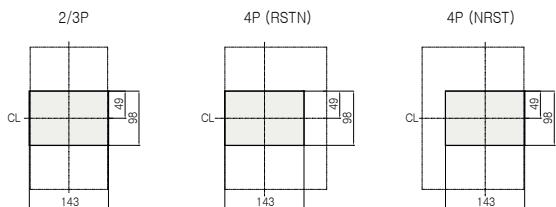
### Terminal/Connection Bus Dimension



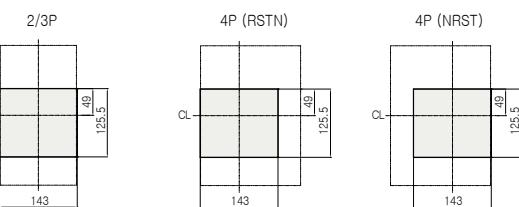
### Panel Cover Cutting Dimensions for Handle



### Panel Cover Cutting Dimensions for Handle/ Test Button



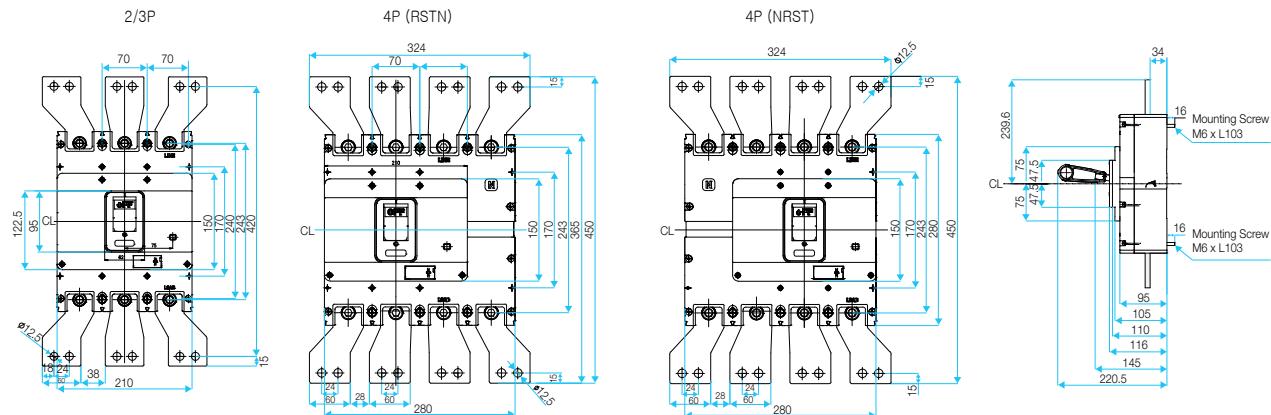
### Panel Cover Cutting Dimensions for Handle/Trip Unit





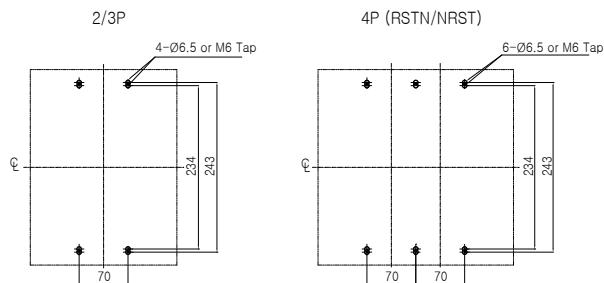
## Dimensions

### Front Connection Type HIM 800

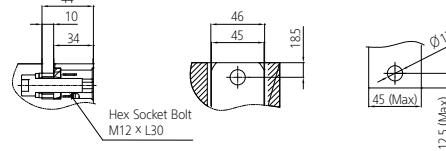


- Insulation barriers for line side are provided as basic option.

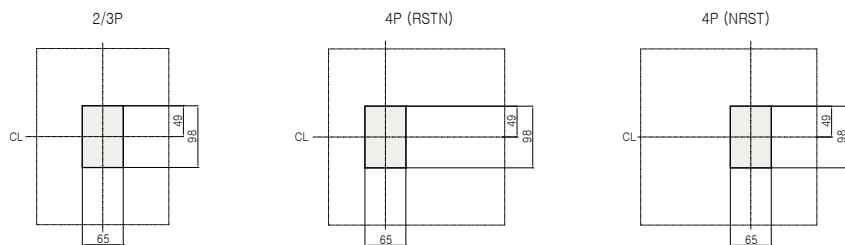
### Dimensions for Mounting Body



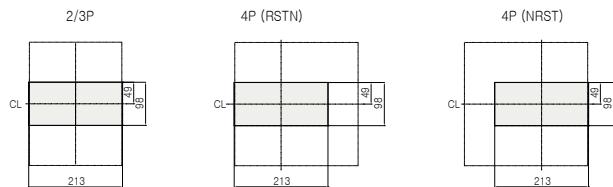
### Terminal/Connection Bus Dimension



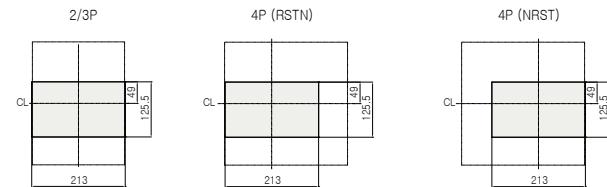
### Panel Cover Cutting Dimensions for Handle



### Panel Cover Cutting Dimensions for Handle/Test Button



### Panel Cover Cutting Dimensions for Handle/Trip Unit

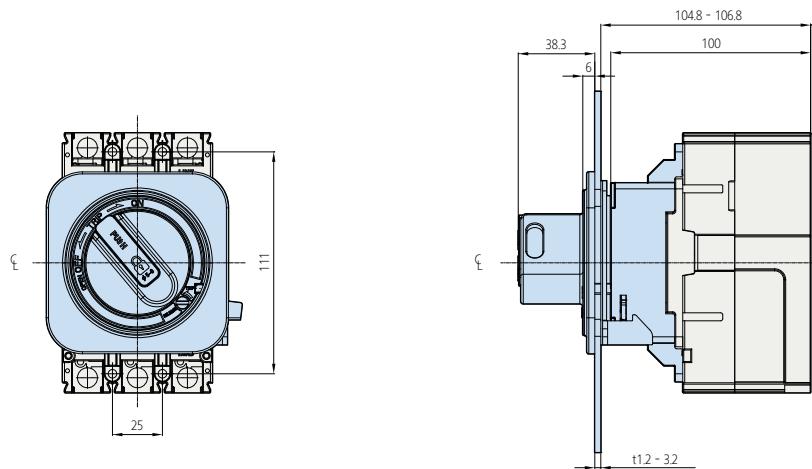




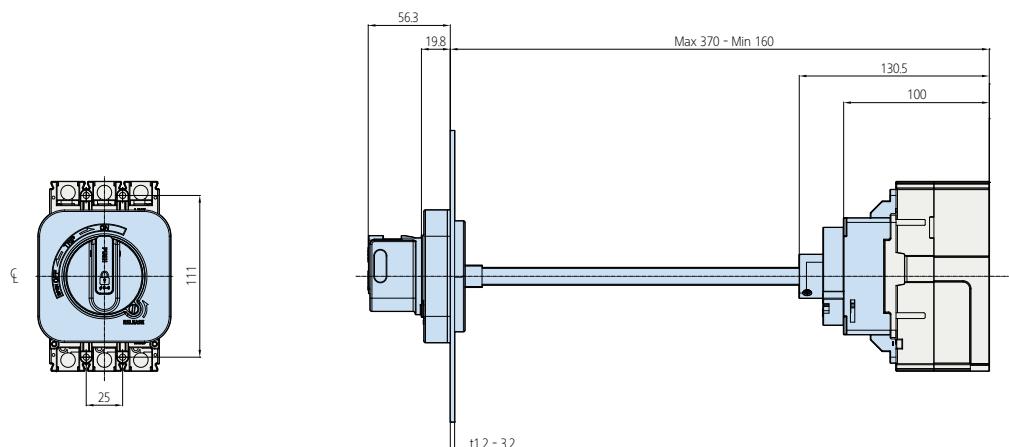
## Dimensions

### Rotary Handle HIM 100

#### Direct Rotary Handle

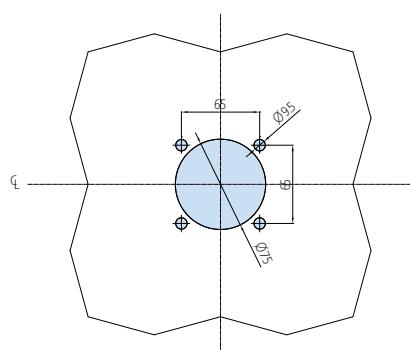


#### Extended Rotary Handle

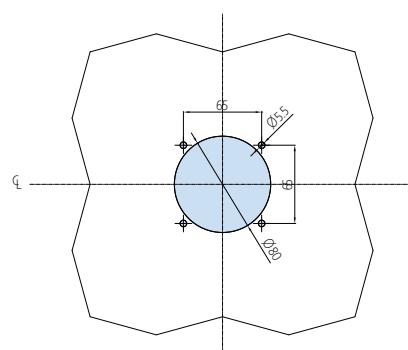


#### Dimensions for Mounting Body

Direct Rotary Handle



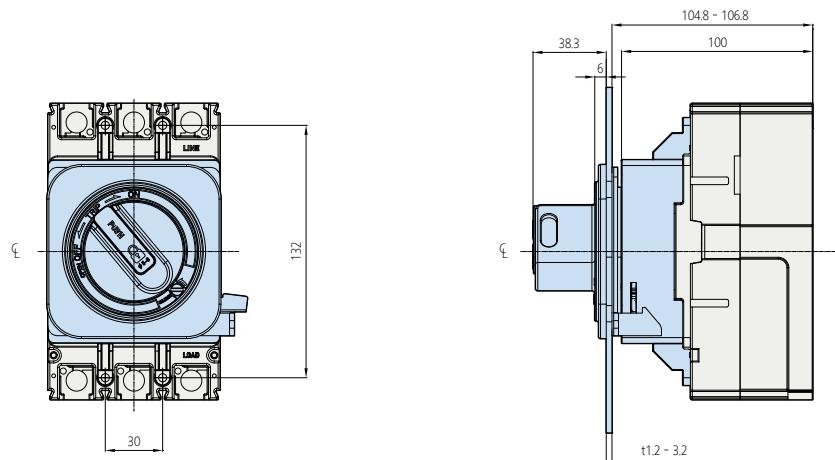
Extended Rotary Handle



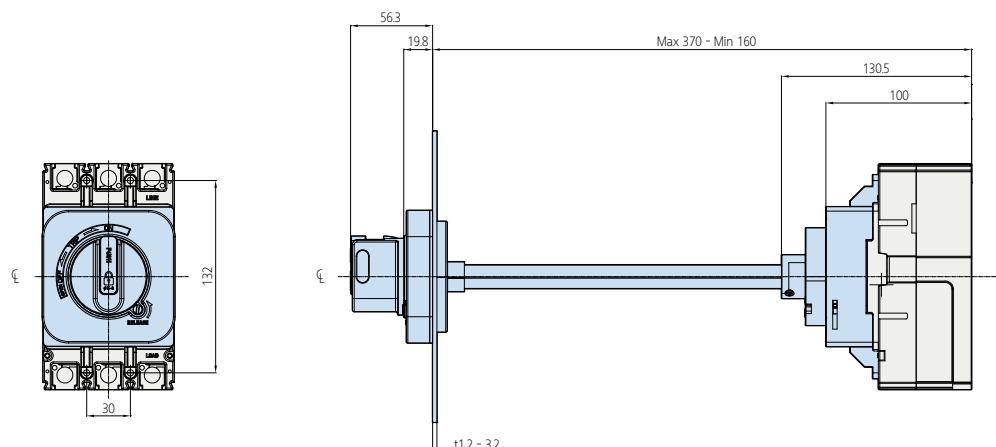


## Rotary Handle HIM 125

### Direct Rotary Handle

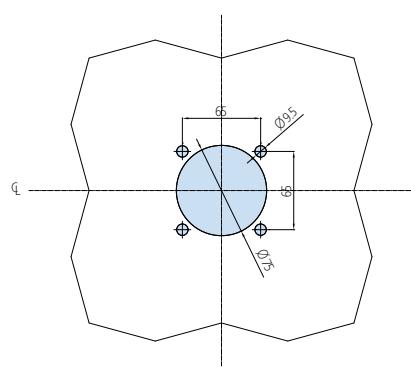


### Extended Rotary Handle

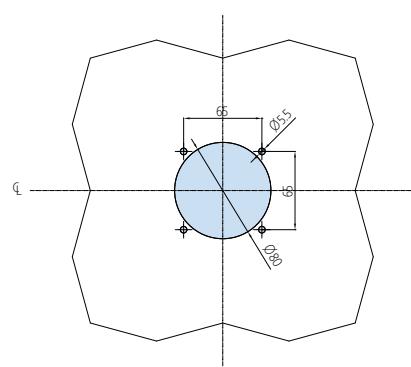


### Dimensions for Mounting Body

Direct Rotary Handle



Extended Rotary Handle

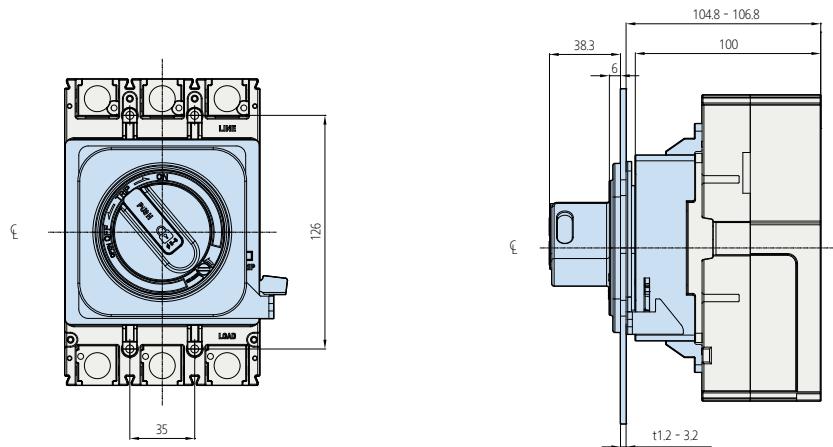




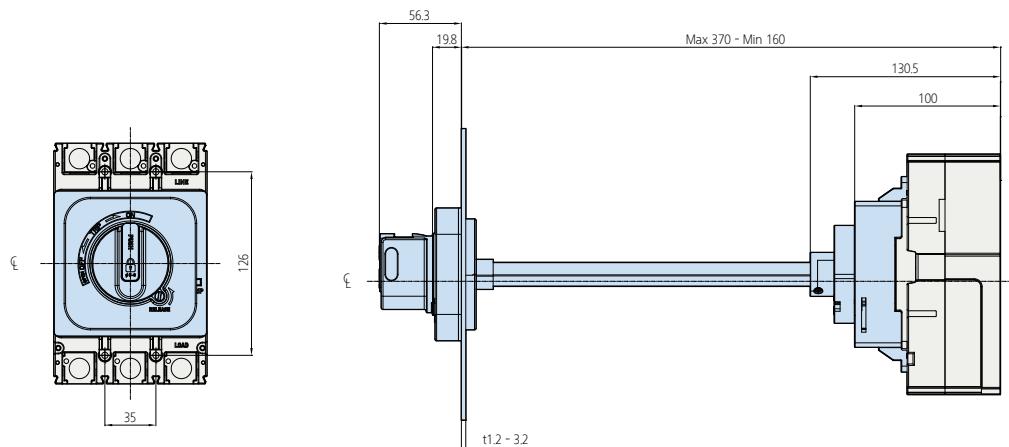
## Dimensions

### Rotary Handle HIM 250

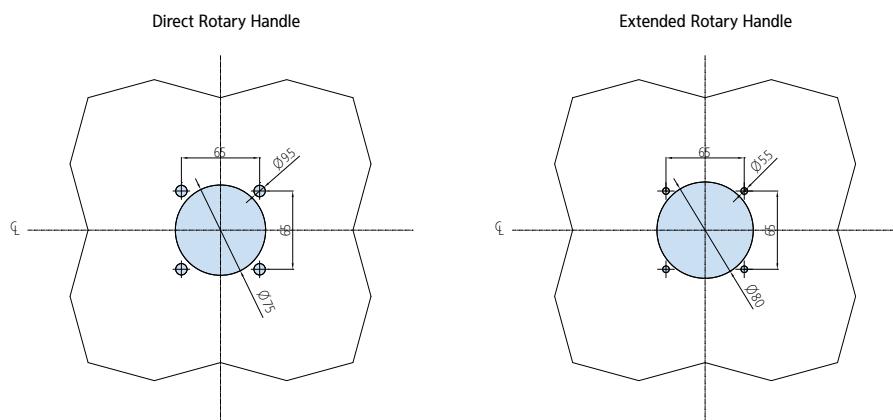
#### Direct Rotary Handle



#### Extended Rotary Handle



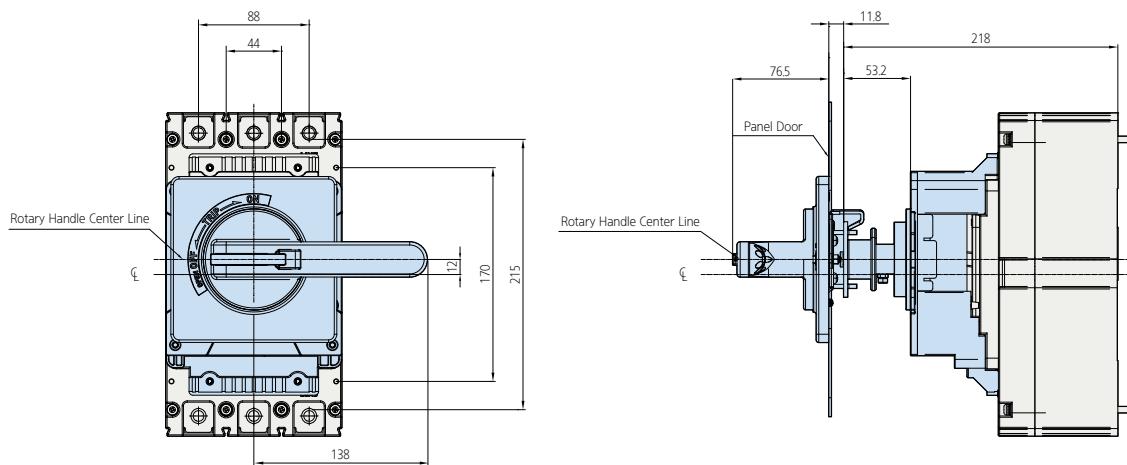
#### Dimensions for Mounting Body



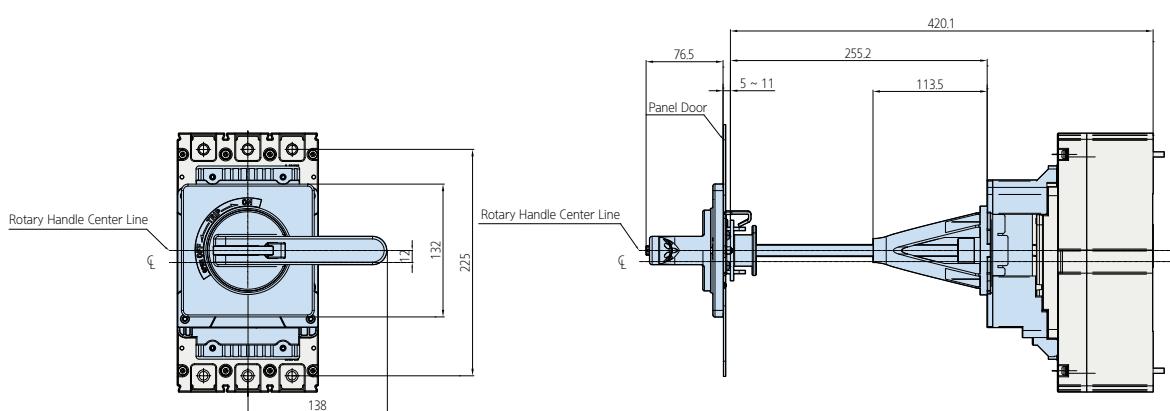


## Rotary Handle HIM 400

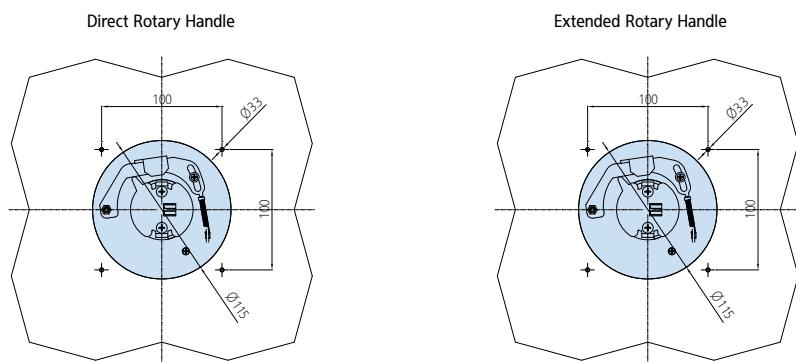
### Direct Rotary Handle



### Extended Rotary Handle



### Dimensions for Mounting Body

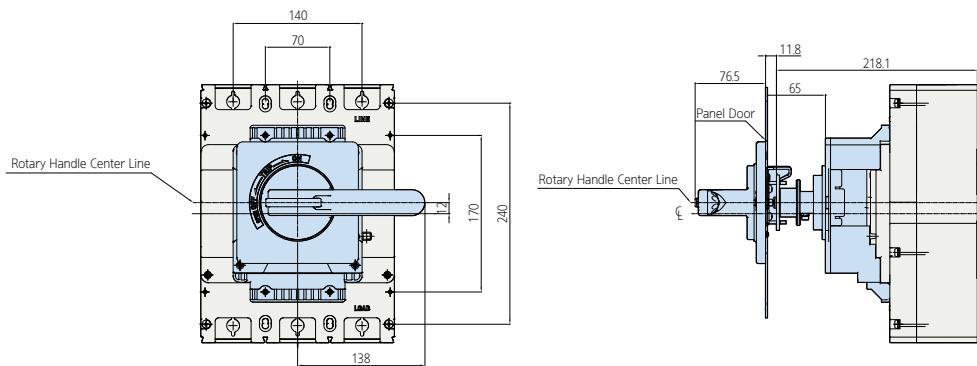




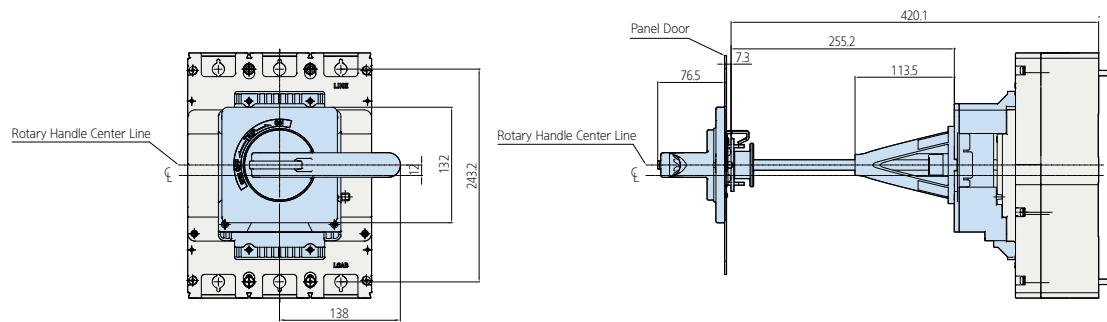
## Dimensions

### Rotary Handle HIM 800

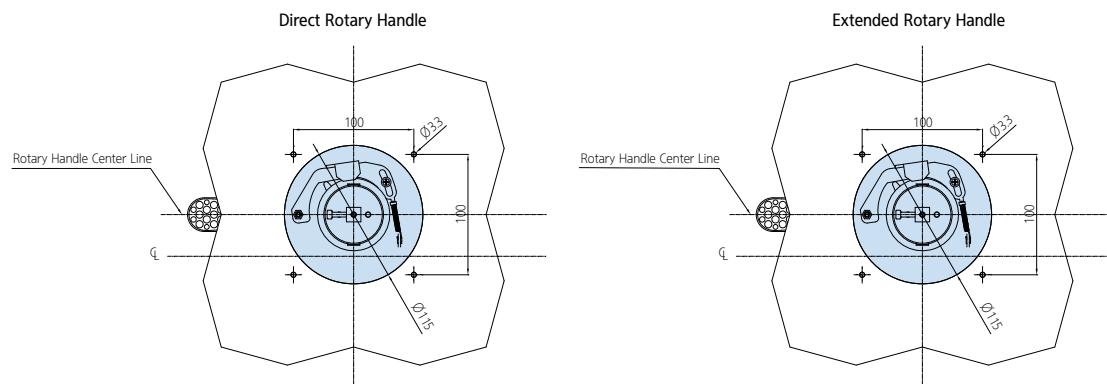
#### Direct Rotary Handle



#### Extended Rotary Handle

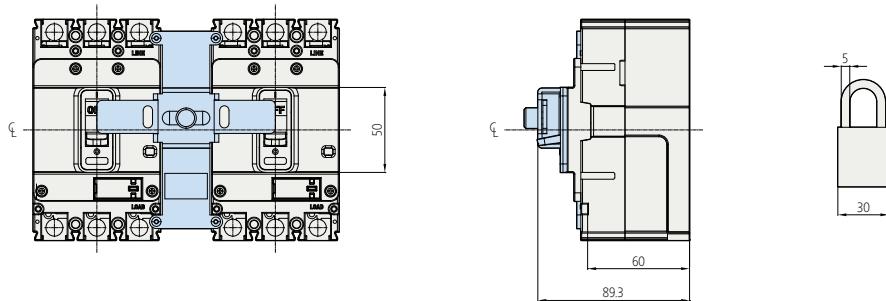


#### Dimensions for Mounting Body

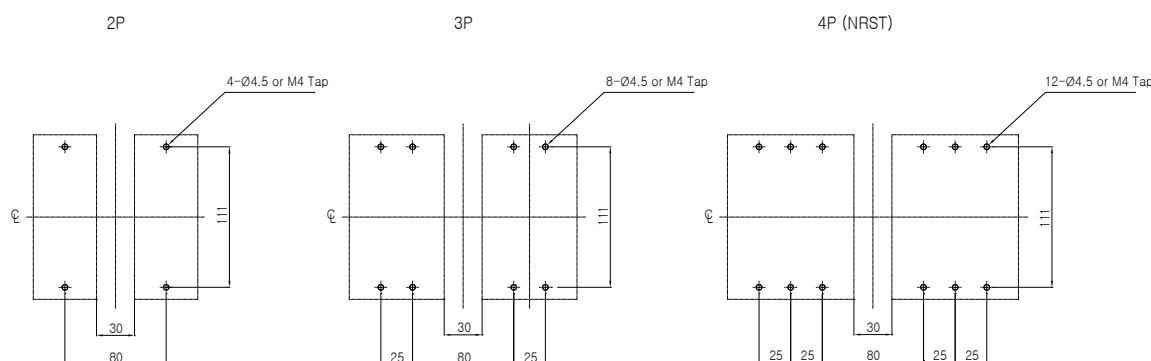




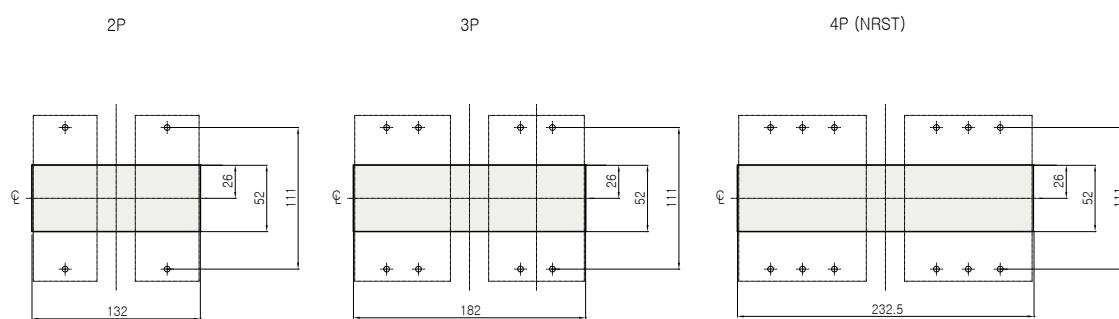
## Mechanical Interlock HIM 100



### Dimensions for Mounting Body



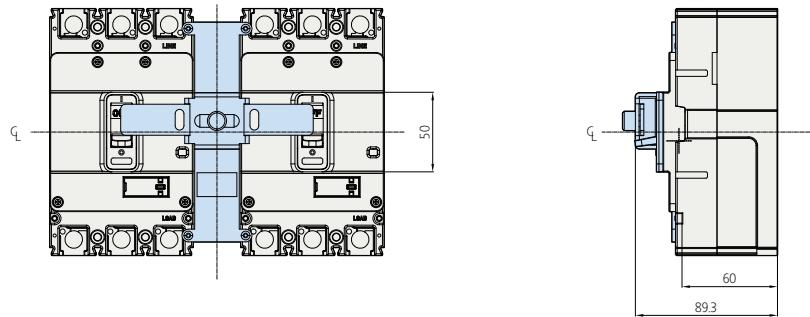
### Panel Cover Cutting Dimension



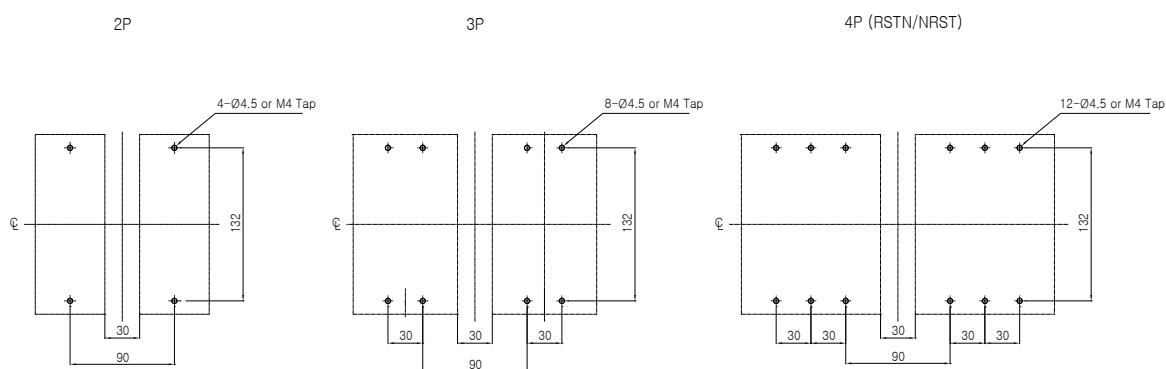


## Dimensions

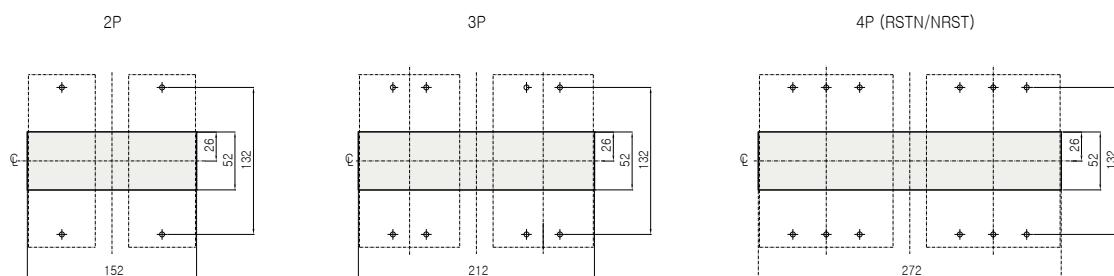
### Mechanical Interlock HIM 125



### Dimensions for Mounting Body

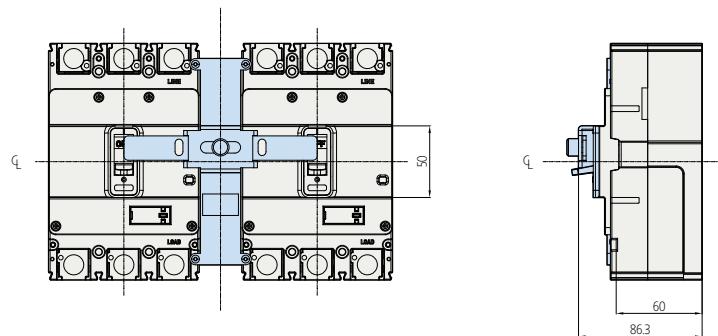


### Panel Cover Cutting Dimension

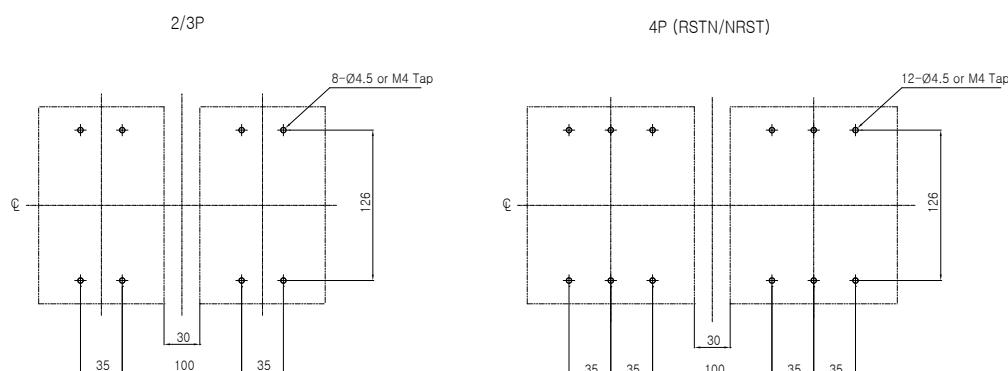




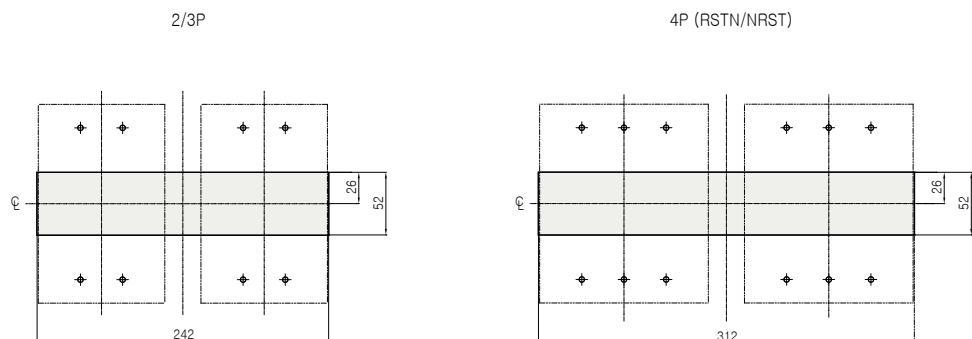
## Mechanical Interlock HIM 250



### Dimensions for Mounting Body



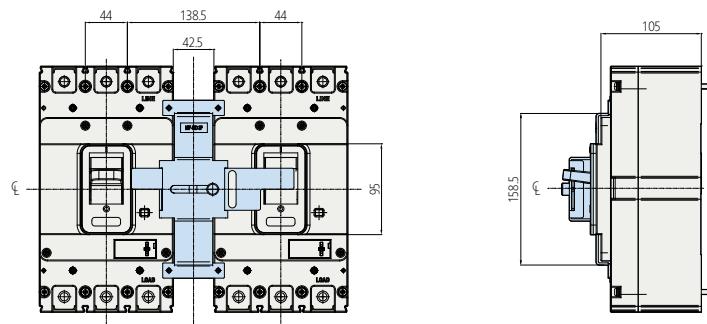
### Panel Cover Cutting Dimension



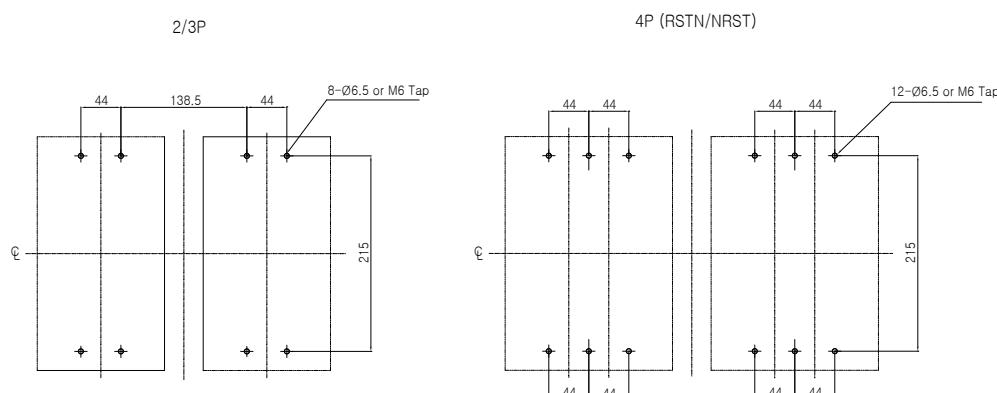


## Dimensions

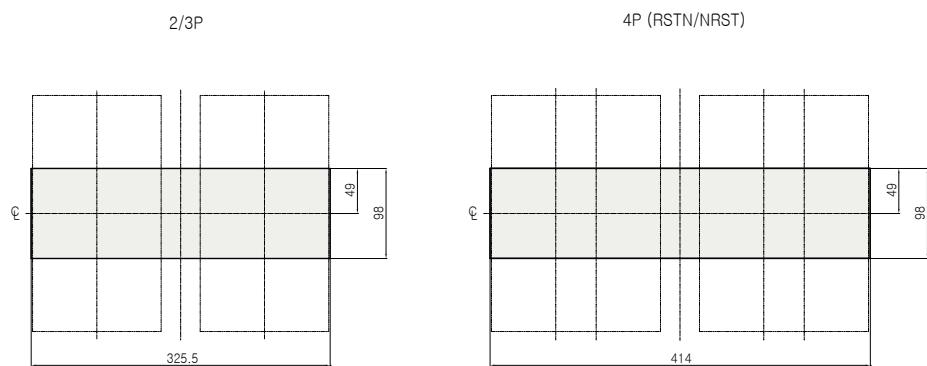
### Mechanical Interlock HIM 400



### Dimensions for Mounting Body

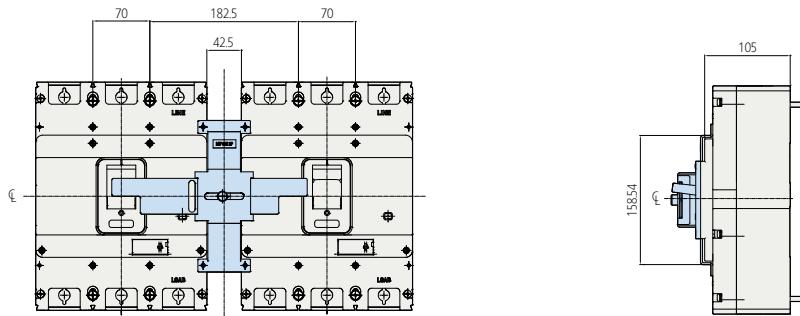


### Panel Cover Cutting Dimension

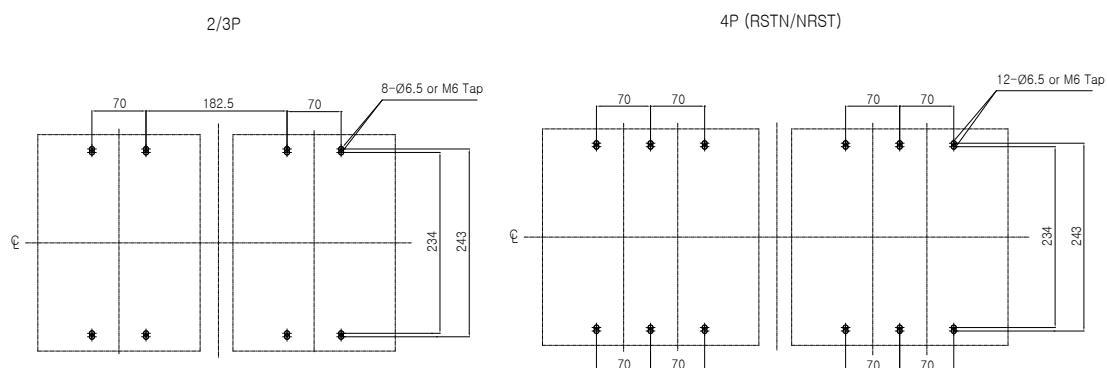




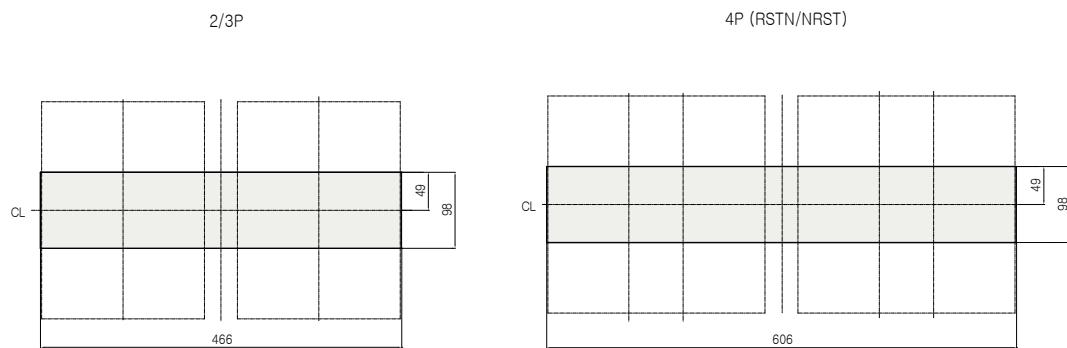
## Mechanical Interlock HIM 800



### Dimensions for Mounting Body



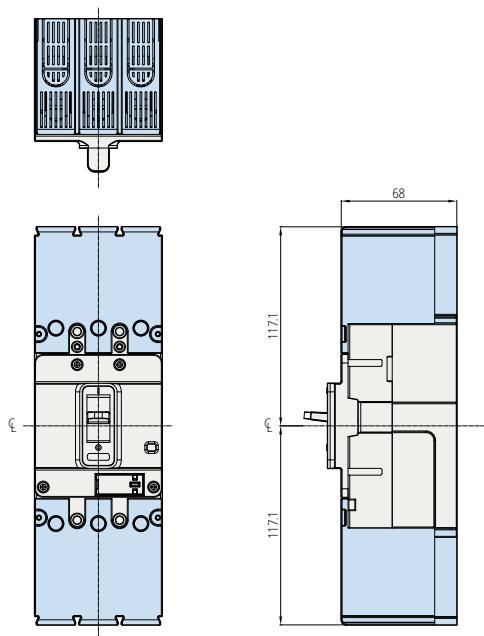
### Panel Cover Cutting Dimension



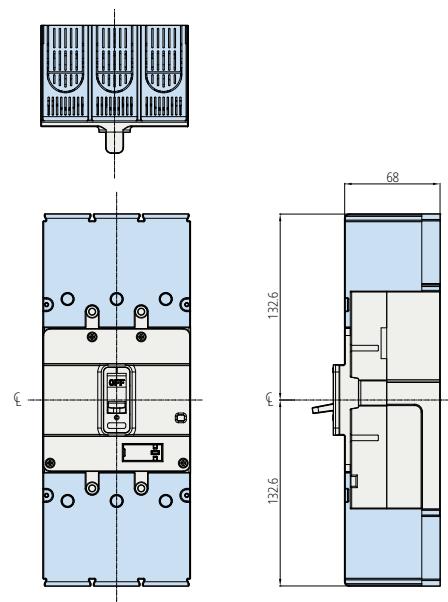


## Dimensions

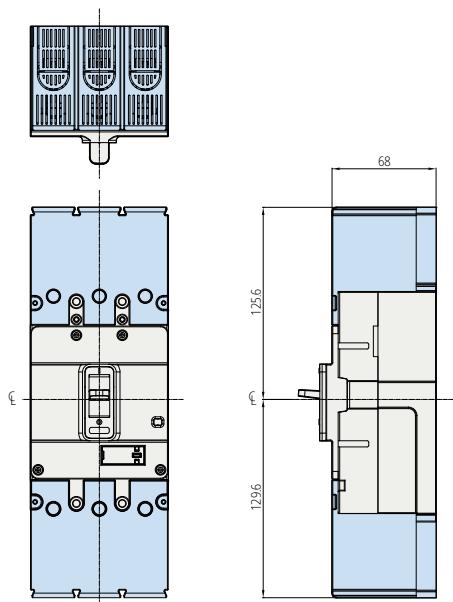
Terminal Cover HIM 100



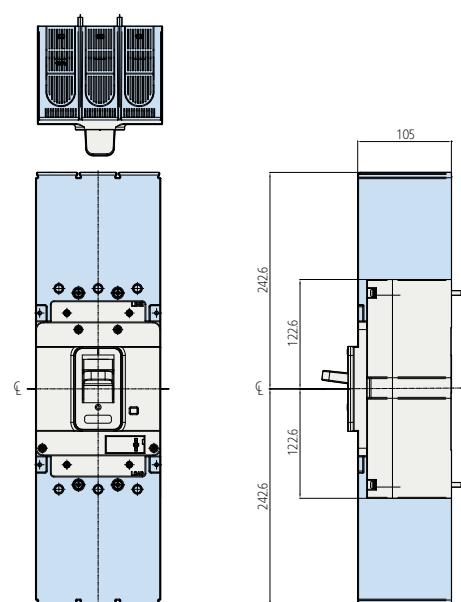
Terminal Cover HIM 250



Terminal Cover HIM 125

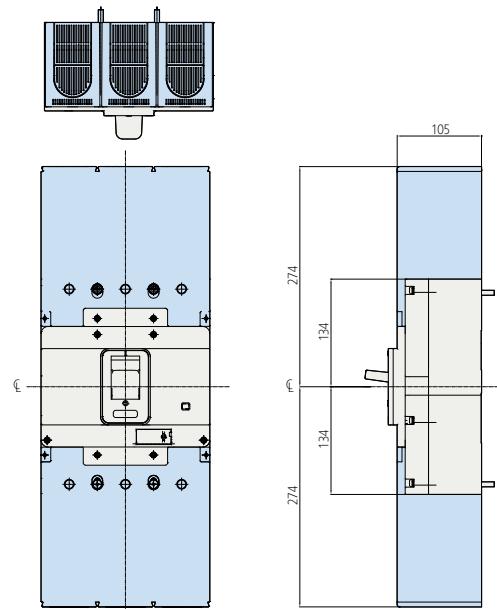


Terminal Cover HIM 400



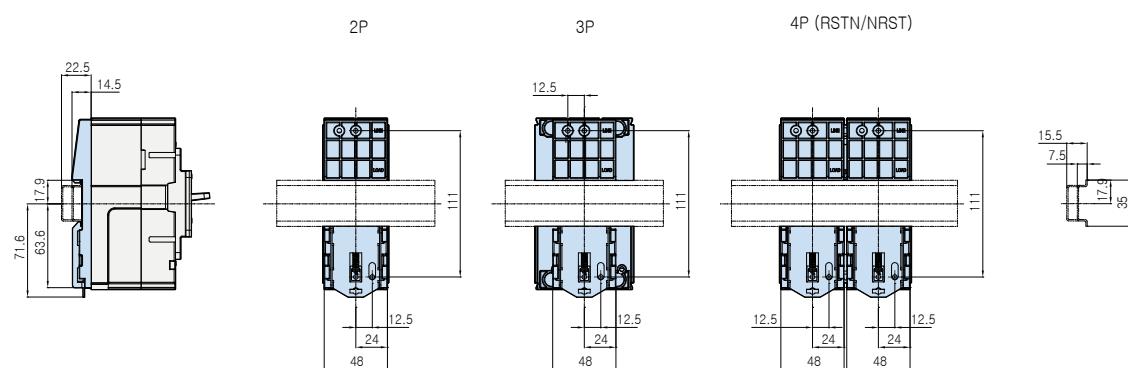


## Terminal Cover HIM 800



## DIN Rail Adaptor

### DIN Rail Mounting Hole

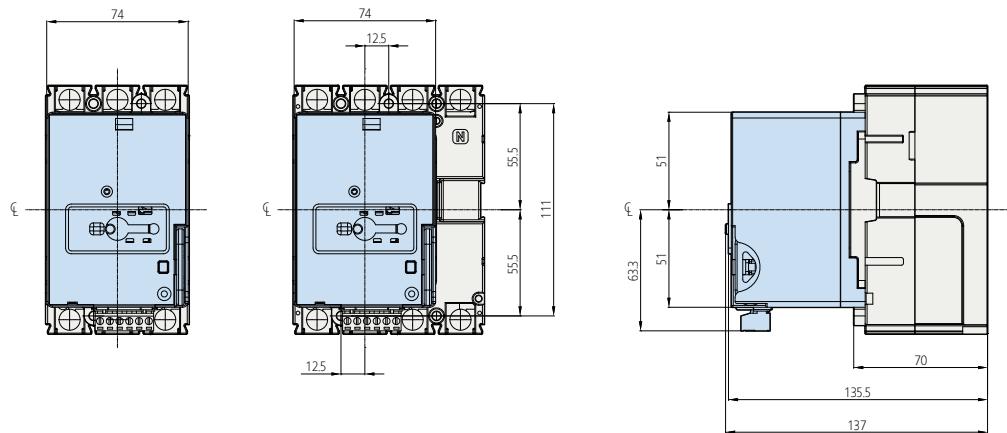




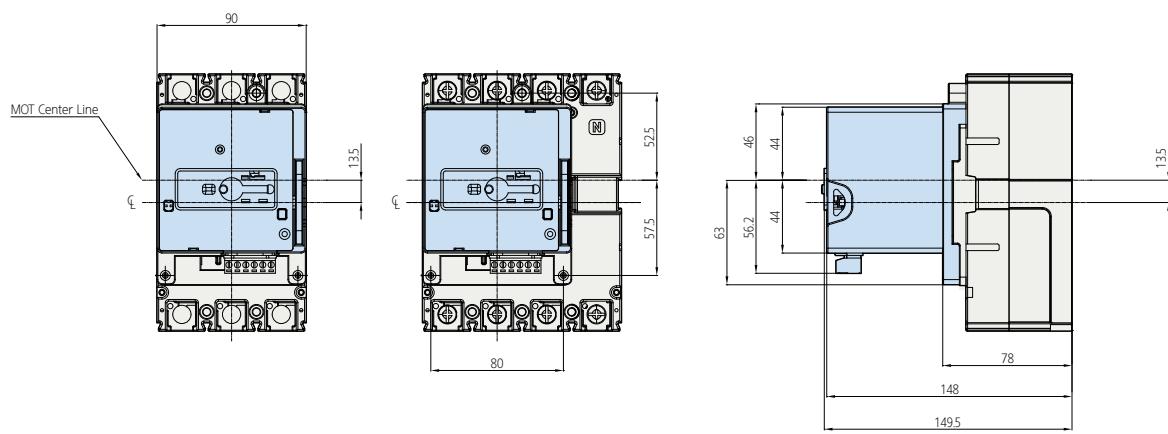
## Dimensions

### Motor Operator

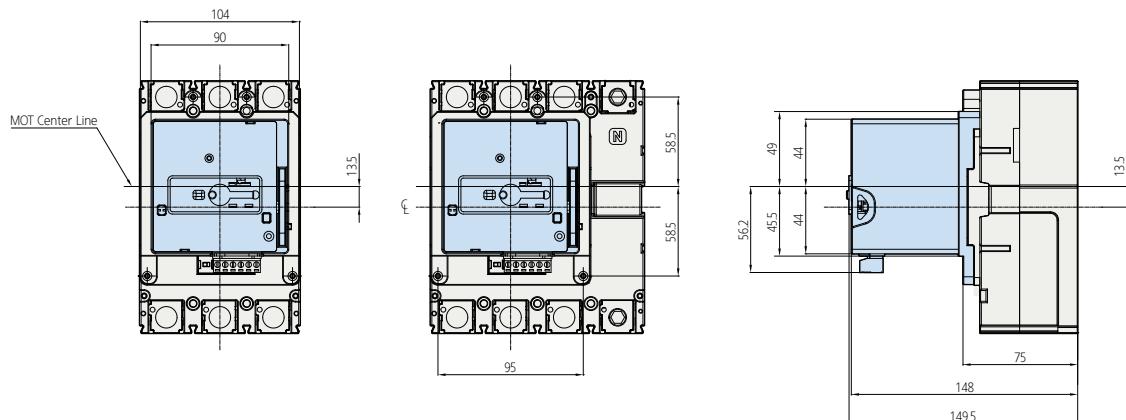
HIM 100



HIM 125



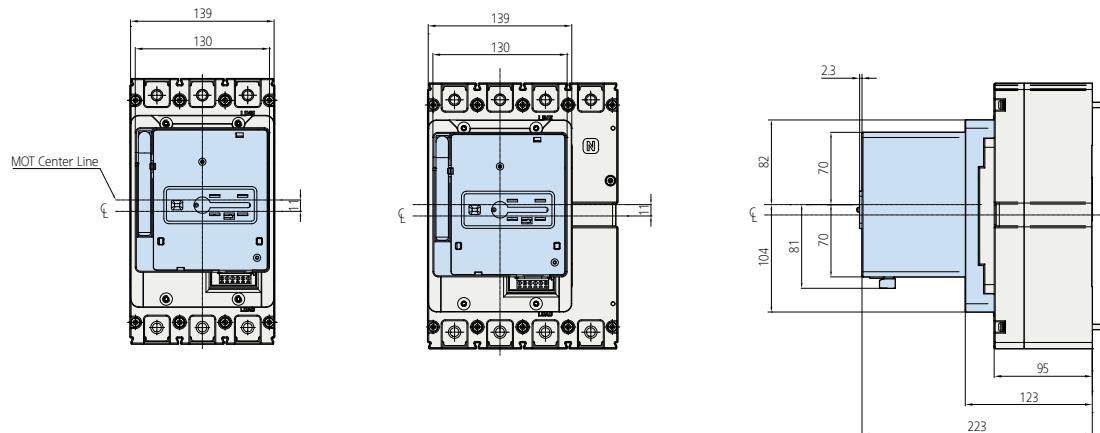
HIM 160, 250



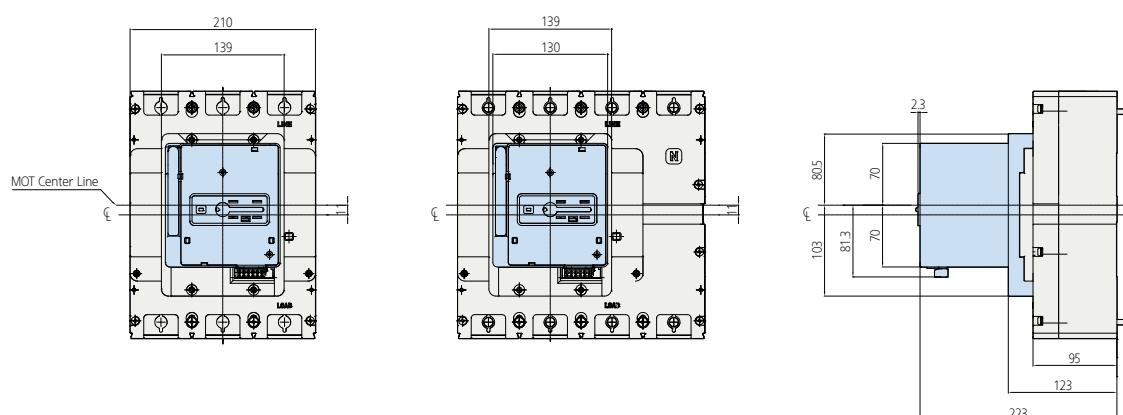


## Motor Operator

HIM 400



HIM 630, 800





## Ordering Codes

### HIM 100AF

100 AF	Current Rating (A)	Double Pole Cat. No.	Three Pole Cat. No.	*Four Pole Cat. No.
	HIM 100E, 16/16 kA, 460 V			
	16 A	IHDA3BBD0016	IHDA3BBT0016	IHDA3BBF0016
	20 A	IHDA3BBD0020	IHDA3BBT0020	IHDA3BBF0020
	25 A	IHDA3BBD0025	IHDA3BBT0025	IHDA3BBF0025
	32 A	IHDA3BBD0032	IHDA3BBT0032	IHDA3BBF0032
	40 A	IHDA3BBD0040	IHDA3BBT0040	IHDA3BBF0040
	50 A	IHDA3BBD0050	IHDA3BBT0050	IHDA3BBF0050
	63 A	IHDA3BBD0063	IHDA3BBT0063	IHDA3BBF0063
	80 A	IHDA3BBD0080	IHDA3BBT0080	IHDA3BBF0080
	100 A	IHDA3BBD0100	IHDA3BBT0100	IHDA3BBF0100
	HIM 100S, 20/20 kA, 460 V			
	16 A	IHDA3CBD0016	IHDA3CBT0016	IHDA3CBF0016
	20 A	IHDA3CBD0020	IHDA3CBT0020	IHDA3CBF0020
	25 A	IHDA3CBD0025	IHDA3CBT0025	IHDA3CBF0025
	32 A	IHDA3CBD0032	IHDA3CBT0032	IHDA3CBF0032
	40 A	IHDA3CBD0040	IHDA3CBT0040	IHDA3CBF0040
	50 A	IHDA3CBD0050	IHDA3CBT0050	IHDA3CBF0050
	63 A	IHDA3CBD0063	IHDA3CBT0063	IHDA3CBF0063
	80 A	IHDA3CBD0080	IHDA3CBT0080	IHDA3CBF0080
	100 A	IHDA3CBD0100	IHDA3CBT0100	IHDA3CBF0100

\*Codes for RSTN Version



## HIM 125AF

125 AF	Current Rating (A)	Double Pole Cat. No.	Three Pole Cat. No.	*Four Pole Cat. No.
	HIM 125S, 26/26 kA, 460 V			
	16 A	IHDA6OBD0016	IHDA6OBT0016	IHDA6OBF0016
	20 A	IHDA6OBD0020	IHDA6OBT0020	IHDA6OBF0020
	25 A	IHDA6OBD0025	IHDA6OBT0025	IHDA6OBF0025
	32 A	IHDA6OBD0032	IHDA6OBT0032	IHDA6OBF0032
	40 A	IHDA6OBD0040	IHDA6OBT0040	IHDA6OBF0040
	50 A	IHDA6OBD0050	IHDA6OBT0050	IHDA6OBF0050
	63 A	IHDA6OBD0063	IHDA6OBT0063	IHDA6OBF0063
	80 A	IHDA6OBD0080	IHDA6OBT0080	IHDA6OBF0080
	100 A	IHDA6OBD0100	IHDA6OBT0100	IHDA6OBF0100
	125 A	IHDA6OBD0125	IHDA6OBT0125	IHDA6OBF0125
	HIM 125H, 38/38 kA, 460 V			
	16 A	IHDA6TBD0016	IHDA6TBT0016	IHDA6TBF0016
	20 A	IHDA6TBD0020	IHDA6TBT0020	IHDA6TBF0020
	25 A	IHDA6TBD0025	IHDA6TBT0025	IHDA6TBF0025
	32 A	IHDA6TBD0032	IHDA6TBT0032	IHDA6TBF0032
	40 A	IHDA6TBD0040	IHDA6TBT0040	IHDA6TBF0040
	50 A	IHDA6TBD0050	IHDA6TBT0050	IHDA6TBF0050
	63 A	IHDA6TBD0063	IHDA6TBT0063	IHDA6TBF0063
	80 A	IHDA6TBD0080	IHDA6TBT0080	IHDA6TBF0080
	100 A	IHDA6TBD0100	IHDA6TBT0100	IHDA6TBF0100
	125 A	IHDA6TBD0125	IHDA6TBT0125	IHDA6TBF0125
	HIM 125L, 55/55 kA, 460 V			
	16 A	IHDA6VBD0016	IHDA6VBT0016	IHDA6VBF0016
	20 A	IHDA6VBD0020	IHDA6VBT0020	IHDA6VBF0020
	25 A	IHDA6VBD0025	IHDA6VBT0025	IHDA6VBF0025
	32 A	IHDA6VBD0032	IHDA6VBT0032	IHDA6VBF0032
	40 A	IHDA6VBD0040	IHDA6VBT0040	IHDA6VBF0040
	50 A	IHDA6VBD0050	IHDA6VBT0050	IHDA6VBF0050
	63 A	IHDA6VBD0063	IHDA6VBT0063	IHDA6VBT0063
	80 A	IHDA6VBD0080	IHDA6VBT0080	IHDA6VBF0080
	100 A	IHDA6VBD0100	IHDA6VBT0100	IHDA6VBF0100
	125 A	IHDA6VBD0125	IHDA6VBT0125	IHDA6VBF0125

\*Codes for RSTN Version





## Ordering Codes

### HIM 250AF

250 AF	Current Rating (A)	Double Pole Cat. No.	Three Pole Cat. No.	*Four Pole Cat. No.
	HIM 250S, 26/26 kA, 460 V			
	150 A	IHD2HOB0D0150	IHD2HOBT0150	IHD2HOBF0150
	160 A	IHD2HOB0D0160	IHD2HOBT0160	IHD2HOBF0160
	200 A	IHD2HOB0D0200	IHD2HOBT0200	IHD2HOBF0200
	225 A	IHD2HOB0D0225	IHD2HOBT0225	IHD2HOBF0225
	250 A	IHD2HOB0D0250	IHD2HOBT0250	IHD2HOBF0250
	HIM 250H, 38/38 kA, 460 V			
	150 A	IHD2HTBD0150	IHD2HTBT0150	IHD2HTBF0150
	160 A	IHD2HTBD0160	IHD2HTBT0160	IHD2HTBF0160
	200 A	IHD2HTBD0200	IHD2HTBT0200	IHD2HTBF0200
	225 A	IHD2HTBD0225	IHD2HTBT0225	IHD2HTBF0225
	250 A	IHD2HTBD0250	IHD2HTBT0250	IHD2HTBF0250
	HIM 250L, 55/55 kA, 460 V			
	150 A	IHD2HVBD0150	IHD2HVBT0150	IHD2HVBF0150
	160 A	IHD2HVBD0160	IHD2HVBT0160	IHD2HVBF0160
	200 A	IHD2HVBD0200	IHD2HVBT0200	IHD2HVBF0200
	225 A	IHD2HVBD0225	IHD2HVBT0225	IHD2HVBF0225
	250 A	IHD2HVBD0250	IHD2HVBT0250	IHD2HVBF0250

\*Codes for RSTN Version

### HIM 400AF

400 AF	Current Rating (A)	Double Pole Cat. No.	Three Pole Cat. No.	*Four Pole Cat. No.
	HIM 400E, 45/45 kA, 460 V			
	300 A	IHDA9UBD0300	IHDA9UBT0300	IHDA9UBF0300
	350 A	IHDA9UBD0350	IHDA9UBT0350	IHDA9UBF0350
	400 A	IHDA9UBD0400	IHDA9UBT0400	IHDA9UBF0400
	HIM 400S, 65/65 kA, 460 V			
	300 A	IHDA9LBD0300	IHDA9LBT0300	IHDA9LBF0300
	350 A	IHDA9LBD0350	IHDA9LBT0350	IHDA9LBF0350
	400 A	IHDA9LBD0400	IHDA9LBT0400	IHDA9LBF0400
	HIM 400H, 85/85 kA, 460 V			
	300 A	IHDA9MBD0300	IHDA9MBT0300	IHDA9MBF0300
	350 A	IHDA9MBD0350	IHDA9MBT0350	IHDA9MBF0350
	400 A	IHDA9MBD0400	IHDA9MBT0400	IHDA9MBF0400

\*Codes for RSTN Version

### HIM 630AF

630 AF	Current Rating (A)	Double Pole Cat. No.	Three Pole Cat. No.	*Four Pole Cat. No.
	HIM 630E, 45/45 kA, 460 V			
	500 A	IHD3HUBD0500	IHD3HUBT0500	IHD3HUBF0500
	630 A	IHD3HUBD0630	IHD3HUBT0630	IHD3HUBF0630
	HIM 630S, 65/65 kA, 460 V			
	500 A	IHD3HLBD0500	IHD3HLBT0500	IHD3HLBF0500
	630 A	IHD3HLBD0630	IHD3HLBT0630	IHD3HLBF0630
	HIM 630H, 85/85 kA, 460 V			
	500 A	IHD3HMBD0500	IHD3HMBT0500	IHD3HMBF0500
	630 A	IHD3HMBD0630	IHD3HMBT0630	IHD3HMBF0630

\*Codes for RSTN Version

### HIM 800AF

800 AF	Current Rating (A)	Double Pole Cat. No.	Three Pole Cat. No.	*Four Pole Cat. No.
	HIM 800S, 65/65 kA, 460 V			
	700 A	IHD4HLBD0700	IHD4HLBT0700	IHD4HLBF0700
	800 A	IHD4HLBD0800	IHD4HLBT0800	IHD4HLBF0800
	HIM 800H, 85/85 kA, 460 V			
	700 A	IHD4HMBD0700	IHD4HMBT0700	IHD4HMBF0700
	800 A	IHD4HMBD0800	IHD4HMBT0800	IHD4HMBF0800

\*Codes for RSTN Version



## Accessories

### Auxiliary Contact

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-250 AUXILIARY CONTACT (1NO+1NC)	ISSLEU0791
2	HIM 30-250 AUXILIARY CONTACT (2NO+2NC)	ISSLEU0792
3	HIM 400-800 AUXILIARY CONTACT (1NO+1NC)	ISSLEU0793

### Alarm Switch

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-250 ALARM SWITCH LEFT SIDE	ISSLEU0794
2	HIM 30-250 ALARM SWITCH RIGHT SIDE	ISSLEU0795
3	HIM 400-800 ALARM SWITCH LEFT SIDE	ISSLEU0796

### Auxiliary+Alarm Switch

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-250 AUXILIARY+ALARM SWITCH RIGHT SIDE	ISSLEU0797
2	HIM 30-250 AUXILIARY+ALARM SWITCH LEFT SIDE	ISSLEU0799

### Shunt Trip

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-250 SHUNT TRIP DC 24 V	ISSLEU0800
2	HIM 30-250 SHUNT TRIP DC 48 V	ISSLEU0801
3	HIM 30-250 SHUNT TRIP DC 60 V	ISSLEU0802
4	HIM 30-250 SHUNT TRIP DC 125 V	ISSLEU0803
5	HIM 30-250SHUNT TRIP AC 100-120 V	ISSLEU0905
6	HIM 30-250SHUNT TRIP DC 100-120 V	ISSLEU1634
7	HIM 30-250 SHUNT TRIP AC 200-250 V	ISSLEU0906
8	HIM 400-800 SHUNT TRIP DC 24 V	ISSLEU0889
9	HIM 400-800 SHUNT TRIP DC 100-125 V	ISSLEU0907
10	HIM 400-800 SHUNT TRIP AC 100-120 V	ISSLEU0908
11	HIM 400-800 SHUNT TRIP AC 200-250 V	ISSLEU0890

### Rotary Handle- Direct Type

S. NO.	DESCRIPTION	FGCODES
1	HIM 100 Direct Rotary Handle Upper Side Power Supply	ISSLEU0806
2	HIM 125 Direct Rotary Handle Upper Side Power Supply	ISSLEU0809
3	HIM 250 Direct Rotary Handle Upper Side Power Supply	ISSLEU0812
4	HIM 400 Direct Rotary Handle Upper Side Power Supply	ISSLEU0815
5	HIM 800 Direct Rotary Handle Upper Side Power Supply	ISSLEU0916



## Ordering Codes

### Accessories

#### Rotary Handle- Extended Type

S. NO.	DESCRIPTION	FGCODES
1	HIM 100 Extended Rotary Type Handle	ISSLEU0820
2	HIM 125 Extended Rotary Type Handle	ISSLEU0821
3	HIM 250 Extended Rotary Type Handle	ISSLEU0822
4	HIM 400 Extended Rotary Type Handle	ISSLEU0823
5	HIM 800 Extended Rotary Type Handle	ISSLEU0824

#### Mechanical Interlock

S. NO.	DESCRIPTION	FGCODES
1	HIM 100 Mechanical Interlock 2 Pole	ISSLEU0825
2	HIM 100 Mechanical Interlock 3 Pole	ISSLEU0826
3	HIM 100 Mechanical Interlock 4 Pole N-R-S-T	ISSLEU0828
4	HIM 125 Mechanical Interlock 2 Pole	ISSLEU0829
5	HIM 125 Mechanical Interlock 3 Pole	ISSLEU0830
6	HIM 125 Mechanical Interlock 4 Pole N-R-S-T	ISSLEU0832
7	HIM 250 Mechanical Interlock 3 Pole	ISSLEU0833
8	HIM 250 Mechanical Interlock 4 Pole N-R-S-T	ISSLEU0835
9	HIM 400 Mechanical Interlock 3 Pole	ISSLEU0836
10	HIM 400 Mechanical Interlock 4 Pole N-R-S-T	ISSLEU0837
11	HIM 630-800 Mechanical Interlock 3 Pole	ISSLEU0838
12	HIM 630-800 Mechanical Interlock 4 Pole N-R-S-T	ISSLEU0843

#### Padlock Device

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-250 Padlock Device	ISSLEU0844
2	HIM 400-800 Padlock Device	ISSLEU0845

#### Auxiliary Handle

S. NO.	DESCRIPTION	FGCODES
1	HIM 400-800 Auxiliary Handle	ISSLEU0846

#### DIN Rail Adaptor

S. NO.	DESCRIPTION	FGCODES
1	HIM 100 DIN Rail Adapter 2P size	ISSLEU0887

**Motor Operator**

S. NO.	DESCRIPTION	FGCODES
1	HIM 100 Motor Operator DC 24 V	ISSLEU0917
2	HIM 100 Motor Operator AC/DC 110 V	ISSLEU0918
3	HIM 100 Motor Operator AC/DC 240 V	ISSLEU0919
4	HIM 125 Motor Operator DC 24 V	ISSLEU0897
5	HIM 125 Motor Operator AC/DC 110 V	ISSLEU0920
6	HIM 125 Motor Operator AC/DC 240 V	ISSLEU0898
7	HIM 250 Motor Operator DC 24 V	ISSLEU0899
8	HIM 250 Motor Operator AC/DC 110 V	ISSLEU0921
9	HIM 250 Motor Operator AC/DC 240 V	ISSLEU0900
10	HIM 400 Motor Operator DC 24 V	ISSLEU0901
11	HIM 400 Motor Operator AC/DC 110 V	ISSLEU0922
12	HIM 400 Motor Operator AC/DC 240 V	ISSLEU0902
13	HIM 800 Motor Operator DC 24 V	ISSLEU0903
14	HIM 800 Motor Operator AC/DC 110 V	ISSLEU0923
15	HIM 800 Motor Operator AC/DC 240 V	ISSLEU0904

**Busbar- Standard Type**

S. NO.	DESCRIPTION	FGCODES
1	HIM 800 Busbar Standard Type 3 Pole	ISSLEU0849
2	HIM 800 Busbar Standard Type 4 Pole	ISSLEU0850
3	HIM 250 Busbar Standard Type 3 Pole	ISSLEU0851
4	HIM 250 Busbar Standard Type 4 Pole	ISSLEU0852

**Busbar- Extended Type**

S. NO.	DESCRIPTION	FGCODES
1	HIM 400 Busbar Extended Type 3 Pole	ISSLEU0847
2	HIM 400 Busbar Extended Type 4 Pole	ISSLEU0848
3	HIM 250 Busbar Extended Type 3 Pole	ISSLEU0853
4	HIM 250 Busbar Extended Type 4 Pole	ISSLEU0854

**Phase Barrier**

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-125 Phase barrier 2Pole 1EA	ISSLEU0879
2	HIM 30-125 Phase barrier 3Pole 2EA	ISSLEU0880
3	HIM 30-125 Phase barrier 3Pole 3EA	ISSLEU0881
4	HIM 250 Phase barrier 2Pole 1EA	ISSLEU0882
5	HIM 250 Phase barrier 3Pole 2EA	ISSLEU0883
6	HIM 250 Phase barrier 3Pole 3EA	ISSLEU0884
7	HIM 400-800 Phase barrier 3Pole 2EA	ISSLEU0885
8	HIM 400-800 Phase barrier 3Pole 3EA	ISSLEU0886



# Ordering Codes

## Accessories

### Terminal Cover

S. NO.	DESCRIPTION	FGCODES
1	HIM 100 Terminal Cover Short Type 2P 1EA	ISSLEU0855
2	HIM 100 Terminal Cover Short Type 3P 1EA	ISSLEU0856
3	HIM 100 Terminal Cover Short Type 4P 1EA	ISSLEU0857
4	HIM 100 Terminal Cover Long Type 2P 1EA	ISSLEU0858
5	HIM 100 Terminal Cover Long Type 3P 1EA	ISSLEU0859
6	HIM 100 Terminal Cover Long Type 4P 1EA	ISSLEU0860
7	HIM 125 Terminal Cover Short Type 2P 1EA	ISSLEU0861
8	HIM 125 Terminal Cover Short Type 3P 1EA	ISSLEU0862
9	HIM 125 Terminal Cover Short Type 4P 1EA	ISSLEU0863
10	HIM 125 Terminal Cover Long Type 2P 1EA	ISSLEU0864
11	HIM 125 Terminal Cover Long Type 3P 1EA	ISSLEU0865
12	HIM 125 Terminal Cover Long Type 4P 1EA	ISSLEU0866
13	HIM 250 Terminal Cover Short Type 3P 1EA	ISSLEU0867
14	HIM 250 Terminal Cover Short Type 4P 1EA	ISSLEU0868
15	HIM 250 Terminal Cover Long Type 3P 1EA	ISSLEU0869
16	HIM 250 Terminal Cover Long Type 4P 1EA	ISSLEU0870
17	HIM 400 Terminal Cover Short Type 3P 1EA	ISSLEU0871
18	HIM 400 Terminal Cover Short Type 4P 1EA	ISSLEU0872
19	HIM 400 Terminal Cover Long Type 3P 1EA	ISSLEU0873
20	HIM 400 Terminal Cover Long Type 4P 1EA	ISSLEU0874
21	HIM 630-800 Terminal Cover Short Type 3P 1EA	ISSLEU0875
22	HIM 630-800 Terminal Cover Short Type 4P 1EA	ISSLEU0876
23	HIM 630-800 Terminal Cover Long Type 3P 1EA	ISSLEU0877
24	HIM 630-800 Terminal Cover Long Type 4P 1EA	ISSLEU0878

### Under Voltage Trip

S. NO.	DESCRIPTION	FGCODES
1	HIM 30-250 UNDER VOLTAGE TRIP DC 24 V	ISSLEU0804
2	HIM 30-250 UNDER VOLTAGE TRIP DC 48 V	ISSLEU0805
3	HIM 30-250 UNDER VOLTAGE TRIP DC 100-110 V	ISSLEU0909
4	HIM 30-250 UNDER VOLTAGE TRIP AC 100-120 V	ISSLEU0910
5	HIM 30-250 UNDER VOLTAGE TRIP AC 200-230 V	ISSLEU0893
6	HIM 30-250 UNDER VOLTAGE TRIP AC 380-415 V	ISSLEU0894
7	HIM 400-800 UNDER VOLTAGE TRIP DC 24 V	ISSLEU0912
8	HIM 400-800 UNDER VOLTAGE TRIP AC 100-120 V	ISSLEU0914
9	HIM 400-800 UNDER VOLTAGE TRIP AC 200-230 V	ISSLEU0895
10	HIM 400-800 UNDER VOLTAGE TRIP AC 380-415 V	ISSLEU0896



# Service Environment

## Storage & Transportation

### Storage Precaution



- Do not store in an environment containing corrosive gases (ammonia, sulfur etc)



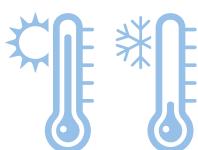
- Do not store under high humidity



- Do not store under direct sunlight



- Do not store in an environment in which dust or dirt is present



- Avoid using this product under extremely high or low temperature and store at a temperature between -20°C and +60°C

### Transportation Precaution

- Do not drop or give shock during transportation. This can cause mal-function in the circuit breakers.
- Do not carry circuit breakers by the external wire or accessories.



- ALWAYS HOLD THE BODY OF THE CIRCUIT BREAKERS DURING TRANSPORTATION



- BE CAREFUL OF INJURIES WHEN HANDLING SHARP METAL ACCESSORIES



- DO NOT DROP OR GIVE SHOCK DURING TRANSPORTATION



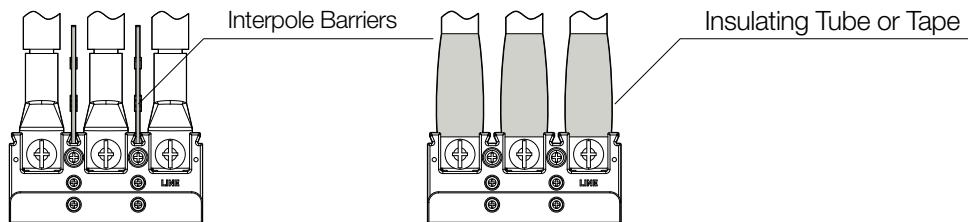
- CHECK THE PACKAGING CONDITION BEFORE TRANSPORTATION



## Service Environment

### Installations

- Installations must be carried out by licensed worker.
- Check whether the circuit breaker is open before performing any wiring.
- Tighten the terminal bolt using the proper torque as specified in the manual when connecting the bus or wire. Loose connections may result in.
- Tighten the terminal bolt as proper torque specified in manual or catalog.  
If not insulated, it may cause short-circuit fault.



- Provide enough insulating space to avoid the blockage of arc gas.  
Blocked arc gas vent may cause trip operation to fail.
- Do not install in an environment where hot and humid air, dust, corrosive gas, vibration and shock is present.  
This may cause a fire or malfunction.
- To prevent fires or malfunctions, provide appropriate measures to prevent the entry of foreign substances following installation.
- For the 4P circuit breakers, connect 3 wires and 4 poles to the neutral line.
- This product should be used with insulation barrier. Using with no insulation barrier may result in additional short-circuit fault.



## Service Environment

### Precautions for Installations

- Install circuit breakers under the following environment conditions

When installing circuit breakers, give due consideration to the environment conditions described below. Installation in inappropriate conditions may result in malfunction or fire.

- Ambient temperature: -5 °C - +40 °C  
(The average temperature for 24 hours not exceed 35 °C)
- Relative humidity: 45% - 85 %
- Vibration & Shock: Without excessive vibration and shock
- Altitude: Up to 2,000 m
- Without excessive water vapor, oil vapor, smoke, dust, salts and corrosive materials



- Do not block the arc vent  
The breaking capacity may be reduced.



- Keep away from dust, metal shaving  
After installations, please use protective cover when maintaining circuit.



- Do not release insulation board from circuit breakers.  
The insulation performance may be reduced.

### Precautions for Connection



- Tighten the terminal bolts with proper torque specified in the manual  
Incomplete tightening of the terminal bolt may cause overheating. Also, excessive tightening of torque may cause damage to the terminal bolt and circuit breaker case.



- Insulate the exposed conductor  
Insulate the MCCB conductor by using insulation tape. If the conductor is not be insulated, it may cause additional short-circuit fault.



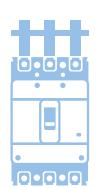
- For 4P circuit breakers, connect 3 wires and 4 poles to the neutral line



- Avoid using lube in terminal bolt  
Lube may reduce friction of terminal bolt.



- Please do not modify STUD  
Rear connection type, do not force STUD. Also, when connecting wire, access without modifying STUD.



- Please fasten conductor firmly in parallel  
Firmly fasten conductor to prevent electronic repulsion when a short-circuit fault occur.



## Service Environment

### Installations

#### Connections to the Power Circuit

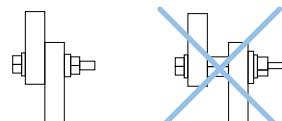
The shock electromagnetic force caused by fault current is as follows.

The Shock Electromagnetic Force Per 1 m Conductor

Short Circuit Current [kA] (Power factor)	Shock Electromagnetic Force (3 phase)	
	Distance Between Conductors 10 cm	Distance Between Conductors 20 cm
10 (0.4)	490 (50)	245 (25)
18 (0.3)	1,863 (190)	932 (95)
25 (0.2)	4,412 (450)	2,206 (225)
35 (0.23)	8,630 (880)	4,315 (440)
42 (0.2)	12,455 (1,270)	6,277 (635)
50 (0.2)	17,652 (1,800)	8,826 (900)
65 (0.2)	29,910 (3,050)	14,955 (1,525)
85 (0.2)	51,190 (5,220)	25,595 (2,510)
100 (0.2)	70,804 (7,220)	35,402 (3,610)
125 (0.2)	110,815 (11,300)	55,408 (5,650)

- Before installation, be sure to clean on connection terminals

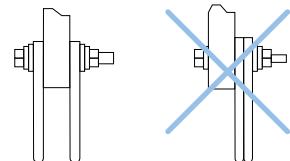
To prevent to increasing contact resistance, eliminate any dust, dirt or damages of any kind.



- Conductor should be connected directly

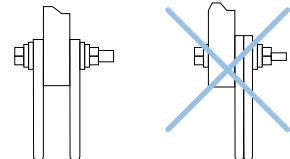
Bolts or Nuts is not allowed between conductors.

If the conductors are not connected directly, it may result in rising temperatures and fires.



- Conductors should be connected without overlap

When connecting several conductors, the busbar should be installed on both sides.



### Inspection and Maintenance

#### Initial Inspection

- Terminal parts shall be clean from dust, metal pieces and so on
- Breaker shall not have any crack or damage
- Check terminal parts. It should be tightened with specified torque
- Be sure to check the value of Ue, Icu of the breakers
- Insulance resistance should be more than  $5\text{ M}\Omega$

#### Dielectric Test

Main Circuit		Secondary and Control Circuit <sup>1)</sup>	
Rated Insulation Voltage [Ui]	Test Voltage	Rated Insulation Voltage [Ui]	Test Voltage
Ui ≤ 300 V	2,000 V for 1 min	Ui ≤ 60 V	1,000 V for 1 min
300 < Ui ≤ 600 V	2,500 V for 1 min	60 V < Ui ≤ 600 V	2·Ui 1,000 V (Minimum 1,500 V) for 1 min

- - Dielectric strength tests should be done in these conditions.

1) Between terminals and earth



## Service Environment

### Periodic Inspection

In order to maintain the breaker performance and prevent accidents, periodical inspection shall be conducted after installation and operation.

### Standard of Inspection

Standard	Circumstance	Inspection Cycle after Installation
Normal	Clean air, no humidity	Within 10 years: Once 2 - 3 year
		More than 10 years: Once a year
		More than 15 years: Once 6 month
	Dust but no corrosive gas	Within 10 years: Once 1 year
		More than 10 years: Once 6 month
		More than 15 years: Once a year
Bad	Sulfurous gas, salinity, vapor	Within 5 years: Once 6 month
		More than 5 years: Once a year
	Excessive corrosive gas	Once a month

### Periodic Check Point

Item of Inspection	Procedure	Trouble Shooting
Tightening terminal torque	·Tightening torque on terminals	<ul style="list-style-type: none"><li>• Applying the tightening torque indicated in manual Too strong tightening torque may cause damage</li></ul>
Dust and dirt	·Confirm to breaker's body and upper side of the line part. Be sure to clean in term of dust and dirt to secure insulation	<ul style="list-style-type: none"><li>• Remove the debris with a clean tool</li></ul>
Case	·Check for damaged and cracked on breakers	<ul style="list-style-type: none"><li>• Replace with a new breaker</li></ul>
Arc exhaust part	·Check terminal part for arc exhaust.	<ul style="list-style-type: none"><li>• Replace with a new breaker in case you can find the black soot and melted metal parts on the breakers</li></ul>
Operation	·Manually put On and OFF several times in case of holding close position. ·It makes reduce friction which is made from harden grease and stabilize contact resistance	<ul style="list-style-type: none"><li>• Replace with a new breaker in case of malfunction on ON and OFF</li><li>• Replace with a new breaker in case of exceeding mechanical and electrical durability</li></ul>
Terminal discoloration	·Check for discolored terminal and conductor parts ·Be sure to confirm insulation capability on conductor parts	<ul style="list-style-type: none"><li>• There is no problem with lightly discolored silver coating part. In case breakers have an insulation trouble caused by heat, replace with a new breaker</li></ul>
Insulation resistance	·Measure insulation resistance between each poles, terminal and earth	<ul style="list-style-type: none"><li>• Insulation resistance should be more than <math>5\text{ M}\Omega</math>. If lower than <math>5\text{ M}\Omega</math>, replace with new one</li></ul>

#### Inspection and Trouble Shooting After Breaking Current

- If there is no pollution in arc exhaust parts and no other abnormality, the breaker can be re-used.
- Measure the insulation resistance when carbonizing symptom is found around arc exhaust parts. If the resistance value is more than  $5\text{ M}\Omega$  with no dielectric breakdown at withstand test voltage and no excessive temperature rise of terminal parts, the breaker can be re-used.
- If the handle part is carbonized or there is metallic melting in internal of breaker, please replace it with a new one.



## Maintenance

### Trouble Shooting

In case of any abnormality during breaker operation, please refer it as below. The following table lists a series of typical service conditions, to help you understand and solve hypothetical faults or malfunctions.

Problem	Symptom	Possible Cause	Trouble Shooting
Overheating	High temperature of terminal part	<ul style="list-style-type: none"> <li>• Loose connection between terminal and conductor</li> <li>• Increased resistance between terminal and conductor</li> </ul>	Mounting screw with proper torque Replace with a new breaker
	Damage in insulation part of terminal	<ul style="list-style-type: none"> <li>• Loose connection between terminal and conductor</li> <li>• Loose connection on terminal parts caused by interference with foreign substance</li> </ul>	Replace with a new breaker
	High temperature of breaker body	<ul style="list-style-type: none"> <li>• Increased contact resistance</li> <li>• Loose internal assembly screws</li> <li>• Increase of current density from cable disconnection</li> </ul>	Replace with a new breaker
Overheating	Abnormal voltage of load side	<ul style="list-style-type: none"> <li>• Excessive contact abrasion</li> <li>• Foreign substances on contact</li> <li>• Melt down on conducting bar (Corrosion of conductor by excessive ON-OFF or corrosive gas)</li> </ul>	Replace with a new breaker
	Inability of ON, OFF, and RESET	<ul style="list-style-type: none"> <li>• Inability of reset after trip</li> <li>• Damaged trip mechanical parts due to lots of operation and improper frequency</li> <li>• Non-energized UVT</li> </ul>	On after RESET Replace with a new breaker
		<ul style="list-style-type: none"> <li>• Melted and adhered contact tip</li> </ul>	Input operational control voltage Replace with a new breaker
Frequent trip	Inability of RESET	<ul style="list-style-type: none"> <li>• Non-energized UVT</li> <li>• Not enough cooling on bi-metal</li> <li>• Corruption and deformation of bi-metal</li> <li>• Malfunction of mechanical parts</li> <li>• Run out of excessive ON-OFF</li> <li>• Damaged mechanical parts after trip on over-breaking capacity</li> </ul>	Input operational control voltage Cool down ambient temperature, then Reset Replace with a new breaker
		<ul style="list-style-type: none"> <li>• High ambient temperature (Higher than 40)</li> <li>• Heating by loose terminal screw connection</li> <li>• Heating from inside of breaker</li> <li>• Connection conductor of which cross-section area is smaller than specified size</li> </ul>	Cool down ambient temperature by ventilation or others Tighten screws with specified torque Replace with a new breaker Use the specified size of conductor or adjust the rated current
		<ul style="list-style-type: none"> <li>• Trip at start-up inrush current</li> <li>• Trip at change-over in star-delta operation</li> <li>• Instantaneous trip at reverse feeding</li> <li>• Instantaneous trip at high inrush current</li> <li>• Instantaneous trip at long starting current</li> <li>• Short-circuit due to motor malfunction</li> <li>• Fault of connecting with SHU or UVT</li> </ul>	Adjust the instantaneous trip setting or replace with a higher rated current breaker Replace with a higher rated current breaker Repair or replace with new motors and check wiring cables
		<ul style="list-style-type: none"> <li>• Low coordination with primary protect device or miss-selected with other protect device</li> <li>• Unconsidered ambient temperature</li> <li>• Improper rated current</li> </ul>	Reconsider of coordination Confirm the derating current Confirm rated current
	Malfunction of Accessory	<ul style="list-style-type: none"> <li>• Over and under control voltage</li> <li>• Drop of the control voltage</li> <li>• Incorrect coil voltage, damaged coil caused by non operating of switch in order to prevent malfunctioning</li> </ul>	Confirm rated voltage Keep control Replace with new parts
		<ul style="list-style-type: none"> <li>• Malfunction of mechanism part</li> <li>• Incorrect coil voltage</li> <li>• Burned UVT controller of the coil</li> </ul>	Replace with new parts Confirm control voltage Replace or check for wiring
		<ul style="list-style-type: none"> <li>• Damaged contact caused by excessive rated operational current</li> <li>• Malfunction of mechanism part</li> </ul>	Replace or check for operational current Replace or repair



## Certifications

### Molded Case Circuit Breakers (MCCB)

Type	Approvals			CB Certificates
Certificate	Safety Certi	KS	IEC (CE)	DEKRA
Mark				
Country	KOREA	KOREA	EUROPE	NETHERLANDS
HIM100	E S	• •	• •	• •
HIM125	S H L	• • •	• • •	• • •
HIM250	S H L	• • •	• • •	• • •
HIM400	E S H	• • •	• • •	• • •
HIM630	S H	• •	• •	• •
HIM800	S H	• •	• •	• •

### Marine Certifications

Type	Approvals							
Certificate	KR	LR	BV	ABS	DNV·GL	RS	RINA	ClassNK
Mark								
National Certification	KOREA	U.K	FRANCE	U.S.A	GERMANY	RUSSIA	ITALY	JAPAN
HIM100	E S	• •						
HIM125	S H L	• • •						
HIM250	S H L	• • •						
HIM400	E S H	• • •						
HIM630	S H	• •						
HIM800	S H	• •						

Load Line range of Molded Case Circuit Breakers are designed and manufactured to world-class standards. Loadline series MCCBs provide overload and short-circuit protection for all applications. The thermal & magnetic elements, adjustable over a wide band, make these MCCBs ideal for any distribution application.

## Features:

- Wide range : 16 A to 1600 A (AC)
- Compact dimensions
- Adjustable thermal setting (70-100%)  $I_n$ .
- Adjustable magnetic setting (5-10 times / 4-10 times)  $I_n$ .
- Suitable for use as switch disconnector
- In 4P wSN version, neutral makes first and breaks last
- Push to trip button provision
- Uniform front escutcheon plate
- Positive dolly position indication
- Suitable for DC application upto 1600 A
- Separate main and arcing contacts
- Wide range of accessories

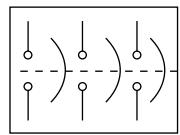
## Range :

16 A to 1600 A in 7 frame sizes in single pole, double pole, three pole and four pole with switched neutral execution.

## Specification :

Conforms to IS / IEC: 60947-2





**MCCB**

Moulded Case Circuit Breaker



## Construction

Loadline Molded Case Circuit Breakers have precision formed molded case and cover of high performance resin bonded thermoset material. The circuit breakers are designed to allow grouping in distribution panels or switchboards to present their operating handles and label escutcheons uniformly aligned in a single panel cut out.

The switching mechanism is Quick make-Quick break type and is tripfree, i.e. the breaker trips internally even if the operating knob is held in ON position.

The contact mechanism comprises of fixed and moving contacts made of sintered silver alloy for reliability, long life and anti-welding properties. Arcing contacts are provided in higher frames, further increasing the contact life.

The arc extinguishing device comprises of arc chutes having grid plates mounted in parallel between supports of insulating material. The arc is divided between these grid plates which helps in its fast quenching. The arc is thus confined, divided and extinguished in the arc chute. The excellent insulation between the conducting parts and better energy dissipation after short circuit makes it possible to make the load and line connections on either side.

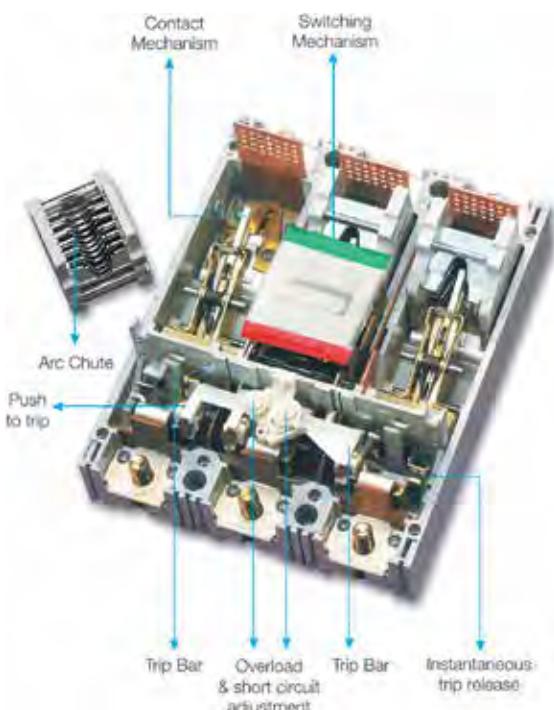
The tripping mechanism comprises of a bimetal and heater element for overload protection and fixed & moving core for magnetic protection in each pole coupled to a single trip bar unit to avoid single phasing. The overload and magnetic setting are front adjustable on site.

### Thermal Magnetic Type

The overload protection is provided by a combination of the heater element and the bimetal strip in each phase which activates the trip mechanism.

Short Circuit protection is provided by the magnetic circuit comprising of the fixed and moving core. In the event of short circuit, the moving core is attracted towards the fixed core due to the high electromagnetic forces developed which actuates the trip mechanism.

The fixed and moving contacts of Loadline MCCBs are so designed that an electromagnetic repulsive force is developed under high currents which is sufficient to overcome the spring tension holding the moving contacts, thereby initiating the contact opening resulting into faster opening of the contacts limiting the prospective short circuit current.





## Technical Information

### ML1 MCCB

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Thermal Magnetic
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Ambient temp	:	40 °C (50 °C on request)
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	8 kV



Frame	SI Unit	ML1
No. of Poles		3P
Current range, ( $I_n$ ) at 40°C	A	63, 80, 100 & 125
Rated operational voltage ( $U_e$ )	V	415
Rated insulation voltage ( $U_i$ )	V	690
Rated Impressed voltage ( $U_{imp}$ )	kV	8
Rated frequency	Hz	50 / 60
Thermal release setting		Fixed
Magnetic release setting		Fixed
63 A	A	800
80 A	A	800
100 A	A	1000
125 A	A	1000
Rated ultimate short circuit breaking capacity (Icu)	kA	10
$I_{cs} = \% I_{cu}$		50%
Utilization Category		A
Pollution degree		3
Temp. range	°C	-5 to +55
Weight	kg	0.90
Mounting		Vertical / Horizontal
Accessories		
Phase barriers		•
Extended terminal		•

Havells new **ML1 Frame MCCBs** with fixed thermal and magnetic release are designed and manufactured to world class standard in accordance to IS / IEC 60947-2 standard. The MCCB provides accurate and reliable protection against overload and short circuit.

Note: • Available. Phase barriers supplied with MCCB as standard.  
Extended terminals provided as standard for 100 A & 125 A only



## Technical Information

### G-Frame

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Thermal Magnetic
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Ambient temp	:	40 °C (50 °C on request)
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	6 kV (1P) 8 kV (3P/4P)



Frame	SI Unit	GS		GN		GH	
No. of Poles		1P	3P / 4P wSN	1P	3P / 4P wSN	1P	3P / 4P wSN
Standard current range / rating (In)	A	16-160*	16-160*	16-160*	16-160*	16-160*	16-160*
Thermal release setting		Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Magnetic release setting for current rating :							
16 A - 32 A	A	800	800	800	800	800	800
40 A - 50 A	A	800	800	800	800	800	800
63 A - 80 A	A	800	800	800	800	800	800
100 A - 160 A	A	1000	1000	1000	1000	1000	1000
Rated short circuit making capacity							
(Peak) I cm at 415 Vac	kA	17†	17	32†	32	52.5†	52.5
Rated ultimate short circuit breaking capacity (Icu), kA	240 V	10	16	16	25	25	40
(at different voltages)	415 V	-	10	-	16	-	25
	440 V	-	10	-	14	-	16
	500 V	-	7.5	-	10	-	12
Ics = % Icu		100%	100%	75%	75%	50%	50%
Weight SP	kg	0.35		0.35		0.35	
TP	kg	-	0.93	-	0.93	-	0.93
4P wSN	kg	-	1.2	-	1.2	-	1.2
Terminal capacity (cable)	mm <sup>2</sup>	70	70	70	70	70	70
Bus bar (width)	mm	10	10	10	10	10	10
Recommended Torque	Nm	2.5	2.5	2.5	2.5	2.5	2.5
Internal Accessories							
Trip Alarm Contact (Factory fitted)		-	•	-	•	-	•
Auxiliary Switch (1 C/O or 2C/O)		-	•	-	•	-	•
Shunt Trip		-	•	-	•	-	•
Under Voltage Release		-	•	-	•	-	•
External Accessories							
Earth Fault Relay		-	•	-	•	-	•
Rotary Handle - Direct, Extended		-	•	-	•	-	•
Extended Terminals (above 63 A)		+	+	+	+	+	+
Dolly Extension		-	-	-	-	-	-
Phase Barriers		+	+	+	+	+	+
Terminal Shrouds		-	•	-	•	-	•
Dolly pad locking Device		-	•	-	•	-	•

\* Current Ratings - 16 A, 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 150 A, 160 A

• Available, - Not Available, + Supplied alongwith the MCCB as standard.

Δ Available in single pole

† At 240 V

1P - Single Pole

3P - Three Pole

4P wSN - Four Pole with Switched Neutral



## Technical Information

AA-Frame (TAMF)

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Thermal Magnetic
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Ambient temp	:	40 °C (50 °C on request)
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	6 kV (1P) 8 kV (3P/4P)



Frame	SI Unit	AAS			AAN		
No. of Poles		1P	3P / 4P wSN		1P	3P / 4P wSN	
Standard current range / ratings (In)	A	25-125	25-125	160-250	25-125	25-125	160-250
Thermal release setting (Adjustable)			70-100% of In			70-100% of In	
Magnetic release setting for current rating :							
25 A - 63 A		400 A	400 A	400 A	400 A	400 A	400 A
80 A - 125 A		800 A	800 A	800 A	800 A	800 A	800 A
160 A - 250 A		1600 A	1600 A	1600 A	1600 A	1600 A	1600 A
50 A -125 A AM Frame		-	-	-	-	-	-
160 A -250 A AM Frame		-	-	-	-	-	-
Rated short circuit making capacity (Peak) I cm	kA	52.5†	52.5	32	52.5†	73.5	52.5
Rated ultimate short circuit breaking capacity (Icu), kA (at different voltages)	240 V	16	40	25	25	50	40
	415 V	-	16	16	-	35	25
	440 V	-	16	16	-	25	25
	500 V	-	12	12	-	18	18
Ics = % Icu	%	100%	100%	100%	75%	75%	75%
Weight SP (Single Pole)	kg	0.7	-	-	0.7	-	-
TP (Triple Pole)	kg	-	1.8	1.8	-	1.8	1.8
FPwSN (Four Pole Switched Neutral)	kg	-	2.4	2.4	-	2.4	2.4
Terminal capacity (Cable)	mm <sup>2</sup>	70 (upto 100 A) / 150 (125 A - 250 A)			70 (upto 100 A) / 150 (125 A - 250 A)		
(Bus bar width)	mm	25 (125 A - 250 A)			25 (125 A - 250 A)		
Recommended Torque	Nm	10	10	10	10	10	10
Internal Accessories							
Auxiliary Switch (1 C/O or 2C/O)		-	•	•	-	•	•
Shunt Trip		-	•	•	-	•	•
Under Voltage Release		-	•	•	-	•	•
Trip Alarm Contact (1 C/O) (Factory Fitted)		-	•	•	-	•	•
External Accessories							
Earth Fault Relay		-	•	•	-	•	•
Rotary Handle - Direct, Extended		-	•	•	-	•	•
Extended Terminals (80 A & Above)	+	+	+	+	+	+	+
Dolly Extension	-	-	-	-	-	-	-
Phase Barriers	+	+	+	+	+	+	+
Terminal Shrouds	•	•	•	•	•	•	•
Dolly pad locking Device	•	•	•	•	•	•	•

\* Current Ratings - 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A

1P - Single Pole

• Available, - Not Available, + Supplied alongwith the MCCB above 63 A

3P - Three Pole

† At 240 V

4P wSN - Four Pole with Switched Neutral



## Technical Information

### A Frame (TAMA) MCCB

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Thermal Magnetic
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Ambient temp	:	40 °C (50 °C on request)
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	8 kV



Frame	SI Unit	AS		AN	
No. of Poles		3P / 4P wSN			
Current range, ( $I_n$ ) at 40°C	A	80-125*	160-250	80-125	160-250*
Rated operational voltage	V	415	415	415	415
Rated insulation voltage	V	750	750	750	750
Rated frequency	Hz	50	50	50	50
Thermal release setting (Adjustable)		70-100% of $I_n$	70-100% of $I_n$	70-100% of $I_n$	70-100% of $I_n$
Magnetic release setting (Adjustable)		560 A - 800 A	1120 A - 1600 A	560 A - 800 A	1120 A - 1600 A
Rated ultimate short circuit breaking capacity (Icu)	kA	25	16	35	25
$I_{cs} = \% I_{cu}$		75%	100%	75%	75%
<b>Accessories</b>					
Auxiliary Switch (1 C/O or 2C/O)		•	•	•	•
Shunt Trip		•	•	•	•
Under Voltage Release		•	•	•	•
Trip Alarm Contact (1 C/O) (Factory fitted)		•	•	•	•
Earth Fault Relay		•	•	•	•
Rotary Handle - Direct, Extended		•	•	•	•
Dolly pad locking Device		•	•	•	•

Note: Phase barriers & extended terminals supplied with MCCB as standard, • Available

Havells new A frame MCCBs with adjustable thermal and magnetic release are designed and manufactured to world class standard in accordance to IS / IEC 60947-2 Standard. The user friendly MCCBs provide accurate and reliable protection against overload and short circuit.

**Current Rating:** 80 A - 250 A

**Execution:** 3 pole & 4 pole with switched neutral

**Breaking Capacity:** 16 kA, 25 kA & 35 kA

- Compact size and light weight
- Adjustable thermal and magnetic release
- Precise and reliable overload and short circuit protection



## Technical Information

### F-Frame

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Thermomagnetic
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Ambient temp	:	40 °C (55 °C on request)
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	8 kV



Frame	SI Unit	FN	FH
No. of Poles		3P / 4P wSN	3P / 4P wSN
Standard Current ratings (I <sub>h</sub> )	A	25-250*	25-250*
Thermal release setting		Fixed	Fixed
Magnetic release setting for current rating		Fixed	Fixed
	25 A - 32 A	500 A	500 A
	40 A - 80 A	800 A	800 A
	100 A - 125 A	1250 A	1250 A
	160 A - 250 A	1600 A	1600 A
Rated short circuit making capacity (Peak) Icm kA		73.5	105
Rated ultimate short circuit breaking capacity (Icu), kA (at different voltages)			
240 V		50	70
380 V		35	50
415 V		35	50
500 V		25	35
Ics = % Icu	%	100	75
Weight TP (Triple Pole) / FPwSN	kg	2.9 / 3.8	2.9 / 3.8
Terminal Type		M8	M8
Terminal capacity (Cable) (Bus bar width)	mm <sup>2</sup>	185	185
	mm	18	18
Internal Accessories			
Auxiliary Switch (1 C/O or 2C/O)		•	•
Shunt Trip		•	•
Under Voltage Release		•	•
Trip Alarm contact (1 C/O) (Factory fitted)		•	•
External Accessories			
Earth Fault Relay		•	•
Rotary Handle - Extended		•	•
Extended Terminals (80 A & Above)		+	+
Dolly Extension		-	-
Phase Barriers		+	+
Terminal Shrouds (only in 3P MCCB)		•	•
Dolly pad locking Device		•	•

\* Current Ratings - 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A

• Available, - Not Available, + Supplied alongwith the MCCB above 63A.

# Factory Fitted

3P - Three Pole

4P wSN - Four Pole with Switched Neutral



## Technical Information

### L-Frame

Ref. Standard	:	IS / IEC 60947-2
Rated operational Voltage	:	415 Vac
Rated insulation Voltage	:	750 Vac
Rated impulse Voltage	:	8 kV
Type of Release	:	Thermal Magnetic
Utilisation category	:	A
Rated frequency	:	50 Hz / 60 Hz
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Suitability of Isolation	:	Yes



Frame	SI Unit	LS	LN
No. of Poles		3P / 4P wSN	3P / 4P wSN
Standard Current Ratings (In)	A	200, 250, 320, 400, 500, 630	200, 250, 320, 400, 500, 630
Thermal release setting (Adjustable)		80-100% In	80-100% In
Magnetic release setting (Fixed)			
250 A - 400 A		4000 A	4000 A
500 A - 630 A		6300 A	6300 A
Magnetic release setting (Adjustable)			
250 A - 400 A		2000 A - 4000 A	2000 A - 4000 A
500 A - 630 A		2500 A - 6300 A	2500 A - 6300 A
Rated S.C. Making Capacity at 415 V (Icm)	kA	75.6	105
Rated Ultimate S.C breaking capacity (Icu) at 240 V	kA	50	65
415 V	kA	36	50
500 V	kA	25	35
Rated Service S.C Breaking Capacity at 415 V, Ics = % Icu	%	100	75
Weight			
Three Pole (3P)	kg	5.6	5.6
Four Pole with Switched Neutral (4P wSN)	kg	7	7
Terminal capacity (Max.)	mm <sup>2</sup>	1 x 240 (250 A-400 A) 2 x 185 (500 A-630 A)	1 x 240 (250 A-400 A) 2 x 185 (500 A-630 A)
Bus bar width	mm	30	30
Overall dimension			
Three Pole (3P)	(W x H x D)	140 x 254 x 110	140 x 254 x 110
Four Pole with Switched Neutral (4P wSN)	(W x H x D)	186 x 254 x 110	186 x 254 x 110
Internal Accessories #			
Auxillary Switch (1C/O or 2C/O)		•	•
Shunt Trip (bulit-in auxillary switch)		•	•
Under Voltage Release		•	•
Trip Alarm Contact (Factory fitted)		•	•
External Accessories			
Rotary Handle - Extended		•	•
Extended Terminals		•	•
Terminal Shroud		•	•
Phase Barriers		•	•
Dolly pad locking device		•	•
Earth Fault Relay		•	•

• Available

# Only 2 accessories at a time can be fitted in the MCCB

3P - Three Pole

4P wSN - Four Pole with Switched Neutral

3P - Three Pole



## Technical Information

CN / CH / DN - Frame

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Thermomagnetic
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Ambient temp	:	40 °C (55 °C on request)
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	8 kV



Frame	SI Unit	CN	CH	DN
No. of Poles		3P/4P wSN	3P/4P wSN	3P
Standard current ratings (In)	A	160-800*	160-800*	1000-1600*
Thermal release setting (Adjustable)		70-100% of In	70-100% of In	70-100% of In
Magnetic release setting		Adjustable	Adjustable	Adjustable
160 - 315 A CN / CH Frame		5 - 10 times In	5 - 10 times In	-
400 - 800 A CN / CH Frame		4 - 10 times In	4 - 10 times In	-
800 - 1600 A DN Frame		-	-	4000 - 10,000 A
Rated short circuit making capacity (Peak) Icm	kA	73.5	105	105
Rated ultimate short circuit breaking capacity(Icu), kA (at different voltages)				
240 V		50	70	70
380 V		35	50	50
415 V		35	50	50
500 V		25	35	35
Ics = % Icu		75%	50%	75%
Weight TP (Triple Pole)	kg	9.2	9.2	17#/19**
FP wSN (Four Pole with Switched Neutral)	kg	11.6	11.6	22/25
Terminal capacity (Cable)	mm <sup>2</sup>	-	-	-
(Busbar width)	mm	40	40	45** upto 1000 A 60** upto 1250 A 65** upto 1600 A 35.5# upto 1600 A
Internal Accessories				
Auxiliary Switch (1 C/O or 2 C/O)		•	•	•
Shunt Trip		•	•	•
Under Voltage Release		•	•	•
Trip Alarm Contact (1 C/O) # Factory Filled		•	•	•
External Accessories				
Earth Fault Relay		•	•	-
Rotary Handle - Extended		•	•	•
Extended Terminals		+	•	+
Dolly Extension		•	•	•
Phase Barriers		+	-	+
Terminal Shrouds		-	-	-
Dolly pad locking Device		•	•	•

\* Current Ratings - 160 A, 200 A, 250 A, 315 A, 400 A, 500 A, 630 A, 800 A, 1000 A, 1250 A, 1600 A.

• Available, - Not Available, + Supplied alongwith the MCCB as standard.

\*\* Terminals at Front

# Terminals at back / rear

3P - Three Pole

4P wSN - Four Pole with Switched Neutral



## Technical Information (DC MCCBs)

GN / AN / CH / DN - Frame

DC MCCBs

Standard conformity	:	IEC 60947-2 / IS:13947-2
Rated operational voltage	:	250 Vdc
Rated Insulation Voltage	:	690 Vdc
Type of release	:	Thermomagnetic
Utilisation Category	:	A
Ambient temp	:	40 °C
Operating altitude	:	2000 m
Humidity	:	0-90%



Frame	SI Unit	GN	AAN	CH	DN
No. of Poles		3P / 4P wSN	3P / 4P wSN	3P / 4P wSN	3P / 4P wSN
Standard current ratings In	A	25-125*	160-250*	160-800*	1000-1600*
Thermal release setting		Fixed	Adjustable	Adjustable	Adjustable
			(70-100% of In)	(70-100% of In)	(70-100% of In)
Magnetic release setting for current rating :					
25 - 50 A GN Frame		800 A	-	-	-
63 - 80 A GN Frame		800 A	-	-	-
100 - 125 A GN Frame		1000 A	-	-	-
160 - 200 A AN Frame		-	1600 A	-	-
160 - 315 A CH Frame		-	-	5 - 10 times In	-
400 - 800 A CH Frame		-	-	4 - 10 times In	-
800 - 1600 A DN Frame		-	-	-	4000-10,000 A
Rated ultimate short circuit	kA	5	10	20	20
breaking capacity (Icu), at 250 Vdc					
Ics = % Icu		75%	75%	50%	75%
Weight	kg	0.93	1.8	9.2	17#/19**
Terminal capacity (Cable)	mm <sup>2</sup>	70	70 (upto 100 A) / 150 (125 A - 250 A)	-	-
(Busbar width)	mm	10	25	40	45** upto 1000 A 60** upto 1250 A 65** upto 1600 A 35.5# upto 1600 A
Recommended Torque	Nm	2.5	10	-	-
Internal Accessories					
Auxiliary Switch (1 C/O or 2 C/O)		•	•	•	•
Shunt Trip		•	•	•	•
External Accessories					
Earth Fault Relay		•	•	•	•
Rotary Handle		•	•	•	•
Back Studs		-	•	•	•
Extended Terminals		+	+	+	+
Dolly Extension		-	-	+	+
Phase Barriers		+	+	+	+
Terminal Shrouds		•	•	-	-
Dolly pad locking Device		•	•	•	•

\* Current Ratings - 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A, 315 A, 400 A, 500 A, 630 A, 800 A, 1000 A, 1250 A, 1600 A.

• Available, - Not Available, + Supplied alongwith the MCCB as standard. \*\* Terminals at Front, # Terminals at Rear.

### Loadline DC MCCBs

DC MCCBs are available in three pole version from 25 A-1600 A with breaking capacity of 5 kA, 10 kA & 20 kA. The selection of the circuit breaker for DC applications depends on these criteria :-

• Rated current of the equipment. • Rated voltage, which determines the number of poles in series for breaking. For voltages upto 250 Vdc, two poles of the breaker are connected in series to form the positive pole and the third pole to be used as a negative pole or three poles can be used in series. • The maximum short-circuit current at the point of installation, which determines the breaking capacity. • The (L/R) ratio for the application should be  $\leq 15$  ms • In D Frame Rear Terminals are available in place of Back Studs



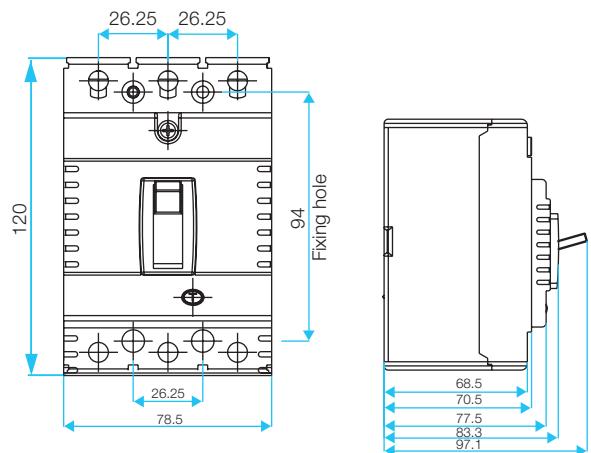
## ML1 MCCB

### Ordering Code

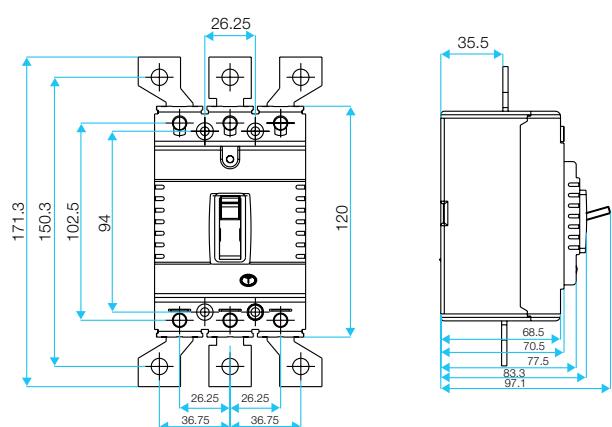
Current Rating	63 A	80 A	100 A	125 A
Cat no.	IHLMLAAT0063	IHLMLAAT0080	IHLMLAAT0100	IHLMLAAT0125

### Dimension (in mm)

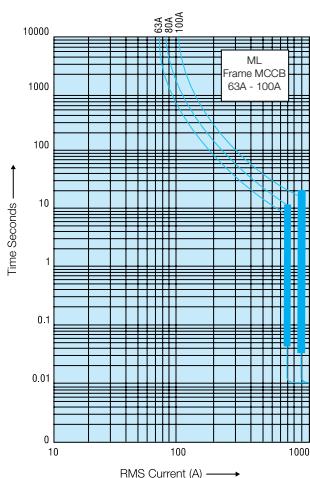
Three Pole



Three Pole with Terminals



Time current characteristics





## G Frame MCCBs



**G Frame Single Pole MCCB**

Current Rating (A)	Icu 10 kA at 240 V Cat. No.	Icu 16 kA at 240 V Cat. No.	Icu 25 kA at 240 V Cat. No.
25	IHLGSS0025	IHLGNS0025	IHLGHDAS0025
32	IHLGSS0032	IHLGNS0032	IHLGHDAS0032
40	IHLGSS0040	IHLGNS0040	IHLGHDAS0040
50	IHLGSS0050	IHLGNS0050	IHLGHDAS0050
63	IHLGSS0063	IHLGNS0063	IHLGHDAS0063
80	IHLGSS0080	IHLGNS0080	IHLGHDAS0080
100	IHLGSS0100	IHLGNS0100	IHLGHDAS0100
125	IHLGSS0125	IHLGNS0125	IHLGHDAS0125
150	IHLGSS0150	IHLGNS0150	IHLGHDAS0150
160	IHLGSS0160	IHLGNS0160	IHLGHDAS0160



**G Frame Three Pole MCCB**

Current Rating (A)	Icu 10 kA at 415 V Cat. No.	Icu 16 kA at 415 V Cat. No.	Icu 25 kA at 415 V Cat. No.
25	IHLGST0025	IHLGNT0025	IHLGHT0025
32	IHLGST0032	IHLGNT0032	IHLGHT0032
40	IHLGST0040	IHLGNT0040	IHLGHT0040
50	IHLGST0050	IHLGNT0050	IHLGHT0050
63	IHLGST0063	IHLGNT0063	IHLGHT0063
80	IHLGST0080	IHLGNT0080	IHLGHT0080
100	IHLGST0100	IHLGNT0100	IHLGHT0100
125	IHLGST0125	IHLGNT0125	IHLGHT0125
150	IHLGST0150	IHLGNT0150	IHLGHT0150
160	IHLGST0160	IHLGNT0160	IHLGHT0160



**G Frame Four Pole wSN MCCB**

Current Rating (A)	Icu 10 kA at 415 V Cat. No.	Icu 16 kA at 415 V Cat. No.	Icu 25 kA at 415 V Cat. No.
25	IHLGSF0025	IHLGNF0025	IHLGHF0025
32	IHLGSF0032	IHLGNF0032	IHLGHF0032
40	IHLGSF0040	IHLGNF0040	IHLGHF0040
50	IHLGSF0050	IHLGNF0050	IHLGHF0050
63	IHLGSF0063	IHLGNF0063	IHLGHF0063
80	IHLGSF0080	IHLGNF0080	IHLGHF0080
100	IHLGSF0100	IHLGNF0100	IHLGHF0100
125	IHLGSF0125	IHLGNF0125	IHLGHF0125
150	IHLGSF0150	IHLGNF0150	IHLGHF0150
160	IHLGSF0160	IHLGNF0160	IHLGHF0160



## G Frame Accessories

(Accessories are for 3P / 4P wSN)

Shunt Trip	

Voltage	Cat. No.
100-110 Vac	IHLGS110
220-240 Vac	IHLGS240
380-415 Vac	IHLGS415

Under Voltage Release	

Voltage	Cat. No.
110-120 Vac	IHLGU110
220-240 Vac	IHLGU240
380-440 Vac	IHLGU440

The breaker trips if the supply voltage dips below 70% to 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

Auxiliary Contact	

Auxiliary Contact (250Vac / 250Vdc) (450Vac / 250Vdc)	
1. Change Over (1NO+1NC)	IHLLASG1CO
2. Change Over (2NO+2NC)	IHLLASG2CO

Rotary Handle	

Description	Cat. No.
Direct Mounted	IHLGD000
With Door interlock and 300 mm remote shaft	IHLGRN30

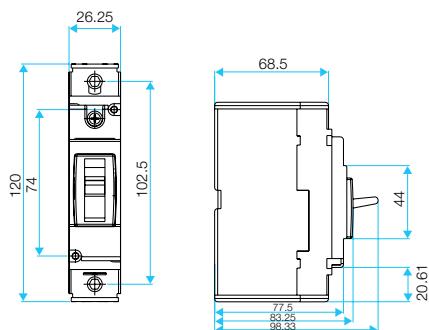


## G Frame Accessories

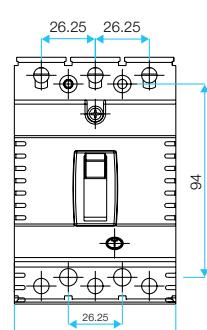
(Accessories are for 3P / 4P WSN)



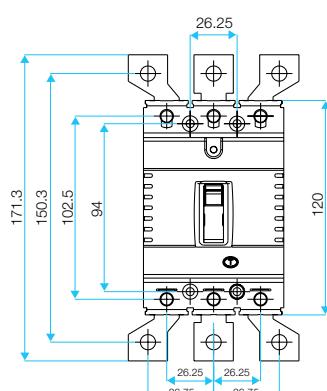
	Cat. No.
Dolly Pad locking device	IHLLDPG125
Phase Barriers	Three P Four P
Terminal Shrouds	Single P Three P Four P
Extended terminals Up to 80 A	Single P Three P Four P
Extended terminals 100 A - 160 A	Single P Three P Four P



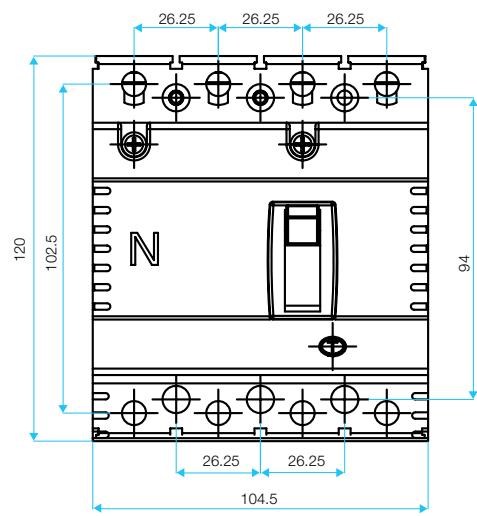
Single Pole



Three Pole



Three Pole with Extended Terminals



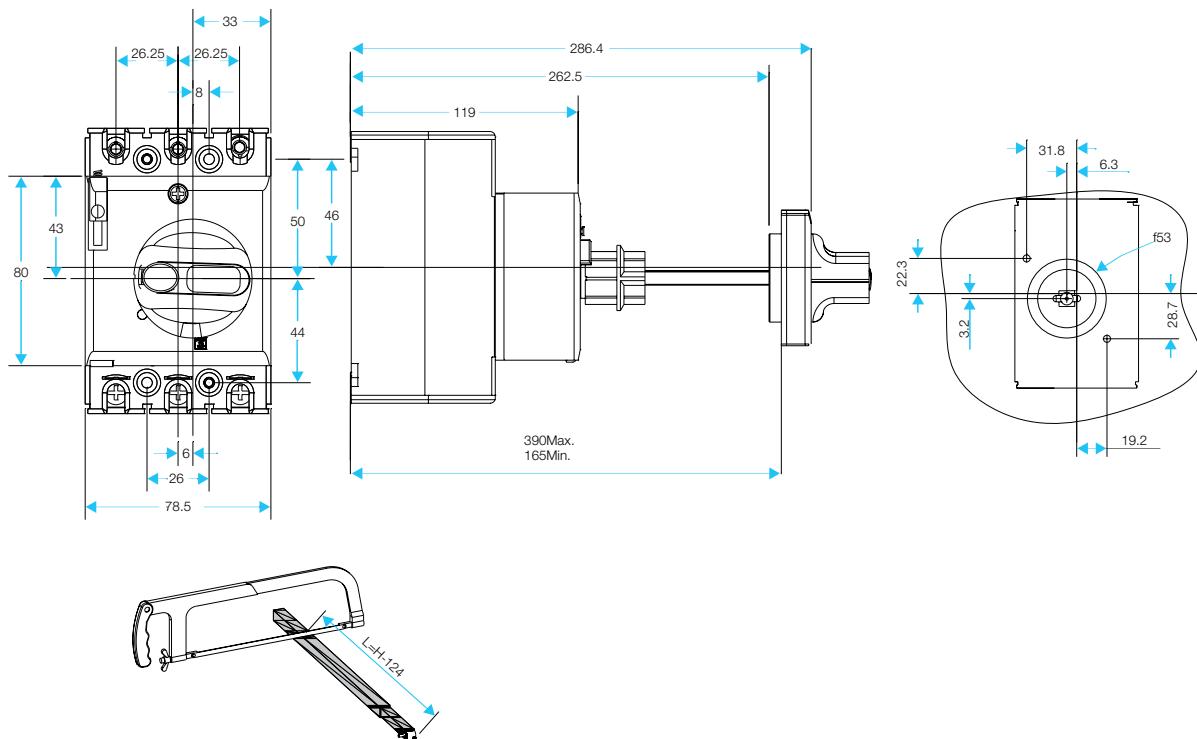
Four Pole with Switched Neutral

All dimensions are in mm.



Dimensions (in mm) - Rotary Handle

### Handle Fixing Details - 'G' Frame



- I - MCCB ON
- O - MCCB OFF
- Trip - (In between I and O positions)  
MCCB tripped by release or push to trip
- To re-close the MCCB move the handle towards position 'RESET' first till MCCB resets and then switch to position - 'I'.



## AA Frame MCCBs



AA Frame Single Pole MCCB

Current Rating (A)	Icu 25 kA at 240 V Cat. No.
25	IHLASS0025
32	IHLASS0032
40	IHLASS0040
50	IHLASS0050
63	IHLASS0063
80	IHLASS0080
100	IHLASS0100
125	IHLASS0125
160	IHLANS0160
200	IHLANS0200
250	IHLANS0250



AA Frame Three Pole MCCB

A)	Cat. No.	Cat. No.	Cat. No.
25	--	IHLAST0025	IHLANT0025
32	--	IHLAST0032	IHLANT0032
40	--	IHLAST0040	IHLANT0040
50	--	IHLAST0050	IHLANT0050
63	--	IHLAST0063	IHLANT0063
80	--	IHLAST0080	IHLANT0080
100	--	IHLAST0100	IHLANT0100
125	--	IHLAST0125	IHLANT0125
160	IHLAST0160	IHLANT0160	--
200	IHLAST0200	IHLANT0200	--
250	--	IHLANT0250	--



AA Frame Four Pole wSN MCCB

Current Rating	Icu 16 kA at 415 V	Icu 25 kA at 415 V	Icu 35 kA at 415 V (A)
25	--	IHLASF0025	IHLANF0025
32	--	IHLASF0032	IHLANF0032
40	--	IHLASF0040	IHLANF0040
50	--	IHLASF0050	IHLANF0050
63	--	IHLASF0063	IHLANF0063
80	--	IHLASF0080	IHLANF0080
100	--	IHLASF0100	IHLANF0100
125	--	IHLASF0125	IHLANF0125
160	IHLASF0160	IHLANF0160	--
200	IHLASF0200	IHLANF0200	--
250	--	IHLANF0250	--



## AA Frame Accessories

(Accessories are for 3P / 4P wSN)

Shunt Trip	
A small rectangular metal component with two terminals and a central screw.	A schematic diagram showing a shunt trip mechanism connected in parallel across a three-phase power source. It includes a normally open (N/O) contact and a normally closed (N/C) contact.

Voltage	Cat. No.
100-110 Vac	IHLAS110
220-240 Vac	IHLAS240
380-415 Vac	IHLAS415

Under Voltage Release	
A black rectangular component with a red indicator light and several terminals.	A schematic diagram showing an under voltage release mechanism connected in parallel across a three-phase power source. It includes multiple normally open (N/O) contacts and a normally closed (N/C) contact.

Voltage	Cat. No.
110-120 Vac	IHLAU110
220-240 Vac	IHLAU240
380-440 Vac	IHLAU440

The breaker trips if the supply voltage dips below 70% to 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

Auxiliary Contact	
A black rectangular component with two sets of terminals, one labeled N/O and one labeled N/C.	A schematic diagram showing an auxiliary contact mechanism connected in parallel across a three-phase power source. It includes two normally open (N/O) contacts and two normally closed (N/C) contacts.

Auxiliary Contact (250 Vac / 250 Vdc) (450 Vac / 250 Vdc)	
1. Change Over (1NO+1NC)	IHLAA1CO
2. Change Over (2NO+2NC)	IHLAA2CO

Rotary Handle	
A black rectangular component with a handle and a lock mechanism.	A schematic diagram showing a rotary handle assembly connected to a remote shaft via a gear system.

Description	Cat. No.
Direct Mounted	IHLAD000
With Door interlock and 300 mm remote shaft	IHLARN30



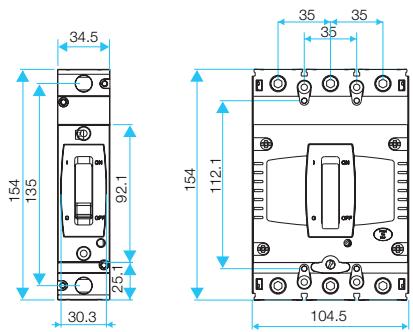
## AA Frame Accessories

(Accessories are for 3P / 4P wSN)

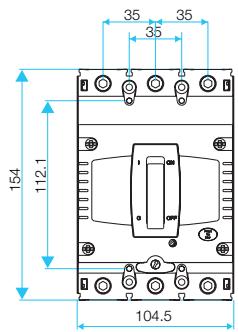


		Cat. No.
Dolly Pad locking device		IHLLDPA250
Phase Barriers	Three Pole Four Pole	ISLAX0063 ISLAX0064
Terminal Shrouds	Single Pole Three Pole Four Pole	IHLTSAS00 IHLTSAT00 IHLTSF00
Extended terminals Up to 100 A	Single Pole Three Pole Four Pole	ISLAX0056 ISLAX0057 ISLAX0058
Extended terminals 125 A - 250 A	Single Pole Three Pole Four Pole	ISLAX0048 ISLAX0061 ISLAX0059

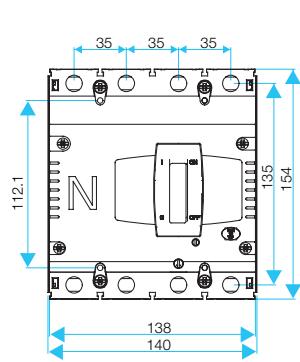
Dimensions (in mm)



Single Pole



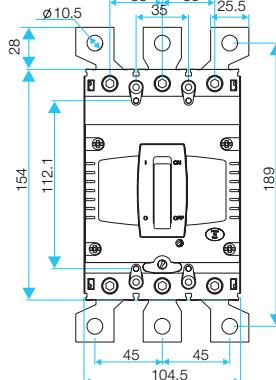
Three Pole



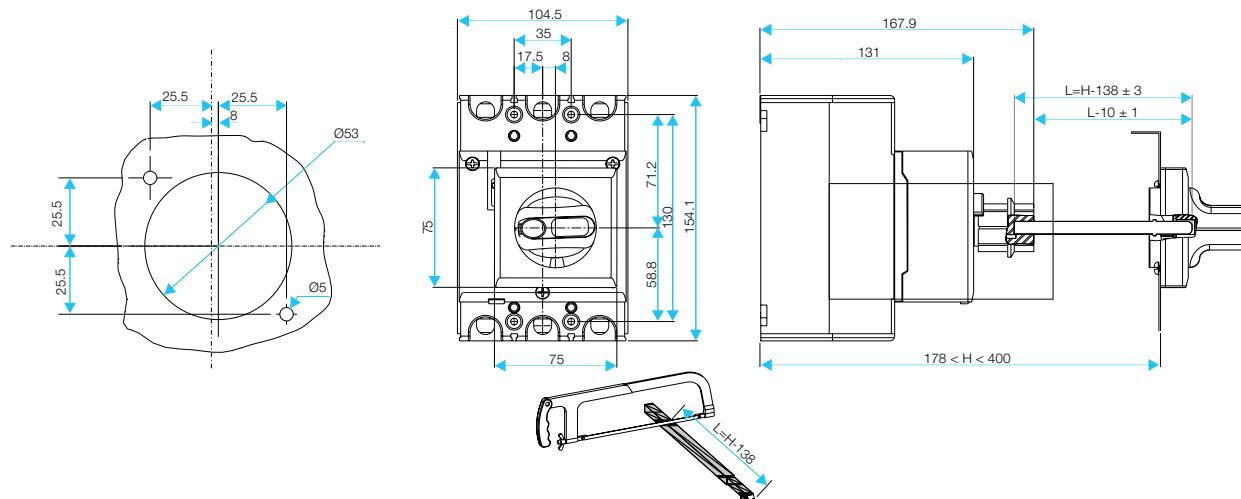
Four Pole with Switched Neutral



Three Pole with Extended Terminals



### Handle Fixing Details - 'A' Frame





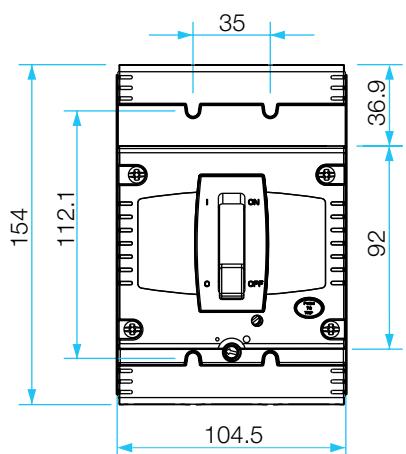
## A Frame (TAMA) MCCB

Ordering code

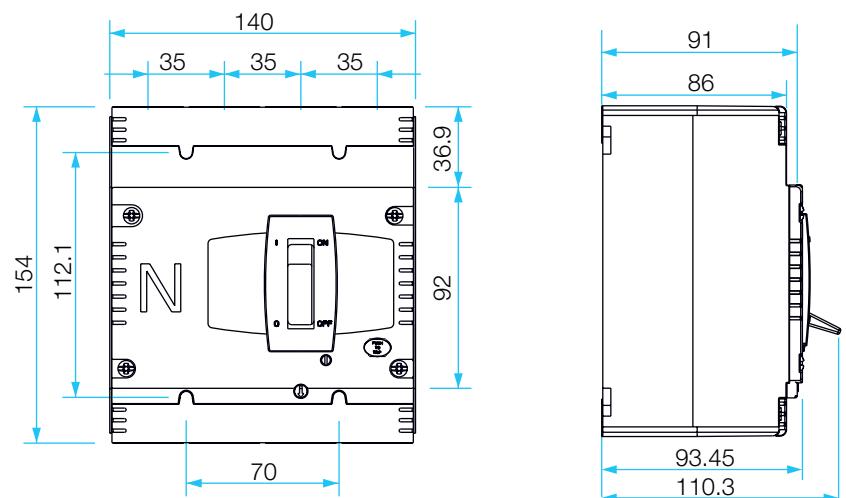
Current Rating	Execution					
	Three Pole			Four Pole		
	16 kA @ 415 V Cat. No.	25 kA @ 415 V Cat. No.	35 kA @ 415 V Cat. No.	16 kA @ 415 V Cat. No.	25 kA @ 415 V Cat. No.	35 kA @ 415 V Cat. No.
80 A		IHLASDCT0080	IHLANECT0080		IHLASDCF0080	IHLANEFC0080
100 A		IHLASDCT0100	IHLANECT0100		IHLASDCF0100	IHLANEFC0100
125 A		IHLASDCT0125	IHLANECT0125		IHLASDCF0125	IHLANEFC0125
160 A	IHLASBCT0160	IHLANDCT0160		IHLASBCF0160	IHLANDCF0160	
200 A	IHLASBCT0200	IHLANDCT0200		IHLASBCF0200	IHLANDCF0200	
250 A	IHLASBCT0250	IHLANDCT0250		IHLASBCF0250	IHLANDCF0250	

Dimension (in mm)

Three Pole



Four Pole





## FN/FH Frame MCCBs

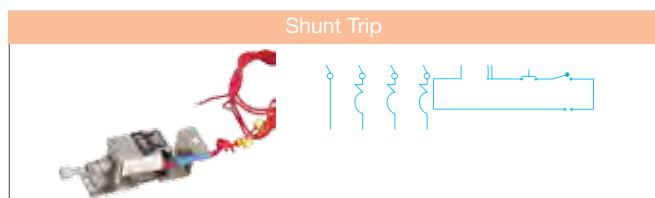


FN/FH Frame Three Pole / Four Pole with Switch Neutral

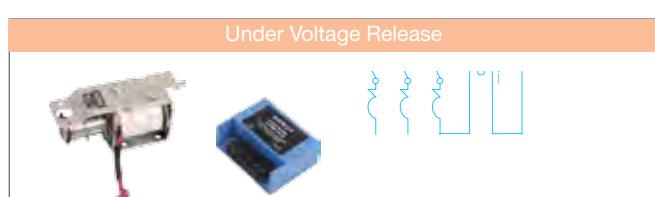
Current	Icu 35 kA at 415 V	Icu 50 kA at 415 V	Icu 35 kA at 415 V	Icu 50 kA at 415 V Rating (A)
	Three Pole		Four Pole	
25	IHLFNT0025	IHLFHT0025	IHLFNF0025	IHLFHF0025
32	IHLFNT0032	IHLFHT0032	IHLFNF0032	IHLFHF0032
40	IHLFNT0040	IHLFHT0040	IHLFNF0040	IHLFHF0040
50	IHLFNT0050	IHLFHT0050	IHLFNF0050	IHLFHF0050
63	IHLFNT0063	IHLFHT0063	IHLFNF0063	IHLFHF0063
80	IHLFNT0080	IHLFHT0080	IHLFNF0080	IHLFHF0080
100	IHLFNT0100	IHLFHT0100	IHLFNF0100	IHLFHF0100
125	IHLFNT0125	IHLFHT0125	IHLFNF0125	IHLFHF0125
160	IHLFNT0160	IHLFHT0160	IHLFNF0160	IHLFHF0160
200	IHLFNT0200	IHLFHT0200	IHLFNF0200	IHLFHF0200
250	IHLFNT0250	IHLFHT0250	IHLFNF0250	IHLFHF0250

## FN/FH Frame Accessories

(Accessories are for 3P / 4P wSN)



Voltage	Cat. No.
100-110 Vac	IHLLSTF110
220-240 Vac	IHLLSTF240
380-415 Vac	IHLLSTF415

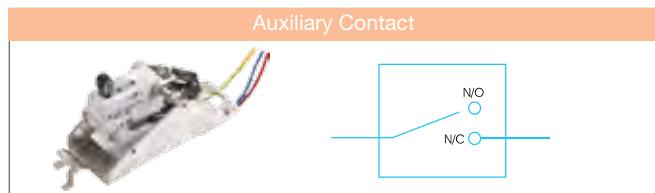


Voltage	Cat. No.
110-120 Vac	IHLUVRF110
220-240 Vac	IHLUVRF240
380-440 Vac	IHLUVRF440

The breaker trips if the supply voltage dips below 70% to 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

Supplied with external mounting Power pack to operate on AC supplies. Additional transformer is supplied with ILUVRF440 & ILUVRF110.



Auxiliary Contact (250 Vac / 250 Vdc) (450 Vac / 250 Vdc)	
1. Change Over (1NO+1NC)	IHLLASF1CO
2. Change Over (2NO+2NC)	IHLLASF2CO



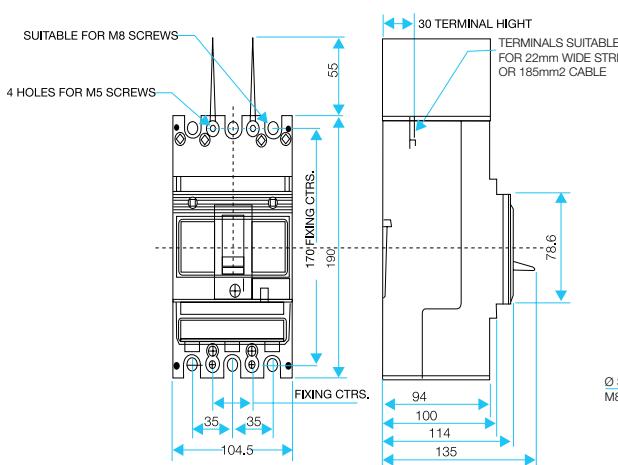
## FN/FH Frame Accessories

(Accessories are for 3P / 4P wSN)

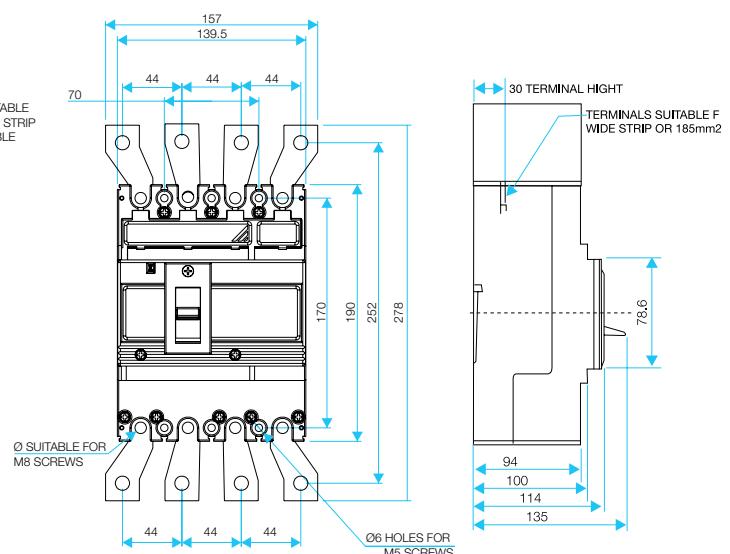
Rotary Handle	Cat No.
	With Door interlock and 300mm remote shaft IHLLRRHF30

Other Accessories	Cat. No.
	Dolly Pad locking device IHLLDPF250
Phase Barriers	Three Pole Four Pole ISLFX0036 ISLFX0038
Terminal Shrouds	Three Pole Four Pole IHLLTSFT00 IHLLTSFF00
Extended terminals Up to 100 A	Three Pole Four Pole ISLFX0047 ISLFX0044
Extended terminals 125 A - 250 A	Three Pole Four Pole ISLFX0049 ISLFX0046

Dimensions (in mm)
--------------------



Three Pole

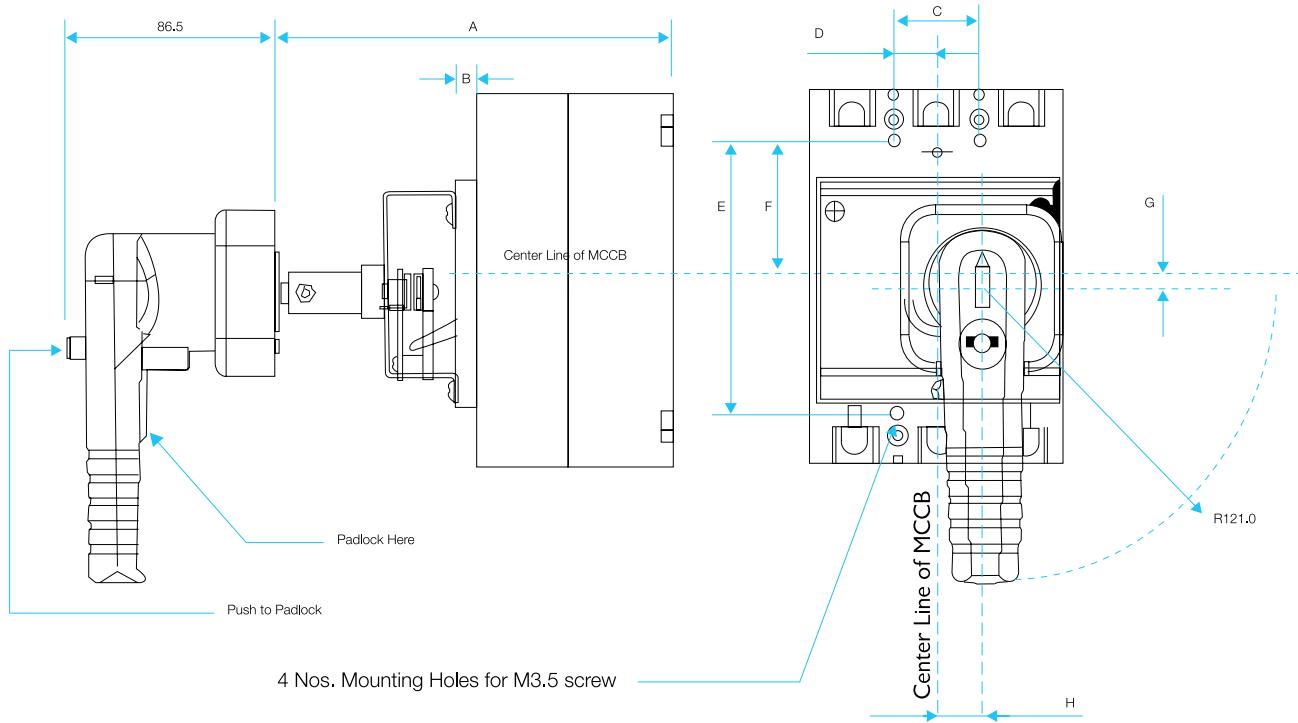


Four Pole with Switch Neutral

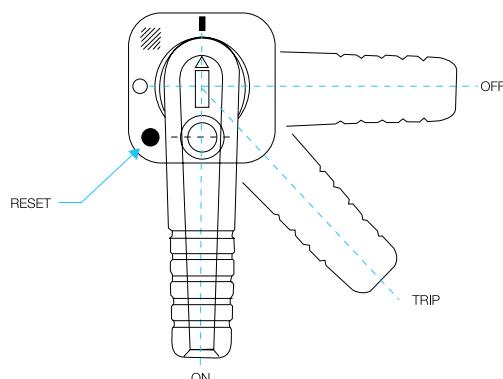
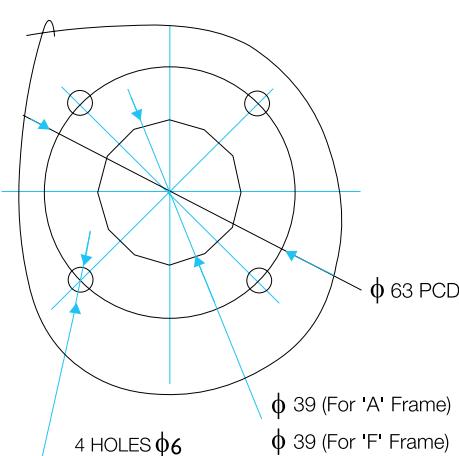


### Dimensions (in mm) - Rotary Handle

#### Handle Fixin Details - 'F' Frame



S. No.	Frame	A	B	C	D	E	F	G	H
1	F	190.0	4.25	35.0	17.5	170.0	85.0	3.75	15.0



- I - MCCB ON
- O - MCCB OFF
- Trip - (In between I and O positions)  
MCCB tripped by release or push to trip
- To re-close the MCCB move the handle towards position 'RESET' first till MCCB resets and then switch to position - 'I'.



## LS / LN Frame MCCB



LS / LN Frame Three Pole / Four Pole MCCB (TAMF)

Current	Icu 36 kA at 415 V Cat. No	Icu 50 kA at 415 V Cat. No	Icu 36 kA at 415 V Cat. No	Icu 50 kA at 415 V Rating (A)
	Three Pole		Four Pole	
200	IHLLSEBT0200	IHLLNFBT0200	IHLLSEBF0200	IHLLNFBF0200
250	IHLLSEBT0250	IHLLNFBT0250	IHLLSEBF0250	IHLLNFBF0250
320	IHLLSEBT0320	IHLLNFBT0320	IHLLSEBF0320	IHLLNFBF0320
400	IHLLSEBT0400	IHLLNFBT0400	IHLLSEBF0400	IHLLNFBF0400
500	IHLLSEBT0500	IHLLNFBT0500	IHLLSEBF0500	IHLLNFBF0500
630	IHLLSEBT0630	IHLLNFBT0630	IHLLSEBF0630	IHLLNFBF0630



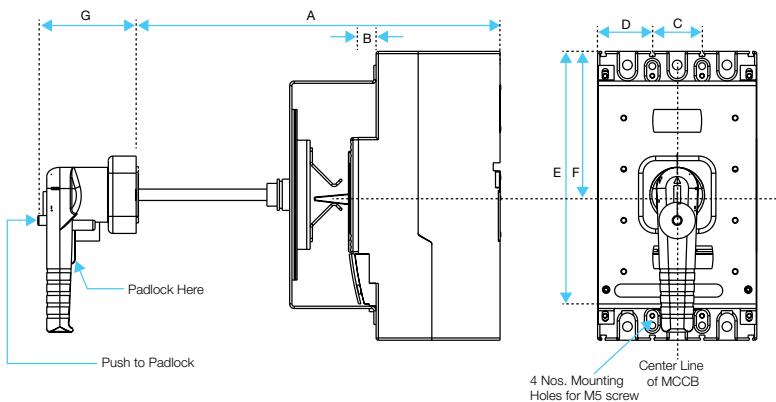
LS / LN Frame Three Pole / Four Pole MCCB (TAMA)

Current	Icu 36 kA at 415 V Cat. No	Icu 50 kA at 415 V Cat. No	Icu 36 kA at 415 V Cat. No	Icu 50 kA at 415 V Rating (A)
	Three Pole		Four Pole	
200	IHLLSECT0200	IHLLNFCT0200	IHLLSECF0200	IHLLNFCF0200
250	IHLLSECT0250	IHLLNFCT0250	IHLLSECF0250	IHLLNFCF0250
320	IHLLSECT0320	IHLLNFCT0320	IHLLSECF0320	IHLLNFCF0320
400	IHLLSECT0400	IHLLNFCT0400	IHLLSECF0400	IHLLNFCF0400
500	IHLLSECT0500	IHLLNFCT0500	IHLLSECF0500	IHLLNFCF0500
630	IHLLSEBT0630	IHLLNFBT0630	IHLLSEBF0630	IHLLNFBF0630



## LS / LN Frame Accessories

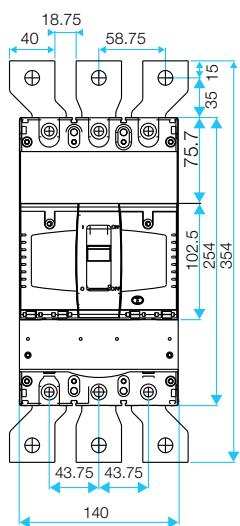
Dimensions (in mm) - Rotary Handle



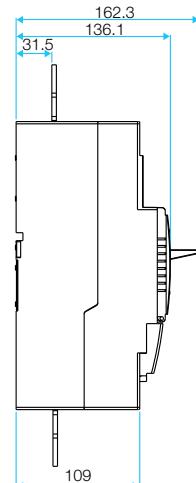
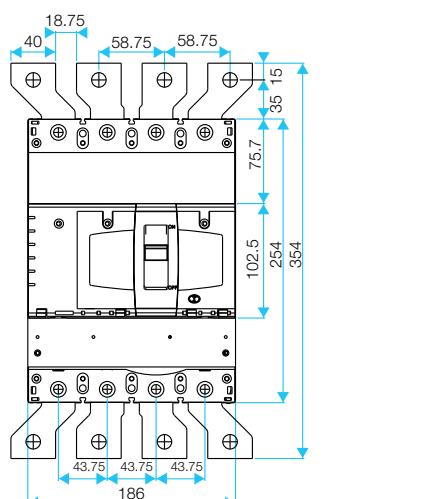
Frame	A	B	C	D	E	F	G
L	415.0	6.8	43.75	21.87	211.0	104.5	86.5

Dimensions (in mm)

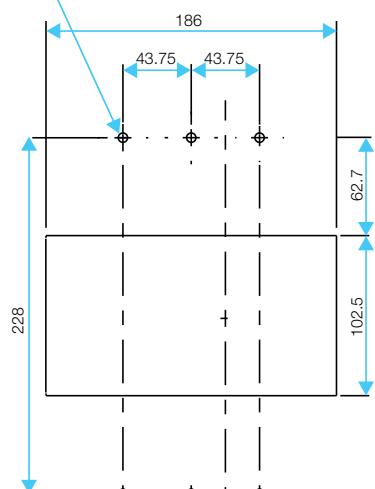
Three Pole



Four Pole

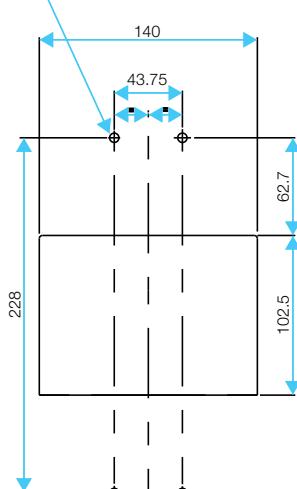


SUITABLE FOR  
6-M5X120 SCREW



MOUNTING & DOOR CUT OUT DETAILS  
(Four Pole)

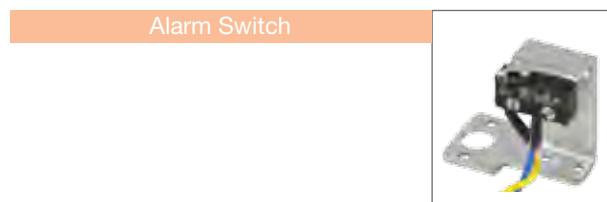
SUITABLE FOR  
4-M5X120 SCREW



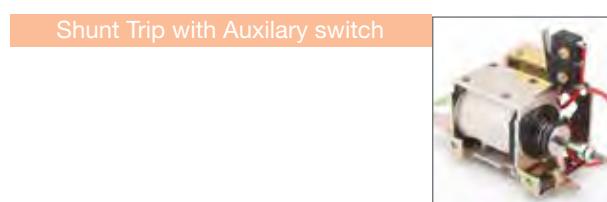
MOUNTING & DOOR CUT OUT DETAILS  
(Three Pole)



## LS / LN Frame Accessories



Voltage	Rating	Configuration	Cat. No.
240 Vac	1 A	1NO + NC	IHLLB000



Voltage	Cat. No.
110 Vac	IHLLS110
240 Vac	IHLLS240
415 Vac	IHLLS415

Note: Shunt Trip release is provided with built-in auxiliary contact

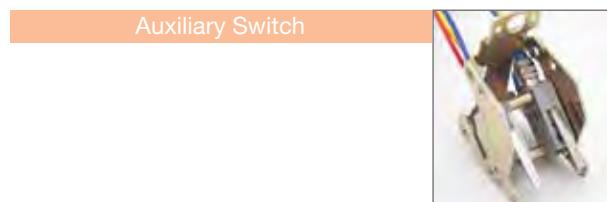


Voltage	Cat. No.
110 Vac	IHLLU110
240 Vac	IHLLU240
415 Vac	IHLLU415

Note: The breaker trips if the supply voltage dips below 70%- 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

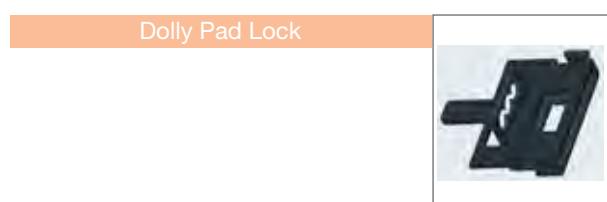
Supplied with external mounting Electronic Power pack to operate on AC supplies.



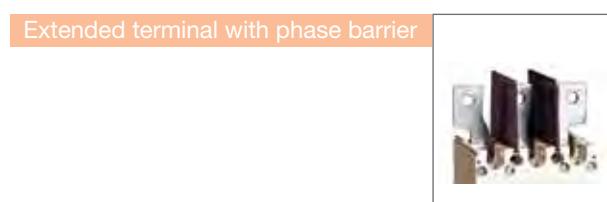
Voltage	Current Rating (AC12)	Configuration	Cat. No.
250 Vac	4 A	(1NO+1NC)	IHLA1CO
250 Vac	4 A	2(1NO+1NC)	IHLA2CO



Rotary Handle	Cat. No.
With Door interlock and 300 mm remote shaft	IHLRN30



	Cat. No.
Dolly Extension	ISCPSMSLLX009
Dolly Pad locking device	IHLPP000



	Cat. No.
Extended terminals (250 A-400 A)	ISSLX0013
(500 A-630 A)	ISSLX0014
Phase Barriers	ISSLLX0004



## CN/CH Frame MCCBs



CN Frame Three Pole MCCB

Current Rating (A)	Icu 35 kA at 415 V Cat. No.
160	IHLCNT0160
200	IHLCNT0200
250	IHLCNT0250
315	IHLCNT0315
400	IHLCNT0400
500	IHLCNT0500
630	IHLCNT0630
800	IHLCNT0800



CN Frame Four Pole wSN MCCB

Current Rating (A)	Icu 35 kA at 415 V Cat. No.
160	IHLCNF0160
200	IHLCNF0200
250	IHLCNF0250
315	IHLCNF0315
400	IHLCNF0400
500	IHLCNF0500
630	IHLCNF0630
800	IHLCNF0800



CH Frame Three Pole MCCB

Current Rating (A)	Icu 50 kA at 415 V Cat. No.
160	IHLCHT0160
200	IHLCHT0200
250	IHLCHT0250
315	IHLCHT0315
400	IHLCHT0400
500	IHLCHT0500
630	IHLCHT0630
800	IHLCHT0800



CH Frame Four Pole wSN MCCB

Current Rating (A)	Icu 50 kA at 415 V Cat. No.
160	IHLCHF0160
200	IHLCHF0200
250	IHLCHF0250
315	IHLCHF0315
400	IHLCHF0400
500	IHLCHF0500
630	IHLCHF0630
800	IHLCHF0800



## CN/CH Frame Accessories

(Accessories are for 3P / 4P wSN)

Shunt Trip	
Voltage	Cat. No.
100-110 Vac	IHLCS110
220-240 Vac	IHLCS240
380-415 Vac	IHLCS415

Under Voltage Release	
Voltage	Cat. No.
110-120 Vac	IHLCU110
220-240 Vac	IHLCU240
380-440 Vac	IHLCU440

The breaker trips if the supply voltage dips below 70% to 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

Supplied with external Power pack to operate on AC supplies.  
Additional transformer is supplied with ILUVRCC440 & ILUVRCC110.

Auxiliary Contact	

Auxiliary Contact (250Vac / 250Vdc) (450Vac / 250 Vdc)	
1. Change Over (1NO+1NC)	IHLASC1CO
2. Change Over (2NO+2NC)	IHLASC2CO

Rotary Handle	

Cat. No.	
With Door interlock and 300 mm remote shaft	IHLRRHC30

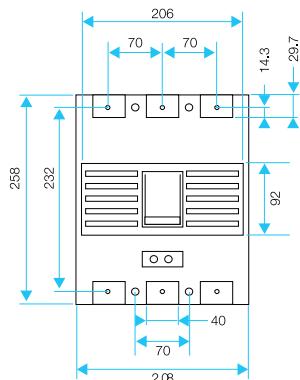


## CN/CH Frame MCCBs

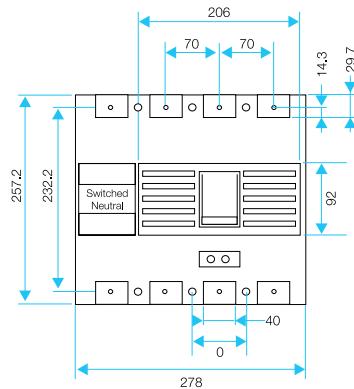


	Cat. No.
Dolly Pad locking device	IHLLDPC800
Phase Barriers	IHLLPBC800
Dolly Extension	IHLDEC800

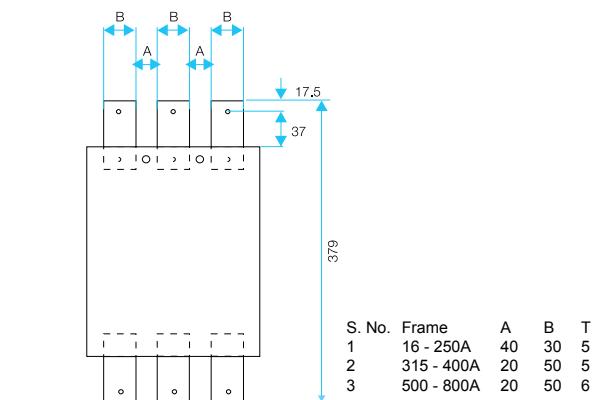
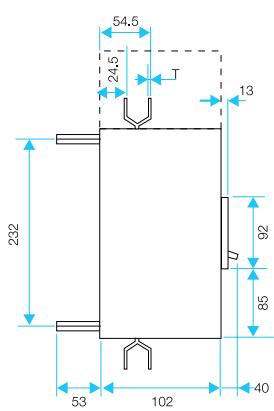
**Dimensions (in mm)**



Three Pole



Four Pole with Switched Neutral

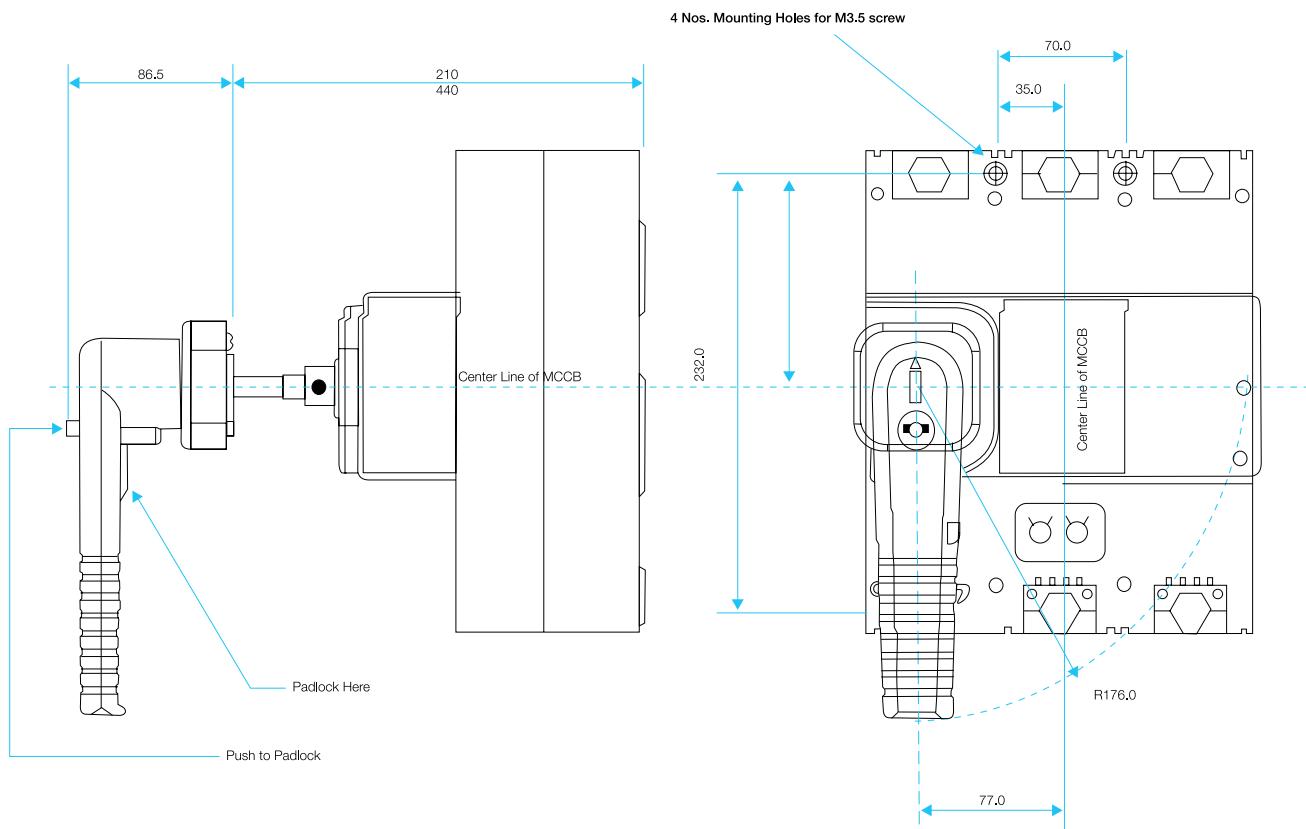


Three Pole with Extended Terminals

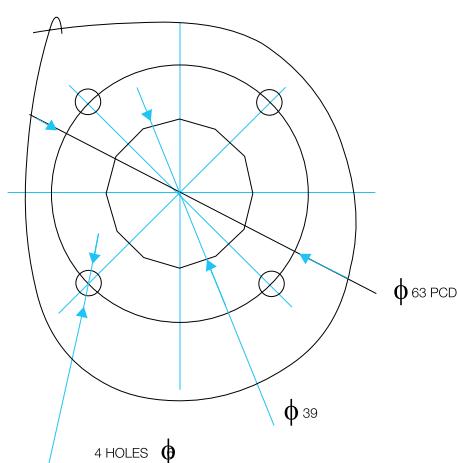


Dimensions (in mm) - Rotary Handle

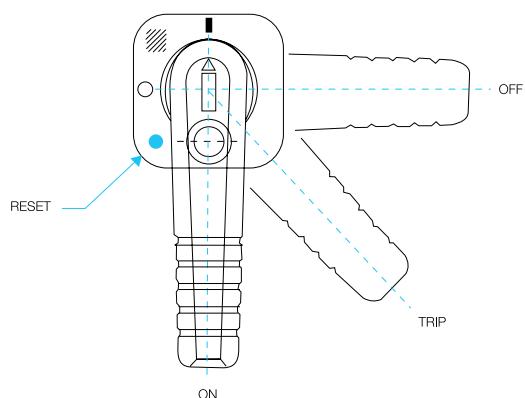
**Handle Fixing Details - 'C' Frame**



**Door Cut-Out**



**Rotary Handle Position**



- I - MCCB ON
- O - MCCB OFF
- Trip - (In between I and O positions)  
MCCB tripped by release or push to trip
- To re-close the MCCB move the handle towards position 'RESET' first till MCCB resets and then switch to position - 'I'.



## DN Frame MCCBs



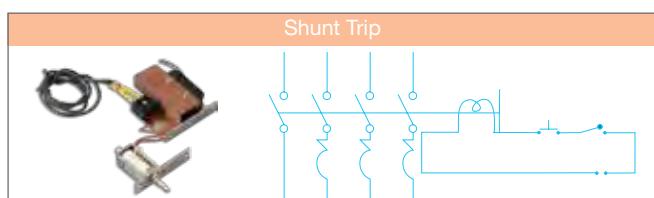
DN Frame MCCB - Three Pole

Current Rating (A)	Icu 50 kA at 415 V Cat. No.
800	IHLNDNT0800
1000	IHLNDNT1000
1250	IHLNDNT1250
1600	IHLNDNT1600

DN Frame MCCB - Four Pole with Switched Neutral

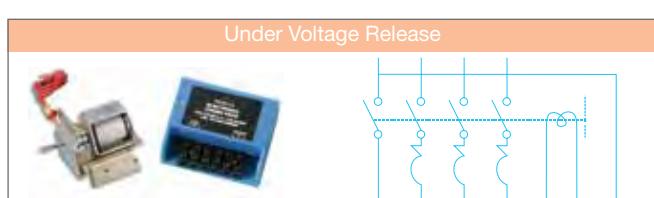
Current Rating (A)	Icu 50 kA at 415 V Cat. No.
1000	IHLDNF1000
1250	IHLDNF1250

## D Frame Accessories



Shunt Trip

Voltage	Cat. No.
100-110 Vac	IHLLSTD110
220-240 Vac	IHLLSTD240
380-415 Vac	IHLLSTD415



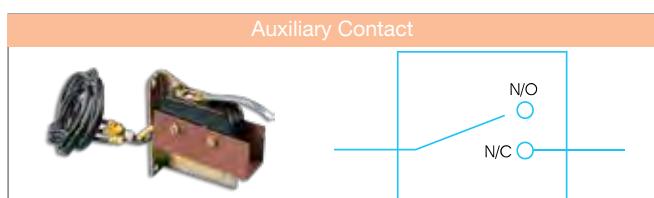
Under Voltage Release

Voltage	Cat. No.
110-120 Vac	IHLUVRD110
220-240 Vac	IHLUVRD240
380-440 Vac	IHLUVRD440

The breaker trips if the supply voltage dips below 70% to 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

Supplied with external mounting Power pack to operate on AC supplies. Additional transformer is supplied with LUVRD440 & LUVRD110.



Auxiliary Contact

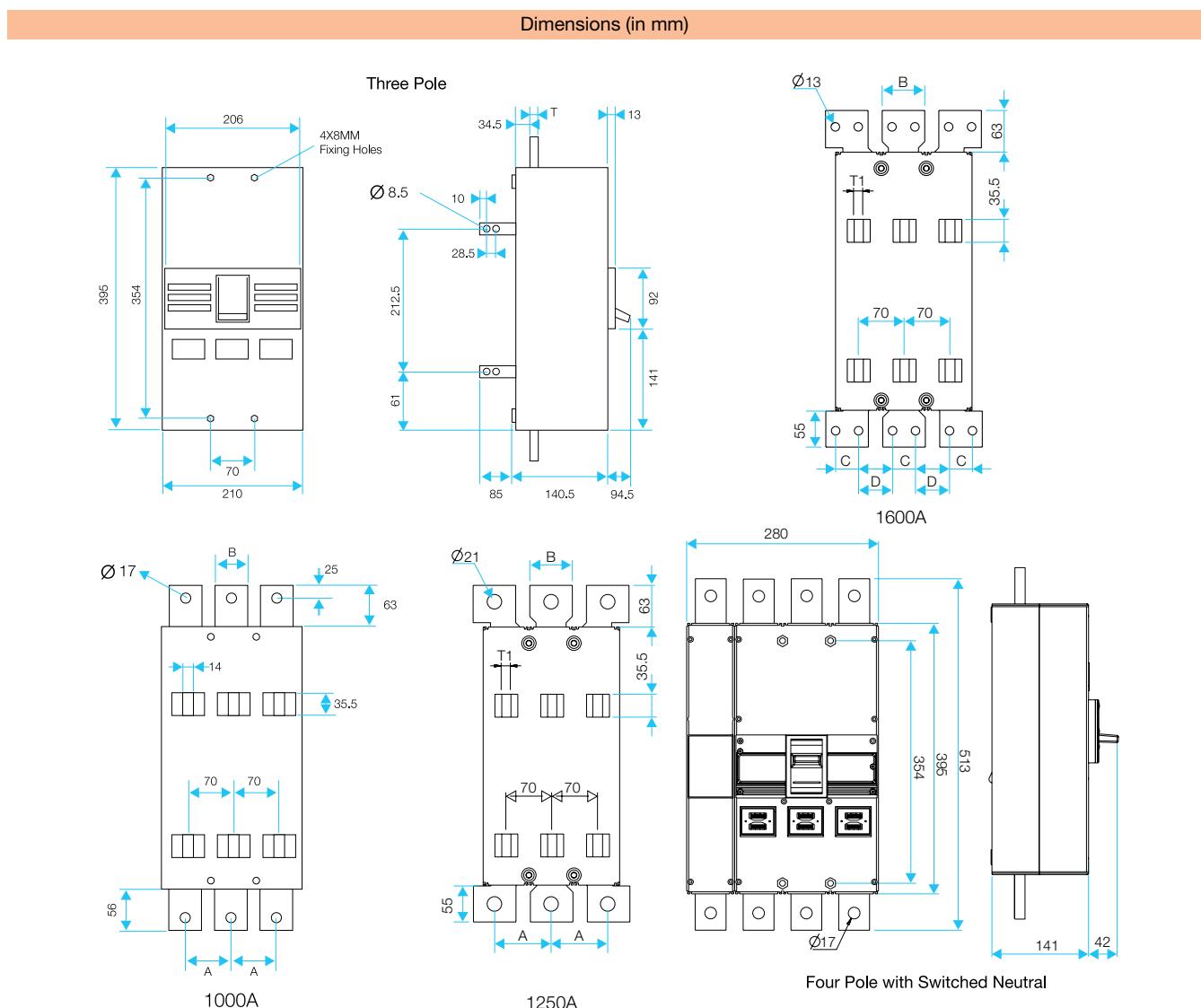
Auxiliary Contact (250 Vac / 250 Vdc) (450 Vac / 250 Vdc)	
1. Change Over (1NO+1NC)	IHLASD1C0
2. Change Over (2NO+2NC)	IHLASD2C1



## D Frame Accessories



	Cat. No.
With Door interlock and 300 mm remote shaft	IHLLRRHD30
<b>Other Accessories</b>	
Dolly Pad locking device	IHLLDPD160
Dolly Extension	IHLLDED160



S.No	Rating	A	B	C	D	T	T1
1	1000A	75	45	-	-	15	15
2	1250A	82	60	-	-	15	15
3	1600A	-	65	35	52	18	18



## DC MCCBs



GN Frame Three Pole MCCB

Current Rating (A)	Icu 5 kA Cat. No.
25	IHMCGNT0025
32	IHMCGNT0032
40	IHMCGNT0040
50	IHMCGNT0050
63	IHMCGNT0063
80	IHMCGNT0080
100	IHMCGNT0100
125	IHMCGNT0125
160	IHMCGNT0160



AN Frame Three Pole MCCB

Current Rating (A)	Icu 10 kA Cat. No.
25	IHMCACT0025
32	IHMCACT0032
40	IHMCACT0040
50	IHMCACT0050
63	IHMCACT0063
80	IHMCACT0080
100	IHMCACT0100
125	IHMCACT0125
160	IHMCACT0160
200	IHMCACT0200
250	IHMCACT0250



CH Frame Three Pole MCCB

Current Rating (A)	Icu 20 kA Cat. No.
160	IHMCCHT0160
200	IHMCCHT0200
250	IHMCCHT0250
315	IHMCCHT0315
400	IHMCCHT0400
500	IHMCCHT0500
630	IHMCCHT0630
800	IHMCCHT0800



DN Frame Three Pole MCCB

Current Rating (A)	Icu 20 kA Cat. No.
1000	IHMCDNT1000
1250	IHMCDNT1250
1600	IHMCDNT1600



## Earth Fault Relay

The Earth Fault Relay is a common accessory for use in conjunction with all MCCB frames.

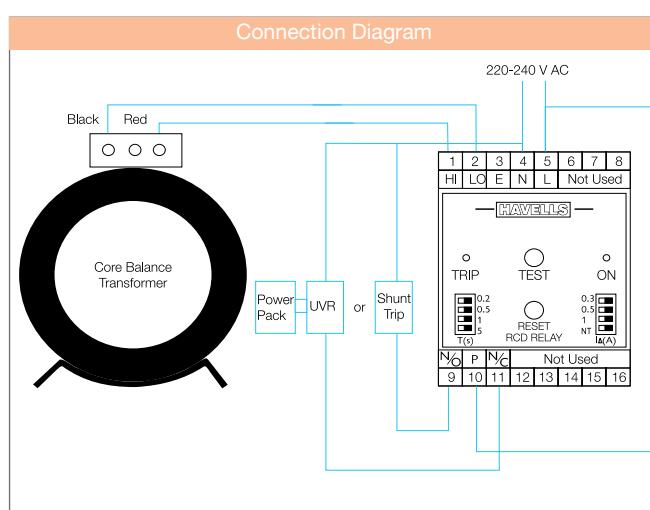
The Earth Fault detection system for use with Loadline MCCBs comprises of a core balance transformer (CT) coupled to an advanced RCD relay. The relay may be used to trip a circuit breaker via a shunt trip or an under voltage release in the event of an Earth Fault.

The relay and one of the four available CT's is all that is required for a complete earth fault sensing system suitable for the control of a circuit breaker in a circuit upto 800 A fitted with either a shunt trip or an under voltage release. The simple arrangement and a small number of interconnections necessary ensure that EFR is easily selected and installed.

The relay is suitable for 220-240 Vac supply with the flexibility of choosing the sensitivity between 300 mA to 1 A and time delay in the range of 200 mili second - 5 second. The required sensitivity and time delay should be selected by the dip switches provided on the facia of the relay.

### Features

- No nuisance tripping
- DIN rail mounting
- Adjustable time delay
- Choice of sensitivity from 300 mA upto 1A
- Trip indication LED (Red)
- ON indication LED (Green)
- Test push button
- Reset push button



### Technical Information

Supply Voltage	220 / 240 Vac, 50 / 60 Hz
Changeover contact	5 A AC-15 250 V
Sensitivity	300 mA, 500 mA, 1A, NT
Time delay (ms)	200, 500, 1000, 5000

Note: Option to By-Pass EFR in NT position available with dip switch.

### Core Balanced Current Transformer

Size	Current Rating	Dimension	Shape
1.	25-100 A	60 mm	Circular
2.	125-200 A	95 mm	Circular
3.	250-400 A	145 mm	Circular
4.	500-800 A	300 x 80 mm	Rectangular

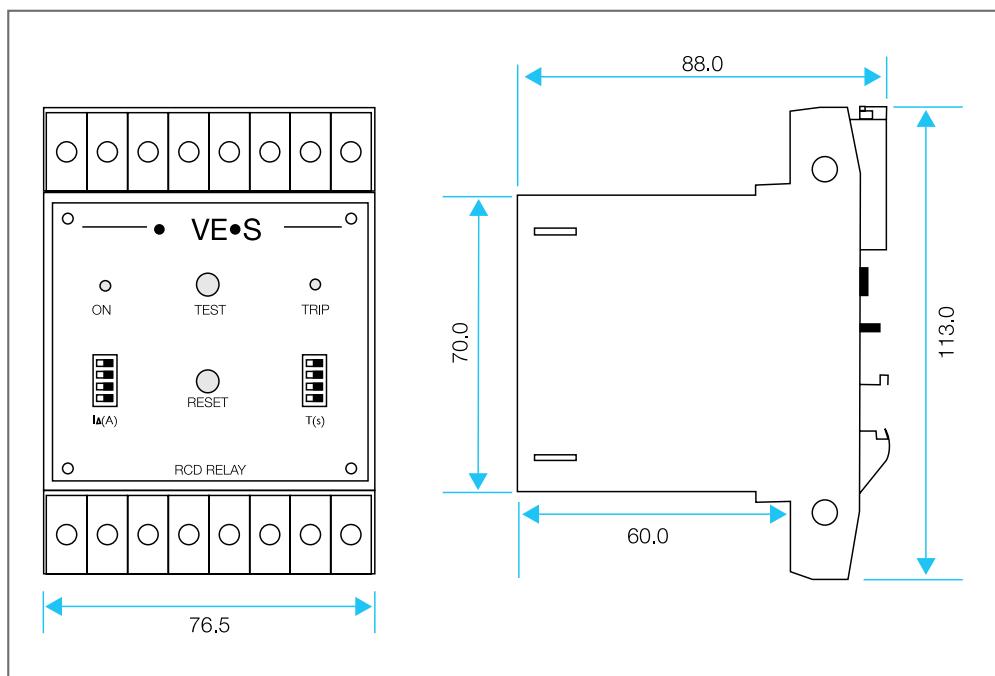


#### Earth Fault Relay

MCCB Current Rating (A)	Cat. No.
25 - 100	IHEF1100
125 - 200	IHEF2200
250 - 400	IHEF3400
500 - 800	IHEF4800

The earth fault relay is supplied with the CT based on the current rating. To operate the EFR, a shunt trip or an under voltage release is necessary which has to be ordered separately.

#### Dimensions (in mm)



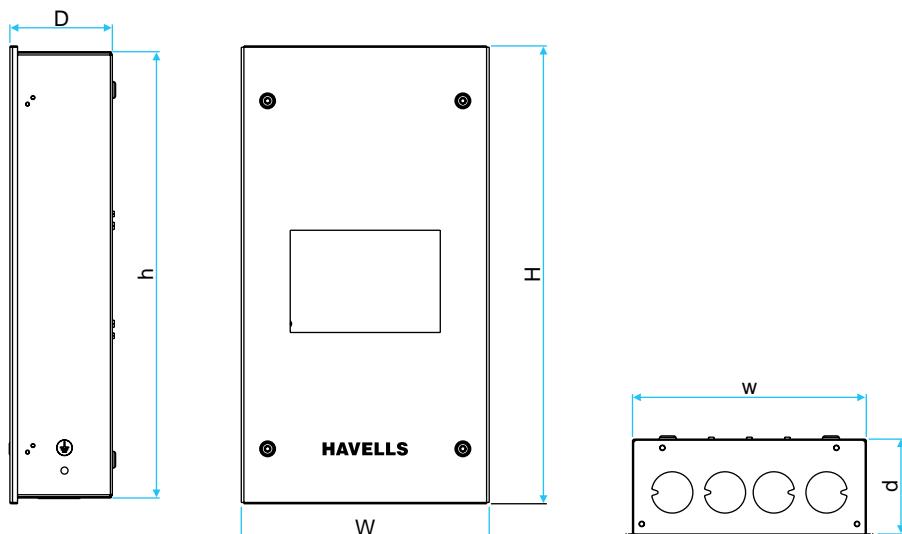


## General Purpose Enclosure



Enclosures made of special grade CRCA steel are available for housing G, A and C Frame MCCBs upto 800A. They are manufactured with latest technology using CNC Punch and Brake presses to attain highest degree of perfection. The enclosures are painted with latest techniques in powder coating using epoxy polyester and polyester resin based powder paints to ensure smooth, scratch resistant surface coatings. They are suitable for wall mounting & adequate knockouts are provided for cable entry.

Dimension (in mm)



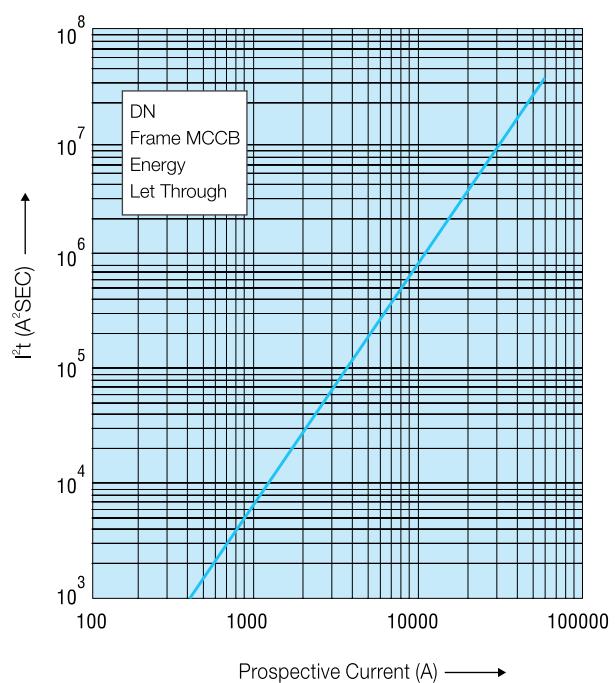
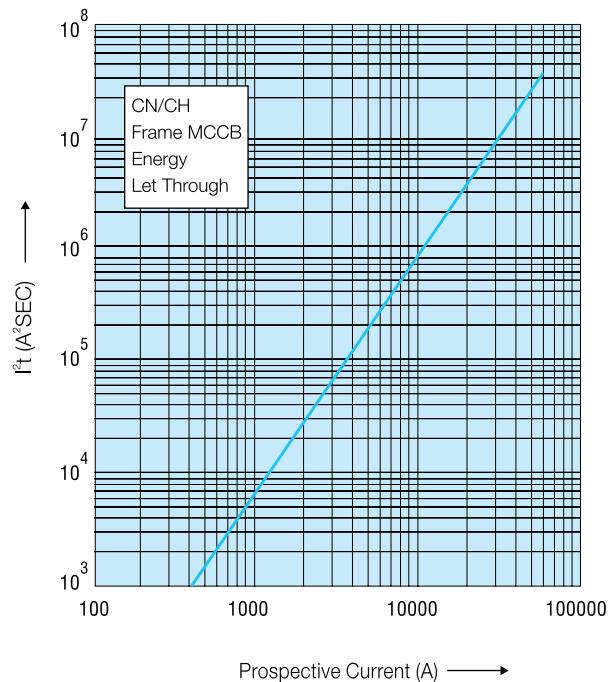
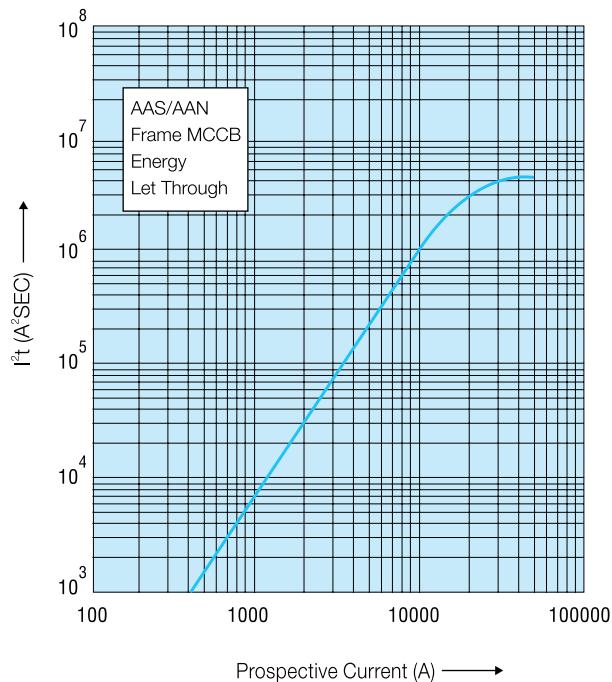
Discription	Cat. No.
ML1 Frame TP	IHEMTP
G Frame 160A TP	IHEGTP
G Frame 160A FP	IHEGFP
A Frame 250A TP	IHEATP
A Frame 250A FP	IHEAFP
F Frame 250A TP	IHEFTP
F Frame 250A FP	IHEFFP
C Frame 400A TP	IHECTP
C Frame 400A FP	IHECFP
C Frame 800A TP	IHECTS
C Frame 800A FP	IHECFS
L Frame 630 A TP	IHELTP
L Frame 630 A FP	IHELFP
HID Frame 160 TP	ISSBOU1117
HID Frame 160 FP	ISSBOU1118

Discription	Rating	H	h	D	d	W	w
G Frame	160 A	310	300	82	75	200	190
A Frame	250 A	421	410	97	87	226	215
F Frame	250 A	570	560	122	210	260	120
C Frame	400 A	710	700	130	123	410	400
C Frame	800 A	975	760	122	115	440	425
L Frame	630 A	705	700	150	145	360	350
HID Frame 1	160 A	310	300	80	75	215	210



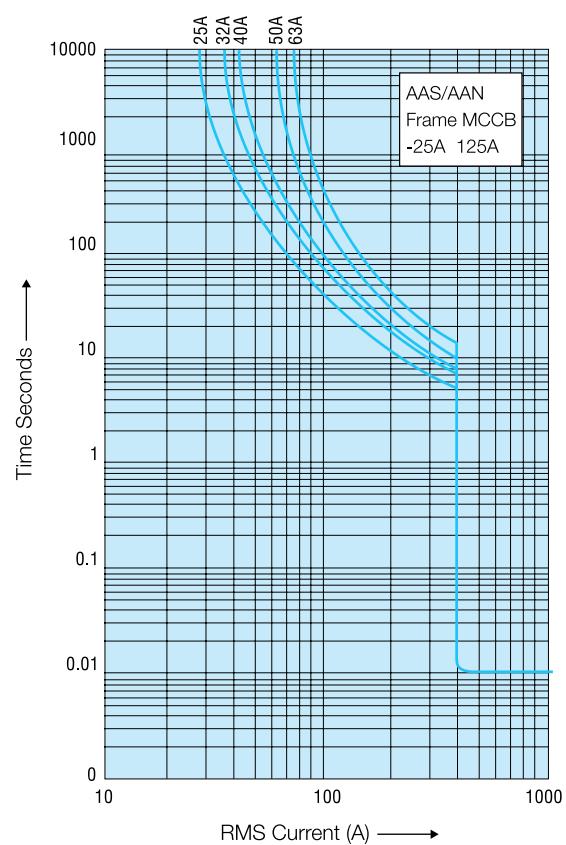
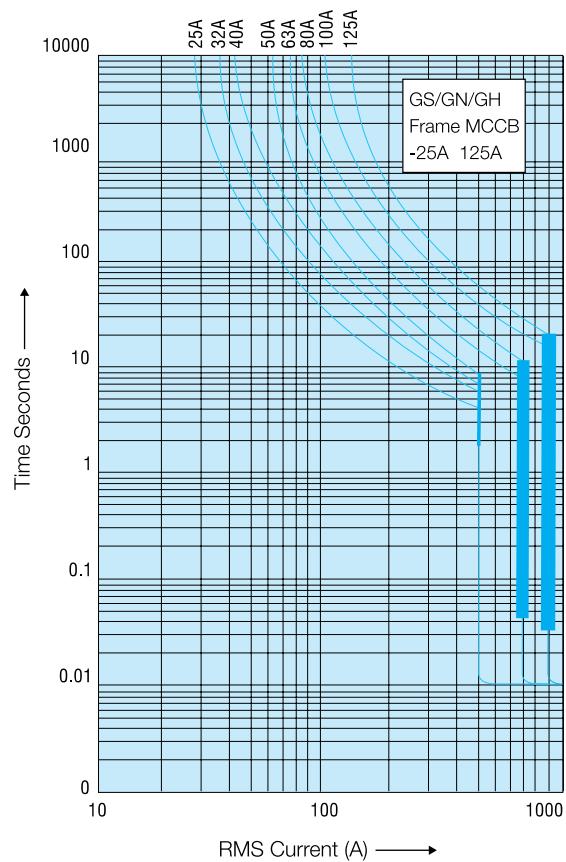


## Let Through Energy ( $I^2t$ ) Characteristics



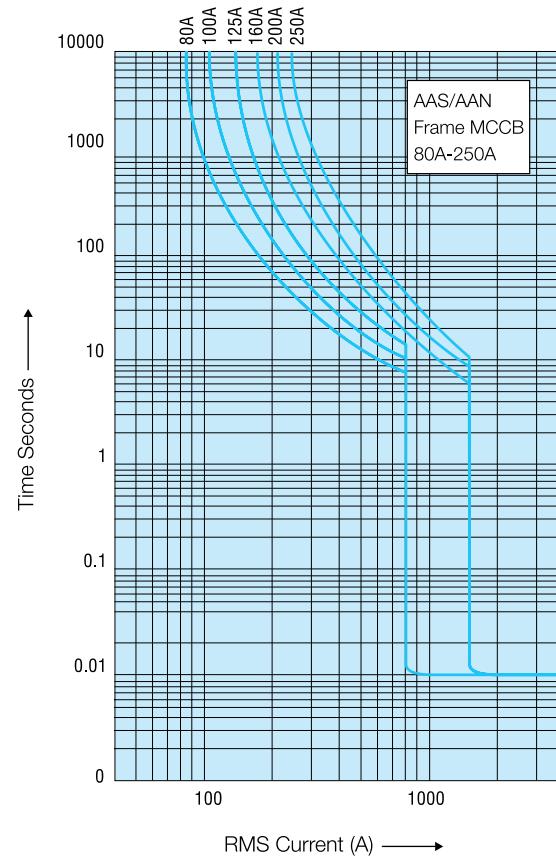


## Tripping Characteristics

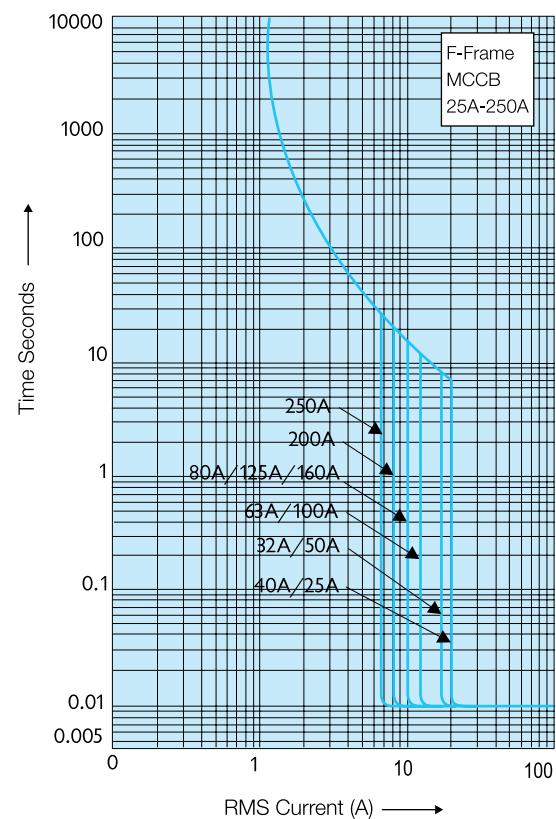




## Tripping Characteristics

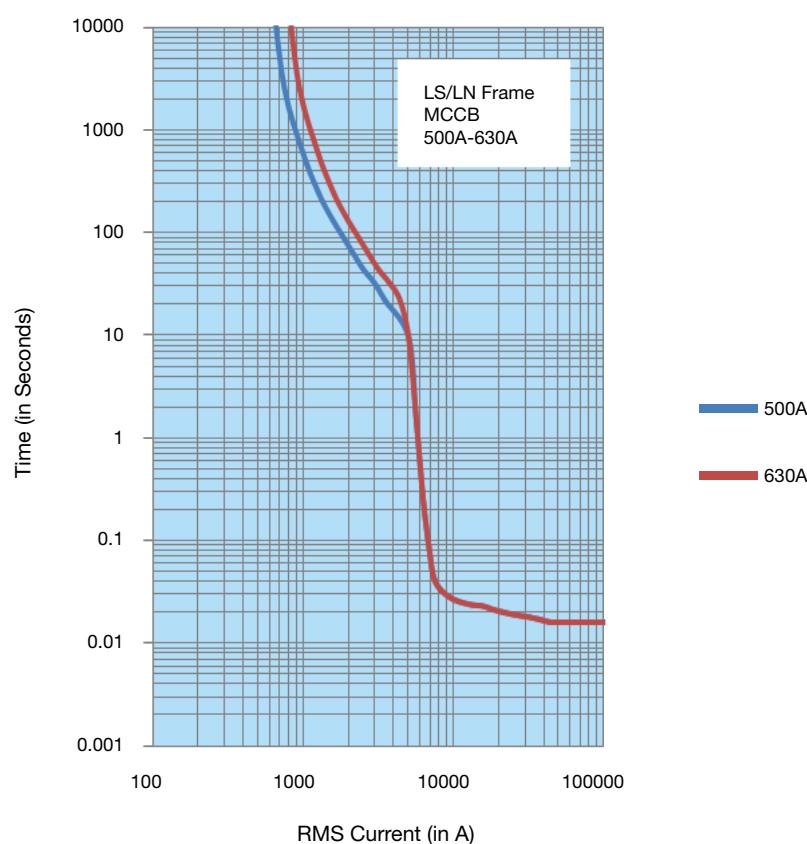
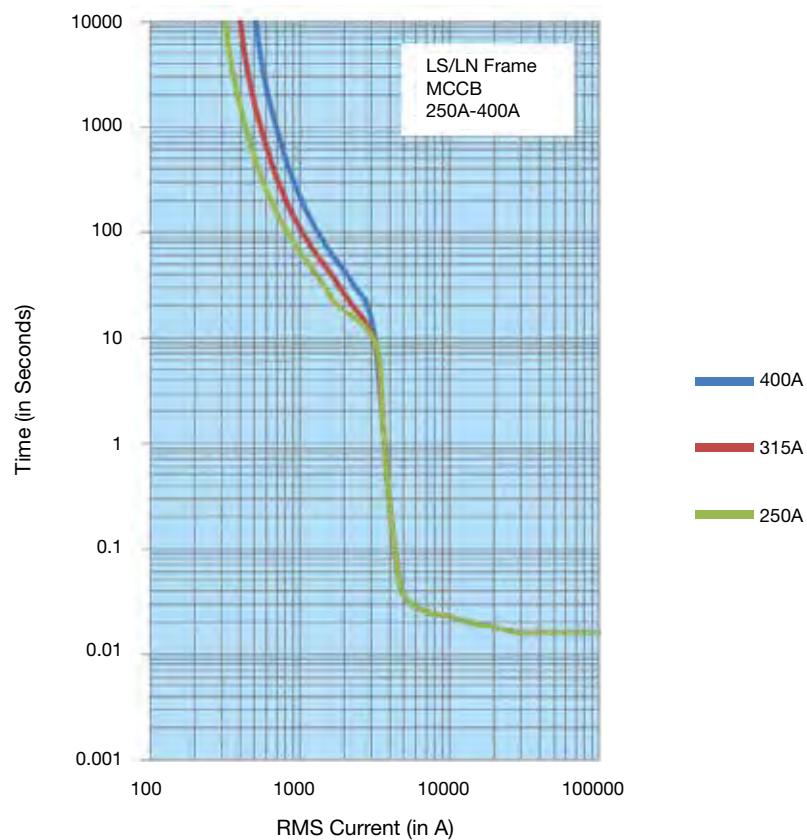


Time current characteristic curve of F-Frame MCCB  
Tolerance on instantaneous current + 10%



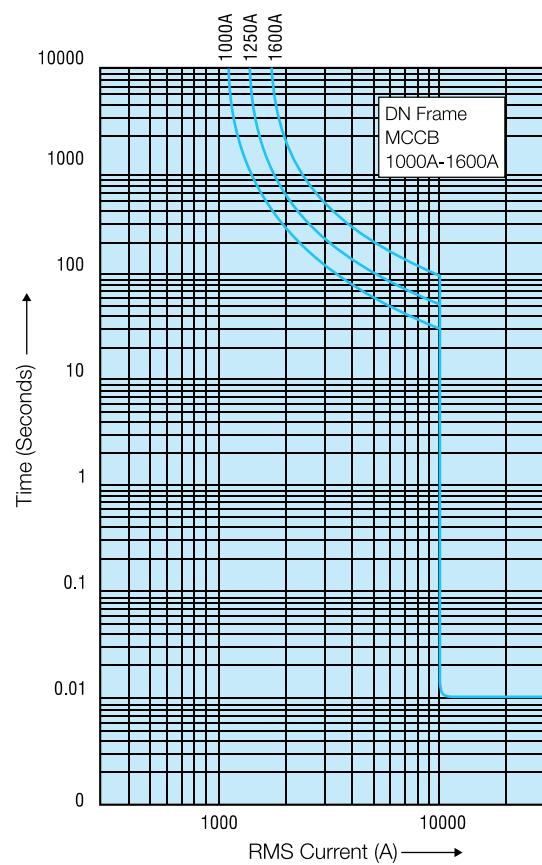
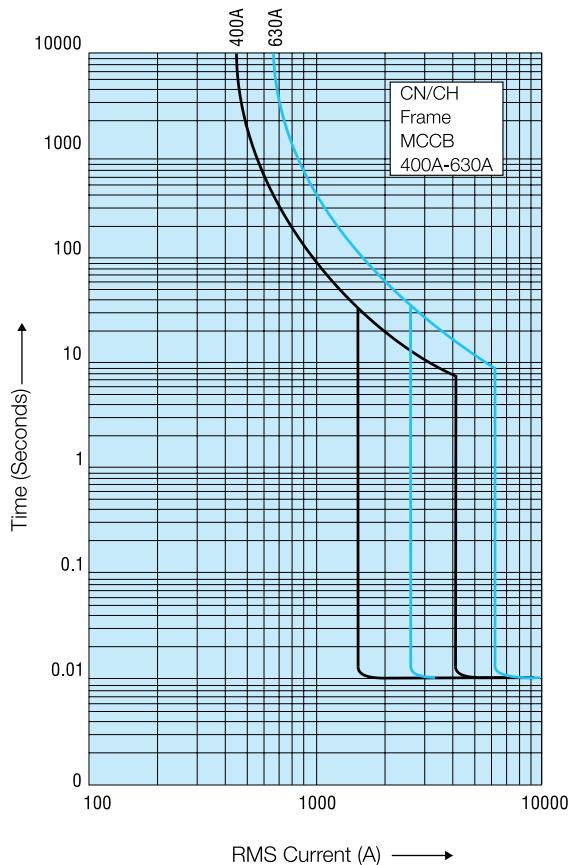
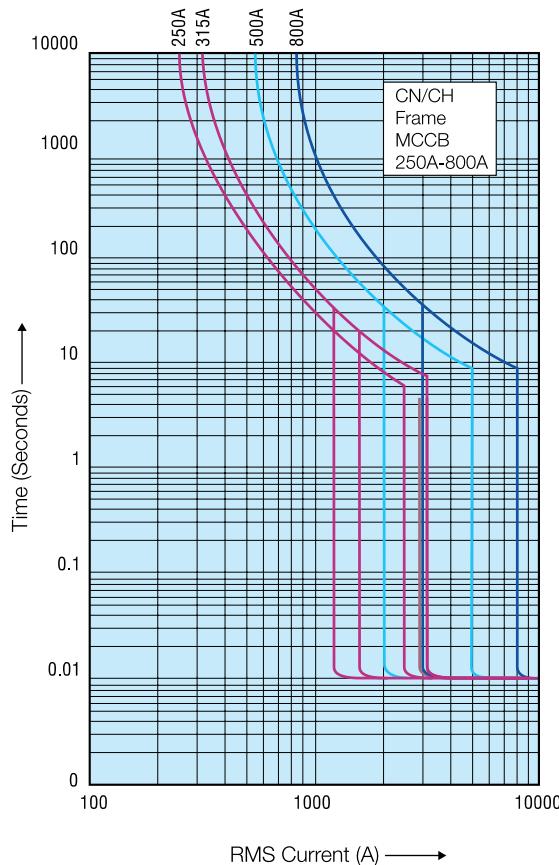


## Tripping Characteristics



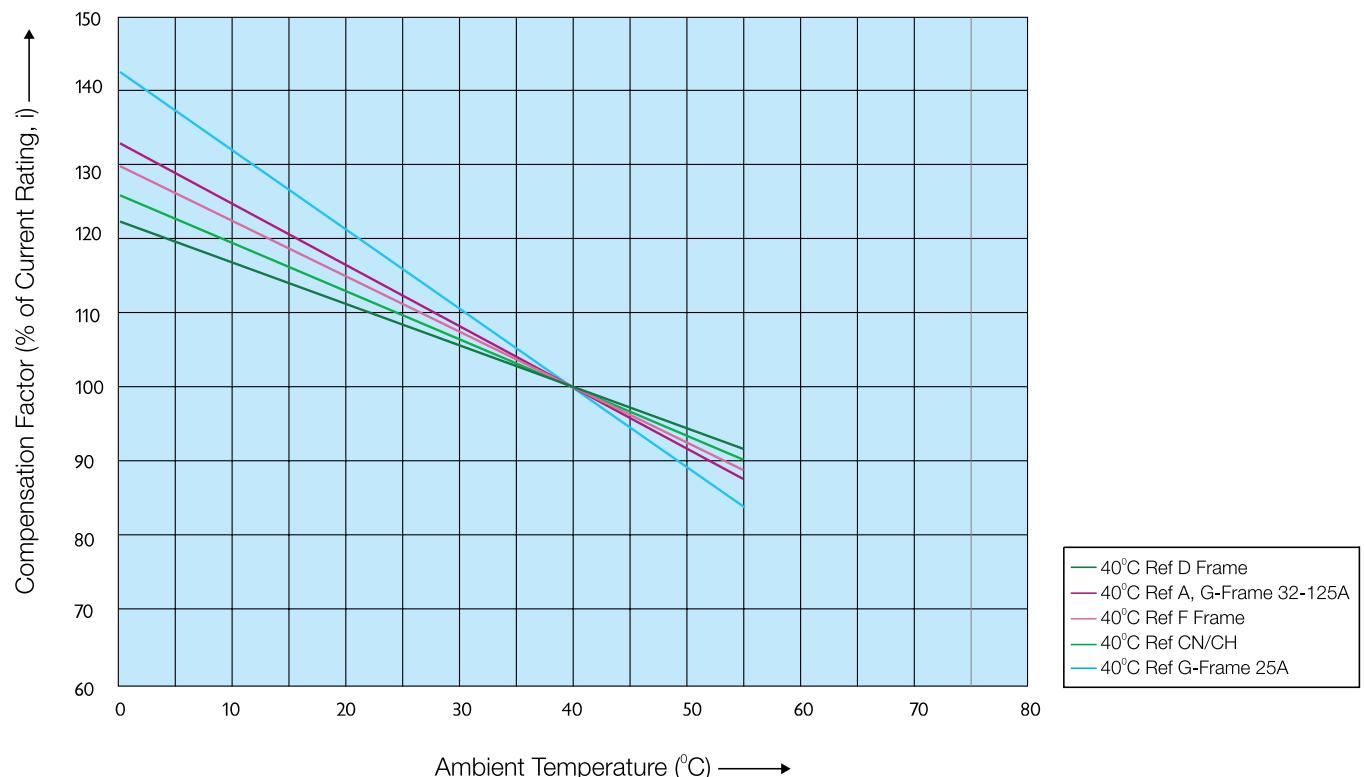


## Tripping Characteristics





## Ambient Temperature Compensation Chart (G, A, C & F Frame Mccbs)





## Discrimination Data

Loadline MCCB upstream device Instantaneous Trip Set at HIGH

Product	Rating	KA@	Loadline AAS/AAN										Loadline CN/CH					Loadline DN	
			25	32	40	50	63	80	100	125	160	200	ALL	250	315	400	500	630	
Loadline AAS/AAN	63	25											1600	2500	3000	4000	5000	6300	8000
		80	25										1600	1600	2500	3000	4000	5000	8000
	100	25											1600	1600	2500	3000	4000	5000	8000
		125	25										1600	1600	2500	3000	4000	5000	8000
	160	25											2500	3000	4000	5000	6300	8000	9200
		200	25										2500	3000	4000	5000	6300	8000	9200
	Loadline AAM	ALL	25										2500	3000	4000	5000	6300	8000	9200
Loadline CN/CH		315	50										4000	5000	6300	8000	9200	9200	9200
400	50											5000	6300	8000	9200	9200	9200	9200	
	500	50										6300	8000	9200	9200	9200	9200	9200	
630	50											8000	9200	9200	9200	9200	9200	9200	
	800	50										9200	9200	9200	9200	9200	9200	9200	
1000	50															9200	9200		
	1250	50															9200		
1600	50																9200		

Loadline MCCB DOWN stream device Instantaneous Trip Set at IOW

The above table gives fault currents in amperes till which level the downstream breakers shall act prior to the upstream breaker.



## Selection & Application

### Transformer Protection

#### Primary side

For the protection of transformer with a circuit breaker connected to the primary side (LT primary) the no load inrush current of the transformer must be considered. The peak value of the first current wave often reaches 10-15 times the rated current and may sometimes reach as high as 20-25 times. However, the transient decays very quickly (in a few m.sec.). Thus the MCCB selected should have a magnetic setting which will not be actuated by the momentary inrush current.

#### Secondary side

Loadline MCCBs can be used for protection of transformer on the LT side (secondary side) as an outgoing protective device.

The rated current of the transformer is calculated as follows :

$$I_e = \frac{kVA \times 1000}{\sqrt{3} \times U_e} \text{ A}$$

' $U_e$ ' is the Rated Voltage at the LT side

The Breaking capacity of the breaker for protection can be calculated as :

$$I_b = \frac{I_e}{Z\%} \times 10^{-3} \text{ Kiloamperes}$$

Where ' $I_b$ ' is the rated breaking capacity,

' $I_e$ ', the rated current

'Z%' is the percentage impedance of transformer (specified by the manufacturer)

### Selection table For Transformer Protection

MCCB Rating in A

Transformer	SH/GS	GN	GH	AAS	AAN	LS	CN	LN	CH	DN
Rating (kVA)	10 kA	16 kA	25 kA	25 kA	35 kA	36 kA	35 kA	50 kA	50 kA	50 kA
16	25	25	25	25	25					
25	40	40	40	40	40					
63	100	100	100	100	100					
100				160	160		160		160	
160				250	250	250	250	250	250	
200						315	315	315	315	
250						400	400	400	400	
315						500	500	500	500	
400						630	630	630	630	
500							800		800	
630										1000
750										1200

### Generator Set Protection

Loadline MCCBs can be used for the effective protection and control of Diesel Generating set against overload and short circuits.

The Current rating of MCCB to be selected is calculated as follows :

$$kVA = \sqrt{3} U_e \times I_e$$

or

$$I_e = \frac{kVA}{\sqrt{3} \times U_e}$$

Where,

kVA = Rating of the DG Set

$U_e$  = Rated Voltage

$I_e$  = Rated Current

The MCCB rating selected is greater than or equal to the rated current value



## Selection & Application

### Feeder / Cable Protection

An estimation of the prospective short-circuit current (psc) in an installation is an important consideration in the selection of the appropriate protective device.

The magnitude of the short-circuit current (rms value of the AC component) at a point in the installation will depend upon;

- (A) Prospective short-circuit current at the origin of the installation.
- (B) The amount of resistance in the circuit between the origin of the installation and the point at which the short circuit occurs.
- (C) The type of short-circuit, phase to phase or phase to earth or phase to neutral.

It is possible to arrive at a maximum prospective short circuit value at the origin by taking the transformer kVA rating and its impedance and calculating from the expression :

$$SC \text{ kA} = \frac{\text{Transformer rating (kVA)} \times 100}{\sqrt{3} \times \text{Secondary voltage} \times \% \text{ impedance of transformer}}$$

To calculate the resistance in the LV circuit, obtain details of lengths and sizes of cables between the source of supply and the point under calculation. Using the table provided, determine the sum of cable resistances and then simply read off the estimated fault current from the relevant transformer curve on the graph.

The values assume a symmetrical fault across the three phases. In a single circuit, for line to neutral faults, take the cable resistance value from the table and double it.

The selection of Loadline MCCB for feeder /cable protection depends on the total load to be protected and the prospective short-circuit current (psc) at the point of installation.

PSC at A approximately 27 kA

PSC at B  
resistance A to B (a) 0.30mΩ = 25 kA

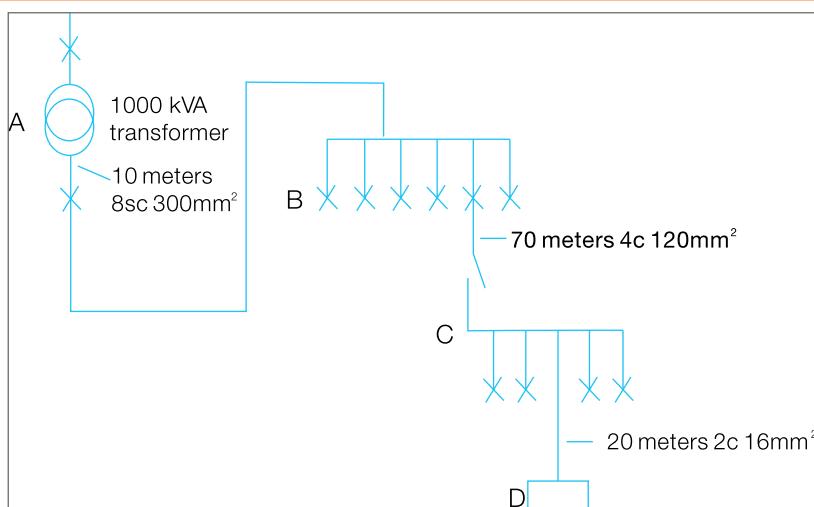
PSC at C  
+resistance A to B 0.30 mΩ  
+resistance B to C1 10.70 mΩ  
11.00 mΩ = 12 kA

PSC at D  
+resistance A to B 0.30 mΩ  
+resistance B to C 10.70 mΩ  
+resistance C to D 46.00 mΩ (b)  
57.00 mΩ = 3 kA

- (a) 2 cables per phase divided by 2  
(b) 2 core cable, multiplied by 2

The above calculations have an inbuilt safety margin as they assume a no impedance fault condition which would not be the case in practice.

Typical Installation

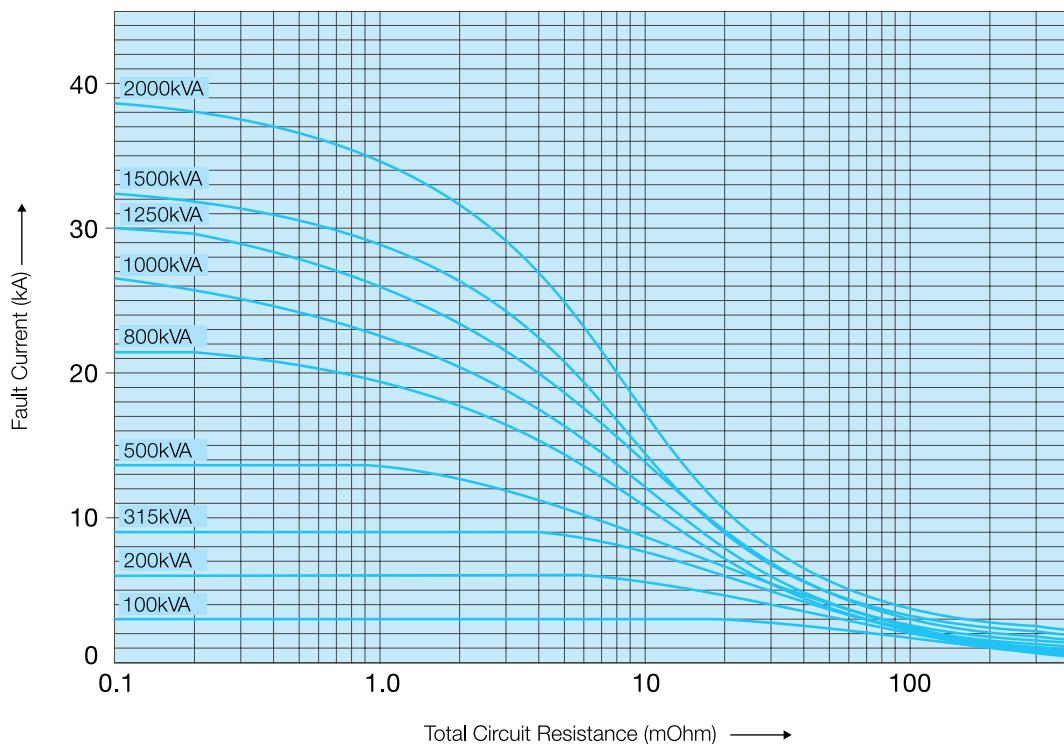




## Selection & Application

### Estimating the Prospective Short Circuit Current

Estimating the Prospective Short Circuit Current



Maximum Resistance of Copper Conductors at 20 °C ( $\mu\Omega$ )

Nominal Cross-sectional Area ( $\text{mm}^2$ )	Cable Length											
	5 m	10 m	15 m	20 m	30 m	40 m	50 m	60 m	70 m	80 m	90 m	100 m
1	90.5	181										
1.5	60.5	121	182									
2.5	37.1	37.1	74.1	111	148							
4	23.1	46.1	69.2	92.2	138							
6	15.4	30.8	46.2	61.6	92.4	123						
10	9.15	18.3	27.5	36.6	54.9	73.2	91.5	110				
16	5.75	11.5	17.3	23	34.5	46	57.2	69	80.5	103.5		
25	3.64	7.27	10.9	14.5	21.8	29.1	36.4	43.6	50.9	58.2	65.4	72.7
35	2.62	5.24	7.86	10.48	15.7	21	26.2	31.4	36.7	41.9	47.2	52.4
50	1.94	3.87	5.81	7.74	11.60	15.5	19.4	23.2	27.1	31	34.8	38.7
70	1.34	2.68	4.02	5.36	8.04	10.7	13.4	16.1	18.8	21.4	24.1	26.8
95	0.96	1.93	2.1	3.86	5.79	7.72	9.65	11.6	13.6	15.4	17.4	19.3
120	0.77	1.53	2.3	3.06	4.59	6.12	7.65	9.18	10.7	12.2	13.8	15.3
150	0.62	1.24	1.86	2.48	3.72	4.96	6.2	7.44	8.68	9.92	11.2	12.4
185	0.49	1	1.49	1.98	2.97	3.96	4.96	5.96	6.94	7.93	8.92	9.91
240	0.34	0.75	1.13	1.51	2.26	3.02	3.77	4.52	5.28	6.03	6.79	7.54
300	0.3	0.63	0.9	1.2	1.8	2.8	3	3.61	4.21	4.81	5.41	6.01
400	0.23	0.47	0.7	0.94	1.41	1.88	2.35	2.85	3.29	3.76	4.23	4.7
500	0.18	0.37	0.55	0.73	1.1	1.46	1.83	2.2	2.56	2.93	3.29	3.66
630	0.14	0.28	0.42	0.57	0.85	1.13	1.42	1.78	2.15	2.51	2.88	3.25



## Selection & Application

### Motor Control

Loadline MCCBs can be used for motor protection. Selection of MCCBs has to be done taking into consideration the starting inrush current, and the system fault levels. Further the selection is also based on type of starting, i.e. DOL or Star Delta.

### DOL Starting

Care is to be taken to avoid nuisance tripping during starting of Squirrel Cage Motors since the inrush current will be in the order of 600 to 800% of the full load current of the motor. The overload setting is chosen such that it does not trip during starting

### Star-Delta Starting

In Star Delta starting of motors, since there is a reduction in the starting current due to reduced voltage, the MCCBs do not have a problem in the overload setting. But the transient currents can go upto 12 times the rated current during change over from star to delta which will cause the instantaneous magnetic release to trip the breaker. So proper selection of magnetic pickup level is important for prevention of nuisance tripping during change over from Star to Delta.

It is always recommended to select an MCCB in co-ordination with Contactor and Over Load Relay so as to have the best and optimum benefit of all the devices.

Selection table for Motor Protection

Motor Rating		Approx. Full Load Current	Direct On Line MCCB Rating/Type		Star/Delta MCCB Rating/Type	
HP	kW	(A) at 415 V	AAN	CN/CH	AAN	CN/CH
10	7.5	14	25	-	25	-
12.5	9	17	25	-	25	-
15	11	21	25	-	25	-
20	15	28	32	-	32	-
25	19	35	40	-	40	-
30	22	41	50	-	50	-
40	30	52	80	-	63	-
50	37	69	100	-	80	-
60	45	80		-	100	-
75	55	97	-	-	125	-
100	75	125	-	-	160	-
125	90	156	-	250	-	-
150	112	190	-	315	-	250
175	130	225	-	315	-	315
200	149	255	-	315	-	315
220	160	275	-	400	-	400
250	186	320	-	400	-	500
300	224	375	-	500	-	500
350	261	449	-	630	-	630
400	298	505	-	630	-	630

The figures shown are based on following motor starting conditions :-

Direct online 7 X full load current for 5 seconds.

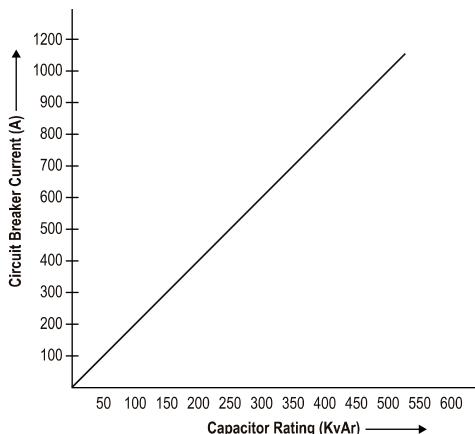
Star/Delta 4 X full load current for 12 seconds.



## Selection & Application

### Capacitor Control

When a capacitor circuit is opened, it exhibits characteristics distinctly



differently from inductor loads due to the effects of residual electric charge in the capacitor. The recovery voltage appears across the contacts immediately after the circuit is opened is equal to the difference between the capacitor residual voltage and supply voltage. Therefore half a cycle after the circuit opens, the voltage between the contacts of the switch rises to twice the supply voltage or higher.

In a three phase circuit the recovery voltage appearing between the contacts in the first interrupted phase could rise to as high as 2.5 times the supply voltage. Unless the breaker contacts are fully open for at least  $\frac{1}{2}$  cycle after the capacitor current is interrupted, restrike of arc is likely to occur. If the restrike arc is repeated, the voltage could continue to rise to the dielectric breakdown point of the capacitor. Hence, fast interrupting, quick make, quick-break circuit breakers should be used for this type of circuit.

When a capacitor circuit is closed a condenser charge  $q = CU$  which corresponds to the instantaneous value 'U' of the supply voltage at closing time, must be instantaneously supplied, causing a large inrush current to flow through it. If the capacitor circuit is closed in the voltage phase at which the inrush current is maximum, the maximum value of the inrush current is approximately,

$$I_p = \frac{C}{L} \times U$$

The maximum time duration during which the maximum current flows is about 0.5 ms. Selection of a MCCB for capacitor circuit duty must therefore consider the effects of higher short circuit and inrush currents. This will affect the choice of instantaneous trip current rating. In practice, an MCCB which satisfies the following equations should be chosen.

$$I_r > 1.5 \times I_c$$

$$I_{inst} > \frac{I_p}{2}$$

Where :

$I_r$  = Rated current of MCCBs

$I_c$  = Rated current of capacitor

$I_{inst}$  = Short circuit pick up setting of the MCCB

$I_p$  = Maximum capacitor inrush current

It is therefore necessary to select a circuit breaker with current rating not less than 1.5 - 2.0 times the rated current of the capacitor.

### Dc Control

MCCBs though not separately designed for DC applications are suitably modified to be able to operate on DC systems also upto 500 Vdc / 250 Vdc. This is achieved by modifying for:

- i) Current carrying capacity
- ii) Over current and short circuit protection
- iii) Short circuit breaking capacity (with L/R time constant limitations)

### Current Carrying Capacity

The continuous current carrying capacity is generally a function limited by the temperature rise of various internal components of MCCBs.

The AC rating of MCCBs is expressed as "RMS" value. The DC rating is "Average" value. The RMS and average value can be related by a "Form Factor" which is 1.1.

Hence, an AC MCCB can be assigned a 10% higher DC current rating. But in practice the use of DC MCCB ratings are equal to AC ratings and thereby, temperature rise is restricted within limits.

### Overload Release & Overload Protection

The overload release are generally thermal type with a Bimetal-Heater system. The heating effect which can be expressed by the factor integral  $I^2t$  varies for AC and DC. The integral ( $I^2t$ ) for AC will be 1.21 times integral ( $I^2avt$ ) for DC, thus an AC MCCB when used in DC circuit will trip slower. For example a 100 A AC MCCB when used in DC circuit for 100A will sense a 20% overload only from 133A onwards.

To retain the same Overload characteristics as AC, it is important to separately calibrate the MCCBs for DC ratings and overload tripping characteristics need to be suitably modified.

### Short Circuit Release & Short Circuit Protection

The short circuit release is actuated by the peak value of the AC sine wave. Since no such peak exists in DC, DC tripping will be slower. Hence to achieve the same short circuit pick up level in DC, the short circuit release will be calibrated specially.

### Short Circuit Breaking Capacity

In AC the breaking of the short circuit current usually occurs within the first current zero, by the current limiting effect. No such current zero exists in DC. Arc breaking and ultimate quenching of arc depends on the rapid dissipation of the inductive Energy  $\frac{1}{2}Li^2$

This energy dissipation is dependent on L/R or time constant of the circuit. The L/R values should be limited to 10-15 milli seconds to achieve satisfactory performance. This is achieved usually by splitting the DC arc voltage over 2 or 3 poles by connecting them in series, depending upon on the DC voltage.

Havells New HID Series (Frame 1) Moulded Case Circuit Breaker is designed and manufactured to world class standard, keeping in mind the complex requirement of electrical system of present and future ensuring reliability which can give uninterrupted service through out product life, meeting all the stresses that the system encounters.

HID Series (Frame 1) MCCBs use the U-shaped Fixed Contact design and Slot Motor Concept along with the unique Enclosed Arc chute Design to provide excellent performance and safety. Besides being compact, it offers ease of installation and termination, extended life, making it an extremely user friendly range of Moulded Case Circuit Breaker for any application.

In fact HID Series (Frame 1) MCCB is a perfect blend of aesthetics, features and performance.

The HID Series (Frame 1) covers a range of 40 A to 160 A in 27 kA & 36 kA breaking capacity with  $I_{cu}=I_{cs}=100\%$  and fully complies with National and International standards. These MCCBs along with the high level of breaking capacity are thermal adjustable making it compatible for various load requirements to meet varied application needs in distribution networks.

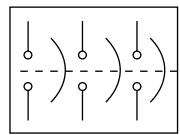
### Range:

- Rating: 40 A to 160 A
- Execution: 1P, 2P, 3P & 4P
- Breaking Capacity: 27 kA & 36 kA
- $I_{cs} = I_{cu} = 100\%$
- Thermal Adjustable (70 to 100% of  $I_n$ )

### Ref. Standard:

IS / IEC : 60947-1 & 2





## HID Series (Frame 1)

Moulded Case Circuit Breaker



## Technical Information



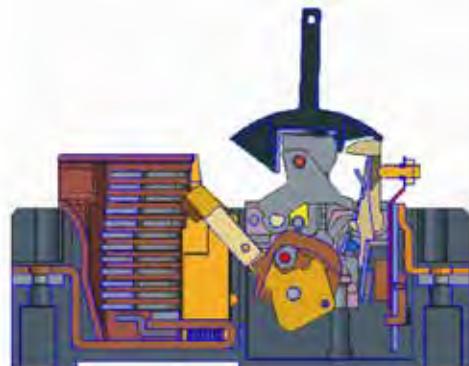
### HID Series (Frame 1)

Frame	SI Unit	HID (Frame 1) - D	HID (Frame 1) - E
No. of Poles		1P / 2P / 3P / 4P	
Standard current rating ( $I_n$ )	A	40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A	
Rated operational voltage	V	415 Vac (1P @ 240 Vac)	
Rated impulse voltage	kV	8 kV	
Rated Insulation Voltage	V	800 Vac	
Rated frequency	Hz	50 Hz / 60 Hz	
Ambient temp	°C	40 °C (50 °C on request)	
Utilisation Category	A / B	A	
Operating altitude	m	2000 m	
Type of release		Thermomagnetic	
Thermal release setting (Adjustable)		70-100% of $I_n$ (in 3P & 4P only)	
Magnetic release setting (Fixed)		12 times of $I_n$	
Rated ultimate short circuit breaking capacity (Icu)	kA	27 kA	36 kA
Rated Service short circuit breaking capacity (Ics)		27 kA	36 kA
Weight			
1P	kg	0.37 kg	
2P		0.75 kg	
3P		1.1 kg	
4P		1.5 kg	
Dimensions (W X H X D)			
1P	mm	(37 X 130 X 73.8) mm	
2P		(67 X 130 X 73.8) mm	
3P		(90 X 130 X 73.8) mm	
4P		(120 X 130 X 73.8) mm	

## Construction

### Case & Cover:

New HID Series (Frame 1) Molded Case Circuit Breakers have precision formed molded case and cover of high performance resin bonded thermoplastic material. The circuit breakers are designed to allow grouping in distribution panels or switchboards to present their operating handles and label escutcheons uniformly aligned in a single panel cut out.



### Switching Mechanism:

It is Quick make-Quick break type and is trip-free, i.e. the breaker trips internally even if the operating knob is held in ON position.

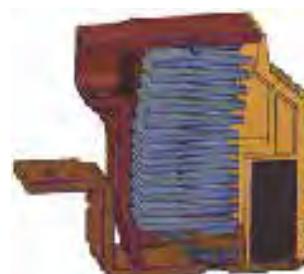


### Contact mechanism:

It comprises of fixed and moving contacts made of sintered silver alloy for reliability, long life and anti-welding properties.

The U-shaped Fixed Contact design utilizes the electromagnetic repulsive force between the arms of the "U-type" conductor to achieve faster opening of the contacts based on the concept that two current carrying conductors when placed parallel to each other will repel each other.

It also uses the Slot Motor Concept meaning when high current flows through the contacts the magnetic field is produced which drives the contacts apart. The magnetic field intensity has been increased through the presence of high permeability material which in turn increases the force on the moving contact arm resulting in faster opening of the contacts.



### Enclosed Arc Chute:

Arc chute Design is of unique enclosed type to rapidly deionize the medium between contacts as soon as the current becomes zero so that the rising contact voltage or restriking voltage cannot breakdown the space between contacts. This is achieved by increasing the pressure in the vicinity of the arc, due to which the density of the particles constituting the discharge also increases. The increased density of particles causes higher rate of de-ionization and consequently the dielectric strength of the medium between contacts is increased.

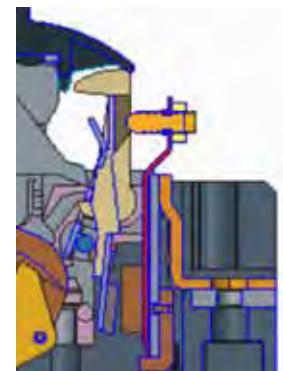


### Tripping Mechanism:

It is thermal magnetic type to handle both overload and short-circuit fault currents.

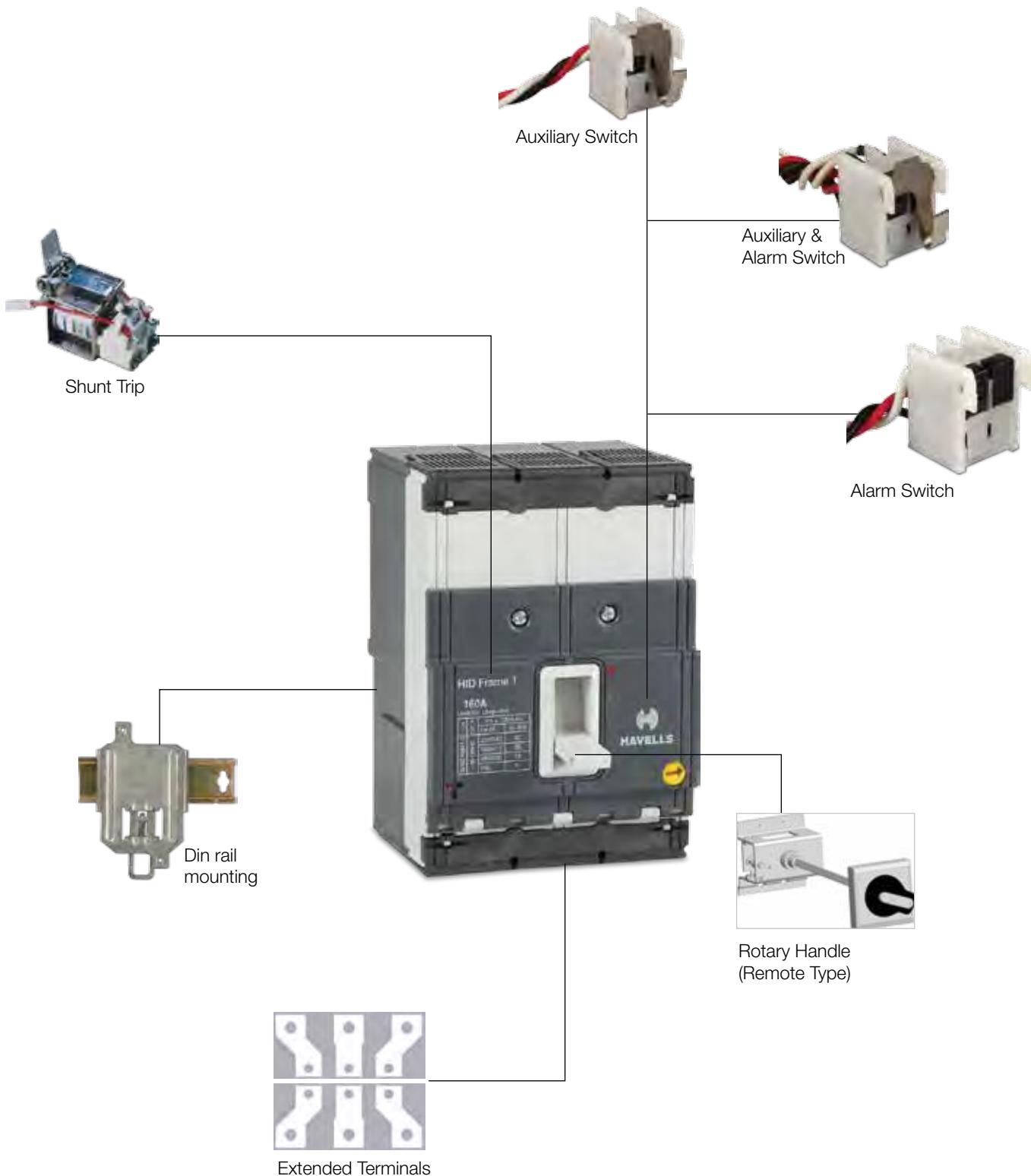
The overload protection is provided by a combination of the heater element and the bimetal strip in each phase which activates the trip mechanism. The overload setting is front adjustable on site.

Short Circuit protection is provided by the magnetic circuit comprising of the fixed and moving core. In the event of short circuit, the moving core is attracted towards the fixed core due to the high electromagnetic forces developed which actuates the trip mechanism.





## Accessories



## Accessories Ordering Information

### Shunt Trip

- It is used for remote tripping of circuit breaker
- Shunt trip coil is rated for short time duty



Voltage	Cat No
100-110 Vac	ISSLEU0438
220-240 Vac	ISSLEU0439
380-440 Vac	ISSLEU0440

Note: Tripping voltage range 0.7 to 1.10 U<sub>e</sub>

### Auxiliary Switch

- It is used for ON and OFF position indication and control
- In normal ON / OFF operation it operates simultaneously with main contacts
- 1NO - 1NC - Field Fitted
- 2NO - 2NC - Factory Fitted



Voltage	Configuration 1CO*	Cat No
240 Vac	1NO. 1NC	ISSLEU0444
240 Vac	2NO. 2NC	ISSLEU0445

\* CO changeover contact

### Alarm Switch

- It operates only when the breaker trips



Voltage	Configuration	Cat No
240 Vac	1NO. 1NC	ISSLEU0447

### Rotary Handle

- It is used for switching the breaker ON / OFF when installed in panels / cubicles and distribution boards
- It can be pad locked in OFF position.
- The handle is provided with door interlock and defeat facility



Description	Cat No
Remote Type with 300 mm remote shaft	ISSLEU0494

### Din Rail Mounting

- It facilitates mounting of breaker on din rail



Pole Execution	Cat No
Three Pole / Four Pole	ISSLEU0449

### Dolly Pad Lock

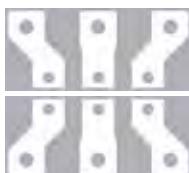
- It is used for locking the operating knob / dolly of the circuit breaker in OFF position



Description	Cat No
Dolly Pad Lock	ISSLEU0448

### Extended Terminal

- These are used for increasing safety of MCCB installation

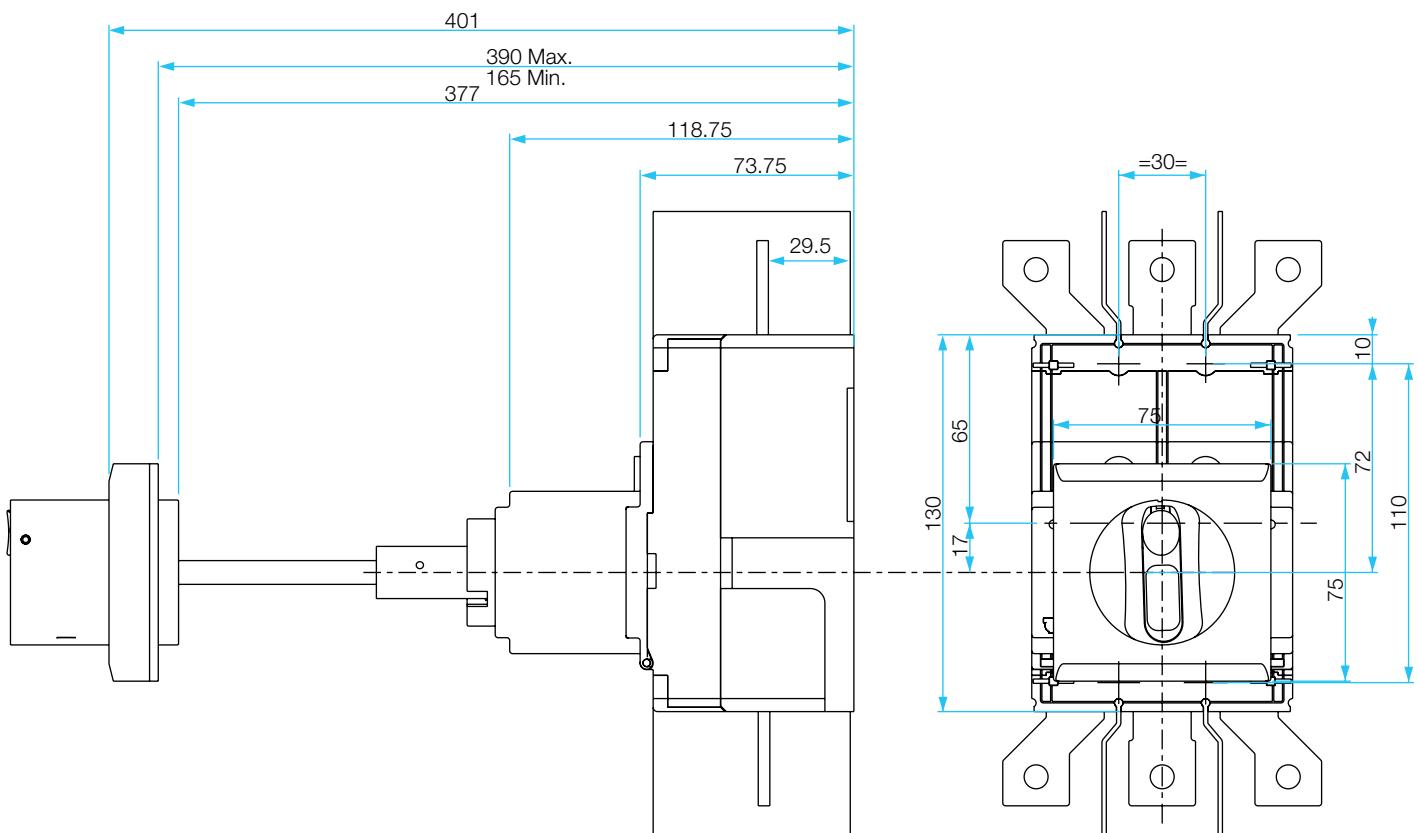


Description	Cat No
SPARE EXT TER KIT 80-100A HID SP	ISSLHX2938
SPARE EXT TER KIT 80-100A HID DP	ISSLHX2937
SPARE EXT TER KIT 80-100A HID TP	ISSLHX2939
SPARE EXT TER KIT 80-100A HID FP	ISSLHX2936
SPARE EXT TER KIT 125A-160 HID SP	ISSLHX3056
SPARE EXT TER KIT 125A-160 HID DP	ISSLHX3057
SPARE EXT TER KIT 125A-160 HID TP	ISSLHX3058
SPARE EXT TER KIT 125A-160 HID FP	ISSLHX3059

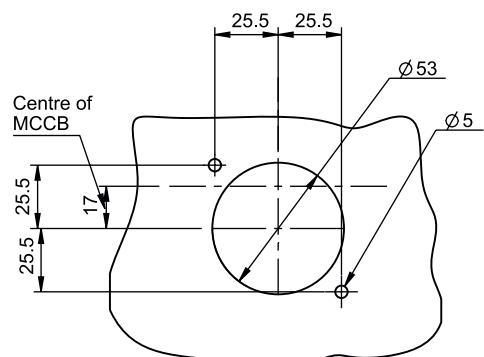


## Accessories Dimensions & Mounting Details

Rotary Handle (Remote Type)



\*Cut as per panel requirement



\*Cut as per panel requirement

## Ordering Information



**HID Series (Frame 1) Single Pole MCCB**

Current Rating (A)	(Icu / Ics = 27 kA / 27 kA)	(Icu / Ics = 36 kA / 36 kA)
40	IHA13DBS0040	IHA13EBS0040
50	IHA13DBS0050	IHA13EBS0050
63	IHA13DBS0063	IHA13EBS0063
80	IHA13DBS0080#	IHA13EBS0080#
100	IHA13DBS0100#	IHA13EBS0100#
125	IHA13DBS0125#	IHA13EBS0125#
160	IHA13DBS0160#	IHA13EBS0160#



**HID Series (Frame 1) Double Pole MCCB**

Current Rating (A)	(Icu / Ics = 27 kA / 27 kA)	(Icu / Ics = 36 kA / 36 kA)
40	IHA13DBD0040	IHA13EBD0040
50	IHA13DBD0050	IHA13EBD0050
63	IHA13DBD0063	IHA13EBD0063
80	IHA13DBD0080#	IHA13EBD0080#
100	IHA13DBD0100#	IHA13EBD0100#
125	IHA13DBD0125#	IHA13EBD0125#
160	IHA13DBD0160#	IHA13EBD0160#



**HID Series (Frame 1) Three Pole MCCB**

Current Rating (A)	(Icu / Ics = 27 kA / 27 kA)	(Icu / Ics = 36 kA / 36 kA)
40	IHA13DBT0040	IHA13EBT0040
50	IHA13DBT0050	IHA13EBT0050
63	IHA13DBT0063	IHA13EBT0063
80	IHA13DBT0080#	IHA13EBT0080#
100	IHA13DBT0100#	IHA13EBT0100#
125	IHA13DBT0125#	IHA13EBT0125#
160	IHA13DBT0160#	IHA13EBT0160#



**HID Series (Frame 1) Four Pole MCCB**

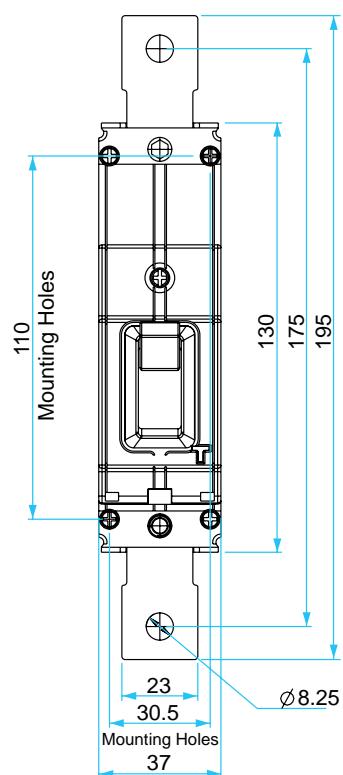
Current Rating (A)	(Icu / Ics = 27 kA / 27 kA)	(Icu / Ics = 36 kA / 36 kA)
40	IHA13DBF0040	IHA13EBF0040
50	IHA13DBF0050	IHA13EBF0050
63	IHA13DBF0063	IHA13EBF0063
80	IHA13DBF0080#	IHA13EBF0080#
100	IHA13DBF0100#	IHA13EBF0100#
125	IHA13DBF0125#	IHA13EBF0125#
160	IHA13DBF0160#	IHA13EBF0160#

In HID1 Frame 25 A / 32 A / 40 A / 50 A / 63 A are without extended terminals, however extended terminals are available on request at extra price for these ratings  
 # All MCCB's of rating 80 A & above are with extended terminals. MCCB's of rating 80 A & above are also available without extended terminals / spreader links (Price on Request).

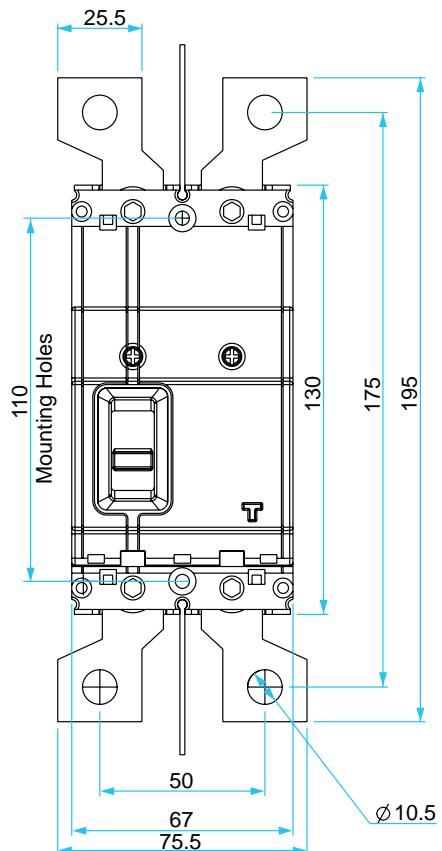
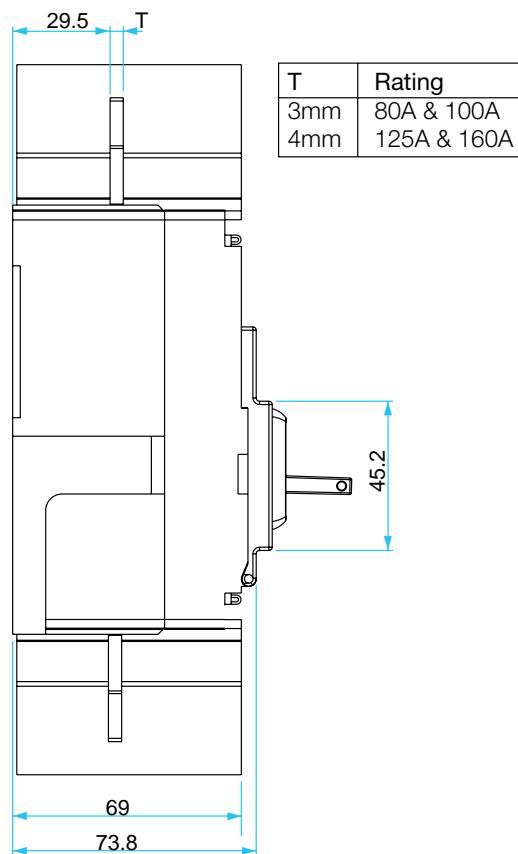


## Outline Dimensions & Mounting Details

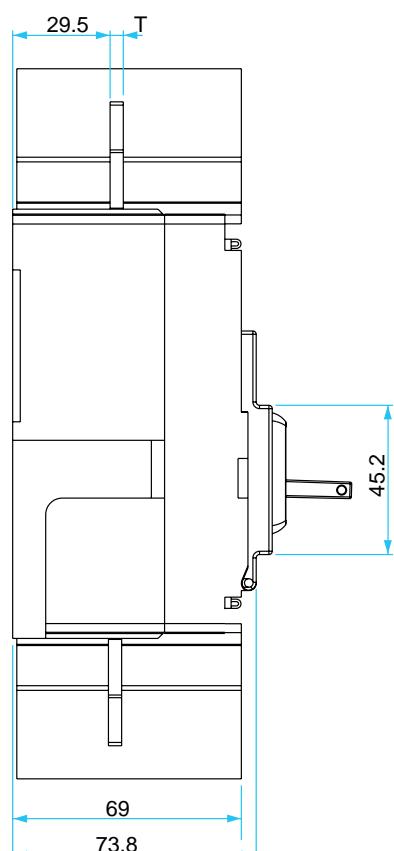
Dimension (in mm)



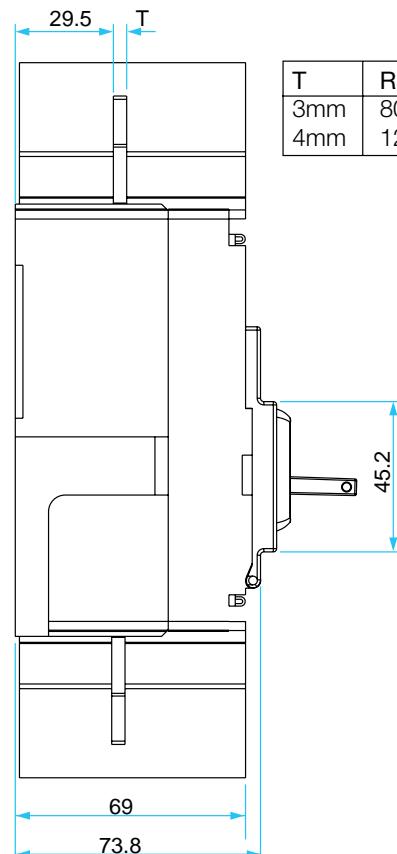
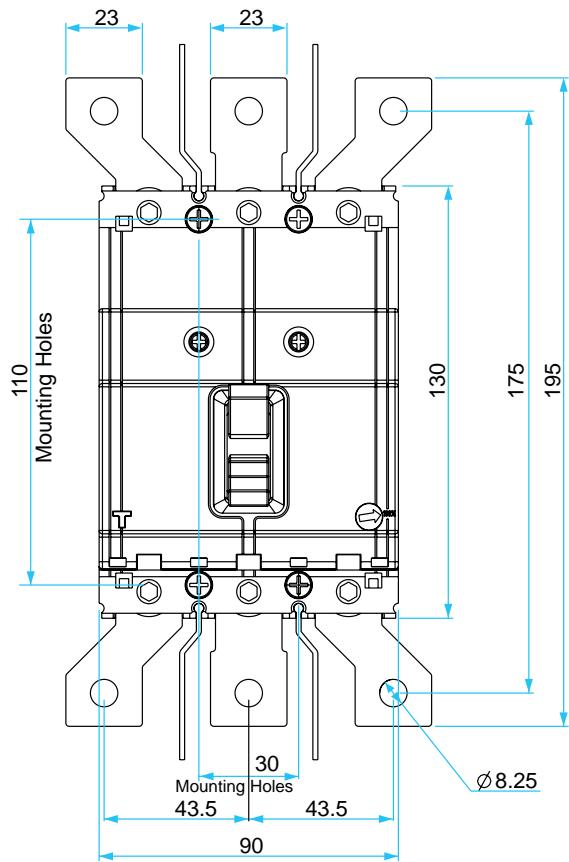
Single Pole



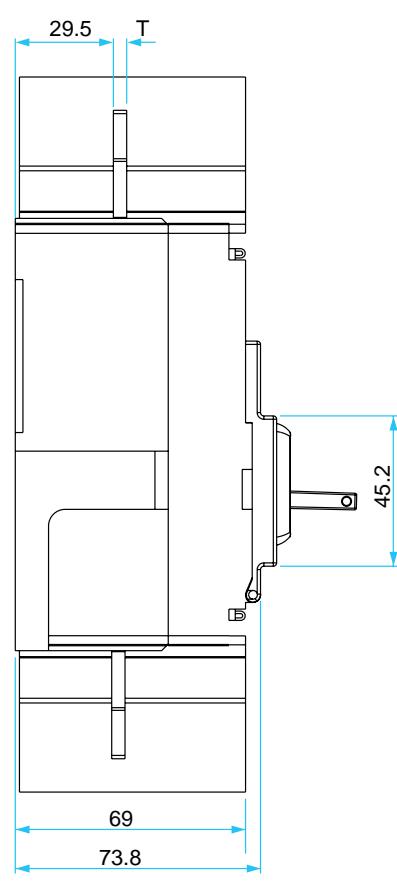
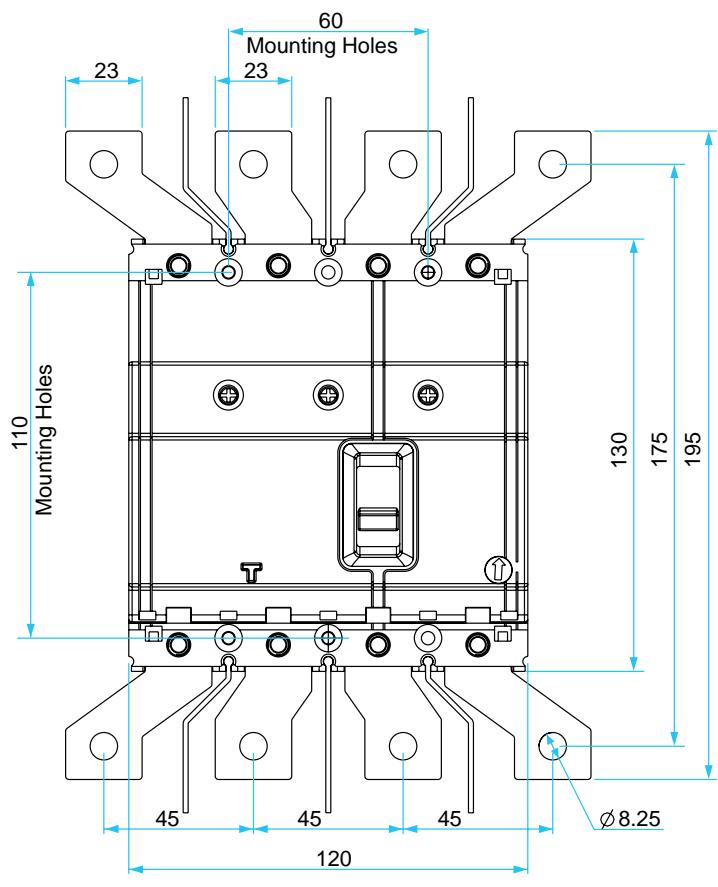
Double Pole



Dimension (in mm)



Three Pole



Four Pole

Digital range microprocessor based electronic MCCBs are designed and manufactured to world-class standards. These MCCBs provide high level of breaking capabilities and offer close, accurate and reliable protection against overload, short-circuit and ground fault through multiple adjustment options. The user-friendly breaker comes with a wide range of internal/external accessories.

## Features:

- True RMS sensing-accurate and close protection.
- High repeat accuracy-reliable protection.
- Flexibility through multiple adjustment option-versatility and closer protection.
- Time delay on overload and short-circuit faults-suitable for discrimination.
- Built in adjustable electronic overload sensing (40% to 110% of In).
- Built in adjustable short-circuit current sensing (600% to 1000% of Ir.)
- No external power required for basic functioning of the release.
- Built in operation-check function with Field Testing Provision.
- Accurate setting by use of DIP switches, ensuring reliable system protection/co-ordination.

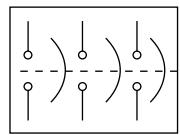
## Range :

25 A, 40 A, 63 A, 100 A, 125 A, 160 A, 200 A, 250 A, 400 A & 630 A in three pole and four pole execution.

## Specification :

Conforms to  
IEC : 60947-2 / IS: 13947-2 EMI/EMC  
IEC : 61000-4-2 (ESD Test)  
IEC : 61000-4-3 (Radiated Electromagnetic Field Test)  
IEC : 61000-4-4 (EFT Test)  
IEC : 61000-4-5 (Surge Test)  
IEC : 61000-4-6 (Conducted Disturbances Test)



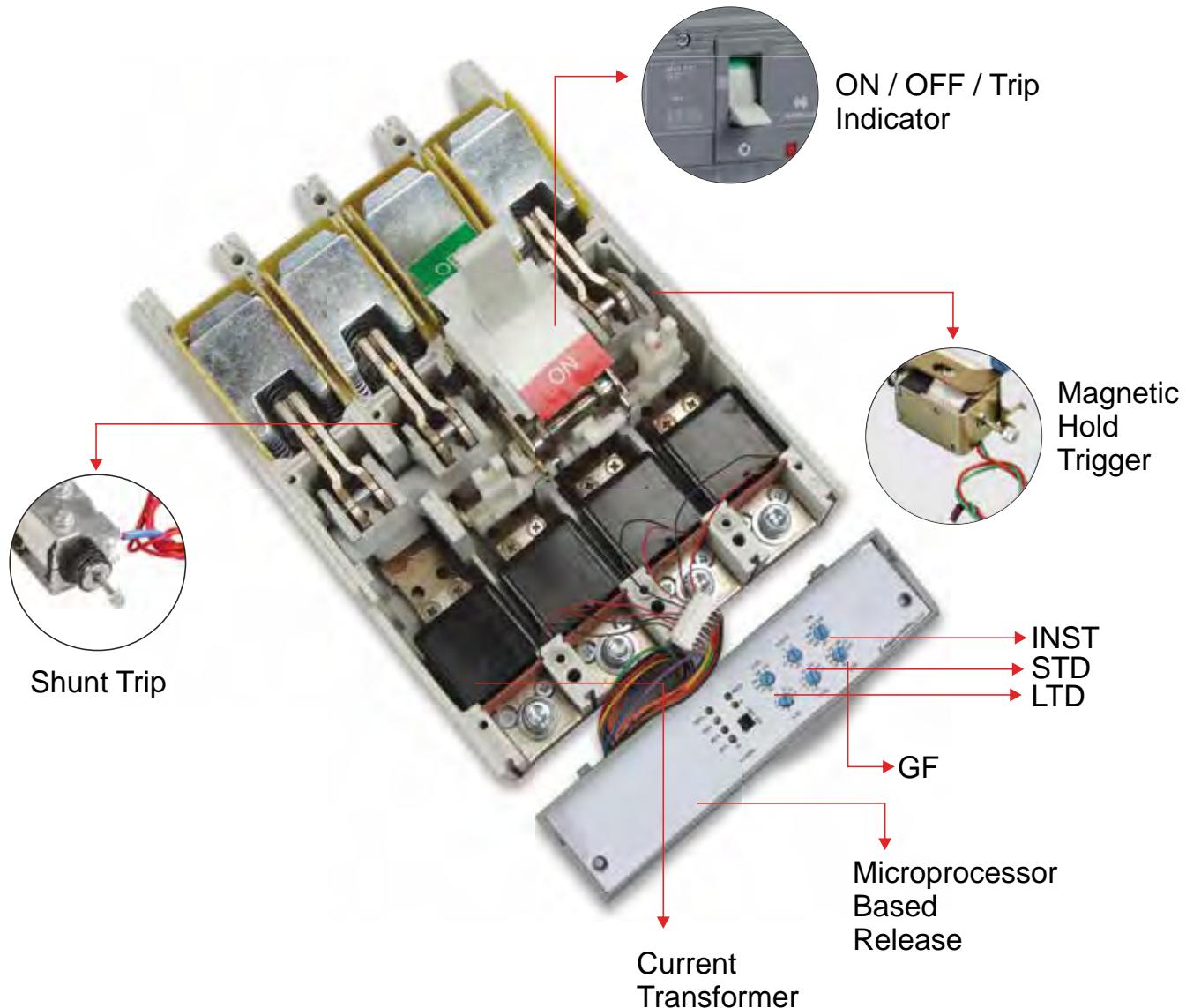


## MCCB

Digital Moulded Case Circuit Breaker



## Construction



Loadline Digital Molded Case Circuit Breakers have precision formed moulded case and cover of high performance resin bonded thermoset material. The circuit breakers are designed to allow grouping in distribution panels or switchboards top resent their operating handles and label escutcheons uniformly aligned in a single panel cutout.

The switching mechanism is Quick make-Quickbreak type and is trip free, i.e. the breaker trips internally even if the operating knob is held in ON position.

The contact mechanism comprises of fixed and moving contacts made of sintered silver alloy for reliability, long life and anti-welding properties. Arcing contacts are provided in higher frames, further increasing the contact life.

The arc extinguishing device comprises of arc chutes having grid plates mounted in parallel between supports of insulating material. The arc is divided between these grid plates which helps in its fast

quenching. The arc is thus confined, divided and extinguished in the arc chute. The excellent insulation between the conducting parts and better energy dissipation after short circuit makes it possible to make the load and line connections on either side

The tripping mechanism comprises of magnet holder trigger which is coupled to the single trip bar unit to avoid single phasing. The electronic circuit gives a signal to this unit in case of over current fault and this unit further trips the MCCB.

**Over current protection** The sensing of the current is through the current transformers fitted on the main terminals. In the case of any fault the secondary output of the CT increases. This secondary output of CT goes to the micro controller based electronic circuit. The micro controller is programmed to give a signal as per inverse time characteristics. The signal in the form of DC supply is given to magnet holder trigger which trips the MCCB. The tripping time and tripping current can be set with the help of the DIP switches provided on the front panel of the MCCB.



## Technical Information

Standard conformity	:	IEC 60947-2 / IS13947-2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Microprocessor Based Electronic Release
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Operating altitude	:	2000 m
Humidity	:	0 - 90%
Rated impulse voltage	:	8 kV



Frame	SI Unit	FEN	FEH
No. of Poles		3, 4	3, 4
Standard Current ratings (In)	A	25, 40, 63, 100, 125, 160, 200, 250	
Rated ultimate short circuit breaking capacity (Icu),	kA		
	380 V	40	50
	415 V	35	50
Rated service short circuit Breaking Capacity (% of Icu)	(Ics)	100%	75%
Rated short circuit Making capacity (Peak), Icm	kA	73.5	105
Weight TP (Triple Pole)	kg	3.4	3.4
FP (Four Pole)		4	4
Terminal Type Cable		M8	M8
Terminal capacity (Cable)	mm <sup>2</sup>	185	185
(Bus bar width)	mm	18	18
Internal Accessories #			
Auxiliary Switch	(1 C/O or 2C/O)	•	•
Shunt Trip (built-in auxilliary contact)		•	•
Under Voltage Release		•	•
Trip Alarm Contact (Factory fitted)	(1 C/O)	•	•
External Accessories			
Earth Fault Relay		•	•
Rotary Handle		•	•
Extended Terminals (above 63 A)		+	+
Phase Barriers		+	+
Terminal Shrouds		•	•
Dolly pad locking Device		•	•
Field Test Unit		•	•
Characteristics of Microprocessor Based Release		©	©
Overload Current I1	xIn (A)	0.4-1.1 in steps of 0.1©	0.4-1.1 in steps of 0.1©
Overload Time Delay t1	Sec	1, 5, 10, 15, 20, 25, 30, 35	1, 5, 10, 15, 20, 25, 30, 35
Short Circuit Current Setting I2	xI1 (A)	6-9 in steps of 1	6-9 in steps of 1
Short Circuit Time Delay t2	mSec	25, 50, 100, 200	25, 50, 100, 200
Instantaneous Pick up Threshold	xI1 (A)	10 times	10 times
Ground Fault Current Ig (4-pole only)	xI1 (A)	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7 (with function block feature)	
Ground Fault Trip Time Tg (4-pole only)	Sec	0.1, 0.2, 0.4, 0.6, 0.8, 1.0, 3.0, 5.0	
Field Test Switch		•	•
Auxiliary Power Module for Field Testing		•	•

• Available, + Supplied alongwith the MCCB above 63 A

# only one accessory can be fitted in the MCCB

© At 1.1 time In for max. 2 hours only



## Technical Information

Standard conformity	:	IS/IEC 60947 – 2
Rated operational voltage	:	415 Vac
Rated Insulation Voltage	:	750 Vac
Type of release	:	Microprocessor Based Electronic Release
Utilisation Category	:	A
Rated frequency	:	50 Hz / 60 Hz
Operating altitude	:	2000 m
Humidity	:	0 - 95%
Rated impulse voltage	:	8 kV



Frame	SI Unit	LES	LEN
No. of Poles		3P / 4P wSN	
Standard Current Ratings, $I_n$	A	250, 320, 400, 500, 630	
Microprocessor Release	LSI	•	•
	LSIG	•	•
Rated S.C Making Capacity at 415 V lcm	kA	75.6	105
Rated Ultimate S.C Breaking Capacity (lcu), at 240 V		50	65
415 V	kA	36	50
500 V		25	35
Rated Service S.C Breaking Capacity at 415 V lcs = % lcu	%	100	75
Weight 3P	kg	7	7
4P wSN	kg	9	9
Terminal Capacity (Cable)	sq. mm	1 x 240 (upto 400 A) 2 x 185 (500 A-630 A)	1 x 240 (upto 400 A) 2 x 185 (500 A-630 A)
(Bus bar width)	mm	30	30
Overall Dimension (W x H x D)	TP	140 x 254 x 110	140 x 254 x 110
	FP wSN	186 x 254 x 110	186 x 254 x 110
<b>Internal Accessories</b>			
Auxiliary Switch (1 C/O or 2 C/O)		•	•
Shunt Trip		•	•
Under Voltage Release		•	•
Trip Alarm Contact (Factory fitted)		•	•
<b>External Accessories</b>			
Rotary Handle - Extended		•	•
Extended Terminals		•	•
Dolly Extension		•	•
Phase Barriers		•	•
Terminal Shroud		•	•
Dolly Pad Locking Device		•	•
Earth Fault Relay		•	•
<b>Characteristics of Microprocessor Release</b>			
Overload Current, $I_o$	$I_o$ (A)	0.4 – 1.0 in steps of 0.1	
Overload Time Delay, $t_o$	s	3, 4, 6, 8, 10, 12, 16, 18	
Short Circuit Current Setting, $I_s$	$I_s$ (A)	2, 2.5, 3, 4, 6	
Short Circuit Time Delay, $t_s$	s	0.05, 0.1, 0.2, 0.3, 0.4, 0.6, 0.8, 1	
Instantaneous Short Circuit Current Setting, $I_i$	$I_i$ (A)	2 – 8 in steps of 2	
Pre-Trip Indication, $I_p$	$I_p$	0.6, 0.7, 0.75, 0.8, 0.85, 0.9, 0.95, 1	
Ground Fault Current, $I_g$ (in 4P wSN only)	$I_g$ (A)	0.2 – 0.8 in steps of 0.1	

• Available

LSI - Long Delay, Short Delay & Instantaneous  
LSIG - Long Delay, Short Delay, Instantaneous & Ground Fault

3 P - Three Pole  
4 P wSN - Four Pole with Switched Neutral



## FEN / FEH Frame Accessories

(Accessories are for 3P / 4P)

Alarm Switch



Voltage	Rating	Configuration	Cat. No.
125 / 250 Vac	1A	1NO + NC	IHLLALF1CO

Shunt Trip



Voltage	Rating
100-110 Vac	IHLLSTF110
220-240 Vac	IHLLSTF240
380-415 Vac	IHLLSTF415

Note: Shunt Trip releases is provided with built-in auxiliary contact

Under Voltage Release



Voltage	Rating
110-120 Vac	IHLUVRF110
220-240 Vac	IHLUVRF240
380-440 Vac	IHLUVRF440

The breaker trips if the supply voltage dips below 70%- 35% of the rated voltage.

The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature).

Supplied with external mounting Power pack to operate on AC supplies. Additional transformer is supplied with LUVRF440 & LUVRF110.

Auxiliary Contact



Auxiliary Contact (250Vac / 250Vdc)  
(450Vac / 250Vdc)

1. Change Over (1NO+1NC)	IHLLASF1CO
2. Change Over (2NO+2NC)	IHLLASF2CO

Rotary Handle



Cat. No.

With Door interlock and 300 mm remote shaft	IHLLRRHF30
--	------------

Other Accessories



Cat. No.		
Dolly Pad locking device	IHLLDPF250	
Phase Barriers	Three Pole Four Pole	ISSLFX0036 ISSLFX0038
Terminal Shrouds	Three Pole Four Pole	IHLLTSFT00 IHLTSFF00
Extended terminals Up to 100 A	Three Pole Four Pole	ISLFX0047 ISLFX0044
Extended terminals 125 A - 250 A	Three Pole Four Pole	ISLFX0049 ISLFX0046



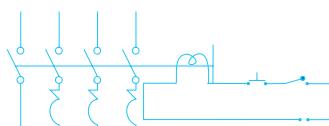
## LES / LEN Frame Accessories

(Accessories are for 3P / 4P)

Alarm Switch
 

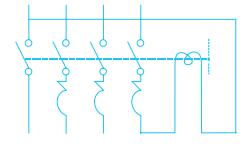
Voltage	Rating	Configuration	Cat. No.
240 Vac	1A	1NO + NC	IHLLB000

\*Changeover Contact

Shunt Trip with Auxiliary switch
 

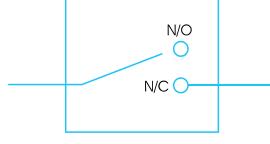
Voltage	Cat. No.
110 Vac	IHLLS110
240 Vac	IHLLS240
415 Vac	IHLLS415

Note: Shunt Trip releases is provided with built-in auxiliary contact

Under Voltage Release
 

Voltage	Cat. No.
110 Vac	IHLLU110
220 Vac	IHLLU240
380 Vac	IHLLU415

Note: The breaker trips if the supply voltage dips below 70% - 35% of the rated voltage. The breaker cannot be switched ON unless there is a supply to the UVR. (NVNC feature). Supplied with external mounting Electronic Power pack to operate on AC supplies. Additional transformer is supplied with 415V & 110V UVR.

Auxiliary Contact
 

Voltage	Current Rating	*Configuration	Cat. No. (AC 12)
250 Vac	4 A	1NO + 1NC	IHLA1CO
250 Vac	4 A	2(1NO + 1NC)	IHLA2CO

\*Changeover Contact

Rotary Handle


Rotary Handle	Cat. No.
With Door interlock and 300 mm remote shaft	IHLRN30

Dolly Pad Lock


	Cat. No.
Dolly Extension	ISCPSMSLLX009
Dolly Pad locking device	IHLLP000

Other Accessories


Cat. No. - 3 P	Cat. No. - 4 P
Dolly Pad locking device	IHLDPF250
Phase Barriers	ISSLFX0036
Terminal Shrouds	IHLTSFT00
Extended terminals Up to 100 A	ISLFX0047
Extended terminals 125 A - 250 A	ISLFX0049
	ISLFX0044



## Ordering Information



FE Frame Three Pole MCCB

Current Rating (A)	Icu 35 kA Cat. No.	Icu 50 kA Cat. No.
25	IHLFENT0025	IHLFEHT0025
40	IHLFENT0040	IHLFEHT0040
63	IHLFENT0063	IHLFEHT0063
100	IHLFENT0100	IHLFEHT0100
125	IHLFENT0125	IHLFEHT0125
160	IHLFENT0160	IHLFEHT0160
200	IHLFENT0200	IHLFEHT0200
250	IHLFENT0250	IHLFEHT0250



FE Frame Four Pole MCCB

Current Rating (A)	Icu 35 kA Cat. No.	Icu 50 kA Cat. No.
25	IHLFENF0025	IHLFEHF0025
40	IHLFENF0040	IHLFEHF0040
63	IHLFENF0063	IHLFEHF0063
100	IHLFENF0100	IHLFEHF0100
125	IHLFENF0125	IHLFEHF0125
160	IHLFENF0160	IHLFEHF0160
200	IHLFENF0200	IHLFEHF0200
250	IHLFENF0250	IHLFEHF0250



LE Frame TP MCCB

Current Rating (A)	Icu 36 kA Cat No.	Icu 50 kA Cat No.
250	IHLLSEET0250	IHLLNFET0250
320	IHLLSEET0320	IHLLNFET0320
400	IHLLSEET0400	IHLLNFET0400
500	IHLLSEET0500	IHLLNFET0500
630	IHLLSEET0630	IHLLNFET0630



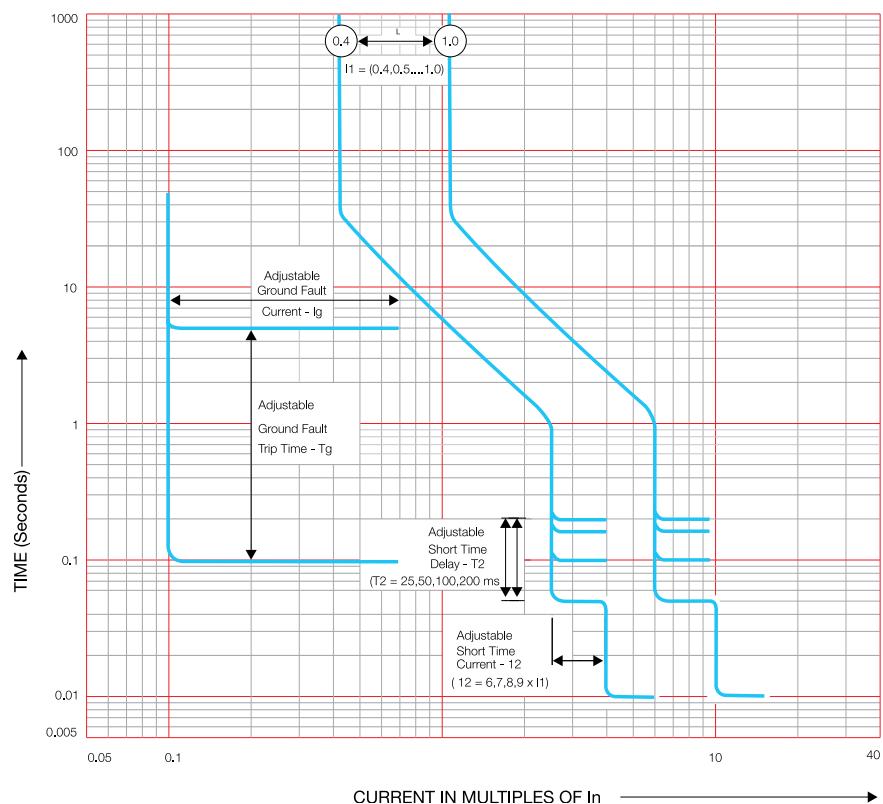
LE Frame FP w/ SN MCCB

Current Rating (A)	Icu 36 kA Cat No.	Icu 50 kA Cat No.
250	IHLLSEEF0250	IHLLNFEF0250
320	IHLLSEEF0320	IHLLNFEF0320
400	IHLLSEEF0400	IHLLNFEF0400
500	IHLLSEEF0500	IHLLNFEF0500
630	IHLLSEEF0630	IHLLNFEF0630

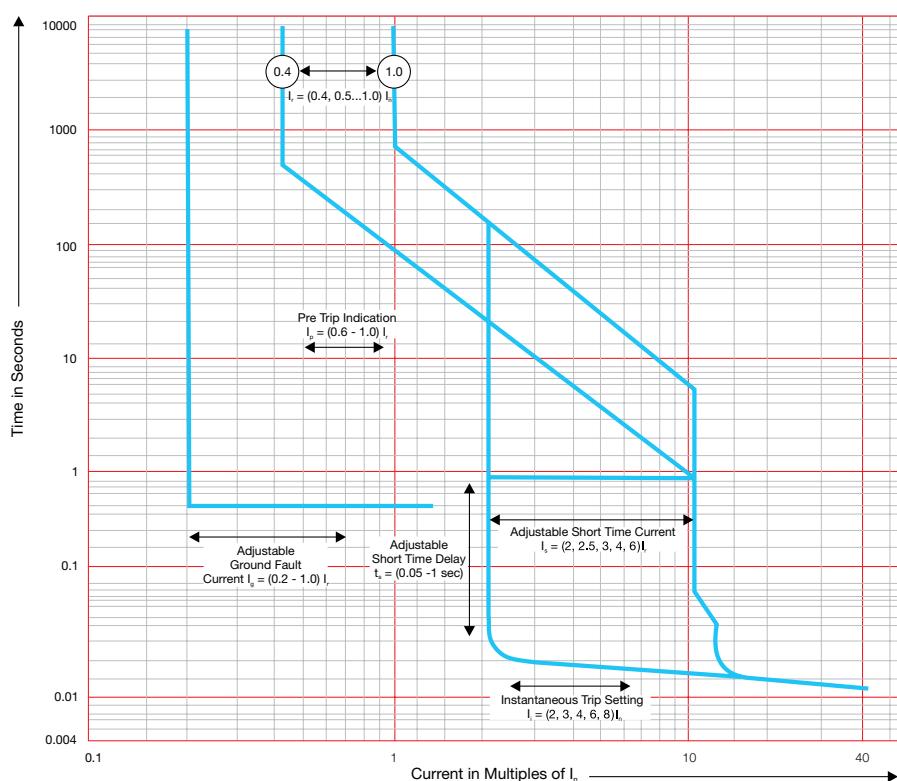


### Time Current Characteristics - FEN / FEH Frame

Ground Fault & Over Current Tripping Characteristics



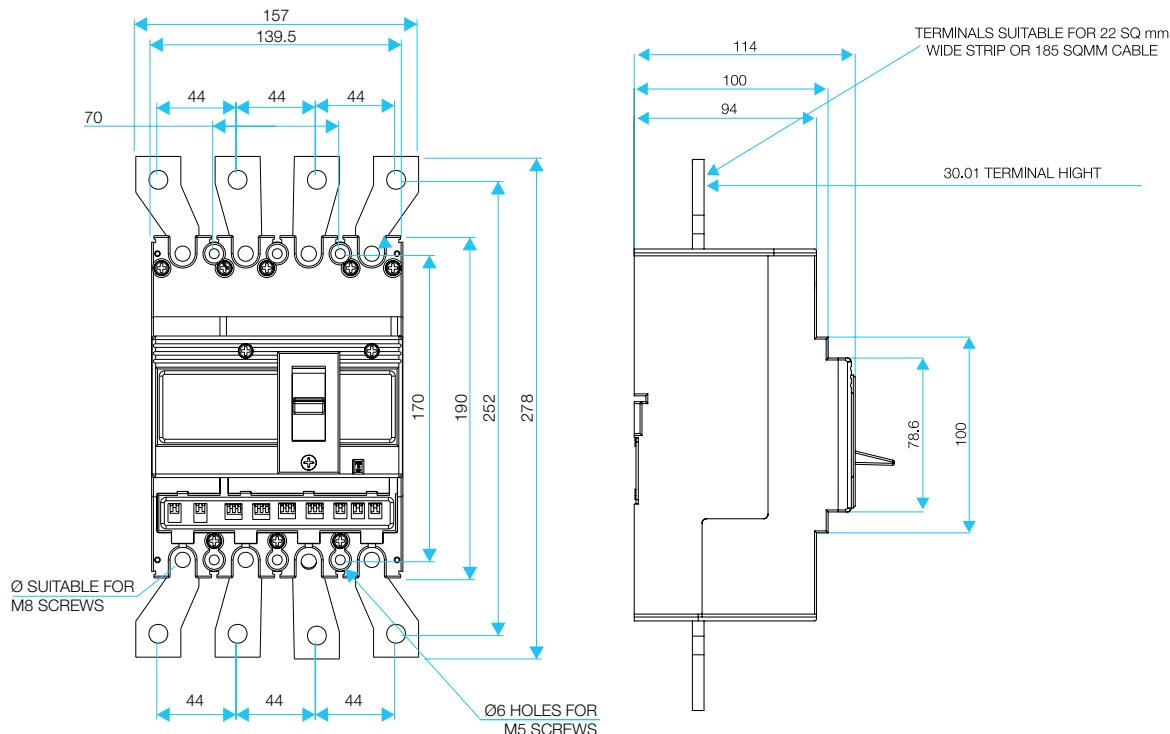
### Time Current Characteristics - LES / LEN Frame





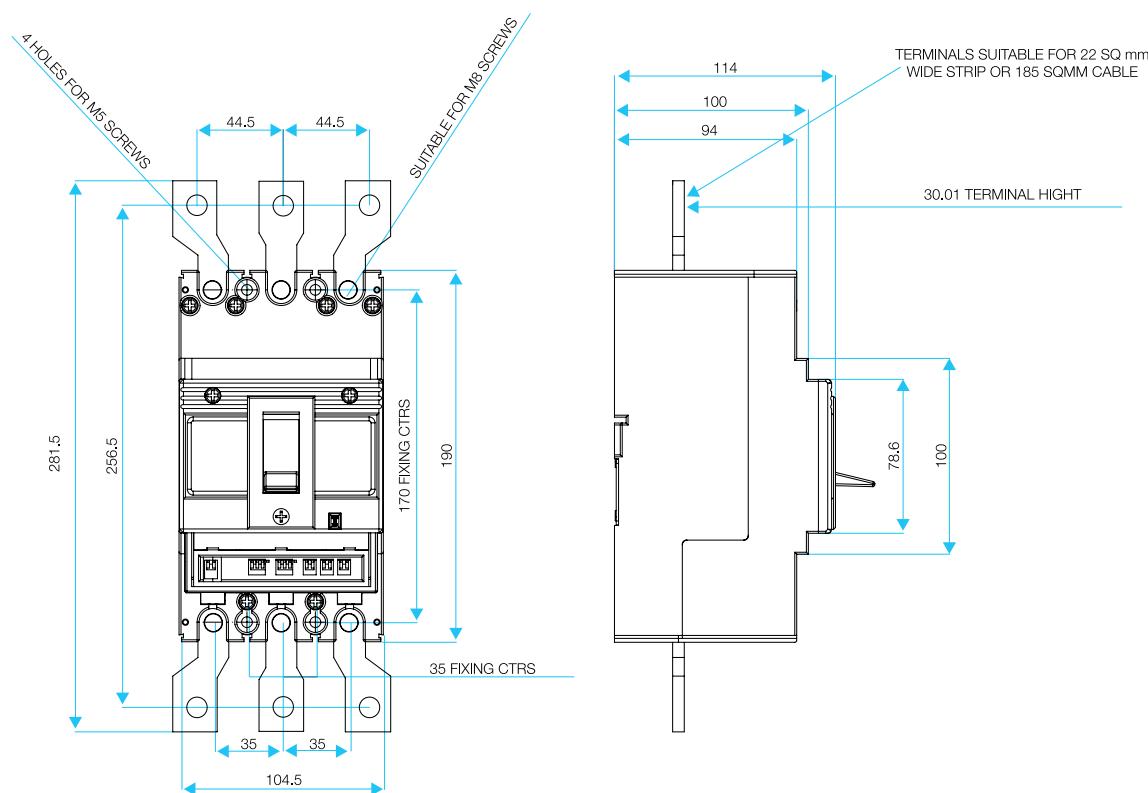
### Dimensions (in mm)

## F Frame - Four Pole With Extended Terminal



### Dimensions (in mm)

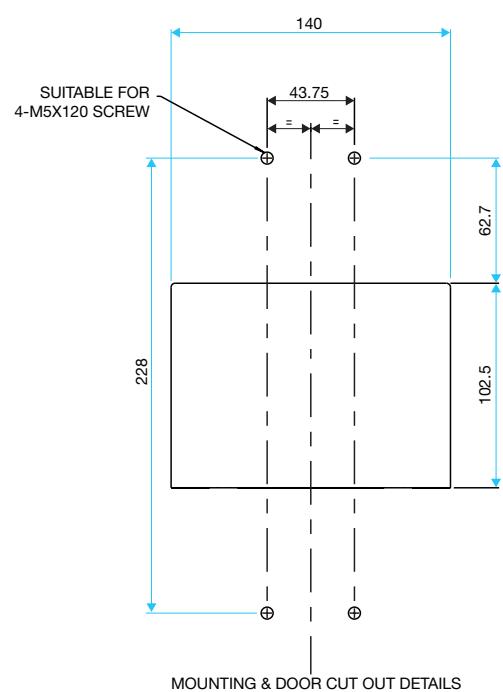
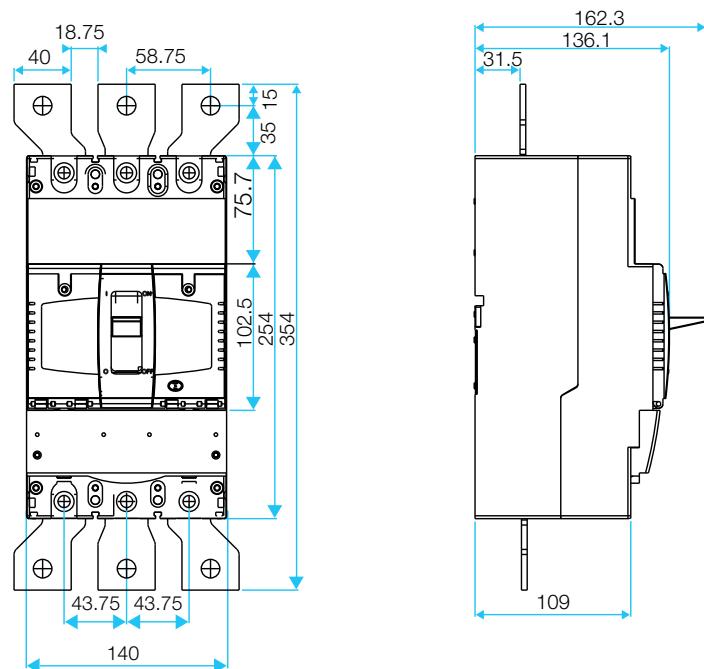
F Frame - Three Pole With Extended Terminal





### Dimensions (in mm)

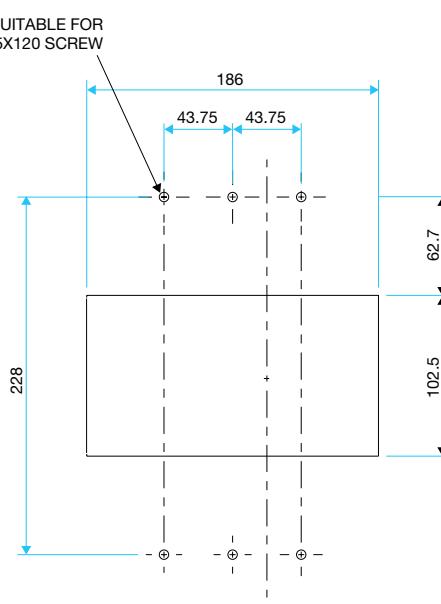
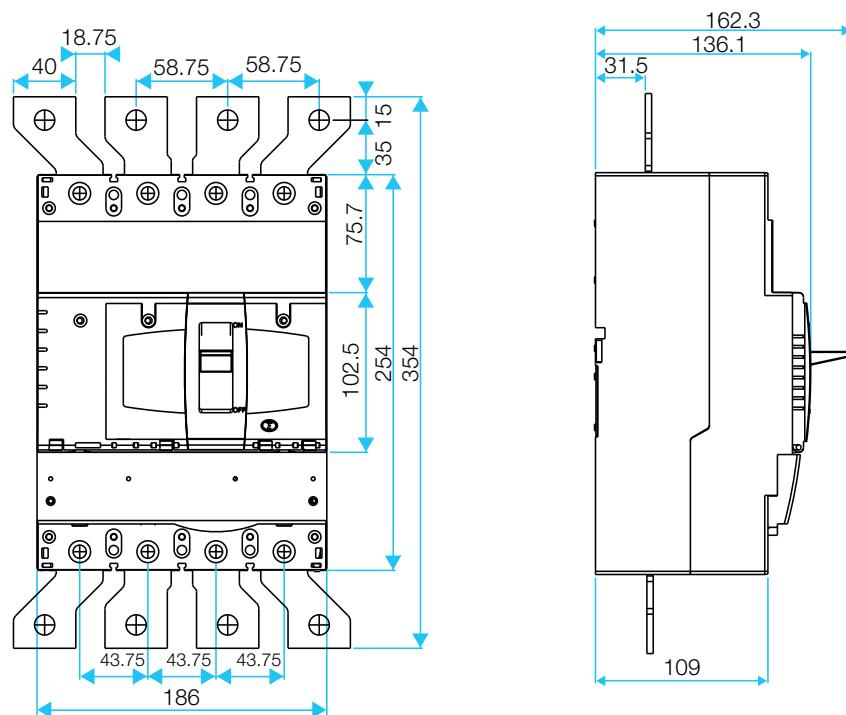
L Frame - Three Pole with extended terminals



MOUNTING & DOOR CUT OUT DETAILS

Dimensions (in mm)

L Frame - FP wSN with extended terminals



MOUNTING & DOOR CUT OUT DETAILS

Havells introduces a new range of MCCB Panel boards for Electrical supplies from 250 A – 630 A. In addition to managing safe Electrical Distribution, the range reflects the wider peripheral demands within modern Commercial buildings installations and upgrades, addressing application requirements such as metering. With an ever increasing focus on energy management and monitoring, the MCCB Panel boards have been designed to simplify the installation of metering for both incoming and outgoing supplies. Outgoing MCCB's for current ratings up to 160 A are available for Panel boards up to 400 A. The 630 A Panel boards provide options for outgoing circuits up to 250 A.

This range is available in double door version. It also has a provision to install a changeover switch as an Incomer.

### Features:

- Available in Single door and Double door with aesthetic layout
- Door opening to 180° for easy access
- Robust 1.6 mm gland plates are removable to aid installation
- Rigid & weld free construction to reduce distortion
- Removable door with easy align hinge to aid installation
- Chrome plated hinges
- Door barrel lock accessory for increased security
- Powder coated paint for better environment protection
- Cable holder provision in cable alley
- Key hole mounting
- Ingress protection, IP 30 for single door and double door

### Range :

Two basic versions :

- 'G' frame panel boards upto 400 A
- 'A' frame panel boards upto 630 A

### Specification :

- Fully application oriented as per
- IS / IEC: 60947-I&II
- IS / IEC: 61439-3
- IS / IEC: 60529

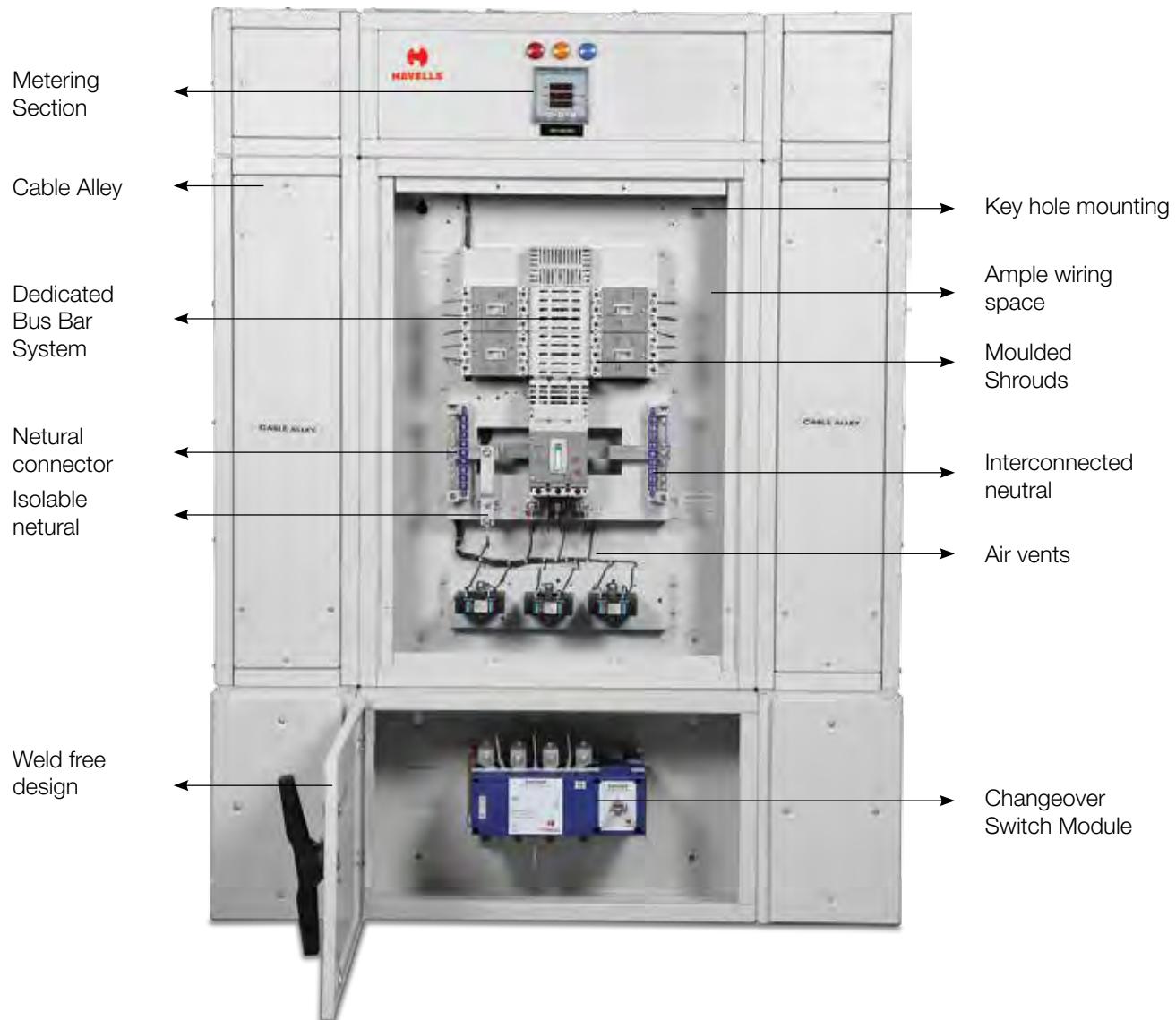




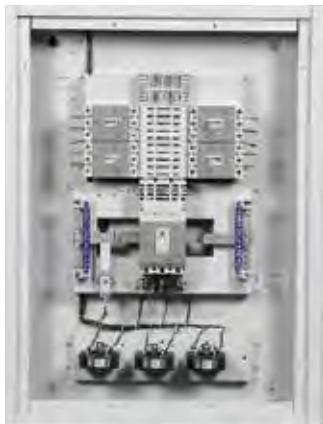
Panel Board System



## Internal Configuration



\*Available in both Single Door and Double Door



#### Basic Module

This accommodates single MCCBs up to 400 A in G frame panel boards and up to 630 A in A Frame panel boards. They are all supplied with their own dedicated set of preformed copper interconnections. It has provision for 2, 4, 6, 8, 12 & 16 way outgoing circuits suitable for mounting single pole, or three pole or four pole 'G' Frame MCCBs up to 160 A in 'G' frame panel boards and for mounting three pole 'A' frame MCCBs up to 250 A in 'A' frame panel boards. The bus bar system are fully rated and are completely shielded all around by nylon robust shrouds having proper air vents. Adequate space is provided for terminating the cable onto the MCCBs.



#### Cable Way Module

Cableway can be added on either side of the basic module for termination of incoming & outgoing MCCBs. The cable way selection is simply determined by adding together the modular height of the final layout & choosing cableways to match. The vertical insulated partition kit allows shielding between the shared face of a cableway and the basic module.



#### Metering Module

This module can be assembled on top of the basic module. Two types of metering module are available, namely, analog and digital. The analog type metering module comprises of analog type ammeter and voltmeter, whereas, the digital type metering module comprises of digital type ammeter and voltmeter. Besides ammeter and voltmeter, the metering module is provided with selector switches, indicating lights and back up fuses.



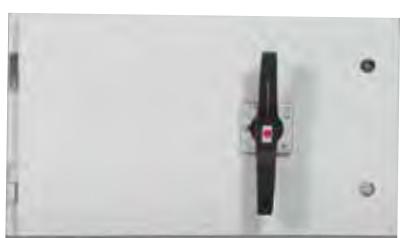
#### MCB Module

A module for housing MCCBs can be integrated with the panel board for individual final outgoing circuit protection. Two different versions are available for mounting 22 SPMCBs or 24 SPMCBs on DIN channel.



#### Add on Module

The add on module is designed for giving extra space for incoming termination. This module can be assembled at the bottom of the basic module if required.



#### Add on Changeover switch module

This module houses the changeover switch for main / standby supply integration. It is available in 250 A, 400 A and 630 A.

#### Add on ATS module

This module houses the AUTOMATIC TRANSFER switch for main / standby supply integration. It is available in 250 A, 400 A and 630 A.



## Technical Information:



G Frame Panel Board

Ref. Standard	IS: / IEC: 61439 - 3		
Incoming			
MCCB Rating	A Frame upto 250 A	C Frame upto 400 A	L Frame upto 400 A
No. of Poles	TP, FP	TP, FP	TP, FP
Breaking Capacity kA	25	35, 50	35, 50
Outgoing			
No. of ways	2, 4, 6, 8, 12, 16	2, 4, 6, 8, 12, 16	2, 4, 6, 8, 12, 16
MCCB Rating	G Frame upto 160 A	G Frame upto 160 A	G Frame upto 160 A
Breaking Capacity kA	10, 16, 25	10,16,25	10,16,25
Bus Bar Rating	250 A	400 A	400 A
Short time withstand current	30 kA for 1 s	30 kA for 1 s	30 kA for 1 s
Neutral terminal capacity	upto 70 sq. mm		
Enclosure material / thickness	CRCA sheet steel / 1.6 mm		
Mounting	Floor / wall mount		
Degree of protection	IP 30		



A Frame Panel Board

Ref. Standard	IS: / IEC: 61439 - 3		
Incoming			
MCCB Rating	C Frame upto 400 A, 630 A	C Frame upto 800 A	L Frame upto 400 A, 630 A
No. of Poles	TP	TP	TP
Breaking Capacity (kA)	35, 50	35, 50	35, 50
Outgoing			
No. of ways	6, 8, 12	6, 8, 12	6, 8, 12
MCCB Rating	A Frame upto 250 A	A Frame upto 250 A	A Frame upto 250 A
Breaking Capacity (kA)	16, 25	16, 25	16, 25
Bus Bar Rating	400 A, 630 A	800 A	400 A, 630 A
Short time withstand current	30 kA for 1 s	50 kA for 1 s	50 kA for 1 s
Neutral terminal capacity	upto 70 sq. mm		
Enclosure material / thickness	CRCA sheet steel / 1.6mm		
Mounting	Floor / wall mount		
Degree of protection	IP 30		



## Ordering Information



### PowerSafe Enclosure

#### 'G' Frame Panel Board, O/G TP MCCBs G-Frame

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat. No.	Double Door Cat. No.
	2	IHVG025002	IHVG02500200
250 A	4	IHVG025004	IHVG02500400
"AA" Frame	6	IHVG025006	IHVG02500600
MCCB	8	IHVG025008	IHVG02500800
	12	IHVG025012	IHVG02501200
	16	IHVG025016	IHVG02501600

#### 'G' Frame Panel Board, O/G TP MCCBs G-Frame

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
	2	IHVG040002	IHVG04000200
400 A	4	IHVG040004	IHVG04000400
"CN" Frame	6	IHVG040006	IHVG04000600
MCCB	8	IHVG040008	IHVG04000800
	12	IHVG040012	IHVG04001200
	16	IHVG040016	IHVG04001600

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
	2	IHLG040002	IHLG04000200
400 A "LS/LN" Frame MCCB	4	IHLG040004	IHLG04000400
	6	IHLG040006	IHLG04000600
	8	IHLG040008	IHLG04000800
	12	IHLG040012	IHLG04001200

#### 'A' Frame Panel Boards, O/G FP MCCBs

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
	2	IHVGF25002	IHVGF2500200
250 A	4	IHVGF25004	IHVGF2500400
"AA" Frame	6	IHVGF25006	IHVGF2500600
MCCB	8	IHVGF25008	IHVGF2500800
	12	IHVGF25012	IHVGF2501200

#### 'G' Frame Panel Boards, O/G FP MCCBs G-Frame

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
	2	IHVGF40002	IHVGF4000200
400 A	4	IHVGF40004	IHVGF4000400
"CN" Frame	6	IHVGF40006	IHVGF4000600
MCCB	8	IHVGF40008	IHVGF4000800
	12	IHVGF40012	IHVGF4001200

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
	2	IHLGF40002	IHLGF4000200
400 A "LS/LN" Frame MCCB	4	IHLGF40004	IHLGF4000400
	6	IHLGF40006	IHLGF4000600
	8	IHLGF40008	IHLGF4000800
	12	IHLGF40012	IHLGF4001200

\* The outgoings number of ways is the number of "G" Frame TP/FP MCCBs that can be mounted. In case of SP MCCBs the number of MCCBs shall be three times the number of ways in TP and four times the number of way in FP O/G.

\*\* Maximum ratings are indicated for the incoming MCCBs however lower ratings in the same frame can be ordered.



## Ordering Information



PowerSafe Enclosure

‘A’ Frame Panel Board, O/G TP MCCBs

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
400 A	6	IHVA040006	IHVA04000600
“CN / CH” Frame	8	IHVA040008	IHVA04000800
MCCB	12	IHVA040012	IHVA04001200

‘A’ Frame Panel Board, O/G TP MCCBs

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
630 A	6	IHVA063006	IHVA06300600
“CN / CH” Frame	8	IHVA063008	IHVA06300800
MCCB	12	IHVA063012	IHVA06301200

‘A’ Frame Panel Board, O/G TP MCCBs

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
400 A	6	IHLA040006	IHLA04000600
“LS / LN” Frame	8	IHLA040008	IHLA04000800
MCCB	12	IHLA040012	IHLA04001200

Current Rating (A) Incomer	Outgoing* (No. of ways)	Single Door Cat No.	Double Door Cat No.
630 A	6	IHLA063006	IHLA06300600
“LS/LN” Frame	8	IHLA063008	IHLA06300800
MCCB	12	IHLA063012	IHLA06301200



## Ordering Information



PowerSafe Cable Alley

'G' Frame Panel Board - Cable Alley

Incomer 250A, outgoing TP / FP G Frame MCCBs

S. No.	Description	Single Door Cat. No.	Double Door Cat. No.
1	Cable Alley I/C 250 A,O/G 3P GF 6 Way & 4P 2/4 Way	ISSBOU0675	ISSBOU0691
2	Cable Alley I/C 250 A,O/G 3P GF 6 Way & 4P 2/4 Way	ISSBOU0676	ISSBOU0692
3	Cable Alley I/C 250 A,O/G 3P GF 12 Way	ISSBOU0677	ISSBOU0693

\* Each set of Cable Alley consists of two numbers, one each on LHS and RHS.

'G' Frame & 'A' Frame Panel Board - Cable Alley

Incomer 400A, outgoing TP / FP G Frame / A Frame MCCBs

S. No.	Description	Single Door Cat. No.	Double Door Cat. No.
4	Cable Alley I/C 400 A,O/G 3P GF 12 Way	ISSBOU0683	ISSBOU0700
6	CABLE ALLEY I/C 400 A,O/G 4P 12 WAY & A/F 12WAY	ISSBOU0685	ISSBOU0702

Note: For A frame 800A incomer Cable Alley codes please contact nearest branch.

\* Each set of Cable Alley consists of two numbers, one each on LHS and RHS.



Pre-Wired Meter Module with Voltmeter, Ammeter, Selector Switch, Ct's Control Fuse & Indicating Lights

S. No.	Description	Single Door Cat. No.	Double Door Cat. No.
1	Prewire Meter Module - Analog	ISSBOU0689	ISSBOU0706
2	Meter Module - Digital	ISSBOU0711	ISSBOU0707

Bare Meter Module / MCB Module / Add on Module

S. No.	Description	Single Door Cat. No.	Double Door Cat. No.
1	Meter Module - Analog Provision for Ammeter, Voltmeter - Analog with selector switch	ISSBOU0686	ISSBOU0703
2	MCB Module	ISSBOU0687	ISSBOU0704
3	Add on Module	ISSBOU0688	ISSBOU0705

\* Ammeter, Voltmeter, Selector Switch, Control Fuses, Indicating Lights, MCBs etc. have to be ordered separately and are at extra cost.

\*\* The above prices are for bare module enclosures only.



## Ordering Information



Add on Incoming Changeover Switch Enclosure

S. No.	Description	Cat. No.
1	250 A Incoming change Over switch-F1	ISSBOU0708
2	400 A & 630 A Incoming change Over switch - F2	ISSBOU0709

S. No.	Description	Cat. No.
1	250A COS Fitted Enclosure	ISSBOU0712
2	400A COS Fitted Enclosure	ISSBOU0713
3	630A COS Fitted Enclosure	ISSBOU0714



Add on Incoming Automatic Transfer Switch with Enclosure

S. No.	Description	Cat. No.
1	250 A - 400 A ATS enclosure with ATS	ISSBOU1124
2	250 A - 630 A ATS enclosure with ATS	ISSBOU1125

S. No.	Description	Cat. No.
1	250 A ATS fitted enclosure	ISSBOU1126
2	400 A ATS fitted enclosure	ISSBOU1127
3	500 A ATS fitted enclosure	ISSBOU1128
4	630 A ATS fitted enclosure	ISSBOU1129

S. No.	Description	Cat. No.
1	250 A ATS fitted enclosure	ISSBOU1126
2	400 A ATS fitted enclosure	ISSBOU1127
3	500 A ATS fitted enclosure	ISSBOU1128
4	630 A ATS fitted enclosure	ISSBOU1129



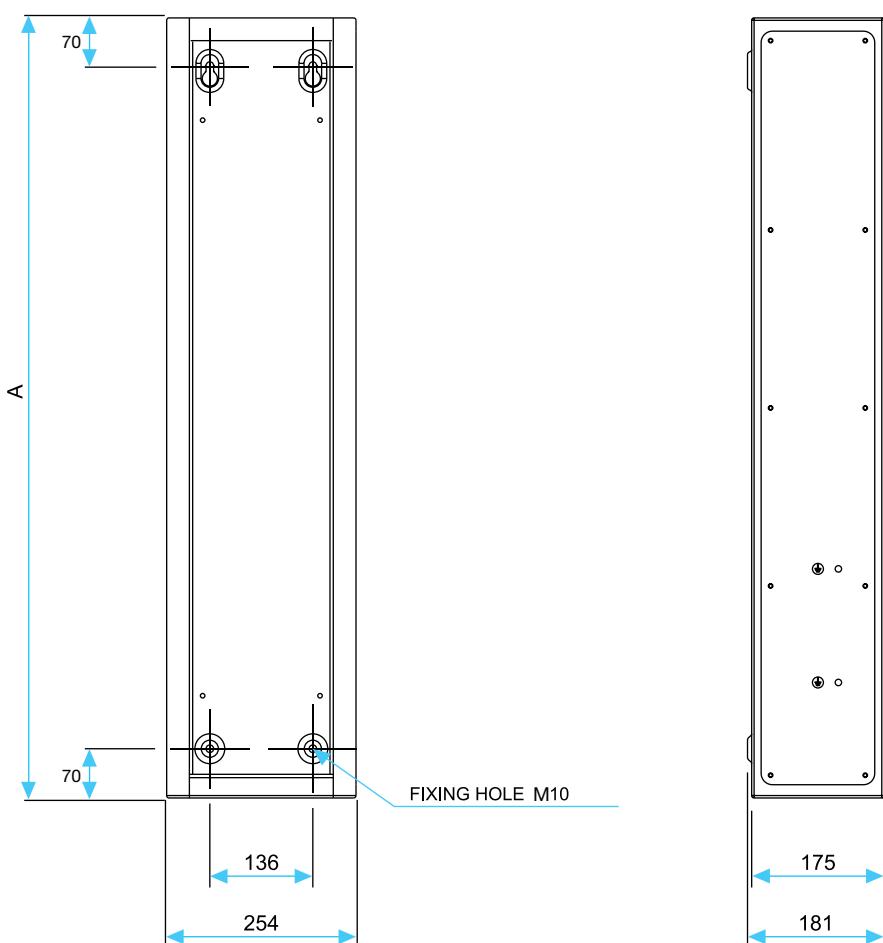
Add on Incoming Switch Disconnector Fuse with Enclosure

S. No.	Description	Cat. No.
1	SDF enclosure for 160 A - 250 A	ISSBOU1130
2	SDF enclosure for 315 A - 400 A	ISSBOU1131
3	SDF enclosure for 630 A	ISSBOU1132

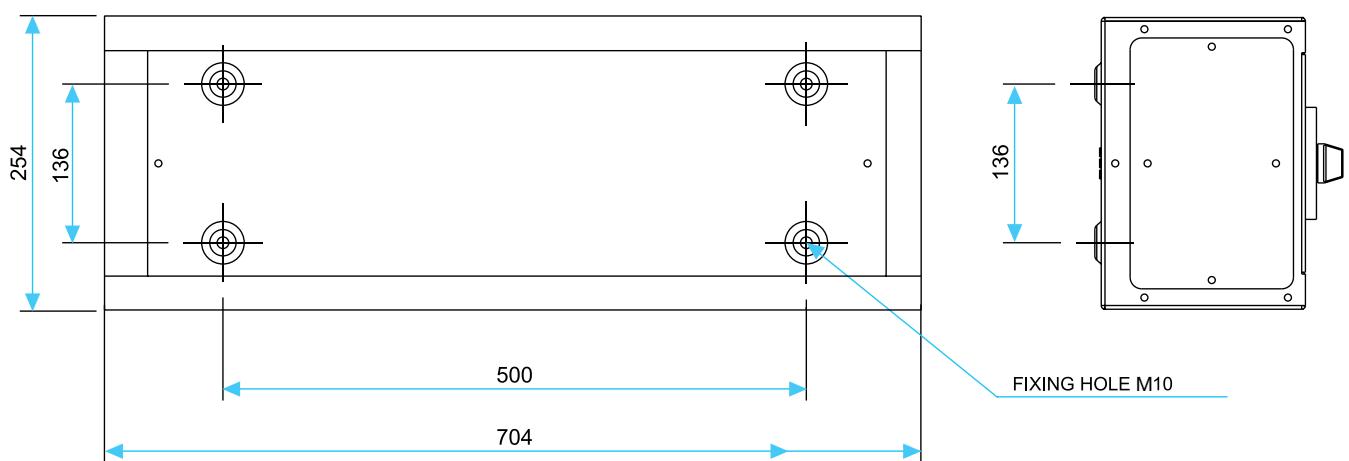
S. No.	Description	Cat. No.
1	160 A SDF fitted enclosure	ISSBOU1133
2	250 A SDF fitted enclosure	ISSBOU1134
3	315 A SDF fitted enclosure	ISSBOU1135
4	400 A SDF fitted enclosure	ISSBOU1136
5	500 A SDF fitted enclosure	ISSBOU1137
6	630 A SDF fitted enclosure	ISSBOU1138

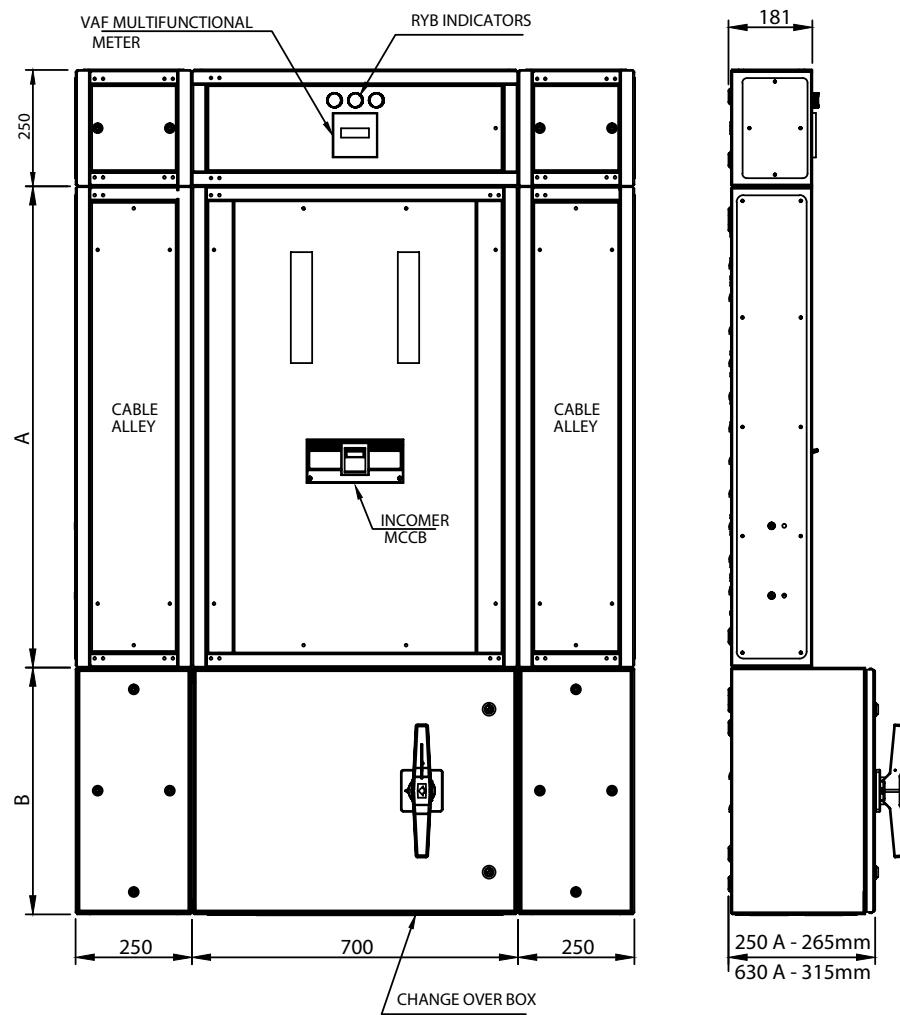
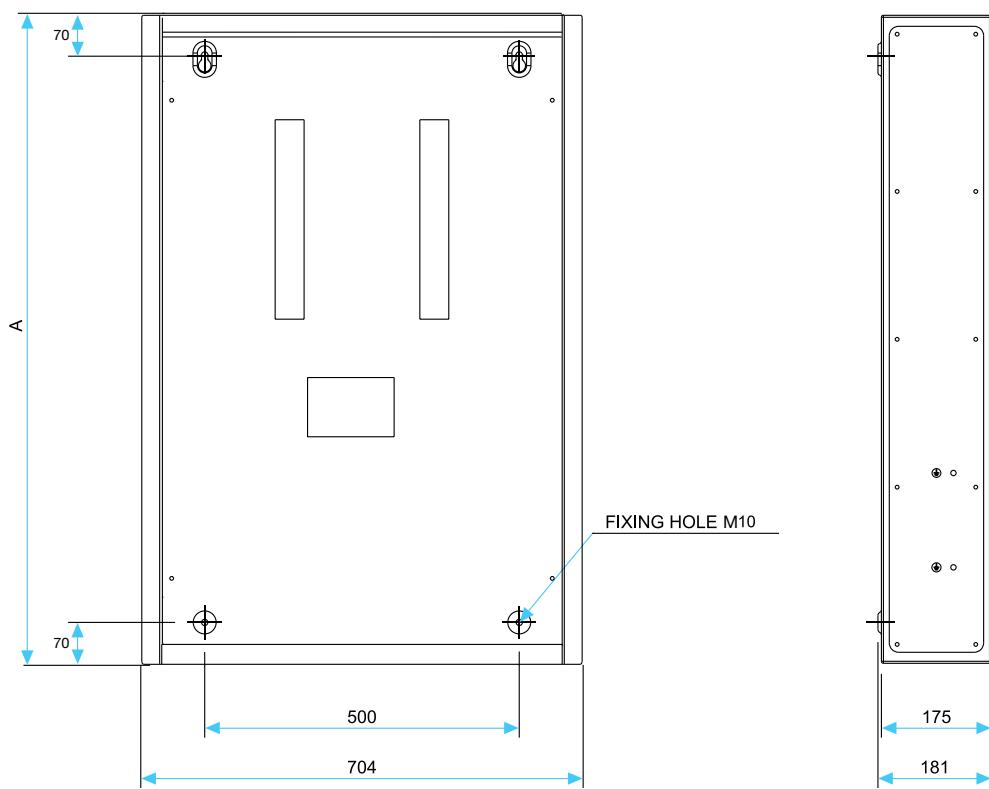
## Dimensions in (mm)

Cable Alley



Meter Module







Cable Alley Selection Table

Material	Material Description	Encl /Alley Height A	Single Door	Double Door	COs Height B 250 A	COs Height B 630 A
IHLG040002	POWERS-V2 400A LF I/C GF O/G TP 2W	1030	ISSBOU0676	ISSBOU0692		530
IHLG040004	POWERS-V2 400A LF I/C GF O/G TP 4W	1030	ISSBOU0676	ISSBOU0692		530
IHLG040006	POWERS-V2 400A LF I/C GF O/G TP 6W	1030	ISSBOU0676	ISSBOU0692		530
IHLG040008	POWERSAFE-V2 400A LF I/C GF O/G TP 8W	1187.5	ISSBOU0677	ISSBOU0693		530
IHLG040012	POWERSAFE-V2 400A LF I/C GF O/G TP 12W	1287.5	ISSBOU0683	ISSBOU0700		530
IHLG040016	POWERSAFE-V2 400A LF I/C GF O/G TP 16W	1445	ISSBOU0685	ISSBOU0702		530
IHLGF40002	POWERSAFE-V2 400A LF I/C GF O/G FP 2W	1030	ISSBOU0676	ISSBOU0692		530
IHLGF40004	POWERSAFE-V2 400A LF I/C GF O/G FP 4W	1030	ISSBOU0676	ISSBOU0692		530
IHLGF40006	POWERSAFE-V2 400A LF I/C GF O/G FP 6W	1187.5	ISSBOU0677	ISSBOU0693		530
IHLGF40008	POWERSAFE-V2 400A LF I/C GF O/G FP 8W	1287.5	ISSBOU0683	ISSBOU0700		530
IHLGF40012	POWERSAFE-V2 400A LF I/C GF O/G FP 12W	1445	ISSBOU0685	ISSBOU0702		530
IHLG025002	POWERS-V2 250A LF I/C GF O/G TP 2W	1030	ISSBOU0676	ISSBOU0692	400	
IHLG025004	POWERS-V2 250A LF I/C GF O/G TP 4W	1030	ISSBOU0676	ISSBOU0692	400	
IHLG025006	POWERS-V2 250A LF I/C GF O/G TP 6W	1030	ISSBOU0676	ISSBOU0692	400	
IHLG025008	POWERSAFE-V2 250A LF I/C GF O/G TP 8W	1187.5	ISSBOU0677	ISSBOU0693	400	
IHLG025012	POWERSAFE-V2 250A LF I/C GF O/G TP 12W	1287.5	ISSBOU0683	ISSBOU0700	400	
IHLG025016	POWERSAFE-V2 250A LF I/C GF O/G TP 16W	1445	ISSBOU0685	ISSBOU0702	400	
IHLGF25002	POWERSAFE-V2 250A LF I/C GF O/G FP 2W	1030	ISSBOU0676	ISSBOU0692	400	
IHLGF25004	POWERSAFE-V2 250A LF I/C GF O/G FP 4W	1030	ISSBOU0676	ISSBOU0692	400	
IHLGF25006	POWERSAFE-V2 250A LF I/C GF O/G FP 6W	1187.5	ISSBOU0677	ISSBOU0693	400	
IHLGF25008	POWERSAFE-V2 250A LF I/C GF O/G FP 8W	1287.5	ISSBOU0683	ISSBOU0700	400	
IHLGF25012	POWERSAFE-V2 250A LF I/C GF O/G FP 12W	1445	ISSBOU0685	ISSBOU0702	400	
IHVA040006	POWERSAFE-V2 400A CF I/C AF O/G TP 6WLB	1187.5	ISSBOU0677	ISSBOU0693		530
IHVA040008	POWERSAFE-V2 400A CF I/C AF O/G TP 8WLB	1287.5	ISSBOU0683	ISSBOU0700		530
IHVA040012	POWERSAFE-V2 400A CF I/C AF O/G TP 12WL	1445	ISSBOU0685	ISSBOU0702		530
IHVA063006	P-SAFE 630A CF I/C AF O/G TP 6W SI	1187.5	ISSBOU0677	ISSBOU0693		530
IHVA063008	P-SAFE 630A CF I/C AF O/G TP 8WSI	1287.5	ISSBOU0683	ISSBOU0700		530
IHVA063012	P-SAFE 630A CF I/C AF O/G TP 12W SI	1445	ISSBOU0685	ISSBOU0702		530
IHVG025002	POWERSAFE-V2 250A AF I/C GF O/G TP 2W	925	ISSBOU0675	ISSBOU0691	400	
IHVG025004	POWERSAFE-V2 250A AF I/C GF O/G TP 4W	925	ISSBOU0675	ISSBOU0691	400	
IHVG025006	POWERSAFE-V2 250A AF I/C GF O/G TP 6W	925	ISSBOU0675	ISSBOU0691	400	
IHVG025008	POWERSAFE-V2 250A AF I/C GF O/G TP 8W	1030	ISSBOU0676	ISSBOU0692	400	
IHVG025012	POWERSAFE-V2 250A AF I/C GF O/G TP 12W	1187.5	ISSBOU0677	ISSBOU0693	400	
IHVG025016	POWERSAFE-V2 250A AF I/C GF O/G TP 16W	1445	ISSBOU0685	ISSBOU0702	400	
IHVG040002	POWERSAFE-V2 400A CF I/C GF O/G TP 2W LB	1030	ISSBOU0676	ISSBOU0692		530
IHVG040004	POWERSAFE-V2 400A CF I/C GF O/G TP 4W LB	1030	ISSBOU0676	ISSBOU0692		530
IHVG040006	POWERSAFE-V2 400A CF I/C GF O/G TP 6W LB	1030	ISSBOU0676	ISSBOU0692		530
IHVG040008	POWERSAFE-V2 400A CF I/C GF O/G TP 8W LB	1187.5	ISSBOU0677	ISSBOU0693		530
IHVG040012	POWERSAFE-V2 400A CF I/C GF O/G TP12W LB	1287.5	ISSBOU0683	ISSBOU0700		530
IHVG040016	POWERSAFE-V2 400A CF I/C GF O/G TP 16WL	1445	ISSBOU0685	ISSBOU0702		530
IHVGF25002	POWERSAFE-V2 250A AF I/C GF O/G FP 2W	925	ISSBOU0675	ISSBOU0691	400	
IHVGF25004	POWERSAFE-V2 250A AF I/C GF O/G FP 4W	925	ISSBOU0675	ISSBOU0691	400	
IHVGF25006	POWERSAFE-V2 250A AF I/C GF O/G FP 6W	1030	ISSBOU0676	ISSBOU0692	400	
IHVGF25008	POWERSAFE-V2 250A AF I/C GF O/G FP 8W	1187.5	ISSBOU0677	ISSBOU0693	400	
IHVGF25012	POWERSAFE-V2 250A AF I/C GF O/G FP 12W	1445	ISSBOU0685	ISSBOU0702	400	
IHVGF40002	POWERSAFE-V2 400A CF I/C GF O/G FP 2W LB	1030	ISSBOU0676	ISSBOU0692		530
IHVGF40004	POWERSAFE-V2 400A CF I/C GF O/G FP 4W LB	1030	ISSBOU0676	ISSBOU0692		530
IHVGF40006	POWERSAFE-V2 400A CF I/C GF O/G FP 6W LB	1187.5	ISSBOU0677	ISSBOU0693		530
IHVGF40008	POWERSAFE-V2 400A CF I/C GF O/G FP 8WL	1287.5	ISSBOU0683	ISSBOU0700		530
IHVGF40012	POWERSAFE-V2 400A CF I/C GF O/G FP 12WL	1445	ISSBOU0685	ISSBOU0702		530

"Titania" range of Air Circuit Breakers are available from 630 A to 2500 A rating in 3 Pole and 4 pole execution, with breaking capacity of 50 kA to 75 kA. These ACBs have been designed keeping in mind the present day complex requirement of electrical systems which makes it essential to have a reliable product which can give un-interrupted service through out the product life meeting all the stresses that the system encounters..

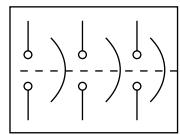
## Features:

- Compact size, wide range & high breaking capacity
- 630 A to 2500 A available in only 2 frame sizes
- First frame available upto 2000 A
- Common height, depth and panel door cutout
- Plug in type front accessible accessories
- Accessories are field fittable & common for the entire range
- Modular construction for pole unit
- Easily replaceable arcing contacts
- Available with communication facility

## C<sup>3</sup> technology

630 A to 2500 A in 2 frame sizes  
with 3 & 4 Pole execution





ACB

Air Circuit Breaker

HAVELLS



## Construction

**Operating Mechanism** is of stored energy type, which operates using pre-charged springs. The springs are charged manually with the help of charging handle or with the help of charging motor, if provided. The same operating mechanism is used for the entire range. Mechanism has been developed using less number of parts resulting in more reliability, longer mechanical life and requiring very less maintenance.

### Contact Mechanism

**Conductor Unit** is of modular design. Each pole consists of Main and Arcing contacts which are housed in the moulded housing. The contacts are made from sintered silver alloy for reliability, longer life and anti-weld properties. The construction of the contact is such that arcing contact closes before and opens later than the main contact, this substantially reduces erosion of main contact under normal and short circuit conditions.

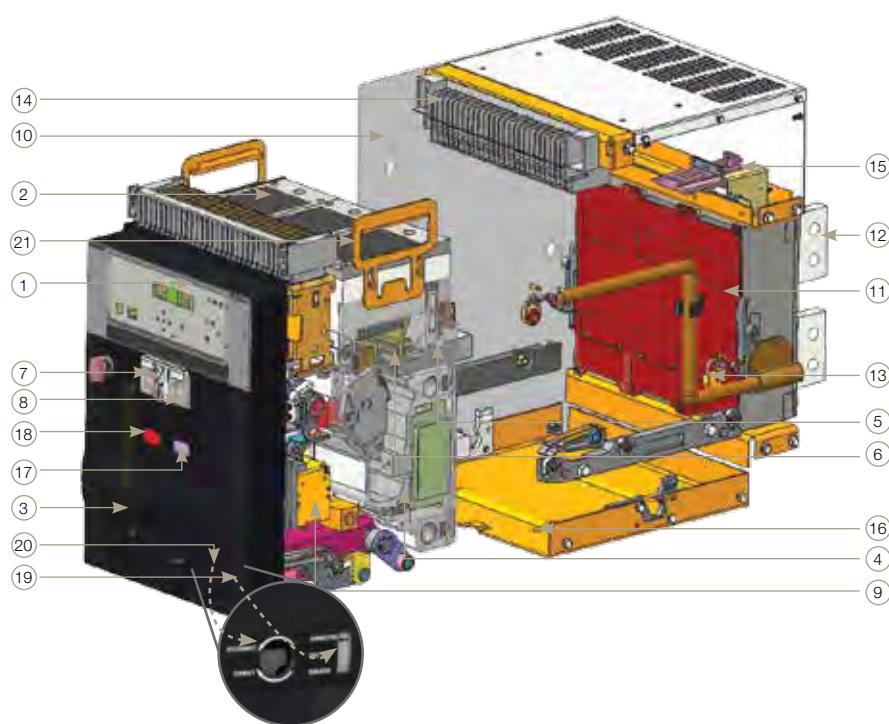
The current transformer is placed inside the pole unit around the lower terminal.

**Arc Chutes** are provided for quenching the arc. Arc chute comprises of grid plates mounted in parallel in the insulated housing. The arc is divided between these grid plates which helps in its fast quenching. The arc is thus confined, divided and extinguished in the arc chute. The excellent insulation between the conducting parts and better energy dissipation after short circuit makes it possible to make the load and line connections on either side.

The **Tripping Mechanism** comprises of magnet holder trigger which is linked to the trip bar unit. The electronic circuit gives a signal to this unit in case of over current fault and this unit mechanically trips the Circuit Breaker.

In **Over Current Protection** the sensing of the current is through the current transformers fitted on the main terminals. In case of any fault the secondary output of the CT increases. This secondary output of CT goes to the micro controller based electronic circuit. The micro controller is programmed to give a signal as per inverse time characteristics. The signal in the form of DC supply is given to magnet holder trigger which trips the ACB. The required tripping time and tripping current can be set with the help of the switches provided on the front panel of the electronic release.

## Internal View of ACB



1. Over Current Release
2. Arc Chute
3. Charging Handle
4. Pole Unit
5. Terminal assembly
6. Moving Contact assembly
7. Push Button "OFF"
8. Push Button "ON"
9. Shunt Trip Coil
10. Cradle Unit
11. Safety Shutter
12. Terminals
13. Pad lock facility for safety shutter
14. Control Terminals
15. Position Indication Switch (Optional)
16. Mounting Holes
17. Spring charge indicator
18. ACB ON OFF indicator
19. ACB connection status indication
20. Cradle rake in / out slot
21. Lifting Plate



## Technical Information

Standard Conformity : IEC 60947-2 & IS 13947-2

Performance Series	SI Unit	E	S	H
Rated Current (In) (Ref. Temp. 45 °C)	A	630	630	2500
		800	800	
		1000	1000	
		1250	1250	
		1600	1600	
		2000	2000	
Rated Service voltage (Ue)	V	690 Vac 250 Vdc	690 Vac 250 Vdc	690 Vac 250 Vdc
Rated Insulation voltage (Ui)	V	1000 V	1000 V	1000 V
Rated impulse withstand voltage (Uimp)				
	kV	12 kV	12 kV	12 kV
Frequency	(Hz)	50/60	50/60	50/60
No. of Poles*		3, 4	3, 4	3, 4
Rated short-circuit breaking capacity (Ics=100%Icu) -220 / 380 / 415 / 440 Vac -500 / 660 / 690 Vac -250 Vdc	(kA)	50	65	75
		40	55	65
		40	55	65
Rated short-time withstand current (Icw) 1sec 3sec	(kA)	50	50	65
		36	36	50
Rated short-circuit making capacity (peak value) (Icm) -220 / 380 / 415 / 440 -500 / 660 / 690	(kA)	105	143	165
		84	121	143
Utilization category		B	B	B
Isolation behavior		Yes	Yes	Yes
Closing time	ms	<70	<70	<70
Break time (max)		30	30	30
Mechanical life (No. of operations) (with regular maintenance)		25000	25000	20000
Electrical life (at 440 Vac) (No. of operations)		630, 800 - 15000 A	630, 800 - 10000 A	10000
		1000, 1250 - 12000 A	1000, 1250 - 10000 A	
		1600 - 12000 A	1600 - 8000 A	
		2000 - 10000 A	2000A - 8000 A	
Overall Dimensions (mm)				
Fixed (WxHxD)	3P		291x421x307	400x421x307
	4P		381x421x307	525x421x307
Draw out (WxHxD)	3P		330x460x386	435x460x386
	4P		420x460x386	560x460x386

\* 2 Pole ACBs are available on request

\*\* In 4 Pole ACB's 3200 A and 4000 A , Netural Pole is available in both 100% or 50% rating.



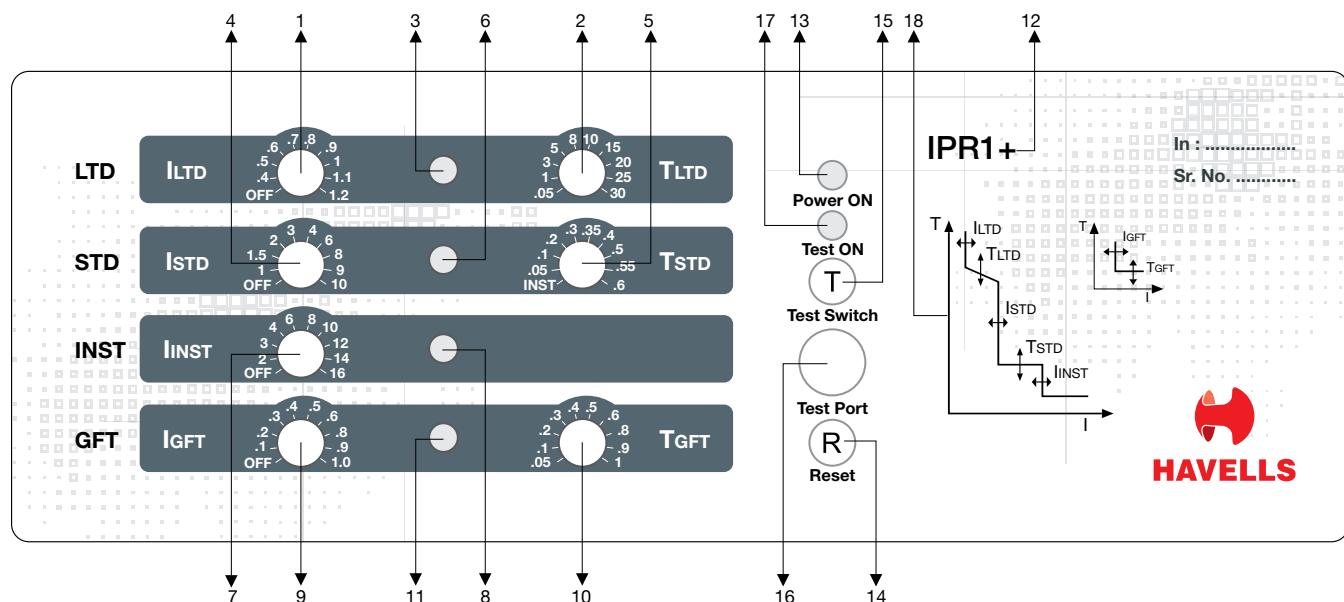
## New Intelligent Protection Releases

New Intelligent Protection Releases - Plus (IPR +) are the multifunctional dedicated protection units for ACB, using advanced micro-controller with full benefits of microprocessor technology offering overload & short circuit protection functions, advance protection functions, measurement & advanced monitoring functions, LCD display, MODBUS communication etc.

For meeting all the application requirements, ACBs come with a wide variety of new electronic releases, categorized into 6 different categories as IPR E+, IPR 1+, IPR 2+, IPR 3+, IPR 4+ and IPR 5+. IPR 1+ being the base model and IPR E+ as the economical version. The next four new models IPR 2+, IPR 3+, IPR 4+ and IPR 5+ are of premium segment with High-end Features.

### Features (IPR E + & IPR 1+):

- Self powered by built in Current Transformer
- User friendly settings of current and time delay using Rotary Switches
  - For IPR E+ : Adjustable LTD & INST settings (Economical Version)
  - For IPR 1+ : Adjustable LTD, STD, INST & GFT settings
- Both Three Phase and Earth fault protection in same unit (IPR 1+)
- More Reliable and repetitive accuracy, using high end micro-controller
- True RMS sensing with immunity to system disturbances
- Compatible with both 5P10 & 5P10 CTs
- LED Indication for fault discrimination
- Function blocking facility provided
- Compact Size & light weight
- Elegant Aesthetics



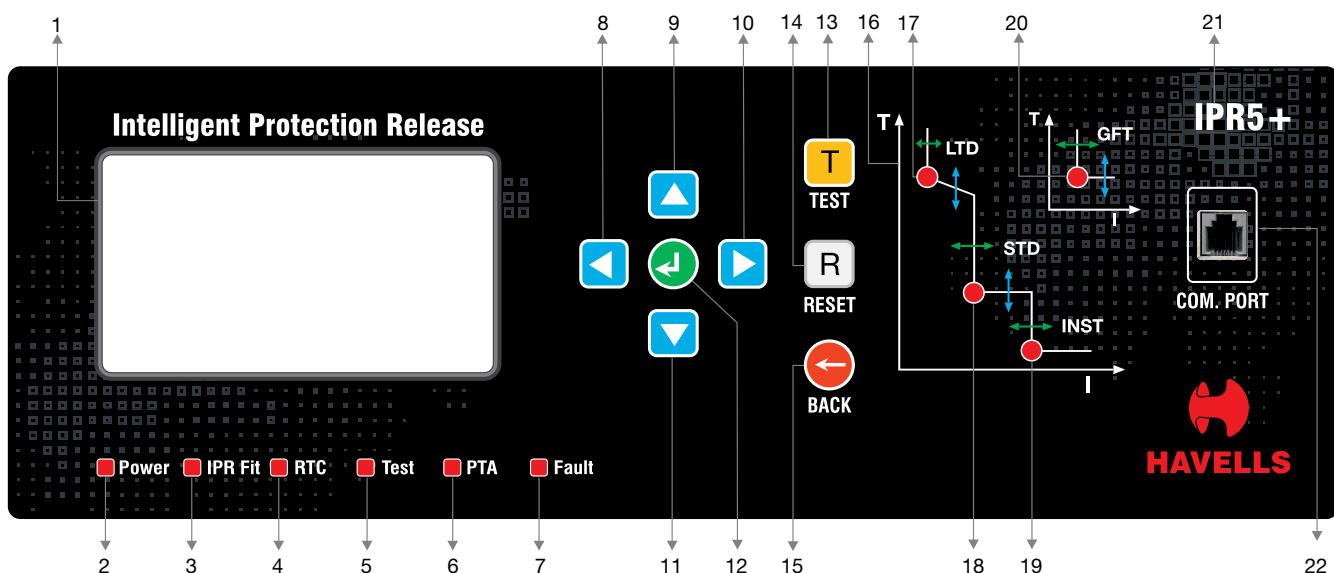
Ref.	Description	Ref.	Description
1	Rotary switch for setting LTD current	10	Rotary switch for setting GFT time
2	Rotary switch for setting LTD Time	11	LED indication for GFT fault
3	LED indication for LTD fault	12	Product identification code
4	Rotary switch for setting STD current	13	LED for "Power ON"
5	Rotary switch for setting STD time	14	Reset push button
6	LED indication for STD fault	15	Test push button
7	Rotary switch for setting INST current	16	Socket for test supply
8	LED indication for INST fault	17	LED for "Test ON"
9	Rotary switch for setting GFT current	18	Time current characteristics curve



## New Intelligent Protection Releases

Features (IPR2+, IPR3+, IPR4+ and IPR5+):

- Advanced Protection Functions
- In-built Measurement Module
- Wide LCD Display
- Zone Selective Interlocking
- Making Current Release Function
- Thermal Memory
- \*Ready To Close Feature
- I<sup>2</sup>t ON/OFF Feature
- Contact Erosion Indicator
- Bar Graphs for Current & Voltage
- Fault History on Display
- Circuit Breaker Failure Function
- Downstream CB Fail Feature
- Digital Operation Counter
- LED Annunciations on Front Fascia
- RS-485 MODBUS Communication facility



Ref.	Description	Ref.	Description
1	LCD Screen	12	Enter / Save Push Button
2	LED for "Power ON"	13	Test Push Button
3	LED for "IPR Fit"	14	Reset Push Button
4	#LED for "RTC (Ready to Close)"	15	Back Push Button
5	LED for "Test ON"	16	Time Current Characteristic Curve
6	LED for "PTA (Pre-Trip Alarm)"	17	LED Indication for LTD Fault
7	LED for "Faults"	18	LED Indication for STD Fault
8	Scroll "Left" Push Button	19	LED Indication for INST Fault
9	Scroll "Up" Push Button	20	LED Indication for GFT Fault
10	Scroll "Right" Push Button	21	Product Identification Code
11	Scroll "Down" Push Button	22	MODBUS RS-485 Communication Port

\*Provided on request

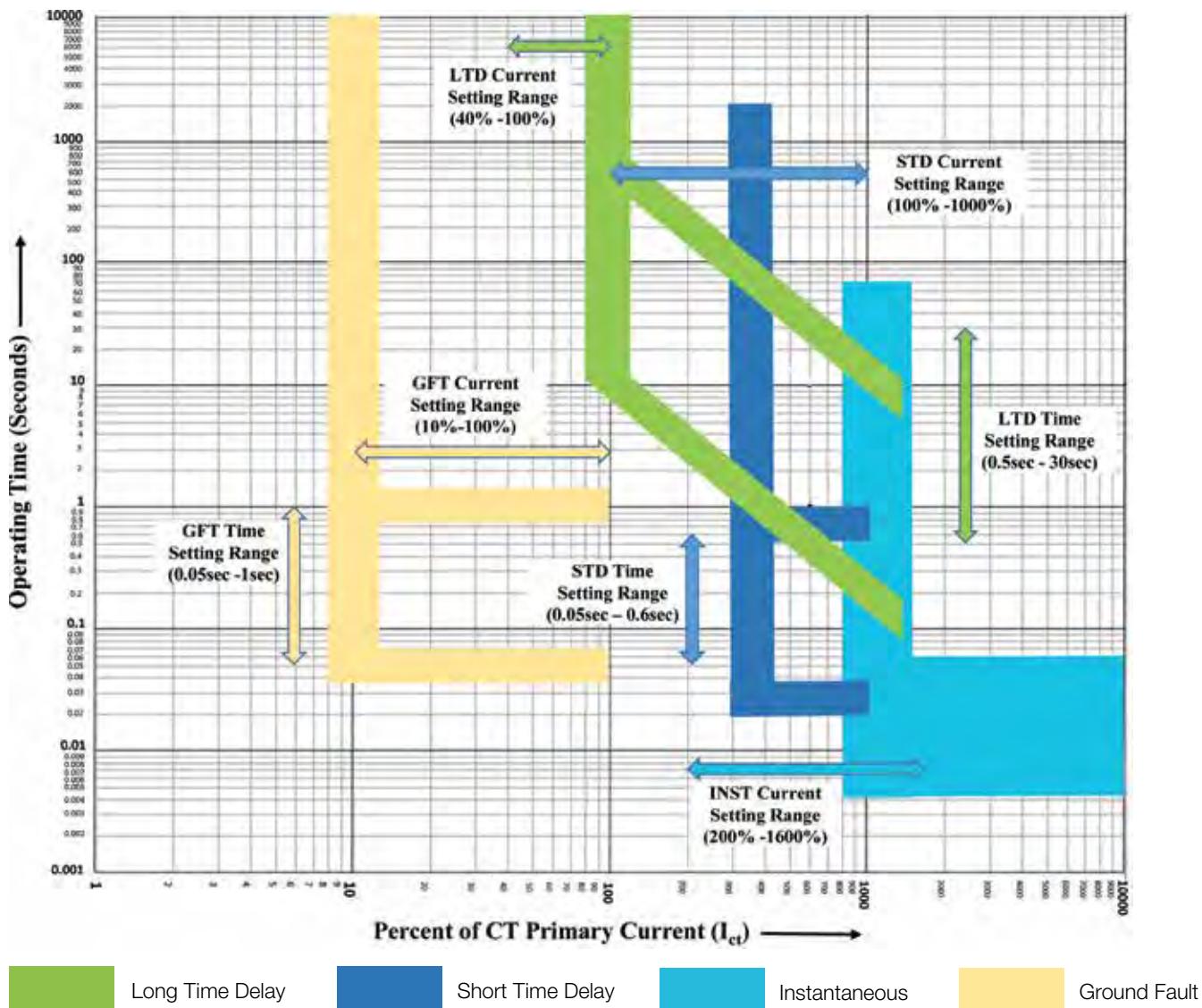
#LED is functional only when RTC feature is requested



## IPR+ Specification

- Overload function (LTD)  
LTD Current OFF, 40% to 100% of  $I_{CT}$   
LTD Time 0.5 s to 30 s
- Short Circuit function (STD)  
STD Current OFF, 100% to 1000% of  $I_{CT}$   
STD Time 50 ms to 600 ms
- Instantaneous function (INST)  
INST Current OFF, 200% to 1600% of  $I_{CT}$
- Ground fault function (GFT)  
GFT Current OFF, 10% to 100% of  $I_{CT}$   
GFT Time 50 ms to 1000 ms

## Time current Characteristics



NOTE: All above values are with a tolerance of  $\pm 20\%$

NOTE: It should be noted that the reference current for this release is  $I_{ct}$  or  $I_n$  (i.e. rated current of the CT) mounted in the circuit breaker and not the  $I_r$  (the rated current of the circuit breaker).



## Description of Features (IPR 2+, 3+, 4+ & 5+)

### Advanced Protection Module:

Along with the basic protection functions of Overload, Short Circuit, Instantaneous and Earth Fault Protection, Intelligent Protection Releases (IPR 2+, 3+ and 5+) offer the advanced protection against the following:

- Over Voltage
- Under Voltage
- Over Frequency
- Under Frequency
- Unbalanced Voltage
- Phase Sequence Protection

### In-built Measurement Module:

It measures the below system parameters on real time basis:

- Current (Both in 3 phases & neutral)
- 3 phase voltage
- Ambient temperature
- Apparent Power (kVA)
- Real Power (kW)
- Reactive Power (kVAr)
- Power Factor

These parameters can be directly viewed on the LCD screen of the Intelligent Protection Release only. Also, a data monitoring sheet can be generated and exported as an excel file for analysis purpose.

### Zone Selective Interlocking:

In the presence of two protection devices against overcurrent in series, the load side protection device carries out the protection without making the other device trip irrespective of the level of the fault current.

When the current increases the threshold values as per the settings done, each protection device sends a block signal by means of a direct connection to the upstream breaker and checks that a similar lock signal has not arrived from the downstream breaker. In this way only the protection nearest to the fault intervenes irrespective of the level of the fault current. In case, if the breaker doesn't trip within the pre-defined trip time, then the Breaker Fail feature of the IPR comes into action and it initiates the tripping of the upstream breaker.

### MCR (Making Current Release) Function:

In case, if initially the Breaker is in the open condition and the fault is already present in the system. Now, when the Breaker is closed, a fault current flows through it. In this situation, the MCR function by-passes the STD time delay and trips the Breaker Instantaneously if the making current exceed a value pre-determined by the customer. Once the Breaker is closed on to a normal circuit condition, this MCR gets inoperative.

### Thermal Memory:

Thermal memory protects the distribution system from cumulative overheating caused by repeated overcurrent conditions.

With this feature the release remembers recent overcurrent events that may have initiated the trip timing sequence, and then returned to nominal levels, halting the sequence prior to trip initiation. In the event that the current levels again exceed the pickup set point within a few cycles of the original pickup, the unit's memory recalls the previous near trip and automatically imposes a shorter delay time. In effect, the unit treats multiple time-related events as a single continuous event thereby preventing system damage due to cumulative overheating. Also, in the event that current levels cause the breaker to trip and the breaker is immediately reclosed, the trip unit remembers the previous overcurrent trip and again imposes a shorter delay time should an additional overcurrent occur before a sufficient cool down period has elapsed.

In case, if the control supply (from incoming or external source) of the Release is interrupted, then too the Release retains its memory & remembers the previous overcurrent trip & functions accordingly. This is called the No Power Thermal Memory (NPTM) feature.



#### Contact Erosion Indicator:

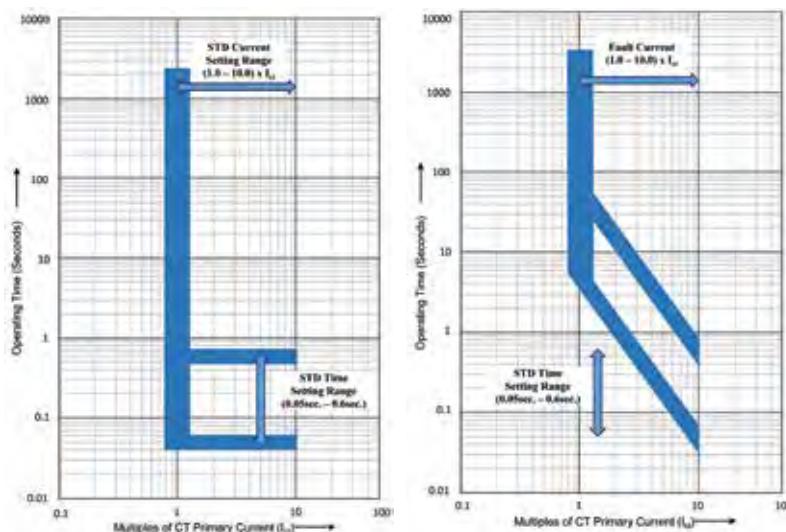
It indicates the erosion (in percentage) of the Arcing contacts occurred during its service condition. This can be viewed on the screen. And it does not merely indicate the contact erosion percentage, but if it is above 90%, then it will suggest the user to replace the arcing contacts through a message 'Service Contacts' on the screen.

#### Relay Contact Card:

It provides 8 potential-free (NO/NC) contacts for the remote indication of various LEDs on releases' front fascia and various types of faults. Also, these are programmable and can be set by the customer as per the requirement. This is an optional feature provided on request.

#### I<sup>2</sup>t ON / OFF Feature:

To offer precise co-ordination with large variety of electrical loads, the Intelligent Protection Release comes with Selectable I<sup>2</sup>t ON/OFF curve feature for short-circuits. Making it OFF will set the definite time characteristics meaning tripping at definite time (as per the set STD Time) after the fault current crosses the threshold value (set STD Current). And selecting it as ON, will set the inverse time characteristics between the trip time and the fault current during short circuit conditions.



#### Fault History:

It records, stores the data of the last 100 fault events. This data can be exported as excel file through MODBUS Communication and the data of last 10 faults can be directly viewed on the LCD screen of the Intelligent Protection Release only. This data includes the type of fault with date and time stamping along with the current, voltage and frequency values of the system during that fault.

#### Ready To Close:

By this feature, the Intelligent Protection Release checks for whether the ACB is ready to close or not and indicates the same to the user through LED on the front fascia of the Release. This is an optional feature provided on the request of customer. This LED glows only if all the below conditions are fulfilled:

1. D/O Contacts are Intact
2. Charging spring is charged
3. Breaker is in Open condition
4. Fault LED is not glowing (means, if the fault occurred in last operation and the fault LED glowed, then the reset button has been pressed)
5. IPR is fit to work (IPR Fit LED is glowing)

IPR E+



IPR 1+



IPR 2+





#### Circuit Breaker Fail Protection:

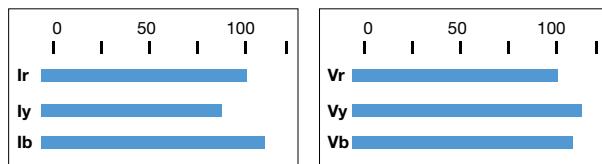
In case if the breaker doesn't open within its defined time as per the setting done by the user, due to any reason (including even any mechanical failure also). The Release checks for it and immediately initiates the trip command to its upstream breaker.

#### Down CB Fail:

If a breaker receives this command from its downstream breaker (in case of the failure of the downstream breaker) or through an external source (as in case of emergency), then the breaker immediately trips to protect from encountering any hazardous situation.

#### Wide LCD Display with Bar Graphs:

The Intelligent Protection Releases (IPR 2+, IPR 3+, IPR 4+ and IPR 5+) comes with a wide 70mm x 40mm Graphics Display for the ease of readout of the parameters. The bar graphs for current and voltages of each phases (R, Y & B) and Neutral displays a relative data at a glance and offers a prompt visual check of the status of the system. All the running parameters of the system can be viewed in the auto scrolling mode also. The "ACB Status" indication can be viewed on display (only) if RTC feature is requested.



#### IPR Fit Indication:

It continuously monitors its own electronic circuit and the corresponding IPR Fit LED glows continuously in its healthy condition. And when any internal fault occurs, the Release trips the breaker and shows a message 'IPR Not Fit' on the display with the 'IPR Fit' LED turned OFF.

#### LED Indications:

The Release has two sets of LED indications on its front fascia.

First set on its right side indicates that the tripping has occurred due to which type of basic four faults as below:

1. LTD- Overload Tripping
2. STD- Short Circuit Tripping
3. INST- Instantaneous Tripping
4. GFT- Ground Fault Tripping

Second set is present below the LCD display:

1. Power- Power 'ON' LED
2. IPR Fit- IPR Fit function
3. \*RTC- Ready To Close
4. Test- Test Mode
5. PTA- Pre-Trip Alarm
6. Fault- Fault Indication

#### Digital Operation Counter:

The Intelligent Protection Release counts the number of ON-OFF operations both with & without current, stores it in its memory and displays the same on the screen.

**IPR 3+**



**IPR 4+**



**IPR 5+**



\*The LED is functional only when RTC feature is requested.



## MODBUS Communication Module

The top premium version, the IPR 5+ offers RS-485 MODBUS communication facility which makes it ready for all the smart city applications. It enables the user to monitor the entire system from his control room on a PC/Laptop, to control/modify the setting of the Release as per the user requirement, record and export the data of complete fault history and system parameters for analysis operate the breaker from the PC/Laptop only.

It is recommended to connect 12-24 Vdc external supply with IPR5+ for taking the maximum benefit of its features. Also, to perform the closing operation on ACB through MODBUS communication facility, the “closing coil” and “charging motor” accessories are mandatory.

The software required for this system is also offered by Havells on request which enables the user to:

- Connect several ACBs through the laptop/PC
- View the status of LED's on IPR+'s front fascia
- Bar graphs for current and voltage parameters
- View metering data and import it to the system
- View parameter settings (both of base & advanced protection)
- Edit all these settings and restore them to default settings
- View information of contacts (operation Counter & Contact Erosion)
- \*View ACB's status (ON, OFF, Spring Charge, D/O contacts Intact)
- Operate the ACB (close, open, self-test function)
- Change password & adjust clock etc.



\*This feature can be viewed on display (only) if RTC feature is requested



S. No.	Features	IPR E+	IPR 1+	IPR 2+	IPR 3+	IPR 4+	IPR 5+
1	Basic Protection Function Settings:	●	●	●	●	●	●
	> LTD	●	●	●	●	●	●
	Current Setting	●	●	●	●	●	●
	Time Setting	●	●	●	●	●	●
	> STD		●	●	●	●	●
	Current Setting		●	●	●	●	●
	Time Setting		●	●	●	●	●
	> INST	●	●	●	●	●	●
	> GFT		●	●	●	●	●
	Current Setting		●	●	●	●	●
	Time Setting		●	●	●	●	●
2	Pre-Trip Alarm			●	●	●	●
	Current Setting			●	●	●	●
3	Time Setting			●	●	●	●
	Function Blocking	●	●	●	●	●	●
4	Field Test Function	●	●	●	●	●	●
5	IPR Fit Indicator			●	●	●	●
6	Load Shedding Function			●	●	●	●
7	Reset Function	●	●	●	●	●	●
8	Thermal Memory			●	●	●	●
9	LED Indications	●	●	●	●	●	●
10	Fault History on Display			●	●	●	●
11	Making Current Release			●	●	●	●
12	Zone Selectivity			●	●	●	●
13	Circuit Breaker Fail Protection			●	●	●	●
14	Operation Counter			●	●	●	●
15	Contact Erosion Indicator			●	●	●	●
16	*Ready to Close (RTC)			●	●	●	●
17	*Relay Contact Card			●	●	●	●
18	I <sup>2</sup> t ON/OFF			●	●	●	●
19	LCD Display			●	●	●	●
	Advanced Protection				●	●	●
20	> Under Voltage Release				●	●	●
21	> Over Voltage Release				●	●	●
22	> Under Frequency protection				●	●	●
23	> Over Frequency protection				●	●	●
24	> Voltage unbalance protection				●	●	●
25	> Phase sequence protection				●	●	●
	Measurement Module				●	●	●
26	> Current (Both in 3 phase & neutral)				●	●	●
27	> Voltage (both Line & Phase)				●	●	●
28	> Apparent Power (kVA)					●	●
29	> Real Power (kW)					●	●
30	> Reactive Power (kVAr)					●	●
31	> Power factor					●	●
32	> Ambient Temperature (degree Celsius)					●	●
33	#Communication Enabled (MODBUS)						●

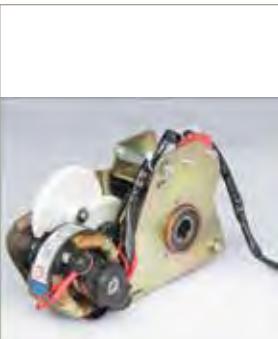
\*Provided on request. #Communication software provided on request.

Note: IPR+ releases do not require any external power supply for their basic protection functioning. For other functions and display to run, they require an external power supply of 12-24 Vdc.



## Accessories

### Electrical Accessories:



#### Charging Motor:

It is provided in an electrical operated ACB to charge the closing springs automatically. These are available in 110 V and 220 Vac / DC. The VA burden of this motor is 150 VA only and the charging time is 3 to 4 seconds.



#### Shunt Trip Coil / Closing Coil:

These coils are used for electrical tripping and closing of ACB. These coils are available in 24 V, 110 Vac / DC, 220 Vac / DC & 415 Vac. The same coil can be used as a shunt trip coil or closing coil. The inrush power is 200 VA.

These coils are used for electrical tripping and closing of ACB. These coils are available in 24 V, 110 Vac / DC, 220 Vac / DC & 415 Vac. The same coil can be used as a shunt trip coil or closing coil. The inrush power is 200 VA.



#### Undervoltage release:

This release trips the ACB in case the voltage drops below the required level. It is necessary to energise the under voltage release coil before attempting to close the circuit breaker as in de-energized condition, it mechanically locks the breaker and the same can not be closed. These coils are available in 24 Vdc, 110 Vac / DC, 220 Vac / DC & 415 Vac.

For energizing this coil minimum 85% of the rated voltage is required and if the voltage drops below 50% of the rated voltage it automatically trips the ACB. Inrush power of this coil is 200 VA and the continuous power is 5 VA only.

### Drawout Accessories:



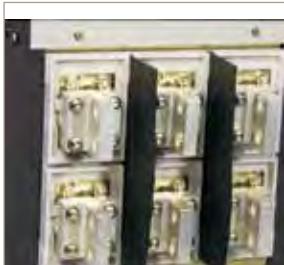
#### Safety Shutter for main circuit:

It is provided on the cradle which automatically isolates the Main circuit terminals when the breaker is drawn out. A provision is also there for locking the safety shutter in the closed position with the help of Pad Lock (not supplied with ACB).



#### Position Indication Switch:

A set of 5 micro switches is provided in the cradle which indicates the position of breaker in the cradle i.e. CONNECTED, TEST, or DISCONNECTED position. Two switches each are provided for CONNECTED AND DISCONNECTED position and one switch is for TEST position.



#### Adaptor terminals for Cradle:

Special Adaptor Terminals can also be provided for 1st frame ACB which can make the terminals suitable for taking horizontal as well as vertical bus bar connections. The standard cradles are supplied with horizontal terminals. Adaptor terminals are factory fitted and are available at extra cost.

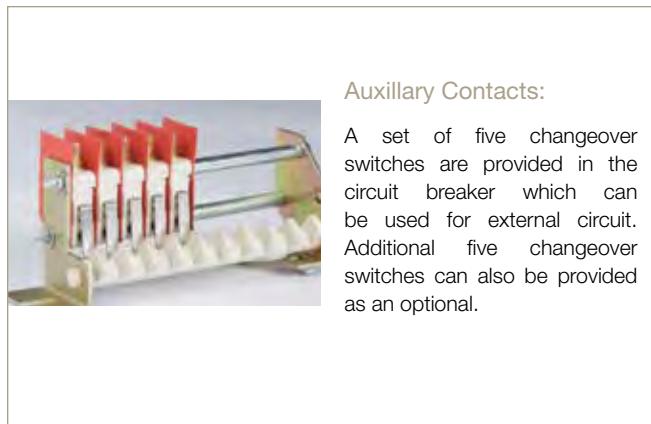
#### Mal-insertion prevention device:

It prevents the breaker of a different rating being inserted into the cradle of different rating.



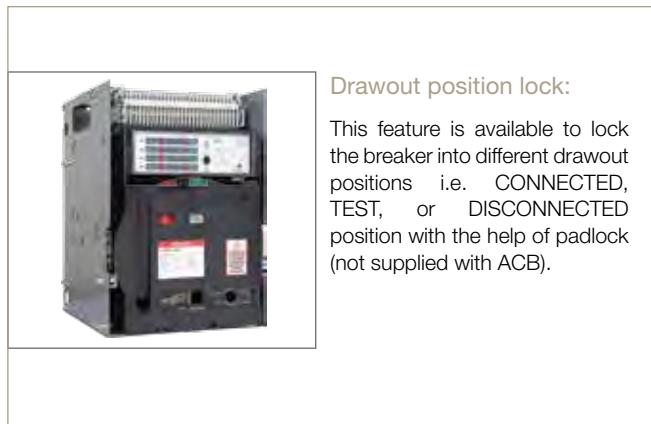
## Accessories

### Other Accessories:



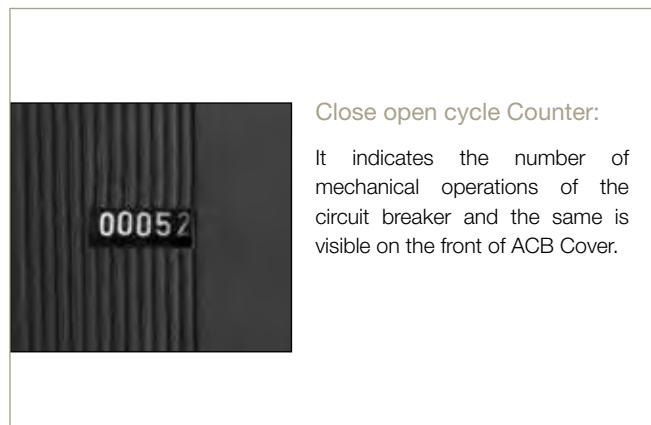
#### Auxillary Contacts:

A set of five changeover switches are provided in the circuit breaker which can be used for external circuit. Additional five changeover switches can also be provided as an optional.



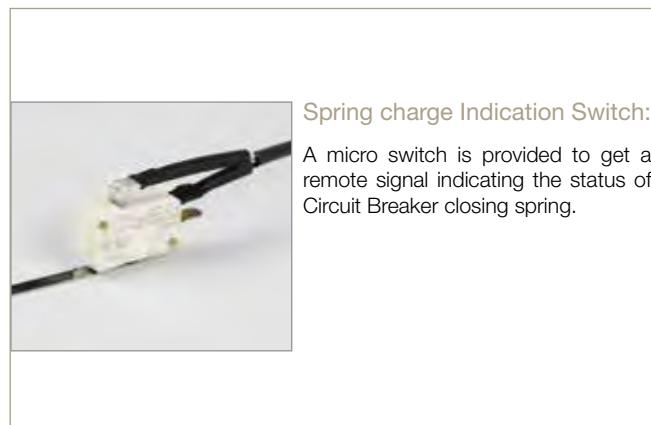
#### Drawout position lock:

This feature is available to lock the breaker into different drawout positions i.e. CONNECTED, TEST, or DISCONNECTED position with the help of padlock (not supplied with ACB).



#### Close open cycle Counter:

It indicates the number of mechanical operations of the circuit breaker and the same is visible on the front of ACB Cover.



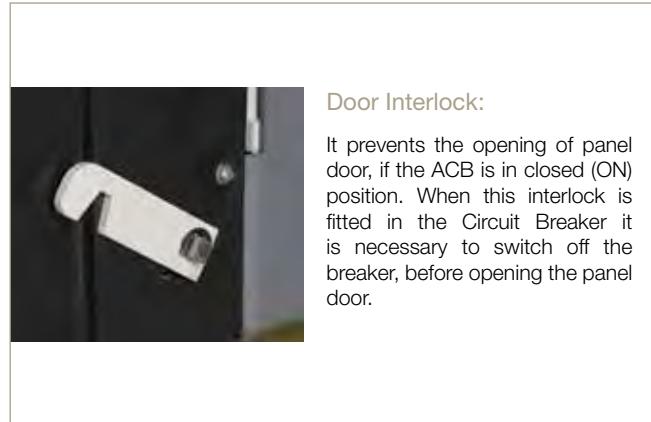
#### Spring charge Indication Switch:

A micro switch is provided to get a remote signal indicating the status of Circuit Breaker closing spring.



#### Key Lock/ Key Interlock:

It is provided to lock the ACB in open position. Once the ACB is locked it can not be switched on. For interlocking purpose three locks with two keys or two locks with one key can be supplied.

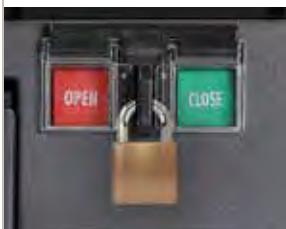


#### Door Interlock:

It prevents the opening of panel door, if the ACB is in closed (ON) position. When this interlock is fitted in the Circuit Breaker it is necessary to switch off the breaker, before opening the panel door.



## Other Accessories:



### ON/OFF push button cover:

A special cover can be provided on the front cover on which a pad lock (not supplied with ACB) can be fitted for locking the ON & OFF push buttons.



### Lifting Plates:

Air Circuit Breakers are fitted with specially designed lifting plates which makes the lifting of these ACBs very convenient.



### Trip Indication Switch:

It is provided to get a remote signal indicating that ACB has tripped due to the operation of over current release.

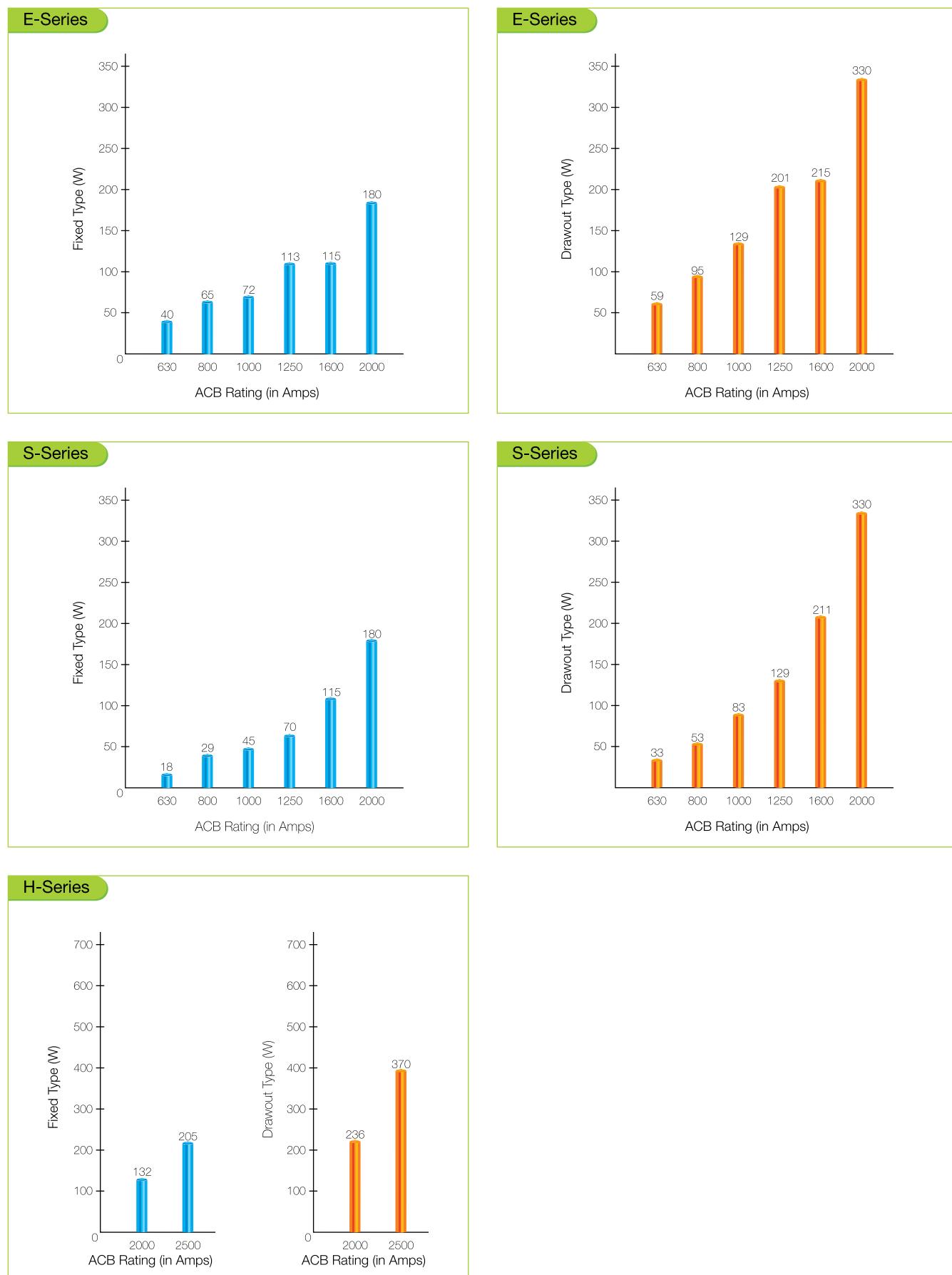


### Safety shutter padlock feature:

For the safety of the personnel, safety shutter can be padlocked once the breaker has been withdrawn from the cradle.



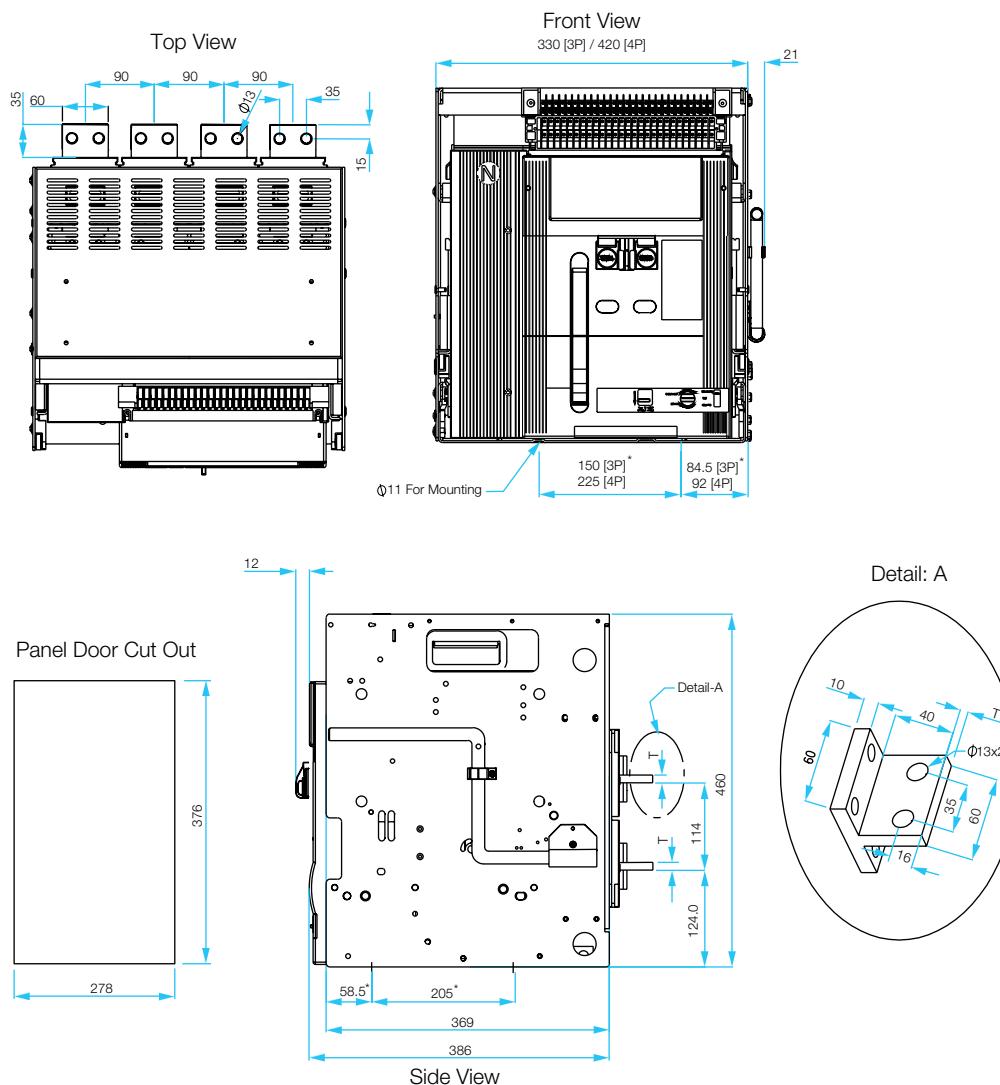
## Wattloss Chart (Total for 3 Pole ACB)





## Out Line Dimensions, Mounting Detail & Terminal Arrangement

Rating: 630 A to 1600 A (E & S Series) Drawout Type



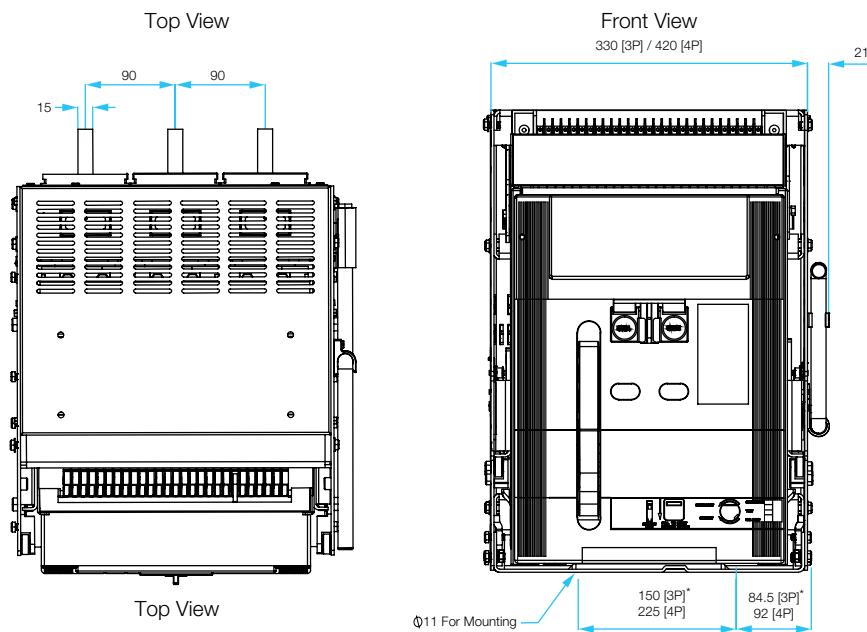
	E- Series	S- Series
630-800 A	10	20
1000-1250 A	15	20
1600 A	20	20
2000 A	25	25

\* Mounting hole dimensions  
All dimensions are in mm.

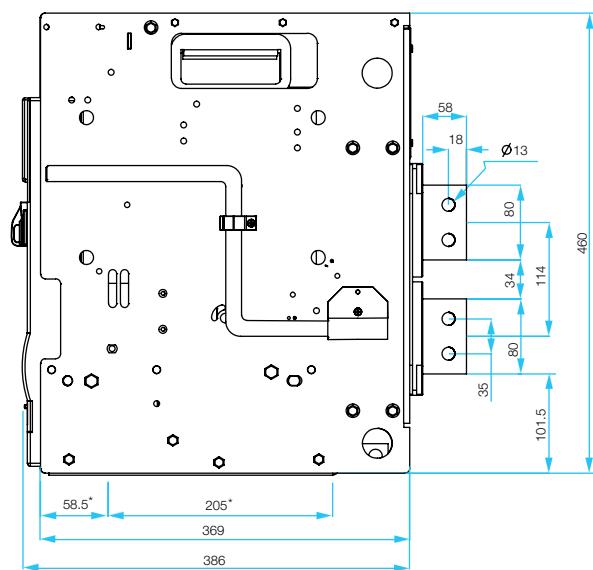
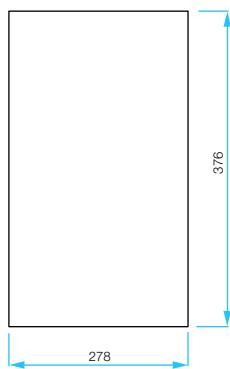


## Out Line Dimensions, Mounting Detail & Terminal Arrangement

Rating: 2000 A (E & S Series) Drawout Type



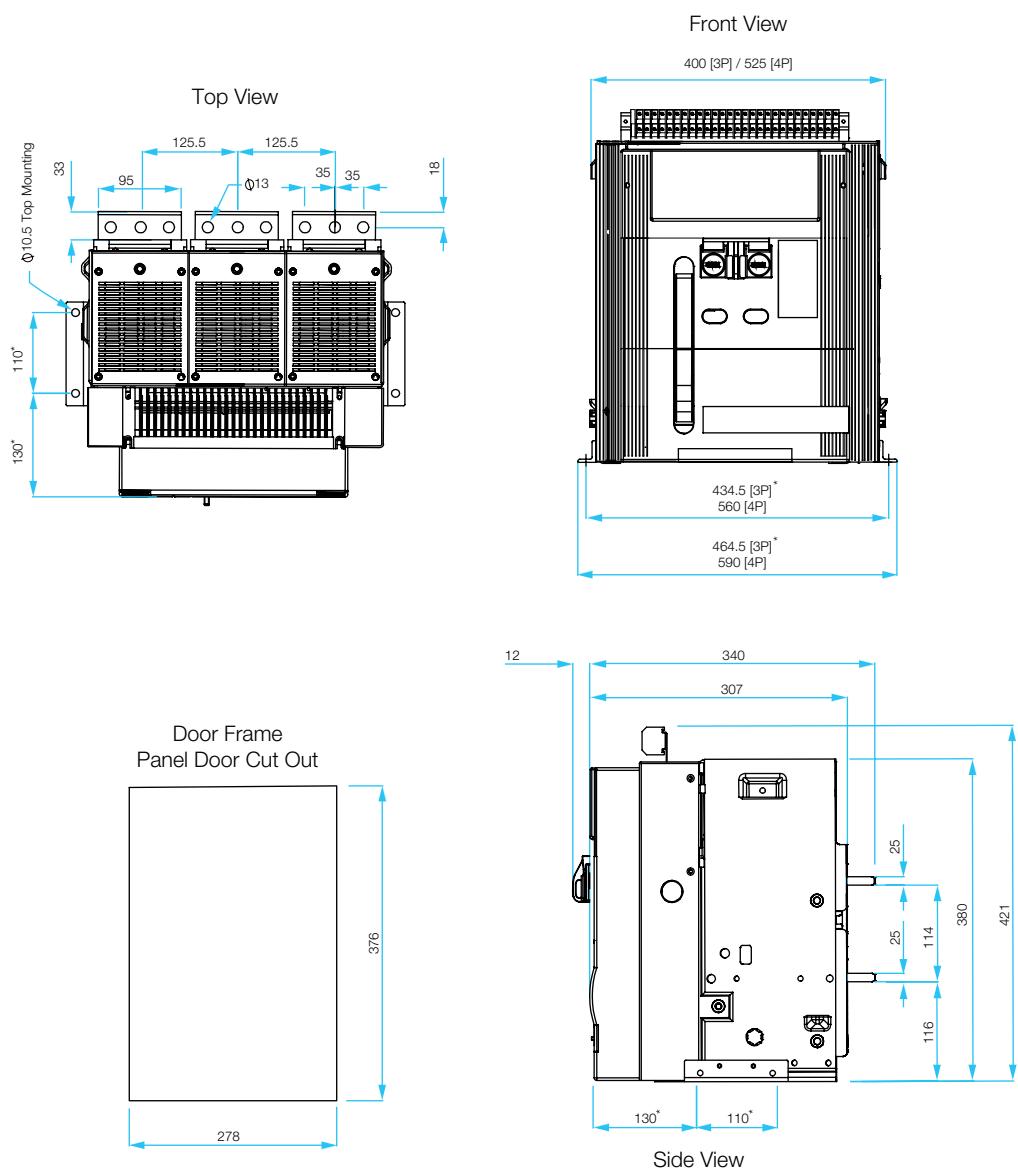
Door Frame  
Panel Door Cut Out





## Out Line Dimensions, Mounting Detail & Terminal Arrangement

Rating: 2500 A (H Series) Fixed Type

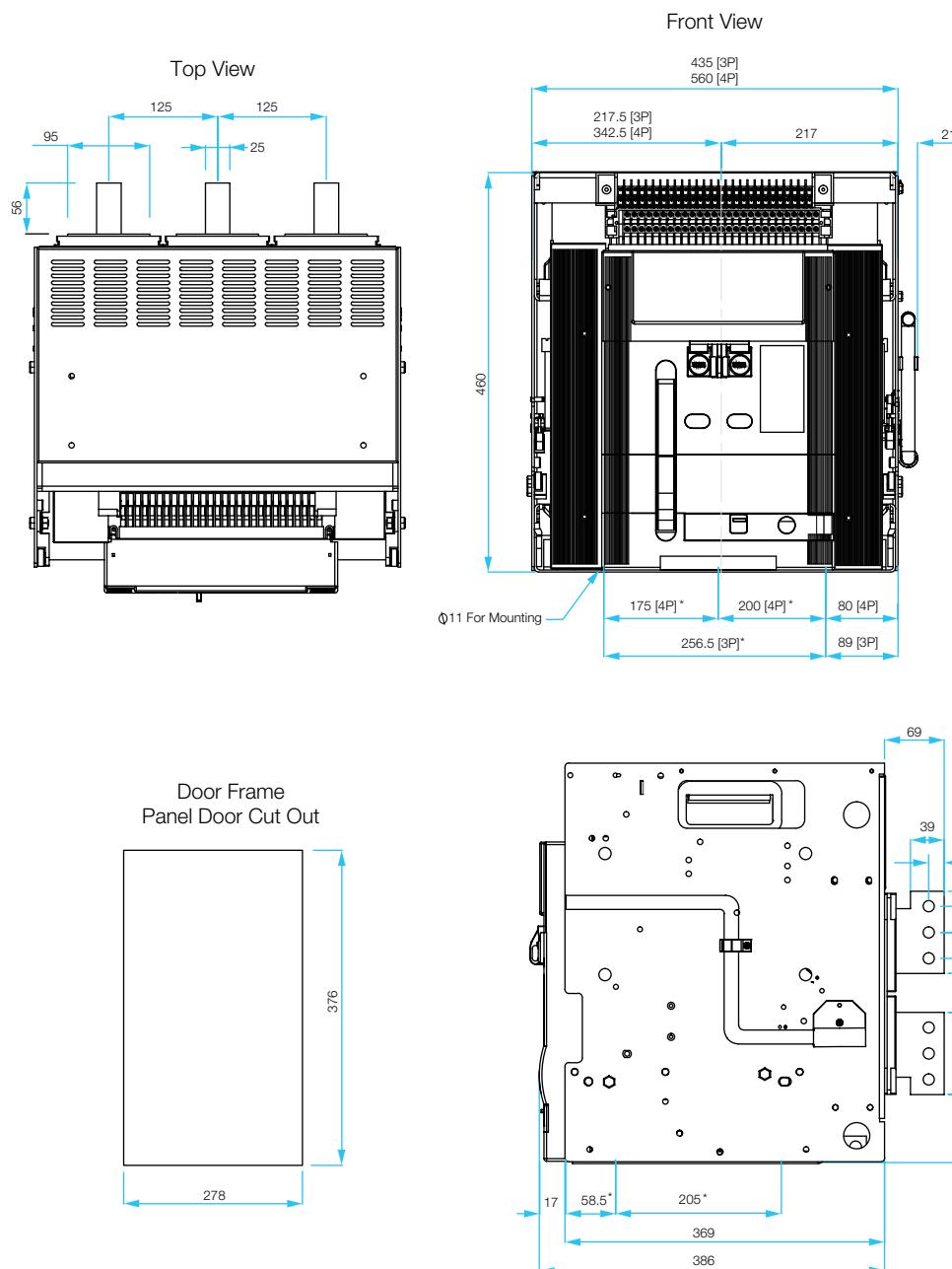


\* Mounting hole dimensions  
All dimensions are in mm.



## Out Line Dimensions, Mounting Detail & Terminal Arrangement

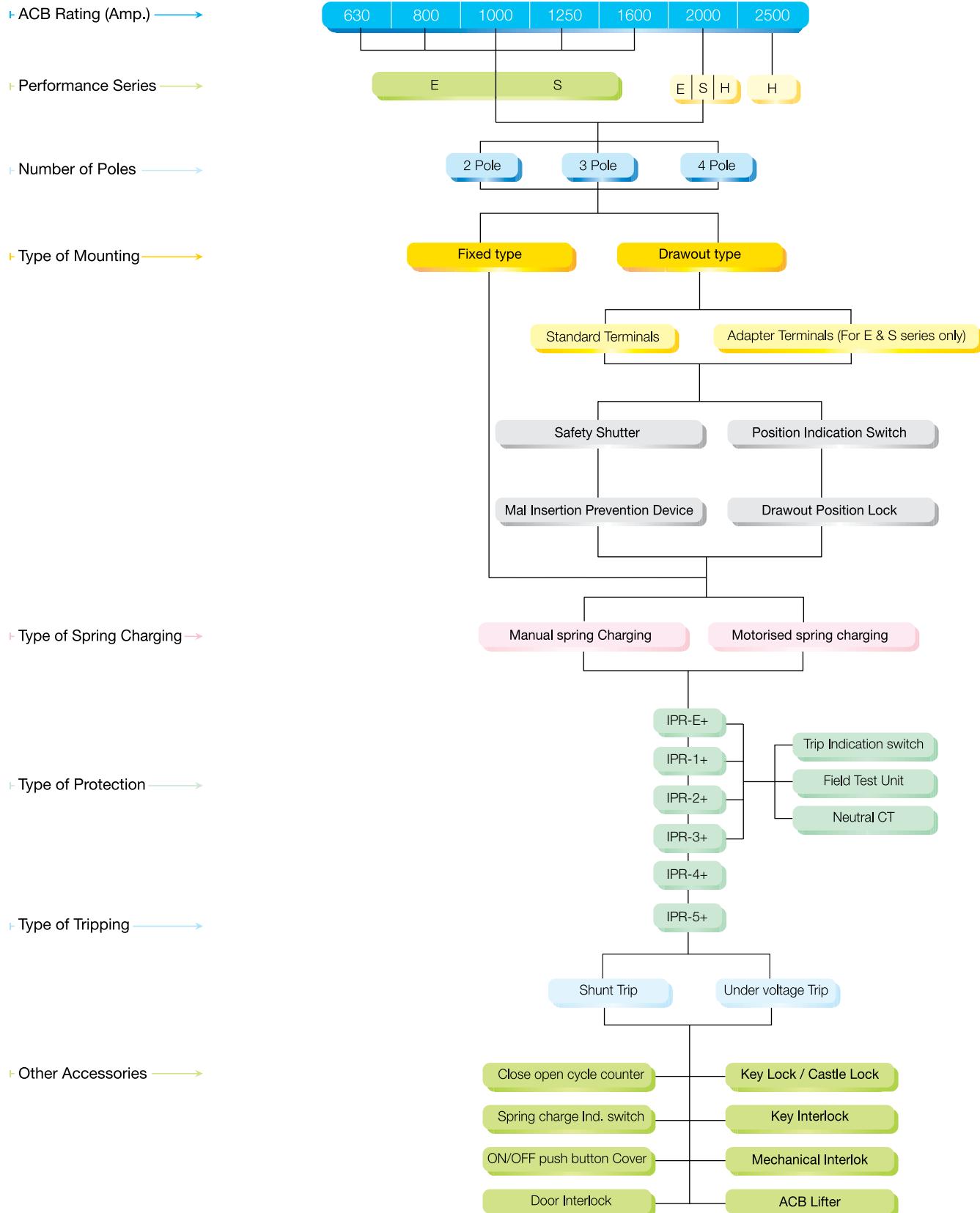
Rating: 2500 A (H Series) Drawout Type



\* Mounting hole dimensions  
All dimensions are in mm.



## Selection Chart





## Order Form

Please check  in front of appropriate box. Fill separate sheet for each type of ACB

CUSTOMER/ DEALER NAME		ORDER NO./DATE		END USER NAME										
Rating of ACB	400A	<input type="checkbox"/>	800A	<input type="checkbox"/>	1250A	<input type="checkbox"/>	2000A	<input type="checkbox"/>	Qty.					
	630A	<input type="checkbox"/>	1000A	<input type="checkbox"/>	1600A	<input type="checkbox"/>								
No. of Poles	3	<input type="checkbox"/>	4	<input type="checkbox"/>	4	<input type="checkbox"/>	(100% Neutral) (50% Neutral for V-Series only)							
Mounting	Fixed	<input type="checkbox"/>	Drawout	<input type="checkbox"/>	* Horizontal Terminals 		<input type="checkbox"/>	<input type="checkbox"/>						
	<small>* For upto 1600A, Horizontal terminals are standard. For 2000A Vertical terminals are standard.</small>													
Spring Charging Operation	Manual	<input type="checkbox"/>	Electrical	<input type="checkbox"/>	Closing Coil _____ VAC/DC Tripping Coil _____ VAC/DC Motor _____ V									
Release	Without Release	<input type="checkbox"/>	IPR E+	<input type="checkbox"/>	IPR 1+	<input type="checkbox"/>	IPR 2+	<input type="checkbox"/>	IPR 3+	<input type="checkbox"/>	IPR 4+	<input type="checkbox"/>	IPR 5+	<input type="checkbox"/>
	CT Rating	_____ A,	Neutral CT <input type="checkbox"/>											
	Setting:	O/L (LTD)	_____ A,	S/C (STD) _____ A,										
		S/C (INST)	_____ A,	GFT _____ A,										
<small>Note: Unless otherwise specified, all settings would be the default factory settings only.</small>														
Other Accessories	Close open cycle counter	<input type="checkbox"/>	Five c/o additional Aux. contacts		<input type="checkbox"/>									
	Field Test Unit (For IPR E+ & IPR 1+)	<input type="checkbox"/>	Shunt Trip Coil		<input type="checkbox"/>	.....V								
	Position Indication Switch	<input type="checkbox"/>	UVT		<input type="checkbox"/>	.....V								
	Spring Charge Indication Switch	<input type="checkbox"/>	Trip Indication Switch		<input type="checkbox"/>									
	Mechanical Interlock	<input type="checkbox"/>	Key Lock		<input type="checkbox"/>									
	Mal Insertion Prevention device	<input type="checkbox"/>	Key Interlock 2L+1K 3L+2K		<input type="checkbox"/>									
	Door Interlock	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>									
	Remote Indications through Relay Card	<input type="checkbox"/>	Adaptor Unit		<input type="checkbox"/>									
	Ready to Close Indication & Display	<input type="checkbox"/>	*Communication Software		<input type="checkbox"/>									

Note :

1. Please specify the voltages for closing coil, shunt trip coil and UVT, available voltages are 24VDC, 110VAC/DC, 220VAC/DC and 415V AC and for motor available voltages are 220V AC/DC and 110V AC/DC.
2. For details of Intelligent Protection Release (IPR+), please refer the chart of technical features.
- \*3. Communication Software on Chargeble basis.

With experience of around 25 years offering solutions to various industrial applications under "Make in India" initiative, Havells presents a completely new GLOBAL series of Controlgear for Power distribution and Protection.

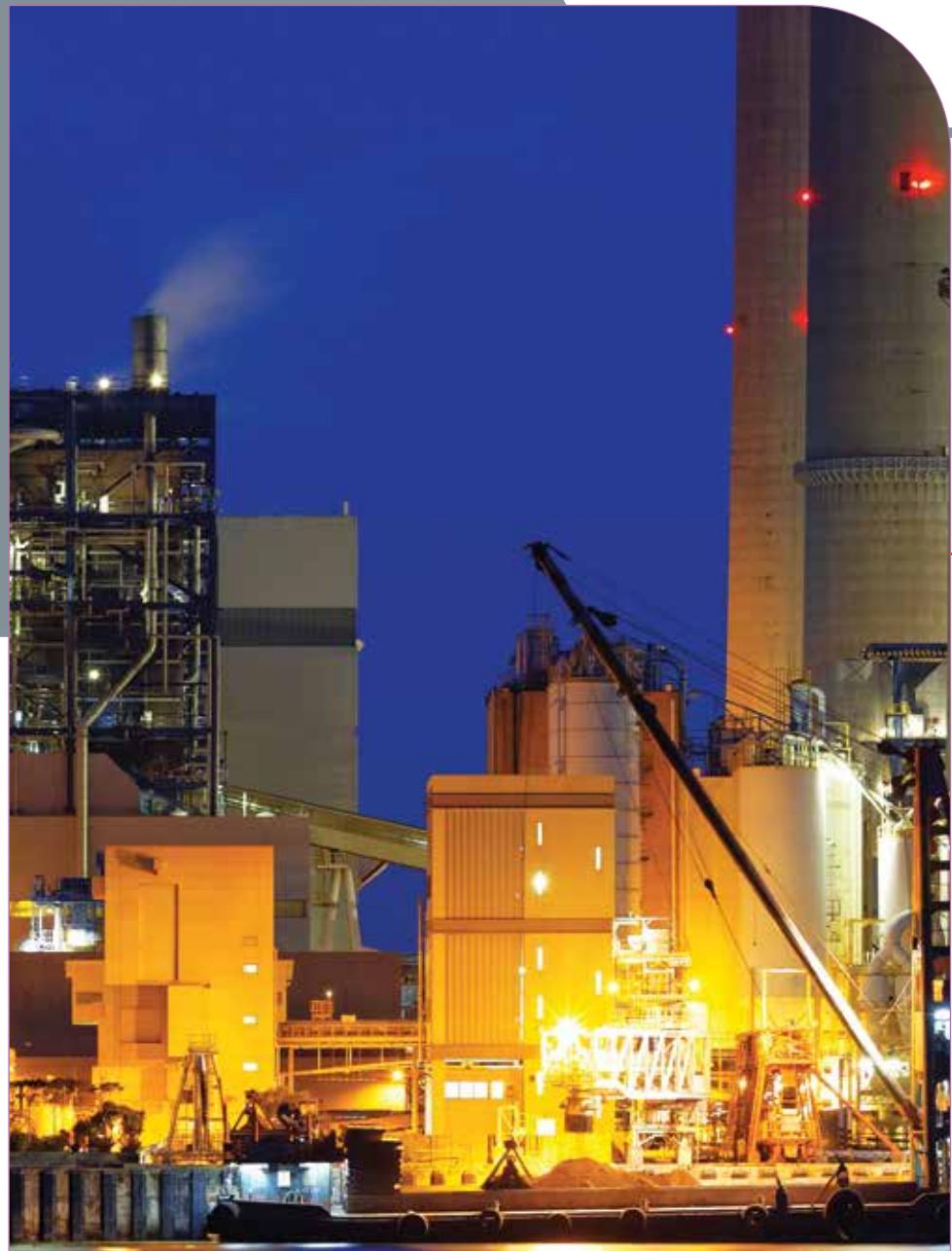
The range includes Contactors , Over-Load Relays and up to 800A along with complete range of accessories & Timer ( ON / OFF Delay) in compact & robust design complying with relevant Indian & International Standards (IEC /IS: 60947-4-1). This State of the Art product with cutting edge technology ensures High Performance in harsh conditions.

A wide range of accessories offers selection flexibility to meet the essential requirements of most stringent industrial applications including Starting, Inching & Plugging of LT Motors.

## Features:

- Dust Free Cover
- Low Power Dissipation / Coil Consumption
- High Endurance / Switching Frequency
- Class-H Insulation for Coils
- Nut Retaining Washer
- Inbuilt Aux. Contacts
- CE Marking
- Gold Design Certification
- Lloyd "7S" - Classifications
- Terminal Barrier & Shrouds up to 800 A
- Removable Arc Chutes (> 115 A ratings)





HGS Range



# Magnetic Contactor HGS 9 - 800 AF

**Contactor  
(HGS)**



**HGST**

**18 AF**

**40 AF**

**65 AF**

**100 AF**

**150 AF**

**265 AF**

**500 AF**

**800 AF**

**Rated Current  
Rated Insulation  
Voltage**

9, 12, 18 A  
800 V

25, 32, 40 A  
800 V

50, 65 A  
1,000 V

75, 85, 100 A  
1,000 V

115, 130, 150 A  
1,000 V

185, 225, 265 A  
1,000 V

300, 400, 500 A  
1,000 V

630, 800 A  
1,000 V

**Setting Current  
Protection Grade**

0.12 - 18 A  
Class 10A

7 - 40 A  
Class 10A

7 - 65 A  
Class 10A

17 - 100 A  
Class 10A

48 - 150 A  
Class 10A

48 - 265 A  
Class 10A

90 - 500 A  
Class 10A

378 - 800 A  
Class 10A

**HGS**  
**Mounting Method**  
**Auxiliary Contacts**  
**Dimensions  
(W x H x D) mm**

Screw & DIN-Rail

Screw & DIN-Rail

Screw & DIN-Rail

Screw & DIN-Rail

Screw

Screw

Screw

Screw

1NO / 1NC

1NO / 1NC

1NO1NC or 2NO2NC

1NO1NC or 2NO2NC

2NO2NC

2NO2NC

2NO2NC

2NO2NC

45 x 85.95 x 75

54 x 90.35 x 84

55 x 123.6 x 129

70 x 146 x 153

103 x 155 x 145.1

138 x 204 x 174.2

163 x 243 x 203

276 x 314 x 255.3

# Thermal Overload Relays HGST 9 - 800 AF



**HGST**

**Model (Basic)**

**3 Phase, 3 Elements  
(Loss Phase Protection)**

**Nominal Current (A)**

**Auxiliary Contact**

**Reset Method**

**Dimensions  
(W x H x D) mm**

**HGST18**

**HGST40**

**HGST65**

**HGST100**

**HGST150**

**HGST265**

**HGST500**

**HGST800**

**HGST18K**

**HGST40K**

**HGST65K**

**HGST100K**

**HGST150K**

**HGST265K**

**HGST500K**

**HGST800K**

**0.12 - 18**

**7 - 40**

**7 - 65**

**17 - 100**

**48 - 150**

**48 - 265**

**90 - 500**

**378 - 800**

**1NO1NC**

**1NO1NC**

**1NO1NC**

**1NO1NC**

**1NO1NC**

**1NO1NC**

**1NO1NC**

**1NO1NC**

**Manual & Automatic**

**45 x 78.2 x 82.7**

**45 x 80.7 x 95.5**

**55 x 89.3 x 110.7**

**70 x 105 x 128.1**

**180 x 159 x 179.3**

**180 x 185 x 179.3**

**180 x 205.2 x 179.3**

**245 x 197 x 209.9**



#### FEATURES & BENEFITS (HGS Motor Starter)

- Single Phasing Protection
- IP 54 degree of protection
- Stop & Test Facility
- Trip mechanisms
- Protection Cover
- Reset Button / Selector
- Ease of Maintenance



HGS Motor Starter

Havells New Urja motor starters are designed to meet the stringent requirements of both agricultural as well as domestic applications. The basic function of starter is isolation, motor control, protection against short circuit, overload & single phasing. These starters address the customer needs to the fullest by incorporating the New Havells Contactors and Relays accompanied with the best after sales service and an unparalleled distribution network across India.

## Features:

- Reliability: Thermal bimetallic relay provides protection against overload and single phasing. Preventor gives protection against Single Phasing.
- Selectivity: Wide band operating Voltage 200 V-400 V and 260 V-440 Vac.
- Robust Construction: Heavy Duty Contactor capable of working under severe conditions.
- Easy to Check: Manual Trip Facility is provided to check the trip operation.
- Flexible Design: Flexibility of onsite conversion between Automatic / Manual reset

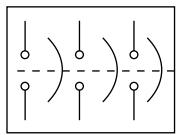
## Range :

- Direct on line starters (0.75 HP - 15 HP)  
0.6 kW - 11.2 kW
- Direct On Line Submersible Pump controller  
(1 HP - 15 HP) 0.7 kW - 11.2 kW
- Automatic Star Delta Submersible Pump controller  
(5 HP - 25 HP) 3.7 kW - 18.7 kW
- Single Phase pump controller (0.5 HP - 3 HP)  
0.6 kW - 0.37 kW

## Specification :

Conforms to IS / IEC: 60947-4-1





Urja Motor Starter



#### URJA - DOL Agri Pump Motor Starter

The starter incorporates robust four pole contactor & thermal overload relay provided in a smart & sleek powder coated deep drawn enclosure to suit the rugged Indian rural conditions for complete protection to pump & motor.



#### URJA - Single Phase Submersible Pump controller

Havells New Urja Single Phase Submersible Pump Controller is designed to meet the stringent requirements of both agricultural as well as domestic applications. The basic function of starter is isolation, motor control and protection against overload. These have been engineered to offer long, reliable life with minimum maintenance.



#### Direct On Line Submersible Pump Controller

DOL starter consists of contactor, overload relay, ON/OFF push buttons, housed in a sheet steel enclosure. It is meant for starting/stopping a motor and protects the motor against overload and single phasing condition.



#### Automatic Star Delta Submersible Pump Controller

In the beginning the star & main contactors get switched ON and the pump runs in star position. After the preset star time, the auto changeover to delta takes place and thereafter the starter runs in delta position. Star delta starters help in meeting the starting current requirement during the star operation and the running current requirement during the delta operation of the submersible pump motor. The changeover from star to delta is achieved by means of an electronic timer which can be adjusted from 1 to 30 seconds as per the requirement of the motor. The **Standard Model**, offers protection against overload and single phasing, the **Deluxe Model** offers additional protection against short circuit besides overload and single phasing.



## Features:

- **Reliability:** Thermal bimetallic relay provides protection against overload and single phasing. Preventor gives protection against Single Phasing.
- **Selectivity:** Wide band operating Voltage 200 V - 400 V and 260 Vac - 440 Vac.
- **Robust Construction:** Heavy Duty Contactor capable of working under severe conditions.
- **Easy to Check:** Manual Trip Facility is provided to check the trip operation.
- **Flexible Design:** Flexibility of onsite conversion between Automatic / Manual reset
- **Better Safety for motor and Operator:** Provision of MCB gives added protection against short circuit in ASD Deluxe Model.
- **Repeat accuracy:** Electronic Timer is provided to precisely control the changeover from Star to Delta. The changeover time can be set accurately from 1 to 30 seconds as per the motor requirement.
- **Added Safety from flash-over:** A pause time has been provided between Star to Delta changeover to allow proper quenching of arc. The pause timing is available from 30 ms to 150 ms
- **Option for Extended Protection:** In case of momentary interruption in power supply the water in the pipe flows backwards into the ground. Sudden restoration of power supply during this period causes excessive load and may even result into burning of the motor. To prevent this, starters can be made available with the option of protection of a built-in on-delay in the SPP unit. Further, this delay can be provided optional as one minute or five minutes.
- **Dual Mode Operation:** Starter is provided with two modes of operation through a selector switch as follows:
  - a. 'Auto' mode with single-phasing preventor in circuit starts automatically
  - b. In 'Manual' mode the starter needs to be initialized manually through start button

**Note:** The on-delay in Single Phasing Preventor unit comes into effect only in auto mode.

## Technical Information

Standard	IS/IEC 60947-4-1
Starter Type	Air Break
Rated Operational Voltage	415 Vac
Rated Frequency	50 Hz
Utilization Category	AC3
Degree of Protection	IP 54
Mounting	Surface/Wall Mounting
Cable Entry	Top/Bottom
Earth Connection	Top/Bottom (Externally Diagonal)
Enclosure Material	CRCA Sheet Steel
Type of Overload Relay	Thermal Bimetallic
Relay Reset	Auto / Manual



## Provision of Devices

Items	Single Phase Sub	DOL Submersible	Standard ASD	Deluxe ASD
Single Phasing Preventor with Auto / Manual Switch	x	✓	✓	✓
Star Delta Timer	x	x	✓	✓
Combined Volt. Meter & Amp. Meter	✓	✓	✓	✓
On / Off Push Button	✓	✓	✓	✓
MCB	x	x	x	✓
Light Indicator	1	2	2	2
Volt. Meter Selector Switch	x	✓	✓	✓

## Ordering information

### Direct On Line (DOL)

HP	kW	FLC	Contactor	O/L Relay	Cable Size		Backup Fuse rating (A)	Motor Starter
		(A)	(A)	(A)	Al	Cu		Cat. No.
0.75	0.56	1.10	20	1.07-1.7	1.5	1	6	IHADOAE1L
1	0.75	1.47	20	1.58-2.5	1.5	1	10	IHADOAF1L
2	1.50	2.94	20	2.4-3.8	1.5	1	20	IHADOAG1L
3	2.24	4.41	20	3.8-6.0	1.5	1	20	IHADOAH1L
5	3.73	7.34	20	6.0-9.3	1.5	1	25	IHADOAJ1L
7.5	5.60	11.01	20	8.9-13.5	2.5	1.5	32	IHADOAK1L
10	7.50	14.69	20	13.2-20	4	2.5	50	IHADOAL1L
15	11.20	21.15	25	17.4-24	6	4	63	IHADOAM1L

## Construction

### Single Phase Submersible Pump Controller

HP Rating	Overload Relay (A)	Contactor (A)	Start Capacitor $\mu\text{F}$	Run Capacitor $\mu\text{F}$	MCB Rating (A)	HRC Fuse Rating (A)	Recommended Cable Size	Cat. No.
0.5	3.8-6.0	20	80-100	25	16	16	1	IHADOAH1F1
0.5	6-9.3	20	80-100	36	16	16	1	IHADOAJ1FA
1	6-9.3	20	100-120	36	25	25	1.5	IHADOAJ1FB
1	6-9.3	20	100-120	50	25	25	1.5	IHADOAJ1FC
1	6-9.3	20	120-150	50	25	25	1.5	IHADOAJ1FD
1.5	8.9-13.5	20	120-150	50	32	32	2.5	IHADOAK1FA
1.5	8.9-13.5	20	150-200	36+36	32	32	2.5	IHADOAK1FB
2	13.2-20	20	150-200	36+36	50	50	2.5	IHADOAL1FA
2	13.2-20	20	150-200	50+50	50	50	2.5	IHADOAL1FB
2	13.2-20	20	200-250	50+36	50	50	2.5	IHADOAL1FC
3	17.4-24	25	200-250	50+50	63	63	4	IHADOAM1FA
3	17.4-24	25	200-250	50+36+36	63	63	4	IHADOAM1FB



## Ordering Information:

### Direct On Line Submersible Pump Controller (Standard)

HP	kW	FLC (A)	Max. Operational Current (A)	Contactor (AC3-A)	OLR (A)	Cat No.
1	0.75	1.41	1.90	20	1.58-2.5	IHSDOAF1LA
2	1.50	2.82	3.81	20	3.8 -6.0	IHSDOAH1LA
3	2.24	4.23	5.71	20	3.8-6.0	IHSDOAH1LB
5	3.73	7.05	9.52	20	8.9-13.5	IHSDOAK1LA
7.5	5.60	10.57	14.27	20	13.2-20	IHSDOAL1LA
10	7.50	14.10	19.03	25	13.2-20	IHSDOAL1LB
12.5	9.30	17.62	23.79	32	17.4-24	IHSDOAM1LA
15	11.19	21.15	28.55	32	22-30	IHSDOAN1LA

\* Deluxe version with MCB is also available



### Automatic Star Delta Submersible Pump Controller (Standard)

HP	FLC *1.5	Max Operating Current 135%	Phase Current (A)	OLR (A)	Contactor (AC3-A)	Cat. No.
5	7.50	10.13	5.85	3.8-6.0	20	IHSASAH1LA
7.5	11.25	15.19	8.77	6-9.3	20	IHSASAJ1LA
10	15.00	20.25	11.69	8.9-13.5	20	IHSASAK1LA
12.5	18.75	25.31	14.61	13.2-20	20	IHSASAL1LA
15	22.50	30.38	17.54	13.2-20	20	IHSASAL1LB
17.5	26.25	35.44	20.46	17.4-24	25	IHSASAM1LA
20	30.00	40.50	23.38	22-30	32	IHSASAN1LA
22.5	33.75	45.56	26.31	22-30	32	IHSASAN1LB
25	37.50	50.63	29.23	22-30	32	IHSASAN1LC

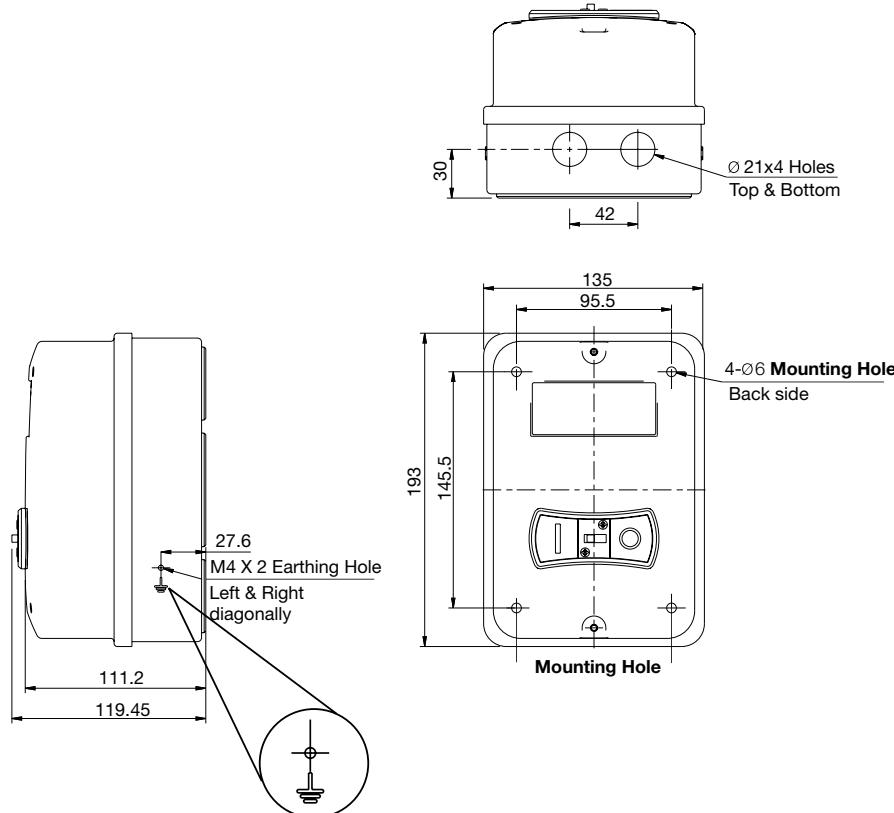




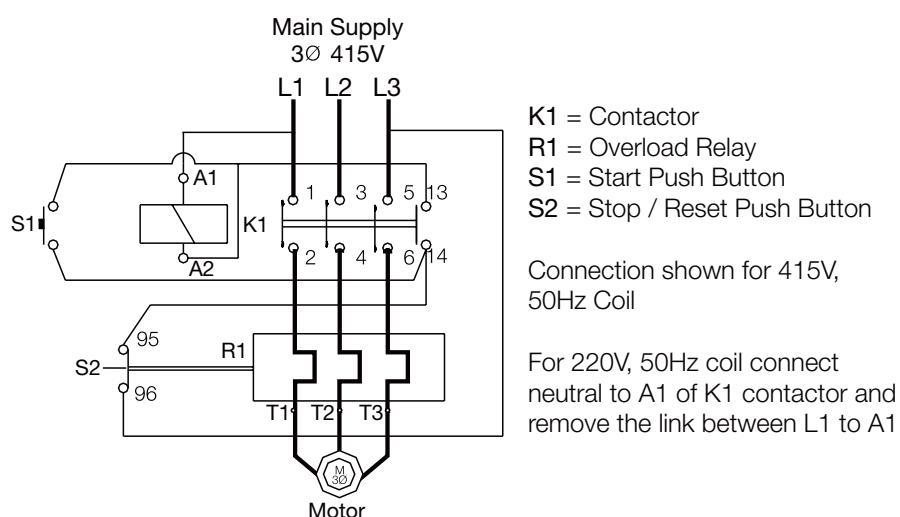
## DOL Agri Pump Starter (0.75 HP - 15 HP)

0.6 kW - 11.2 kW

Dimensions (in mm)



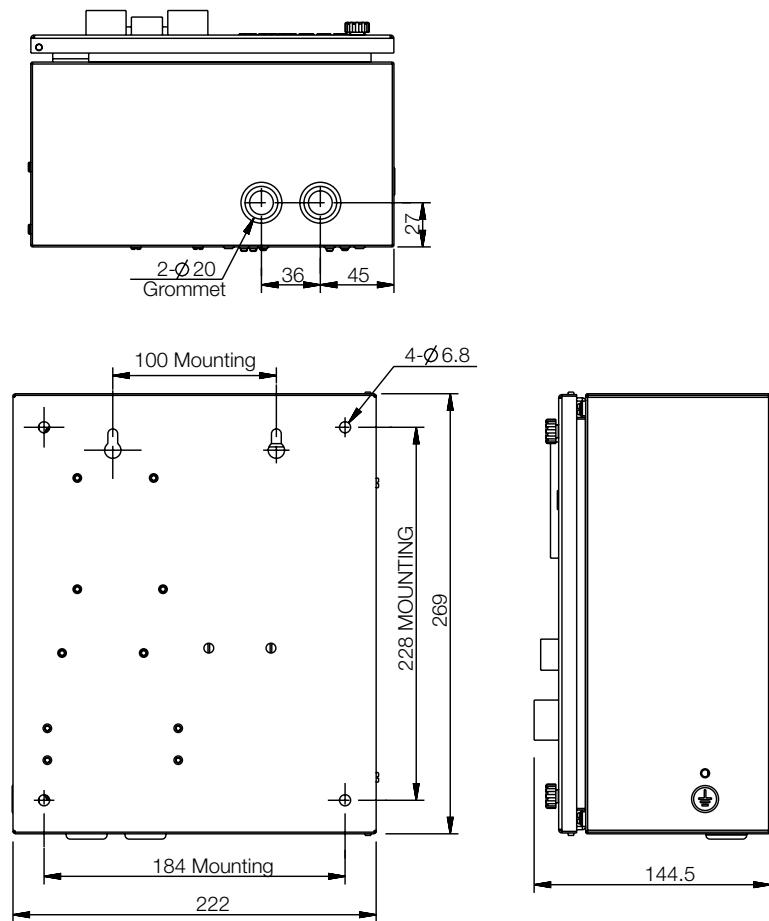
## Wiring Diagram



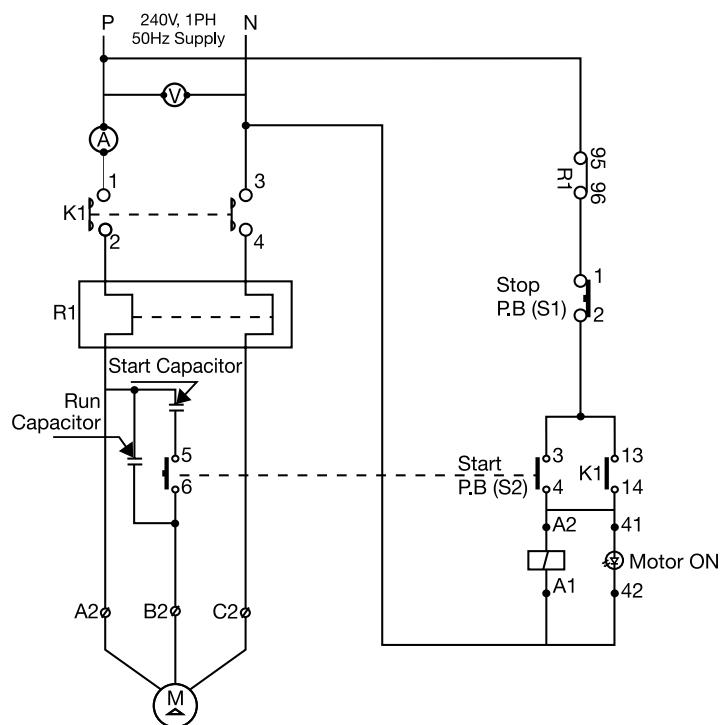
## Single Phase Submersible Pump Controller (0.5 HP - 3 HP)

3.7 kW - 2.2 kW

Dimensions (in mm)



### Wiring Diagram

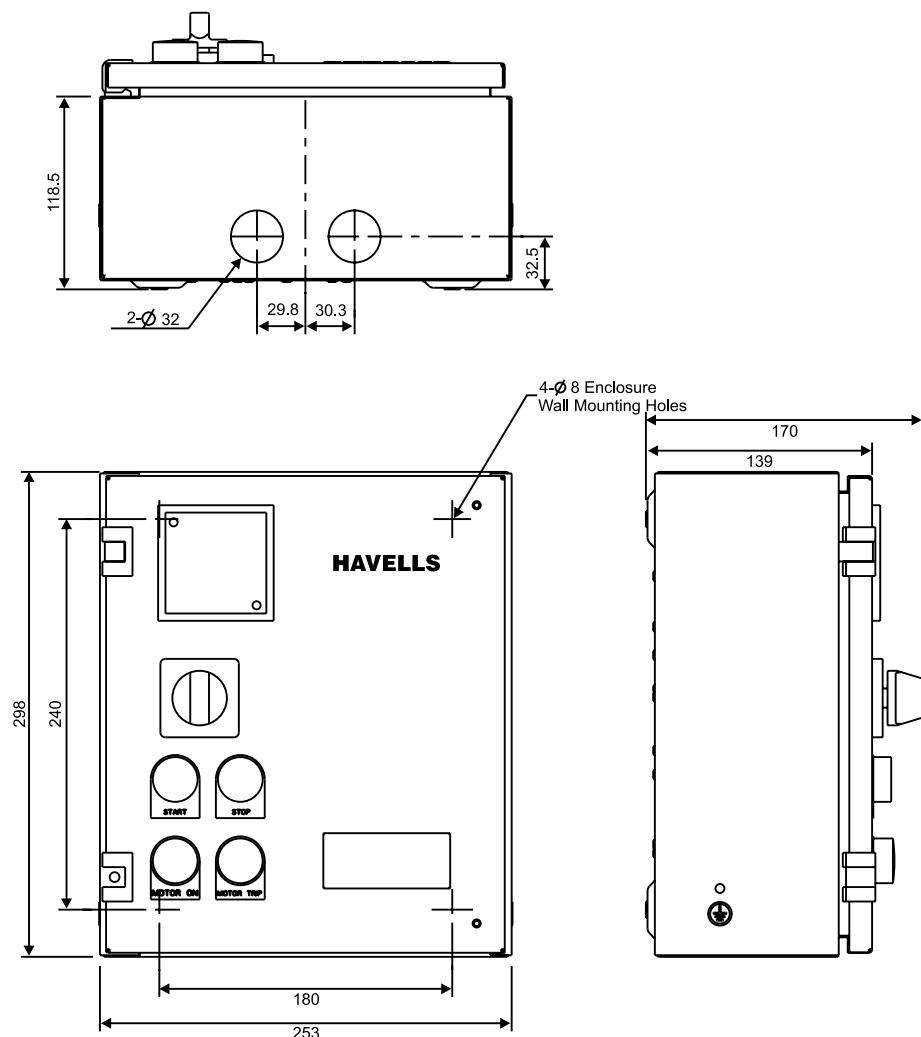




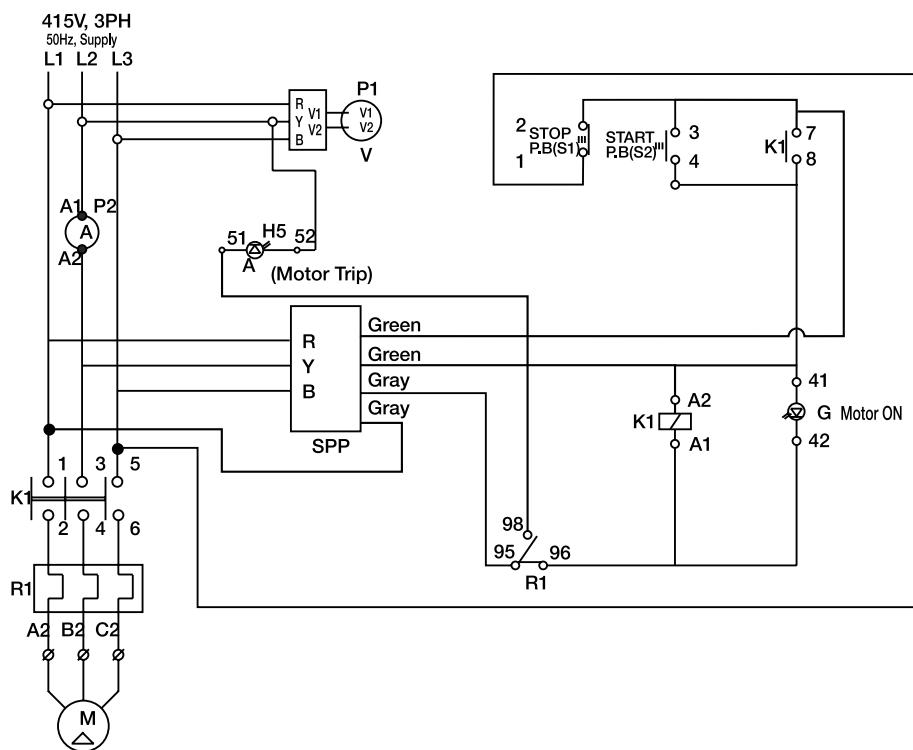
## DOL Submersible Pump Controller (1 HP - 15 HP)

0.7 kW - 11.2 kW

Dimensions (in mm)



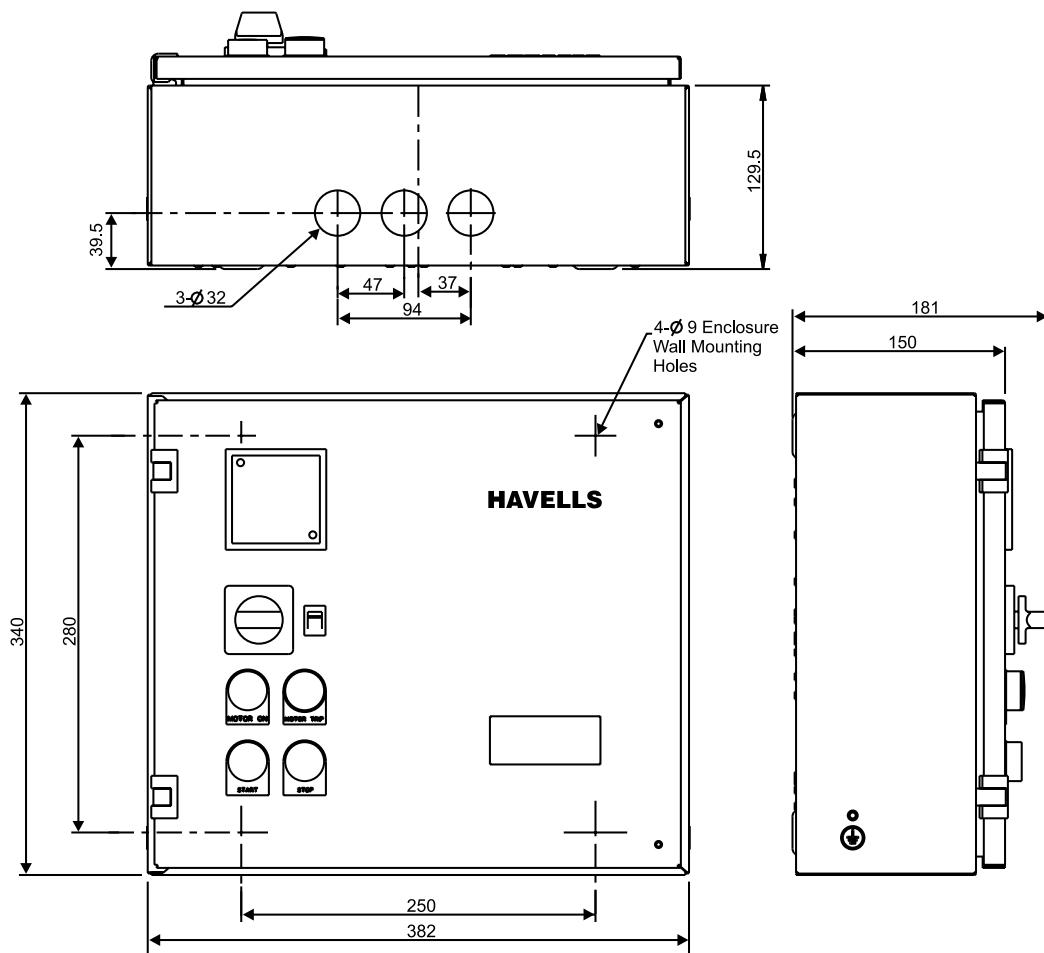
## Wiring Diagram



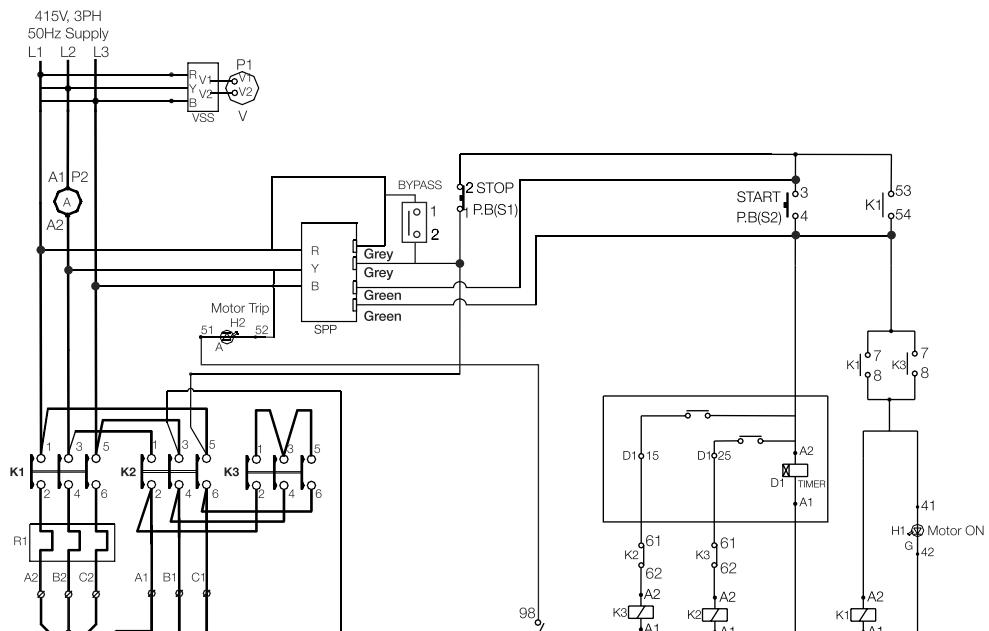
## ASD Standard (5HP - 25HP)

3.7 kW - 18.7 kW

Dimensions (in mm)



## Wiring Diagram





## Contactor

The new 'Urja' series of Contactor are designed and manufactured to world class standard.

The series covers contactor range 20 A - 40 A in 2 Pole & 4 pole execution. These conform to IS /IEC : 60947-4-1 & IEC 60947-4-1.

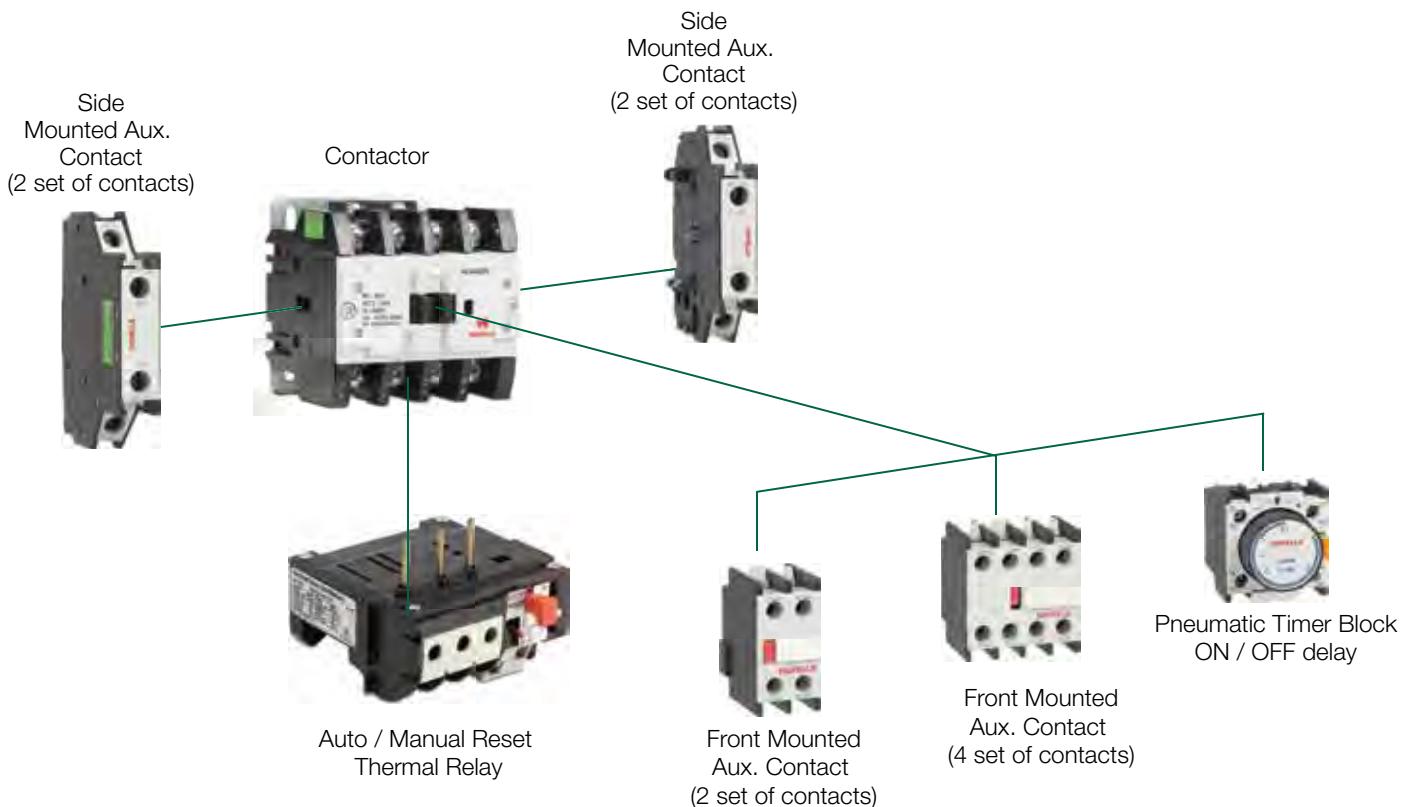
The contactor provides reliable and safe switching & thermal overload relay offers close and accurate protection against overload and single phasing.

The user friendly series comes with a range of add on optional accessories to meet varied application needs in motor and distribution circuits.

## Contactor Features

- Compact and rugged construction
- Encapsulated coil
- High mechanical & electrical endurance
- Suitable for low voltage conditions
- Liberal Terminal capacity
- Spare coil and contact kit available

## Contactor Accessories





## Technical Information

Standard conformity : IS/IEC - 60947 - 4 - 1  
 Insulation voltage  $U_i$  : 690 V  
 Operation voltage  $U_e$  : 415 V  
 Ambient Temperature Range : -5 °C to +55 °C  
 Pole : 4 P



Contactor Type		SI Unit	UC1 20F	UC1 25F	UC1 32F	UC1 40F
Rated Current at 415 V 50 Hz $I_e$		A	20	25	32	40
No. of poles			4 Pole			
Rated Thermal Current $I_{th}$		A	32	40	45	63
AC1 Duty : Rated Operational Current		A	32	40	45	63
Max. Power Rating at 415 V		kW	13	16	18	26
AC3 Duty Rated Operational Current $I_e$		A	20	25	32	40
Max. Power Rating at 415 V		kW	8	10	13	16
Mechanical Life		(Million Operations)	5	5	5	5
Electrical life		(Million Operations)	1	1	1	1
Switching Frequency (No load)		Operations per hour	600	600	600	600
Back Up Fuse Rating		A	32	40	50	63
Max. Cable Size		mm <sup>2</sup>	1 x 10	1 x 10	1 x 10	1 x 10
Weight	4P	kg	0.745	0.745	0.745	0.745
Over all Dimension (W x H x D)	4P	mm	80x90x84			
Mounting			Surface / wall			
<b>Auxiliary Circuit</b>						
Built in Auxiliary Contact			1NO			
Add on Auxiliary Contact			Front & Side			
Thermal Rating $I_{th}$		A	6	6	6	6
Terminal Capacity		mm <sup>2</sup>	2.5	2.5	2.5	2.5
<b>Control Circuit</b>						
Rated Coil Voltages		V	200 - 400 & 415			
Coil Consumption (Sealed )		VA	12			
Coil (Pick up)		%	50 Max. of rated voltage			
Coil (Drop out)		%	20 - 30 of rated voltage			
Coil Insulation Class			H			
<b>Spares</b>						
Coil			Available			
Contact kit			Available			



## Ordering Information

Product Description	Cat. Code
20 A 4P Contactor	IHPBC020100*
25 A 4P Contactor	IHPBC025100*
32 A 4P Contactor	IHPBC032100*
40 A 4P Contactor	IHPBC040100*



Coil Code	Voltage
K	415 V (260 V - 440 V)
L (Wide Band)	200 V - 400 V



## Spare Contact

Product Description	Cat. Code
Fixed Contact -4P Contactor 20 A	ISSPEX0428
Fixed Contact -4P Contactor 25 A	ISSPEX0429
Fixed Contact -4P Contactor 32 A	ISSPEX0430
Fixed Contact -4P Contactor 40 A	ISSPEX0439
Moving Contact-4P Contactor 20 A	ISSPEX0431
Moving Contact-4P Contactor 25 A	ISSPEX0432
Moving Contact -4P Contactor 32 A	ISSPEX0433
Moving Contact -4P Contactor 40 A	ISSPEX0440

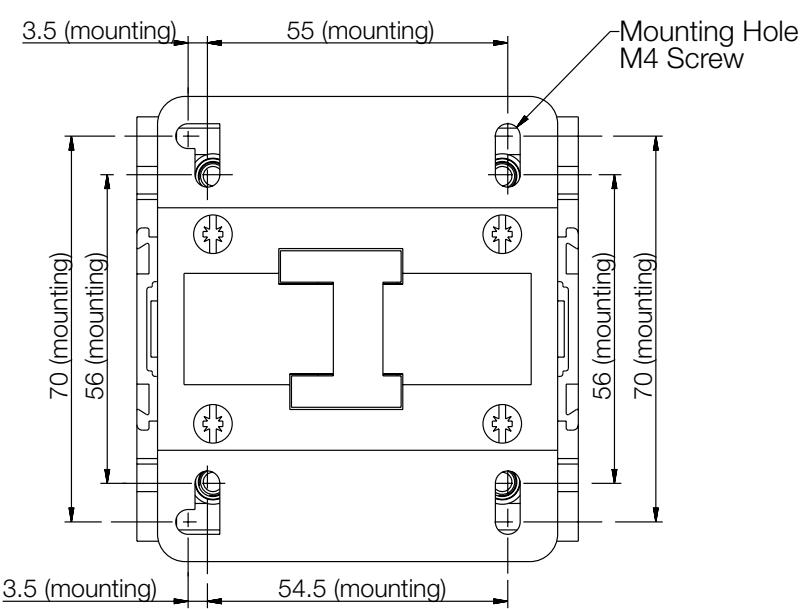
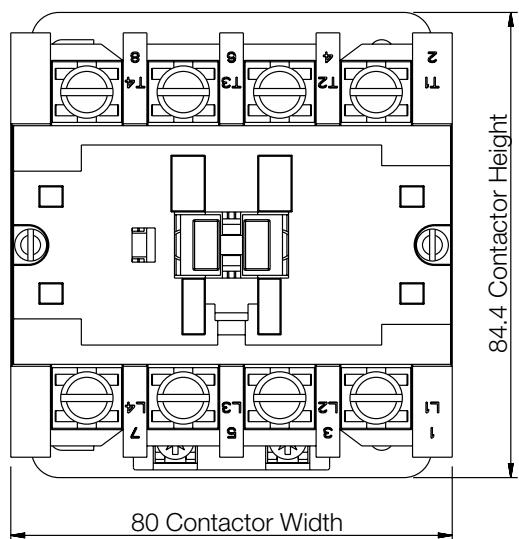
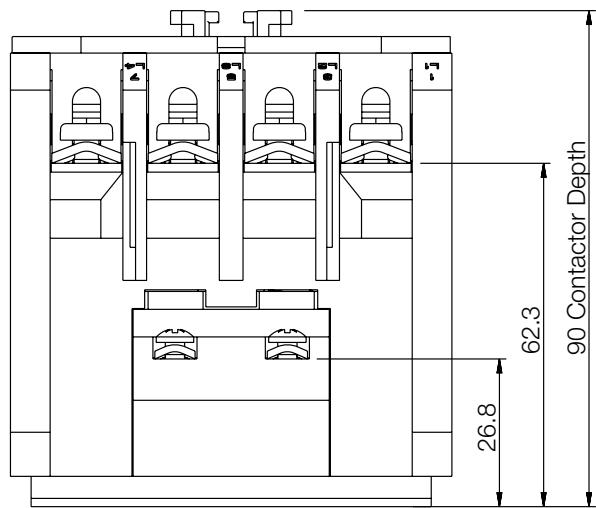
## Spare Contact Kit

Product Description	Cat. Code
Contact Kit 4P Contactor-20 A	ISSPEX0434
Contact Kit 4P Contactor-25 A	ISSPEX0435
Contact Kit 4P Contactor-32 A	ISSPEX0436
Contact Kit 4P Contactor-40 A	ISSPEX0445

## Spare Coil

Product Description	Cat. Code
4P Contactor Coil 200 V-400 V	ISSPEP0007
4P Contactor, Coil 415 V	ISSPEP0009

Dimension in (mm)



Rear View For Mounting Details



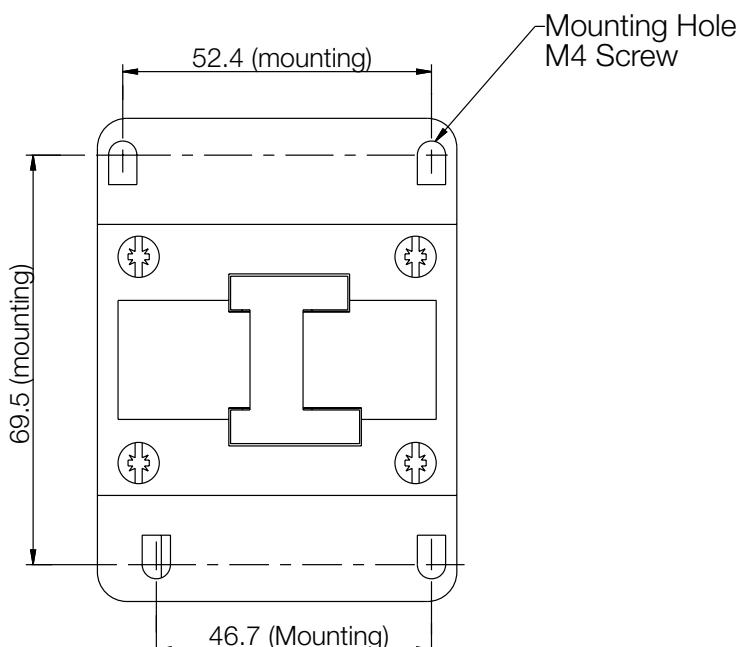
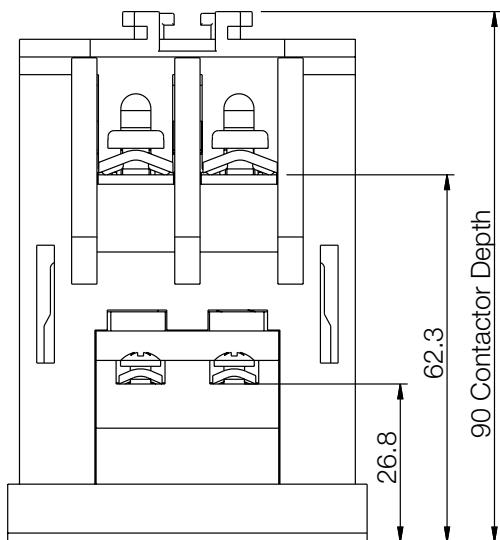
## Technical Information

Standard conformity : IS/IEC - 60947 - 4 - 1  
 Insulation voltage  $U_i$  : 690 V  
 Operation voltage  $U_e$  : 240 V  
 Ambient Temperature Range : -5 °C to +55 °C  
 Pole : 2 P



Contactor Type		SI Unit	UC1 20 D	UC1 25 D	UC1 40 D
Frame Size			1		
Rated Current at 240V 50Hz $I_e$		A	20	25	40
No. of poles			2 Pole		
Rated Thermal Current $I_{th}$		A	32	40	63
AC1 Duty : Rated Operational Current		A	32	40	63
Max. Power Rating at 240V		kW	8	10	15
AC3 Duty Rated Operational Current $I_e$		A	20	25	40
Max. Power Rating at 240 V		kW	5	6	10
Mechanical Life		(Million Operations)	5	5	5
Electrical life		(Million Operations)	1	1	1
Switching Frequency (No load)		Operations per hour	600	600	600
Back Up Fuse Rating		A	32	40	63
Max. Cable Size		mm <sup>2</sup>	10	10	10
Weight	2P	kg	0.5		
Over all Dimension (W x H x D)		mm	57 x 90 x 82		
Mounting			Surface / wall		
<b>Auxiliary Circuit</b>					
Add on Auxiliary Contact			Front	Front	Front
Auxiliary contact configuration			1NO + 1NC, 2NO	1NO + 1NC, 2NO	1NO + 1NC, 2NO
Thermal Rating $I_{th}$		A	6	6	6
Terminal Capacity		mm <sup>2</sup>	2.5	2.5	2.5
<b>Control Circuit</b>					
Rated Coil Voltages		V	140 - 270 & 240		
Coil Consumption (Sealed)		VA	24 Max.		
Coil (Pick up)		V	Between (130 - 140)		
Coil Insulation Class			H		
<b>Spares</b>					
Coil			Available		
Contact kit			Available		

### Dimension in (mm)



Rear View For Mounting Details

### Ordering Information

Product Description	Cat. Code
20 A 2P Contactor	IHPBF020100*
25 A 2P Contactor	IHPBF025100*
40 A 2P Contactor	IHPBF040100*

\* Coil voltage

Coil Code	Voltage
K	240 V
L (Wide band)	140 V - 270 V



### Spare Contact

Product Description	Cat Code
Fixed Contact -2P Contactor 20 A	ISPEP0428
Fixed Contact -2P Contactor 25 A	ISPEP0429
Fixed Contact -2P Contactor 40 A	ISPEP0439
Moving Contact-2P Contactor 20 A	ISPEP0431
Moving Contact-2P Contactor 25 A	ISPEP0432
Moving Contact -2P Contactor 40 A	ISPEP0440

### Spare Coil

Product Description	Cat Code
ISSPEP0008	2P Contactor Coil 140 V -270 V
	2P Contactor, Coil 240 V

### Spare Contact Kit

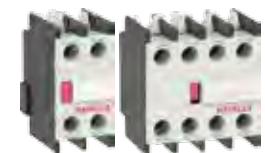
Product Description	Cat Code
Contact Kit 2P Contactor-20 A	ISPEP0441
Contact Kit 2P Contactor-25 A	ISPEP0442
Contact Kit 2P Contactor-40 A	ISPEP0444



## Add on accessories

Auxilliary Contact Block

Description	Suitable for Mounting on Urja Contactor	Contact Configuration		Type	Cat No.	
		NO	NC			
Side Block	20 A, 25 A, 30 A, 40 A	1	1	CAS11		
		2	0	CAS20		
Front Block		1	1	CAF11		
		2	2	CAF22		
		3	1	CAF31		
		4	0	CAF40		



Pneumatic Timer Block

ON Delay	Suitable for Mounting on Urja Contactor	Type	Cat No.
0.1 -3s	20 A, 25 A, 30 A, 40 A	CPT1A	
0.1-30s		CPT1B	
10-180s		CPT1C	



Pneumatic Timer Block

OFF Delay	Suitable for Mounting on Urja Contactor	Type	Cat No.
0.1 -3s	20 A, 25 A, 30 A, 40 A	CPT2A	
0.1-30s		CPT2B	
10-180s		CPT2C	



## Urja Contactor 2P / 4P (Spares)

Type		Cat. No.
Housing 2P		CPSMPCX016
Housing 4P		ISCPSPMCX014
Carrier Assembly 2P		ISSPEX0447
Carrier Assembly 4P		ISSPEX0446
2P Contactor Coil	140 V - 270 V	ISSPEP0008
4P Contactor Coil	200 V - 400 V	ISSPEP0007
	415 V (260 V - 440 V)	ISSPEP0009
	240 V (140 V - 270 V)	ISSPEP0011
Single Fixed Contact 2P / 4P	20 A	ISSPEX0428
	25 A	ISSPEX0429
	32 A	ISSPEX0430
	40 A	ISSPEX0439
Single Moving Contact 2P / 4P	20 A	ISSPEX0431
	25 A	ISSPEX0432
	32 A	ISSPEX0433
	40 A	ISSPEX0440



Single Fixed  
Contact 2P / 4P



Single Moving  
Contact 2P / 4P



## Thermal Overload Relay

### Principle of Operation

The heating elements in the main circuit heat the bimetal tripping elements corresponding to the motor load current. The heating elements are calibrated such that the set trip point is achieved in accordance with the standards. By means of trip bar, the movement / deflection of the bimetal is transmitted to plunger which in turn operates the trip mechanism and thus the contacts are separated. The trip point can be easily set on a scale in accordance with the nominal motor rated current.

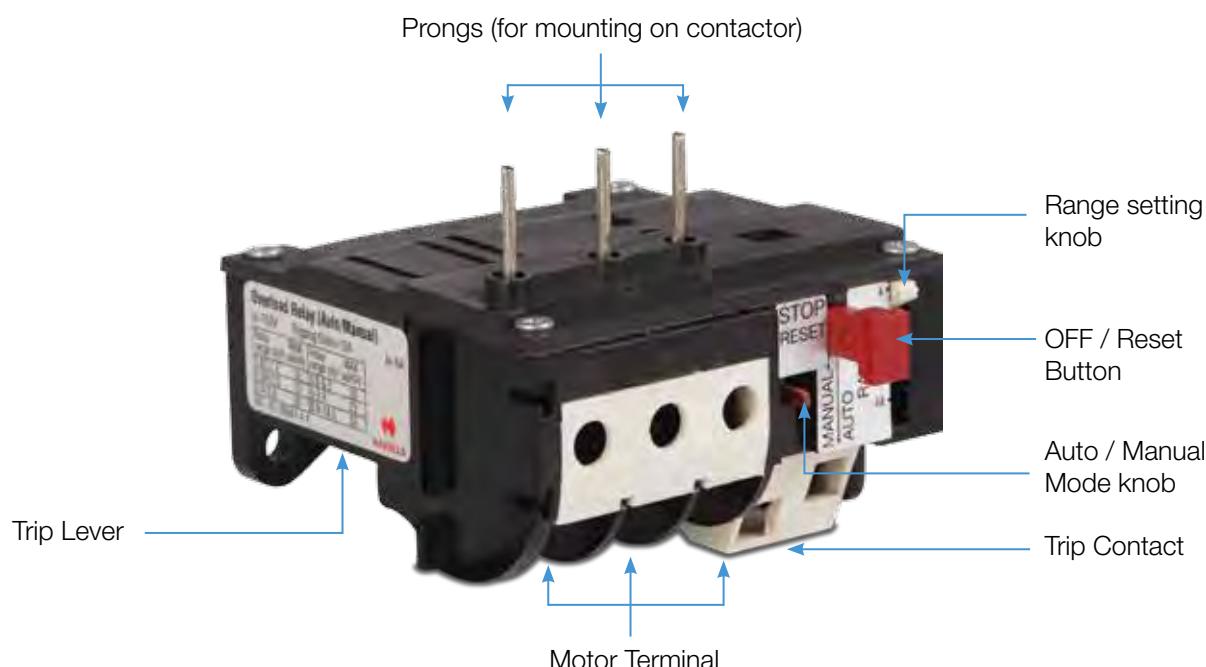
Bimetal elements for compensating the trip point in case of different ambient temperature is fitted on the trip lever. Buttons are used for testing the circuit to be protected, for resetting by hand and for conversion from manual to auto reset mode.

### Differential Mechanism

The relay operates on the differential system of protection provided by the double slide mechanism. Under single phasing conditions, the two slides of the relay undergo differential deflection. One slide senses the movement of the bimetal that deflects the maximum, while the other senses the minimum deflection.

The slides are linked in such a way that the difference in movements of the two slides is amplified for actuation of the trip lever. This leads to accelerated tripping under single phasing.

### Parts Identification





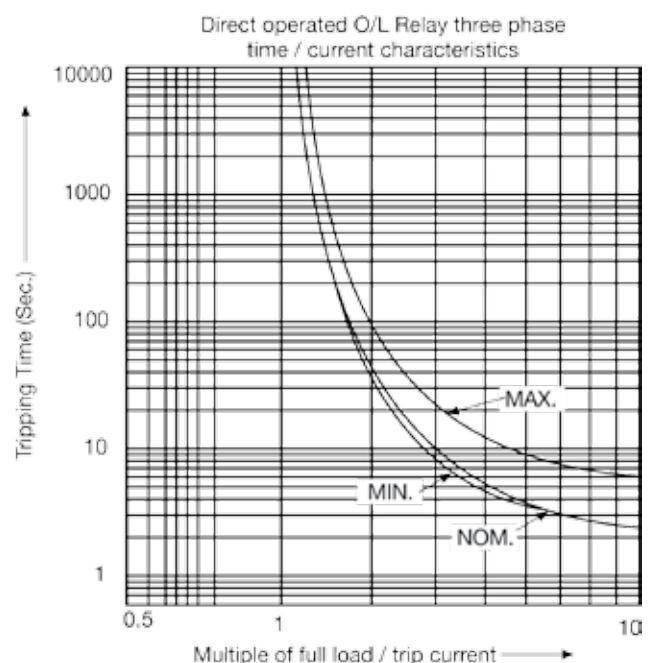
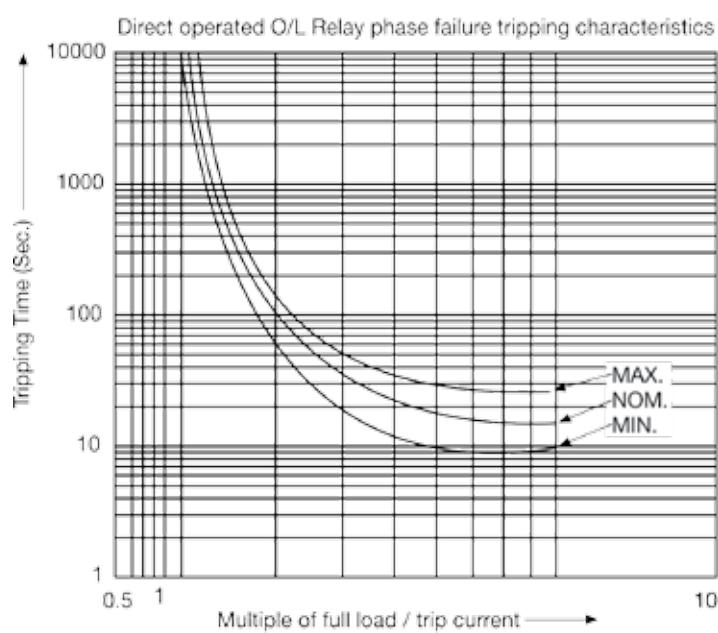
## Technical Information

Conformity of Standard : IS / IEC - 60947 - 4-1  
 Ambient temperature range : -5 °C - +55 °C  
 Degree of protection : IP 20  
 Trip Class : 10 A  
 Pole : 3P



Thermal Overload Relay	SI Unit	
Current Range	A	1.07 - 30
Rated Insulation Voltage (Ui)	V	660
Rated Operational Voltage (Ue)	V	415
Switching Frequency	Operations per hour	15
Terminal Capacity	mm <sup>2</sup>	10
Type of Reset		Auto / Manual
<b>Auxilliary Circuit</b>		
Insulation Voltage	V	660
Rated Thermal Current	A	10
Rated Current (AC-15) at 220 Vac	A	1.64
at 415 Vac	A	0.95
Auxilliay Terminal Capacity	mm <sup>2</sup>	2 x 2.5
Weight	kg	0.15
Dimension (W x H x D)	mm	72.5 x 40 x 72

## Time / Current Characteristics



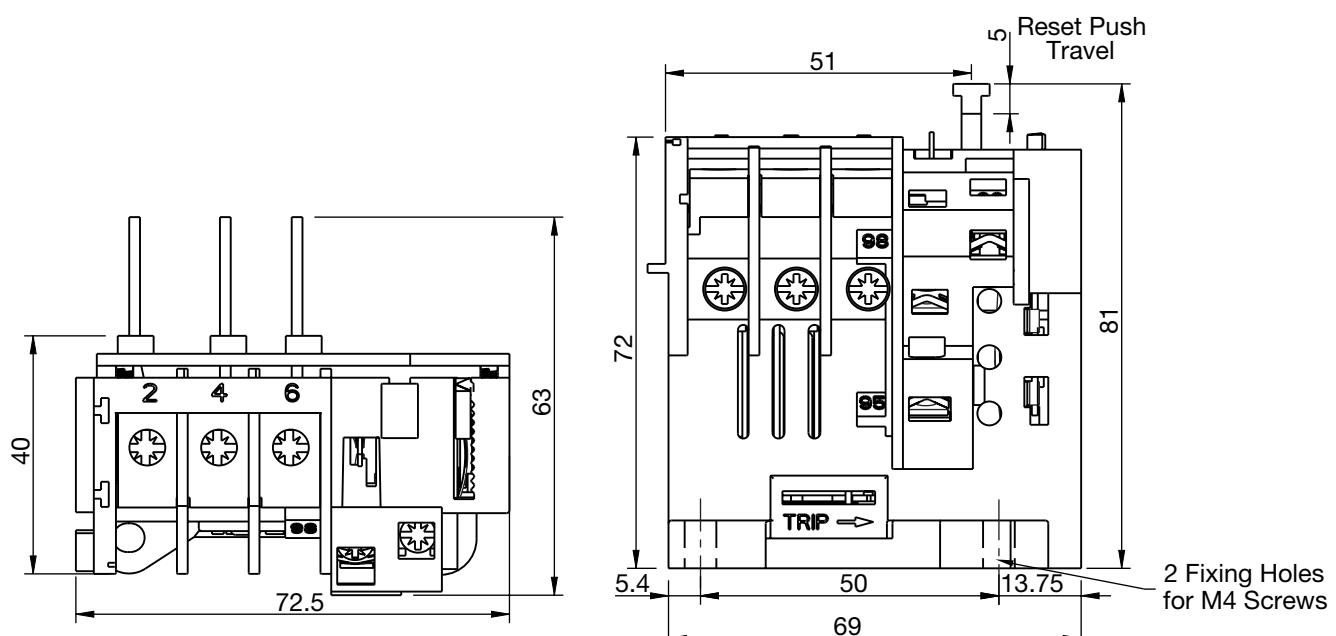


### Ordering Information

Relay Range (A)	Suitable for Contactor Frame Size	Poles	Type	Cat No.	Item Description
1.07-1.7	1	3	UR1 E	IHAR13CE	3P Thermal O/L Relay A/M
1.58-2.5		3	UR1 F	IHAR13CF	3P Thermal O/L Relay A/M
2.4-3.8		3	UR1 G	IHAR13CG	3P Thermal O/L Relay A/M
3.8-6.0		3	UR1 H	IHAR13CH	3P Thermal O/L Relay A/M
6-9.3		3	UR1 J	IHAR13CJ	3P Thermal O/L Relay A/M
8.9-13.5		3	UR1 K	IHAR13CK	3P Thermal O/L Relay A/M
13.2-20		3	UR1 L	IHAR13CL	3P Thermal O/L Relay A/M
17.4-24		3	UR1 M	IHAR13CM	3P Thermal O/L Relay A/M
22-30		3	UR1 N	IHAR13CN	3P Thermal O/L Relay A/M



### Dimension in (mm)



Thermal Overload Relay - 3 Pole



## Technical Information

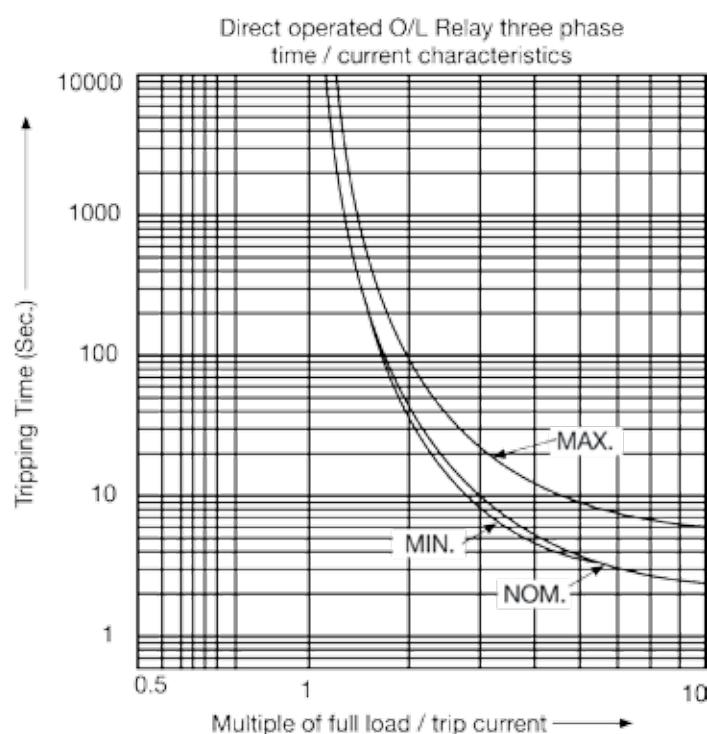
Conformity of Standard : IS / IEC - 60947 - 4-1  
Ambient temperature range : -5 °C - +55 °C  
Degree of protection : IP 20  
Trip Class : 10 A  
Pole : 2P



### Thermal Overload Relay

Over Load Relay	Type	Thermal
Current Range	A	3.8 - 30
Rated Insulation Voltage (Ui)	V	660
Rated Operational Voltage (Ue)	V	240
Switching Frequency	Operations per hour	15
Type of Reset		Auto / Manual
Terminal Capacity	mm <sup>2</sup>	10 (Cu)
Auxilliary Circuit		
Insulation Voltage	V	660
Rated Thermal Current	A	10
Rated Current (AC-15) at 120 Vac	A	3
Auxilliay Terminal	mm <sup>2</sup>	2 x 2.5
Dimension (W x H x D)	mm	72.5 x 40 x 72

### Time / Current Characteristics



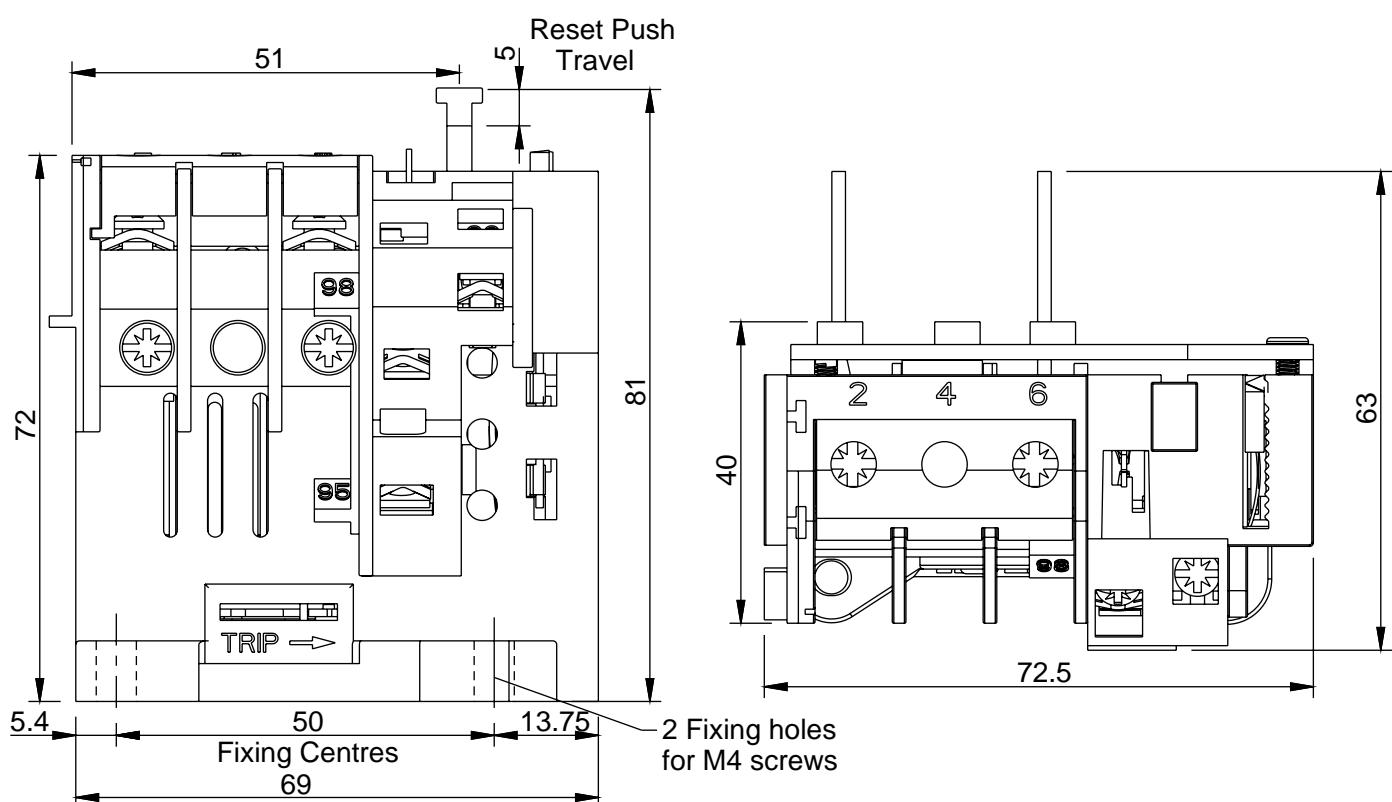


## Ordering Information

Relay Range (A)	Suitable for Contactor Frame Size	Poles	Type	Cat No.	Item Description
3.8 - 6	1	2	UR1 H	IHAR12CH	2P Thermal O/L Relay A/M
6 - 9.3		2	UR1 J	IHAR12CJ	2P Thermal O/L Relay A/M
8.9 - 13.5		2	UR1 K	IHAR12CK	2P Thermal O/L Relay A/M
13.2 - 20		2	UR1 L	IHAR12CL	2P Thermal O/L Relay A/M
17.4 - 24		2	UR1 M	IHAR12CM	2P Thermal O/L Relay A/M
22 - 30		2	UR1 N	IHAR12CN	2P Thermal O/L Relay A/M



## Dimension in (mm)



Smart Street Lighting allows a city to easily schedule lights ON or OFF for individual or group of lights so that the city can intelligently provide the right level of lighting needed by time of day, season, or weather conditions.

Introducing Havells Street Light Panel that is specially designed for energy conservation in conventional street light systems.

Apart from energy saving, it also saves on Manpower, Operating Cost and reduces Manual Operating Errors.

## Features:

- Timer based system: Allows one to set the ON and OFF time. The switching of street lights can be repeated every day as per the set time through Programmable 24 Hours Time Switch / Programmable Astronomical Time Switch
- Mode Selection: By Auto/ Manual Selector switch
- Panel Locking Facility: Provision of Door locking by Padlock and Panel lock
- Installation: Wall mounted / Floor Mounted
- Enclosure: CRCA Sheet Steel duly phosphatized and power coated
- Degree of Protection: IP 54 (Dust & Vermin proof)

## Range :

- Three Phase (230 Vac / per phase application) version in two frame sizes - Max. Load 6 kW & 12 kW
- Single Phase (230 Vac) version in single frame size - Max. Load 2 kW, 4 kW, 6 kW & 12 kW

## Specification :

IS 8623 / IEC 60439

IS 2147 / IEC 60529





Street Light Panel



## Introduction

Smart Street Lighting allows a city to easily schedule lights ON or OFF for individual or group of lights so that the city can intelligently provide the right level of lighting needed by time of day, season, or weather conditions.

Introducing Havells Street Light Panel that is specially designed for **energy conservation** in conventional street light systems.

Apart from energy saving, it also saves on Manpower, Operating Cost and reduces Manual Operating Errors.

### Reference Standard:

- IS 8623 and IEC 60439
- IS 2147 and IEC 60529

### Range

- Three Phase (230 Vac / per phase application) version in two frame sizes - Max. Load 6 kW & 12 kW
- Single Phase (230 Vac) version in four frame size - Max. Load 2 kW, 4 kW, 6 kW & 12 kW

### Features

- **Timer based system:** Allows one to set the ON and OFF time. The switching of street lights can be repeated every day as per the set time through Programmable 24 Hours Time Switch / Programmable Astronomical Time Switch

**24 Hour Programmable Time Switch** has a 24 Hour dial and is used to switch an electrical circuit "ON" or "OFF" at selected times during a period of time programmed in advance. A program consists of a closing time and an opening time for a circuit.

**Astronomical Programmable Time Switch** automatically adjusts the set time along with seasonal variation to control ON / OFF for lighting on purpose of realizing that light is turned ON when sun sets & turned OFF when sun rises. This time switch is programmed on latitude base for whole year for sun rise and sun set timing.

- **Mode Selection:** By Auto/ Manual Selector switch
- **Panel Locking Facility:** Door locking by Panel lock and provision for Pad Locking available
- **Installation:** Wall mounted / Floor mounted
- **Enclosure:** CRCA Sheet Steel duly phosphatized and powder coated with 7 tank process
- **Degree of Protection:** IP 54
- Pre-wired ready to use
- Liberal termination space
- Louvers provided on both sides for proper heat dissipation
- Manufactured by an ISO 9001 certified company

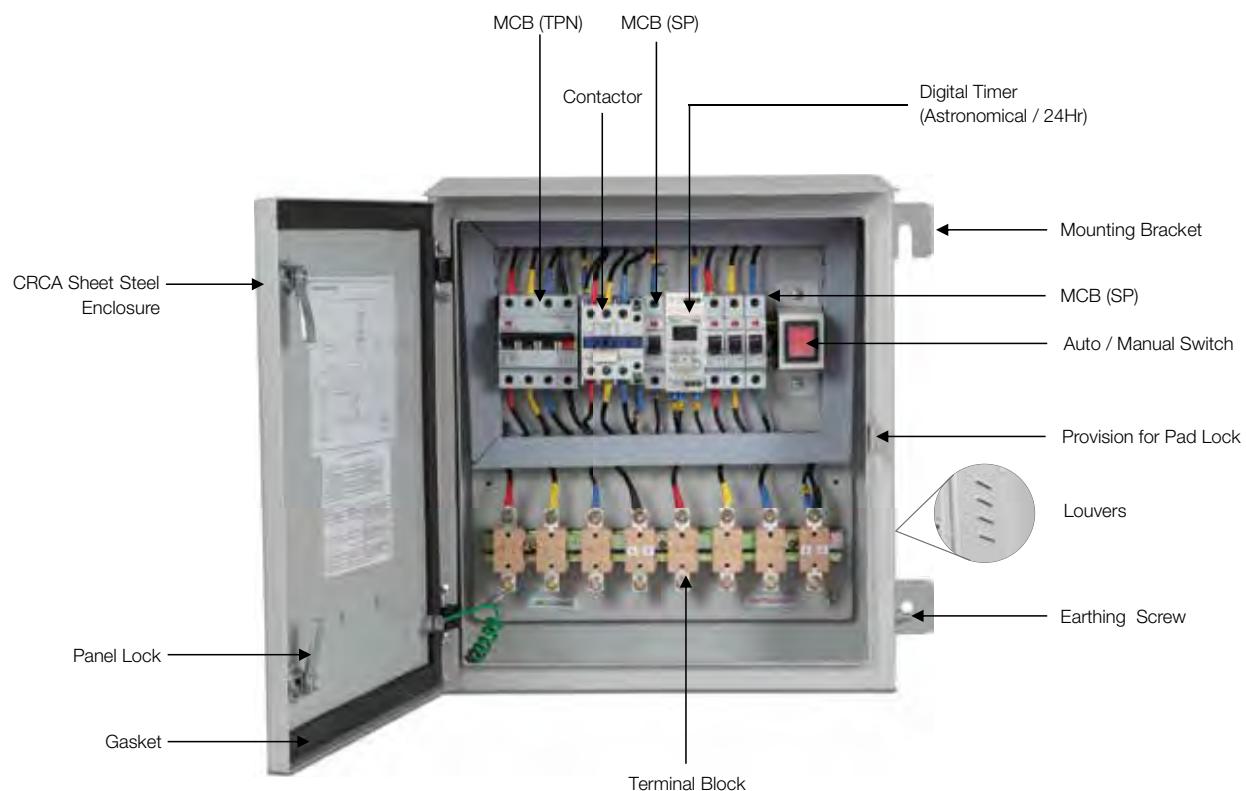
\*IP 54 enclosure can be provided on request



## Construction

### Internal View

Three Phase Street Light Panel with 24 Hours / Astronomical Timer



Single Phase Street Light Panel with 24 Hours / Astronomical Timer





## Technical Information

### Timer Details

#### 24 Hour Programmable Time Switch

#### Product Description



#### Technical Specifications

Operating Voltage	220 Vac - 240 Vac
Power Consumption	Approx. 9 W at 252 Vac
Operation Period	1 Week
Max. Switching Current	16 A
Weekly Program	Total 50 ON steps and 50 OFF steps
Minimum Setting Unit	1 second
Clock	12-h (am/pm) and 24-h selection
Mounting	DIN Rail
Dimensions	60 mm * 35 mm * 90 mm
Weight	105 g
Type of protection	IP 20



## Technical Information

### Operation Functions

Functions	Description
Adjusting Clock	Allow current date & time settings through day, hour (24-hour/ 12-hour indication), minutes and seconds settings
Weekly Timer Operation	Controls the output according to set time of ON & OFF for specified days of the week
Holiday Setting	Sets holidays without having to revise the existing program. (16 Dates max.)
Permanent Override ON / OFF	Allows the output to be forcibly turned ON/ OFF regardless of the control output setting.
Keypad Lock	Allows each key to lock/ unlock. When key is locked programming parameters of that key can not be edited.
Programmable No. of Steps	Allows to modify No. of steps per program. (6 minimum, 25 maximum)
Enable / Disable Program	Allows to enable/ disable particular program.

### Other Settings of Timer

Step	Function	Key	Display
1	For Permanent Override ON	Press 'ESC' for 3 second	Permanent Override ON displays
2	For Permanent Override OFF	Press 'ESC' for 3 second	Permanent Override OFF displays
3	For Auto Mode	Press 'ESC' for 3 second	Auto Mode Displays
4	For Lock All Keys	Press 'ENT' for 3 times	Lock 'L' displays
5	For Unlock All Keys	Press 'ENT' for 3 times	Lock 'L' stop displaying on screen
6	To End	Press 'ENT'	Current Time displays on screen
7	To Reset	Press 'RST' for 3 second	Device reset to factory setting

### To Set Date & Time

Step	Function	Key	Display
1	To set the Present Date	Press  Key	Date Bit Blinks
2	To select the Present Date	Press '^' or 'v' Key	Date Bit Increases or Decreases
3	To save the Present Date & set the Present Month	press 'PRG' key	Month Bit Blinks
4	To select the Present Month	Press '^' or 'v' Key	Month Bit Increases or Decreases
5	To save the Present Month & set the Present Year	press 'PRG' key	Year Bit Blinks
6	To select the Present Year	Press '^' or 'v' Key	Year Bit Increases or Decreases
7	To save the date & to set current time	Press 'ENT' Key	Hour Bit Blinks
8	To select the Present Hour	Press '^' or 'v' Key	Hour Bit Increases or Decreases
9	To save the Present Hour & set the Present Minute	press 'PRG' key	Minute Bit Blinks
10	To select the Present Minute	Press '^' or 'v' Key	Minute Bit Increases or Decreases
11	To save the Present Minute & set the Present Second	press 'PRG' key	Second Bit Blinks
12	To select the Present Second	Press '^' or 'v' Key	Second Bit Increases or Decreases
13	To save the time & to set current day	Press 'ENT' Key	Day Bit Blinks
14	To select the present Day	press 'PRG' key	Day Bit moving left
15	To save the day & to set clock	Press 'ENT' Key	Clock Bit Blinks
16	To set the Clock type	Press '^' or 'v' Key	Clock Bit Displays 24 Hour or 12 Hour
17	To save the Clock type & to end	Press 'ENT' Key	current time is shown in display



## Technical Information

### Programming for ON / OFF Time

Step	Function	Key	Display
1	To begin the setting	Press 'PRG' key	Program Number Bit Blinks
2	To select the Program Number	Press '^' or 'v' Key	Program Number Bit Increases or Decreases
3	To save the Program Number & to set On/ Off of day	Press 'ENT' Key	Day Bit Blinks
4	To select the day	Press 'PRG' key	Day Bit moving left
5	To select the setting of that day	Press '^' or 'v' Key	Setting will change to ON / OFF
6	To save the Day setting & to set the step No.	Press 'ENT' Key	Step No. Bit Blinks
7	To select the Step No.	Press '^' or 'v' Key	Step Number Bit Increases or Decreases
8	To save the Step No. & Set the ON time of the step	Press 'ENT' Key	ON time Bit Blinks
9	To select the ON time of the step	Press '^' or 'v' Key	ON time Bit Increases or Decreases
10	To save the Step ON time & Set the OFF time of the step	Press 'ENT' Key	OFF time Bit Blinks
11	To select the OFF time of the step	Press '^' or 'v' Key	OFF time Bit Increases or Decreases
12	To Save the Step OFF time	Press 'ENT' Key	Next Step Bit Blinks
13	To set the Next Step	Repeat Step 6-12	
14	To End	Press 'ESC' Key	Current time is shown in display

### Programming for Holiday Setting

Step	Function	Key	Display
1	To begin the setting	Press 'SET/^' key	Step Number Bit Blinks
2	To select the Step Number	Press '^' or 'v' Key	Step No. Bit Increases or Decreases
3	To save the Step No. & to set the Program No.	Press 'ENT' Key	Program No. Bit Blinks
4	To select the Program Number	Press '^' or 'v' Key	Program No. Bit Increases or Decreases
5	To save the Program No. & to set the Holiday No.	Press 'ENT' Key	Holiday No. Bit Blinks
6	To select the No. of Holidays	Press '^' or 'v' Key	Holiday No. Bit Increases or Decreases
7	To save the Holiday No. & to set the Holiday date	Press 'ENT' Key	Holiday date Bit Blinks
8	To select the Holiday Date	Press '^' or 'v' Key	Holiday Date Bit Increases or Decreases
9	To save the Holiday Date & to set the next Holiday date	Press 'ENT' Key	Next Holiday date Bit Blinks
10	Repeat the steps to set all holiday dates and then to end	Press 'ENT' Key	Version is shown in display
11	To End	Press 'ENT' Key	Current time is shown in display
12	To set current Holiday Date	Press  Key	Holiday Date Bit Blinks
13	To select the Date	Press '^' or 'v' Key	Holiday Date Bit Increases or Decreases
14	To Save the Date & to set the time	Press 'ENT' Key	Current time is shown in display
15	To select the time	Press '^' or 'v' Key	Time Bit Increases or Decreases
16	To save the Time & to set the day of week	Press 'ENT' Key	Day Bit blinks
17	To select the day	Press 'PRG' Key	Day Bit moves left
18	To save the day and set the clock type	Press 'ENT' Key	Clock Bit blinks
19	To select the clock type	Press '^' or 'v' Key	Clock type bit increases or decreases
20	To save the clock type & to end	Press 'ENT' Key	Current time is shown in display

Note: At any time, to come out from the programming, press 'ESC' Key.



## Technical Information

### Astronomical Programmable Time Switch

#### Product Description



Technical Specifications	
Operating Voltage	220 Vac - 240 Vac
Power Consumption	Approx. 9 W at 252 Vac
Operation Period	1 Week
Max. Switching Current	16 A
Program	Relay ON at calculated Sunset & Relay OFF at calculated Sunrise
Minimum Setting Unit	1 second
Clock	12-hour (am/pm) and 24-hour selection
Mounting	DIN Rail
Dimensions	60 mm * 35 mm * 90 mm
Weight	105 g
Type of protection	IP 20



## Technical Information

### Operation Functions

Functions	Description
Adjusting Clock	Allow current date & time settings through day, hour (24-hour/ 12-hour indication), minutes and seconds settings
Setting Latitude, Longitude & Timezone	"Allows user to set Latitude & Longitude of his location & timezone as per UDT standards first digit as; Latitude: 0 for North & - for South Longitude: 0 for East & - for West"
Summer/ winter Daylight Shift	Allows user to select Daylight shift due to Summer & Winter
Sunrise & Sunset Timings (Twilight Settings)	"Allows user to view present day's Sunrise & Sunset timings & to give offset in those timings if required Offset Range: -59 to + 59 minutes Shows on Display; POS: for +ve offset (add minutes) NEG: for -ve offset (subtracts minutes)"
Day of Week Operation	Allows user to select on which day of week to operate Astro-Time Switch Function.
Permanent Override ON / OFF	Allows the output to be forcibly turned ON/ OFF regardless of the control output setting.
Keypad Lock	Allows each key to lock/ unlock. When key is locked programming parameters of that key can not be edited.

### To Set Date & Time

Step	Function	Key	Display
1	To set the Present Date	Press  Key	Date Bit Blinks
2	To select the Present Date	Press '^' or 'v' Key	Date Bit Increases or Decreases
3	To save the Present Date & set the Present Month	press 'PRG' key	Month Bit Blinks
4	To select the Present Month	Press '^' or 'v' Key	Month Bit Increases or Decreases
5	To save the Present Month & set the Present Year	press 'PRG' key	Year Bit Blinks
6	To select the Present Year	Press '^' or 'v' Key	Year Bit Increases or Decreases
7	To save the date & to set current time	Press 'ENT' Key	Hour Bit Blinks
8	To select the Present Hour	Press '^' or 'v' Key	Hour Bit Increases or Decreases
9	To save the Present Hour & set the Present Minute	press 'PRG' key	Minute Bit Blinks
10	To select the Present Minute	Press '^' or 'v' Key	Minute Bit Increases or Decreases
11	To save the Present Minute & set the Present Second	press 'PRG' key	Second Bit Blinks
12	To select the Present Second	Press '^' or 'v' Key	Second Bit Increases or Decreases
13	To save the time & to set current day	Press 'ENT' Key	Day Bit Blinks
14	To select the present Day	press 'PRG' key	Day Bit moving left
15	To save the day & to set clock	Press 'ENT' Key	Clock Bit Blinks
16	To set the Clock type	Press '^' or 'v' Key	Clock Bit Displays 24 Hr or 12 Hr
17	To save the Clock type & to end	Press 'ENT' Key	current time is shown in display



## To Set Latitude & Longitude

Step	Function	Key	Display
1	To begin	Press 'PRG' Key	Latitude Bit Blanks
2	To select the Latitude	Press '^' or 'V' Key	Latitude Bit Increases or decreases
3	To save the Latitude & to set Longitude	Press 'ENT' Key	Longitude bit Blanks
4	To Select the Longitude	Press '^' or 'V' Key	Longitude Bit Increases or decreases
5	To save the Longitude & to set Timezone	Press 'ENT' Key	Timezone Bit Blanks
6	To select the Timezone	Press '^' or 'V' Key	Timezone Bit Increases or decreases
7	To save the Timezone & to set Daylight Shift	Press 'ENT' Key	SW Bit Blanks
8	To select the Daylight Shift	Press '^' or 'V' Key	SW Bit Increases or decreases
9	To save the Daylight Shift & to set Week Day	Press 'ENT' Key	Week Day Bit Blanks
10	To select the Week Day	Press 'PRG' Key	Week Day Bit moves Left
11	To Save the Week Day & to end	Press 'ENT' Key	current time displays on screen

## To Set Sunrise & Sunset

Step	Function	Key	Display
1	To begin	Press '^' Key	Sunrise Bit Blanks
2	To select the Sunrise Time	Press '^' or 'v' Key	Sunrise Bit Increases or Decreases
3	To save the Sunrise Time & to Set Sunset Time	Press 'ENT' Key	Sunset Bit Blanks
4	To select the Sunset Time	Press '^' or 'v' Key	Sunset Bit Increases or Decreases
5	To save the Sunset Time & to set Offset Sunrise	Press 'ENT' Key	Offset Sunrise Bit Blanks
6	To change the Offset Sunrise Type (positive/negative)	Press '^' or 'v' Key	Offset Sunrise Type changes
7	To save the Offset Sunrise & to set Offset Sunset	Press 'ENT' Key	Offset Sunset Bit blinks
8	To change the Offset Sunset Type (positive/negative)	Press '^' or 'v' Key	Offset Sunset Type Changes
9	To save the Offset Sunset	Press 'ENT' Key	Version Displays on Screen
10	To end	Press 'ENT' Key	Current time displays on the screen

## Other Settings of Timer

Step	Function	Key	Display
1	For Permanent Override ON	Press 'ESC' for 3 sec	Permanent Override ON displays
2	For Permanent Override OFF	Press 'ESC' for 3 sec	Permanent Override OFF displays
3	For Auto Mode	Press 'ESC' for 3 sec	Auto Mode Displays
4	For Lock All Keys	Press 'ENT' for 3 times	Lock 'L' displays
5	For Unlock All Keys	Press 'ENT' for 3 times	Lock 'L' stop displaying on screen
6	To end	Press 'ENT'	Current Time displays on screen
7	To Reset	Press 'RST' for 3 sec	Device reset to factory setting

Note: At any time, to come out from the programming, press 'ESC' Key.



## Ordering Information

### Selection Chart

Max. Per Phase Load	Contactor rating	MCB rating	Per Phase Max. no. of Light Points to be used				
kW	A	A	400 W	250 W	150 W	70 W	40 W
6	32	40	8	12	20	43	75
12	65	63	15	24	40	86	150

### Three Phase Street Light Panel

Frame Size	Max. Load (kW)	Contactor Rating (A)	MCB Rating (A)	Timer	SAP Code
1	6	32 / TP	40 / TPN	Digital 24 hour	IHXTS03060
1	6	32 / TP	40 / TPN	Astronomical	IHXTS0306A
2	12	65 / TP	63 / TPN	Digital 24 hour	IHXTS09120
2	12	65 / TP	63 / TPN	Astronomical	IHXTS0912A

### Single Phase Street Light Panel

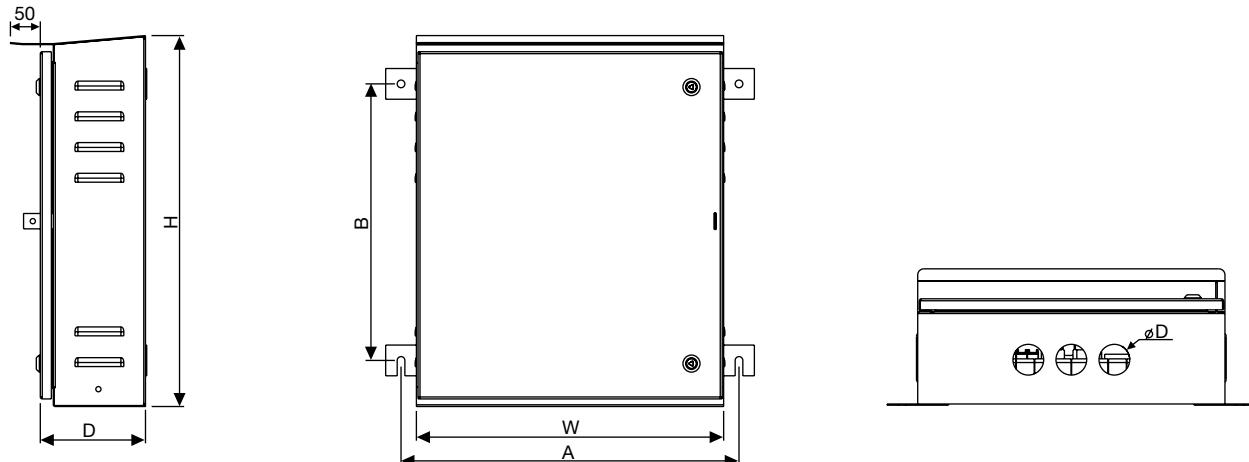
Frame Size	Max. Load (kW)	Contactor Rating (A)	MCB Rating (A)	Timer	SAP Code
1	2	20 / TP	16 / SPN	Digital 24 hour	IHXSS01020
1	2	20 / TP	16 / SPN	Astronomical	IHXSS0102A
1	4	20 / TP	20 / SPN	Digital 24 hour	IHXSS01040
1	4	20 / TP	20 / SPN	Astronomical	IHXSS0104A
1	6	32 / TP	40 / SPN	Digital 24 hour	IHXSS01060
1	6	32 / TP	40 / SPN	Astronomical	IHXSS0106A
1	12	65 / TP	63 / SPN	Digital 24 hour	IHXSS03120
1	12	65 / TP	63 / SPN	Astronomical	IHXSS0312A

### Spares

Item	SAP Code
Digital 24 hour Timer	DCTDD15016
Astronomical Timer	DCTBW01006
32 A Contactor Coil 240 Vac	ISPNCN4H
65 A Contactor Coil 240 Vac	ISPNCN6H

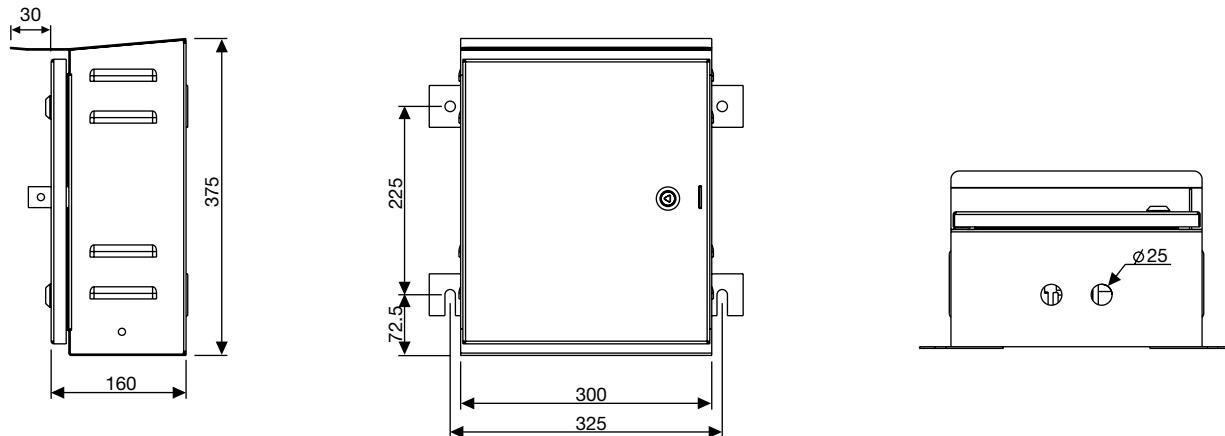
### Dimensions (in mm)

#### Three Phase Street Light Panel

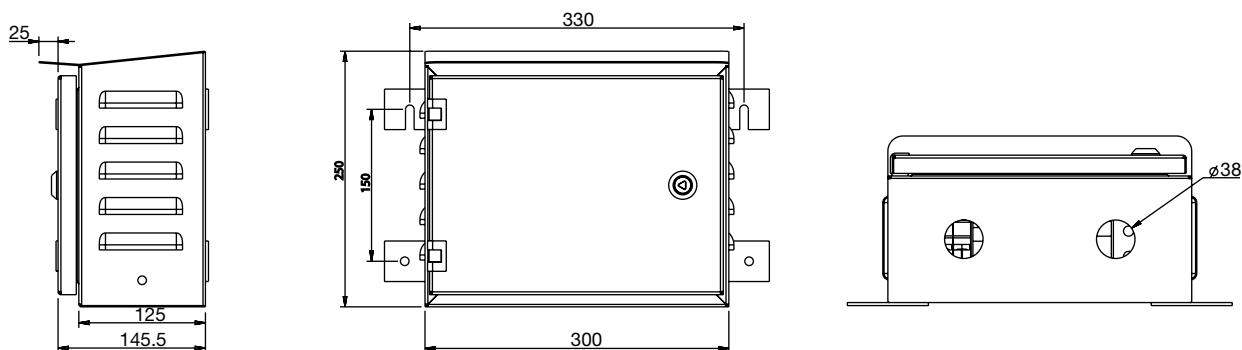


Frame	W	H	D	A	B	ØD
Size 1	400	450	170	450	350	50
Size 2	500	600	170	550	450	50

#### Single Phase Street Light Panel



\* Dimensions for 6 kW & 12 kW Single Phase Street Light Panel are common



Euroload Changeover Switches find a wide application scope wherever the reliability of electrical supply from the utilities is low and are used in lighting/motor circuits wherever continuity of supply is necessary, for switching to an alternative source from main supply and vice versa. They are switch disconnectors with independent manual operation capable of making, carrying and breaking currents under normal circuit conditions which may include operating overload conditions and also carrying currents under specified abnormal circuit conditions such as those of short circuit for a specified time. These switches are modular in construction, compact in size and suitable for stringent utilization category AC-23 A.

## Features:

- Quick make & quick break mechanism.
- High electrical & mechanical endurance.
- Advance neutral.
- Enclosed housing to avoid dust ingress.
- Staggered terminals upto 800 A.
- Load and Line reversibility.
- Provision of phase separators, add-on auxiliary switch
- Door interlock and padlock facility.
- Extended outgoing terminals.
- Available in open execution & in sheet steel enclosure.

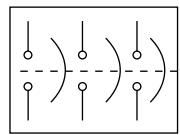
## Range :

- 40 A to 3150 A in 7 frame sizes in 4 Pole.

## Specification :

IS / IEC 60947-1 & 3.





**Euroload Changeover Switch**



## Construction



Euroload Changeover Switch has unique modular construction. The module comprises of two load switch disconnectors coupled together and mechanically interlocked with a common outgoing and operable by a single handle having I-O-II position.

The switching mechanism is quick make, quick break type independent of the speed of the operation. There are four breaks per pole thereby resulting into faster quenching of arc. The load and line can be connected on either side by virtue of isolation on both the sides. The entire switching mechanism alongwith the fixed and moving contact assembly are housed in a fiber glass reinforced Polyester, moulded frame/cover, having high dielectric strength & thermal withstand capacity.



### Contact Mechanism

The contact mechanism is knife blade type with self cleaning action during operation. The fixed contact terminals in each phase have separate main and arcing contacts. The moving contact assembly has four sets of contacts on moving carrier and the entire assembly rests on three guides on moving carrier itself, which assists in its true movement during making and breaking.

The moving contact mates with the fixed contact by slide movement of the moving contact assembly. The contact is first made with the arcing contact and thereafter with the main contact. During breaking, the arc formation is across the arcing contacts thereby protecting the main contacts which results into enhanced life of the switch. The arc is effectively quenched & confined in arc barrier in each phase.

The switches can be mounted inside a panel either in horizontal or vertical mode without any effect on the performance.



### Operating Mechanism

The operating mechanism consists of single side from operated handle which drives the spring assisted toggle mechanism, inturn operating the switch. Position indication provided on front of switch, i.e. on the operating shaft.

In position 'I', supply I (Main) is connected to the load, supply II is off.

In position 'O', supply I & II are both disconnected from the load.

In position 'II', supply II (Standby) is connected to the load, supply I is off.

Hence in none of the cases, supply I & II are connected simultaneously.





## Technical Information

Frame Size 00



Frame size	SI Unit	Size 00			
Rated Operational Current $I_e$	A	40	63	80	100
Nos. of Poles		4	4	4	4
Conventional free air thermal current $I_{th}$	A	40	63	80	100
Rated uninterrupted current $I_u$	A	40	63	80	100
Rated Operational Voltage AC $U_e$	V	415	415	415	415
Rated Insulation Voltage AC $U_i$	V	1000	1000	1000	1000
Rated Impulse Voltage $U_{imp}$	kV	8	8	8	8
Rated Frequency	Hz	50	50	50	50
Design temp./ Ambient Temp.	°C	40	40	40	40
Utilization Category		AC23 A			
Conventional Enclosed Thermal Current at 40° C $I_{the}$	A	40	63	80	100
Rated Operational Power at 415 V, 3Ø	kW	23	36	46	58
Rated Making Capacity at 436 V Rated AC 23 A, PF-0.45	A	400	630	800	1000
Rated Breaking Capacity Rated AC 23 A, PF-0.45	A	320	504	640	800
Conditional Short circuit current	kA rms	80	80	80	80
With Havells Fuse Ratings gG	A	40	63	80	100
Electrical Endurance	Operations	1500	1500	1500	1500
Mechanical Endurance	Operations	10000	10000	10000	10000
Temperature withstand range (Ambient)	°C	-5 to 40	-5 to 40	-5 to 40	-5 to 40
Min. Cu cable section	mm²	10	16	25	35
Min. Al. cable section	mm²	16	25	35	50
Terminal Bolt Size Metric thread diameter x length		M6 X 16			
Overall Dimensions H X W X D	mm	136.5 X 144 X 158			
Weight Open Execution	kg	1.5	1.5	1.6	1.6
In Enclosure	kg	4.5	4.5	4.6	4.6



## Technical Information



Frame Size	SI Unit	Size 0		
Rated operational current, $I_e$	A	125	160	200
Conventional free air thermal current, $I_{th}$	A	125	160	200
Rated uninterrupted current, $I_u$	A	125	160	200
No. of Poles		4	4	4
Rated insulation voltage, $U_i$	Vac	1000	1000	1000
Rated operational voltage, $U_e$	Vac	415	415	415
Di-electric strength, 50 Hz	kV	5	5	5
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8
Conventional Enclosed Thermal Current at 40 °C, $I_{the}$	A	125	160	200
Rated making capacity Amp, 436 Vac 23 A, p.f.- 0.35	A	1250	1600	2000
Rated breaking capacity Amp, 436 Vac 23 A, p.f.- 0.35	A	1000	1280	1600
Rated operational power at 415 V, 3Ø	kW	72	92	115
Rated conditional short circuit current	kA rms	80	80	80
Max. Allowed cut off current	kA <sub>peak</sub>	17	18	22
Electrical Durability				
No. of operating cycles AC - 23 A		1000	1000	1000
Mechanical Durability				
No. of no load operating cycles		8000	8000	8000
Temperature withstand range (Ambient)	°C	-5 to 40	-5 to 40	-5 to 40
Terminal connection				
Al. Cable/Bus Bar cross section	mm <sup>2</sup>	70	95	150
Cu. Cable/Bus Bar cross section	mm <sup>2</sup>	50	70	95
Weight				
Open Execution	kg	3.6	4	4
In Enclosure	kg	8.6	9.00	9.2

Frame Size	SI Unit	Size 1		Size 2	
Rated operational current, $I_e$	A	250	320	400	630
Conventional free air thermal current, $I_{th}$	A	250	320	400	630
Rated uninterrupted current, $I_u$	A	250	320	400	630
No. of Poles		4	4	4	4
Rated insulation voltage, $U_i$	Vac	1000	1000	1000	1000
Rated operational voltage, $U_e$	Vac	415 V	415 V	415 V	415 V
Di-electric strength, 50 Hz	kV	5	5	5	5
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8	8
Conventional Enclosed Thermal Current at 40 °C, $I_{the}$	A	250	320	400	630
Rated making capacity Amp, 436 Vac 23 A, p.f.- 0.35		2500	3200	4000	6300
Rated breaking capacity Amp, 436 Vac 23 A, p.f.- 0.35		2000	2560	3200	5040
Rated operational power at 415V, 3Ø	kW	144	184	230	362
Rated conditional short circuit current	kA rms	80	80	80	80
Max. Allowed cut off current	kA <sub>peak</sub>	27	33	39	55
Electrical Durability					
No. of operating cycles AC-23A		1000	1000	1000	1000
Mechanical Durability					
No. of no load operating cycles		8000	5000	5000	5000
Temperature withstand range (Ambient)	°C	-5 to 40	-5 to 40	-5 to 40	-5 to 40
Terminal connection					
Al. Cable/Bus Bar cross section	mm <sup>2</sup>	185	240	300	40 x 8 x 2
Cu. Cable/Bus Bar cross section	mm <sup>2</sup>	120	185	240	40 x 5 x 2
Weight					
Open Execution	kg	7.50	8.00	15.50	16.50
In Enclosure	kg	17.00	17.50	31.20	32.20

For ratings 630A & above Bus Bar Termination Recommended



## Technical Information



Frame Size	SI Unit	Size 3		Size 4	
Rated operational current, $I_e$	A	800	1000	1250	1600
Conventional free air thermal current, $I_{th}$	A	800	1000	1250	1600
Rated uninterrupted current, $I_u$	A	800	1000	1250	1600
No. of Poles		4	4	4	4
Rated insulation voltage, $U_i$	Vac	1000	1000	1000	1000
Rated operational voltage, $U_e$	Vac	415 V	415 V	415 V	415 V
Dielectric strength, 50 Hz, V	kV	5	5	5	5
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8	8
Conventional Enclosed Thermal Current at 40° C, $I_{the}$	A	800	1000	1250	1600
Rated making capacity Amp,436Vac23A, p.f.- 0.35		8000	10000	12500	16000
Rated breaking capacity Amp,436Vac23A, p.f.- 0.35		6400	8000	10000	12800
Rated operational power at 415V, 3ø	kW	460	575	719	920
Rated conditional short circuit current	kA rms	80	80	80	-
Max. Allowed cut off current	kA <sub>peak</sub>	70	86	100	-
Electrical Durability					
No. of operating cycles AC-23A		500	500	500	500
Mechanical Durability					
No. of no load operating cycles		3000	3000	3000	3000
Temperature withstand range (Ambient)	°C	-5 to 40	-5 to 40	-5 to 40	-5 to 40
Terminal connection					
Al. Cable/Bus Bar cross section	mm <sup>2</sup>	50 x 8 x 2	50 x 10 x 2	63 x 12 x 2	50 x 8 x 4
Cu. Cable/Bus Bar cross section	mm <sup>2</sup>	50 x 5 x 2	60 x 5 x 2	80 x 5 x 2	100 x 5 x 2
Weight					
Open Execution	kg	27.00	46.00	48.00	51.00
In Enclosure	kg	44.50	82.00	84.00	87.00

Frame Size	SI Unit	Size 5		
Rated operational current, $I_e$	A	2000	2500	3150
Conventional free air thermal current, $I_{th}$	A	2000	2500	3150
Rated uninterrupted current, $I_u$	A	2000	2500	3150
No. of Poles		4	4	4
Rated insulation voltage, $U_i$	Vac	1000	1000	1000
Rated operational voltage, $U_e$	Vac	415 V	415 V	415 V
Dielectric strength, 50 Hz	kV	5	5	5
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8
Conventional Enclosed Thermal Current at 40° C, $I_{the}$	A	2000	2500	3150
Rated making capacity Amp,436Vac23A, p.f.- 0.35		20000	25000	31500
Rated breaking capacity Amp,436Vac23A, p.f.- 0.35		16000	20000	25200
Rated operational power at 415V, 3ø	kW	1150	1438	1811
Rated conditional short circuit current	kA rms	80	80	80
Electrical Durability				
No. of operating cycles AC-23A		500	500	500
Mechanical Durability				
No. of no load operating cycles		3000	3000	2000
Temperature withstand range (Ambient)	°C	-5 to 40	-5 to 40	-5 to 40
Terminal connection				
Al. Cable/Bus Bar cross section	mm <sup>2</sup>	100 x 10 x 3	100 x 10 x 4	150 x 10 x 4
Cu. Cable/Bus Bar cross section	mm <sup>2</sup>	100 x 5 x 3	100 x 5 x 4	100 x 10 x 3
Weight				
Open Execution	kg	88.00	91.50	98.00

\* For ratings 630A & above Bus Bar Termination Recommended



## Ordering Information

Frame - 00		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
040	IHCNFO0040	IHCNFE0040
063	IHCNFO0063	IHCNFE0063
080	IHCNFO0080	IHCNFE0080
100	IHCNFO0100	IHCNFE0100

Frame - 0		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
125	IHCNFO0125	IHCNFE0125
160	IHCNFO0160	IHCNFE0160
200	IHCNFO0200	IHCNFE0200

Frame - 1		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
250	IHCNFO0250	IHCNFE0250
320	IHCNFO0320	IHCNFE0320

Frame - 2		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
400	IHCNFO0400	IHCNFE0400
630	IHCNFO0630	IHCNFE0630

Frame - 3		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
800	IHCNFO0800	IHCNFE0800

Frame - 4		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
1000	IHCNFO1000	IHCNFE1000
1250	IHCNFO1250	IHCNFE1250
1600	IHCNFO1600	IHCNFE1600

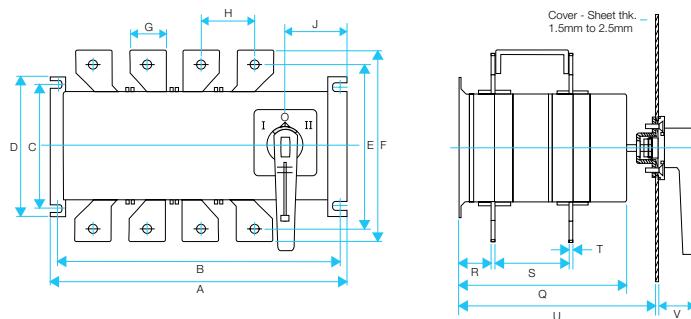
  

Frame - 5		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
2000	IHCNFO2000	IHCNFE2000
2500	IHCNFO2500	IHCNFE2500
3150	IHCNFO3150	IHCNFE3150



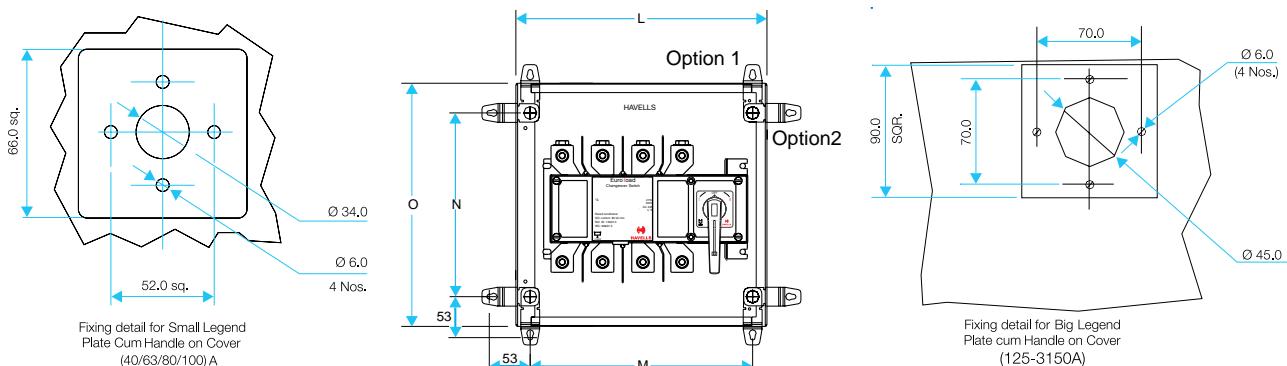


## Dimension in (mm)



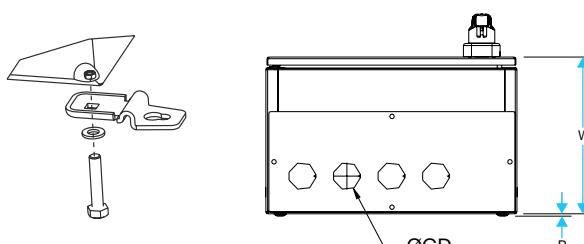
Dimensions (in mm) - Open Execution

Current (A)	A	B	C	D	E	F	G	H	J	Q	R	S	T	U	V
40A-100A	156	140	94.5	111	96.5/106.5	126	12	25.5	21	125	24.5	49	2.5	156	44
125A-200A	220	207	113	132	122	148	20/24	46	34	174	54	69	3.2	215	62
250A-320A	315	306	134	156	147/165	177/198	28/35	58/63	54	220	57	89	4	260	62
400A-630A	405	378	184	206	221/241	251/281	40/55	80	76	270	67	110	5	308	62
800A	464	430	212	234	280	330	45	97	76	292	71	120	8	342	62
1000A	575	440	290	315	331	380	60x10	100	79	362	100	143	10	416	62
1250A	575	440	290	315	331	380	70x12	100	79	362	100	143	12	416	62
1600A	575	440	290	315	331	380	70x15	100	79	362	100	143	15	416	62



Fixing detail for Small Legend Plate Cum Handle on Cover (40/63/80/100) A

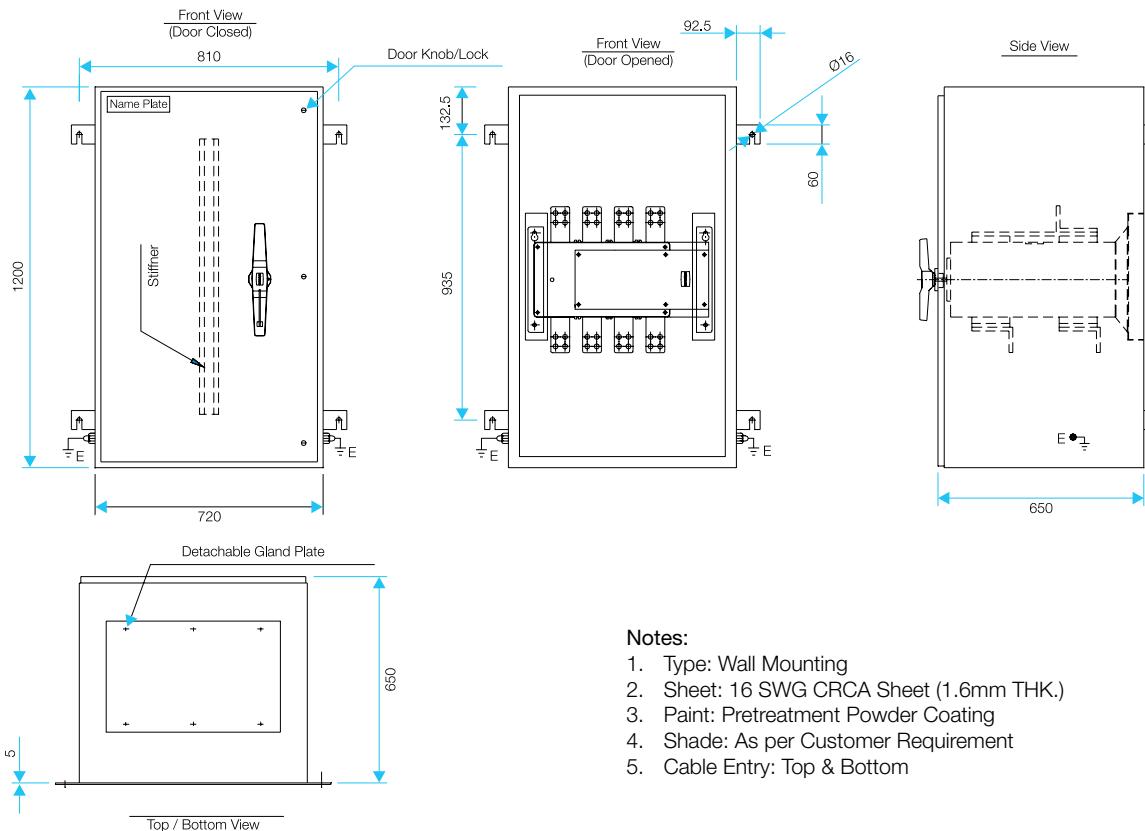
Fixing detail for Big Legend Plate cum Handle on Cover (125-3150A)



Dimension (in mm) - Enclosure

Ratings	L	M	N	O	P	W	ØGD
40A-100A	210	160	200	256	5	165	22
125A-200A	310	260	260	320	5	217	34
250A-320A	445	397	352	400	5	262	42
400A-630A	524	476	482	530	5	310	80
800A	563	515	552	600	5	345	105
1000A-1600A	740	705	530	630	6	420	-

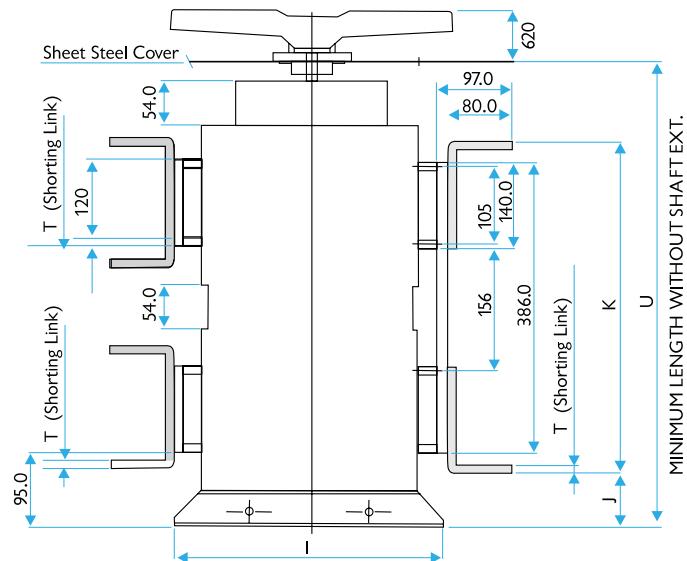
Dimensions (in mm) - with Enclosure for 2000A, 2500A & 3150A



## Notes:

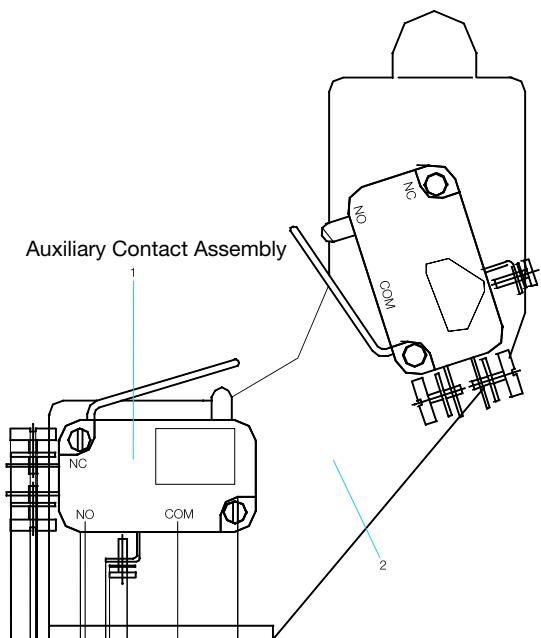
- Notes:**

  1. Type: Wall Mounting
  2. Sheet: 16 SWG CRCA Sheet (1.6mm THK.)
  3. Paint: Pretreatment Powder Coating
  4. Shade: As per Customer Requirement
  5. Cable Entry: Top & Bottom



### Dimensions (in mm) - Open Execution

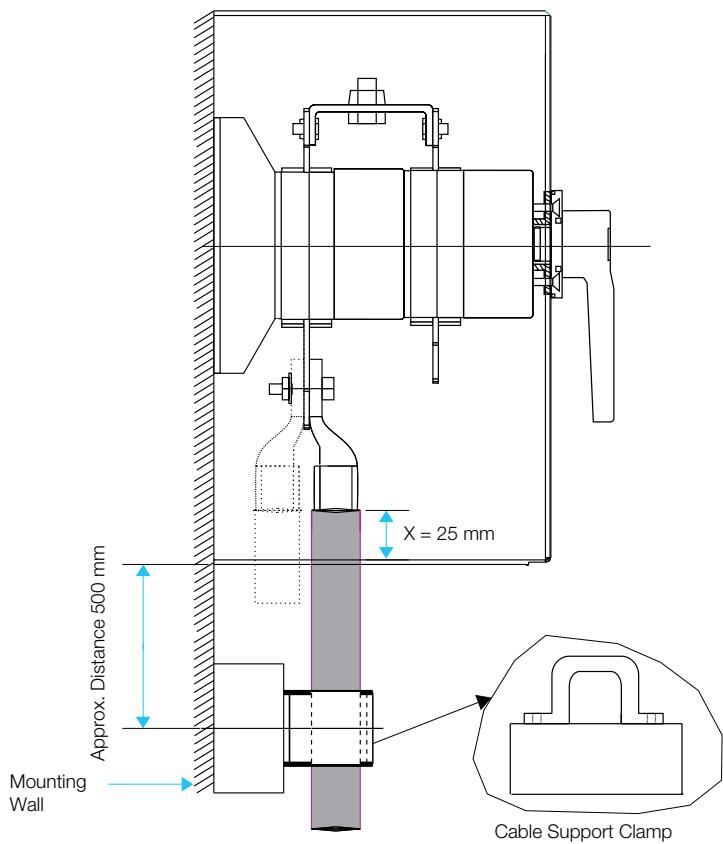
Current (A)	A	B	C	D	E	F	G	H	J	Q	R	S	T	U	V
2000A	575	440	290	315	420	470	75	100	68.5	570	66/68.5	120	12	620	62



1. Micro Switch 1NO - 1NC  
2. Mounting Frame

Accessories	
Auxiliary Contact	Cat. No.
1 No. 1 NC	IHCNFAC1CO
2 No. 2 NC.	IHCNFAC2CO

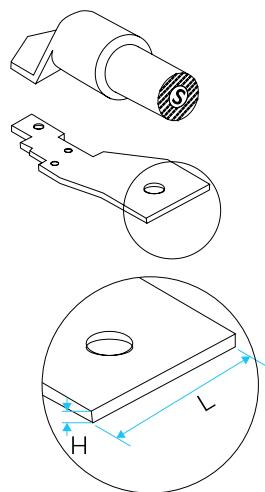
#### Switch Mounting & Cable Clamping



Note: X is the Min Clearance Between Cable Lug and Enclosure

#### Aluminium / Copper Cable / Bus Bar Size for External Termination

$I_n$	$\phi T$	S max. Nm	S max. (Al) mm <sup>2</sup>	L mm <sup>3</sup>	H mm <sup>3</sup>	mm <sup>3</sup>	Fastener Size
125 A	M8	9	70	50	3.2	20	
160 A	M8	9	95	70	3.2	24	
200 A	M8	9	150	95	3.2	24	M6 x 15
250 A	M8	9	185	120	4	28	
320 A	M10	48	240	185	4	35	
400 A	M10	48	300	240	5	40	
630 A	M10	48	2x40x8	2x40x5	5	55	M8 x 15
800 A	M12	48	2x50x8	2x50x5	8	45	
1000 A	M12	84	2x50x10	2x60x5	10	70	
1250 A	M12	84	2x63x12	2x80x5	12	70	M10 x 15
1600 A	M12	84	4x50x8	2x100x5	15	70	



Switch mountings and fitments have been detailed in installation sheets which are supplied with every switch.

Havells On-Load By-Pass Switch connects normal supply to the loads in case stabilized source fails. In fact, it By-passes the UPS/Servo Stabilizer in case of their failure and provides a means of connecting alternate supply to the load. The switch also ensures isolation of the up-stream and down-stream circuit.

## Features:

- Robust and reliable mechanism provides total disconnection.
- Quick make and break operation, independent of the operating speed enables the switches to open and close under stringent conditions, namely AC 23 A utilizations.
- The switch housing is made of fiber glass reinforced polyester, which has excellent mechanical, di-electric and thermal properties.

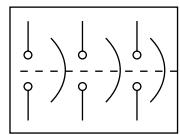
## Range :

In current ratings of 63 A-1600 A in 6 frame sizes in 4 Pole execution.

## Specification :

IS / IEC: 60947-1 & 3





Euroload By-pass Changeover Switch



## Construction



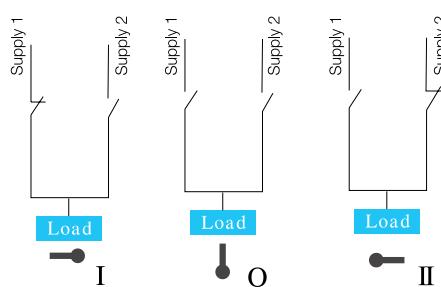
### Application

The By-pass switches are designed to meet customer specific needs particularly in IT related industries where UPS and Servo stabilizers provide main source of supply. In the event of an emergency, normal supply can be made available to the services without interrupting any installation and at the same time providing time for maintenance of UPS systems without causing break down of services.

### Operation

The By-pass Switch is operated manually with handle. It provides 3 stable positions namely :

- 0      Loads are open circuited
- I      Loads are connected to stabilized supply
- II     Loads are connected to the normal supply

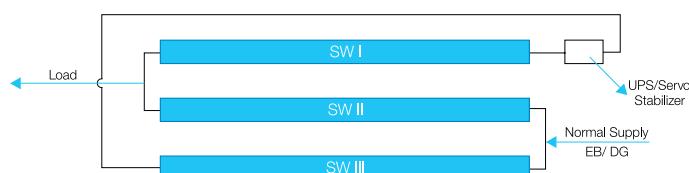


### Single Line Diagram

At 'O' position, all the contacts of the three disconnectors are open and thereby provide isolation. At 'I' position, disconnectors No. I and III are closed and disconnector II is open. Hence stabilized supply is connected to the load. At 'II' position only disconnector No. II is closed and I & III are open. Hence bypassing the UPS and connecting the load directly to normal supply.

### Auxiliary contact :

Auxiliary contacts having 1 NO. NC or 2 NO. NC configuration can be provided for indication and signaling purposes.



## Ordering Information

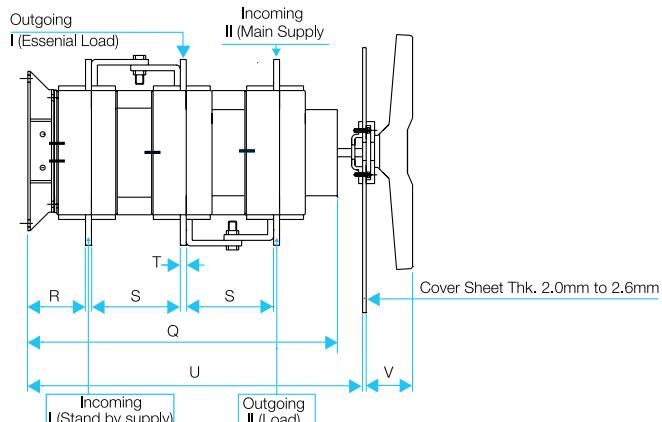
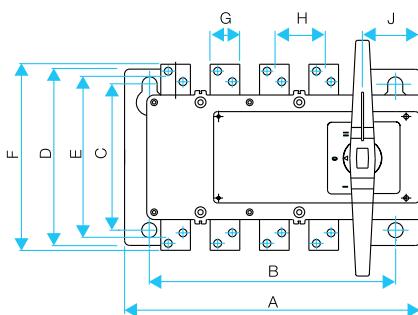
Frame Size	Current Rating (A)	Open Execution Cat. No.
00	63	IHCBF00063
00	100	IHCBF00100
0	125	IHCBF00125
0	160	IHCBF00160

Frame Size	Current Rating (A)	Open Execution Cat. No.
0	200	IHCBF00200
1	250	IHCBF00250
1	320	IHCBF00320
2	400	IHCBF00400

Frame Size	Current Rating (A)	Open Execution Cat. No.
2	630	IHCBF00630
3	800	IHCBF00800
4	1000	IHCBF01000
4	1250	IHCBF01250
4	1600	IHCBF01600



## Dimension in (mm)



Current (A)	A	B	C	D	E	F	G	H	J	Q	R	S	T	U	V
Size 63 A	144	128	95	111	120	136	12	25	29	178	26	51	2.5	210	44
Size 100 A	144	128	95	111	135	150	12	25	29	178	26	51	2.5	210	44
125	220	207	113	132	122	148	20	46	34	250	54	69	3.2	272	62
160	220	207	113	132	122	148	24	46	34	250	54	69	3.2	272	62
200	220	207	113	132	122	148	24	46	34	250	54	69	3.2	272	62
250	315	300	134	156	165	198	28	58	54	331	57	89	4.0	337	62
320	315	300	134	156	165	198	35	63	54	331	57	89	4.0	337	62
400	405	378	184	206	221	251	40	80	76	385	67	110	5.0	405	62
630	405	378	184	206	241	281	55	80	76	385	67	110	5.0	405	62
800	464	430	212	234	280	330	45	80	76	420	71	120	8.0	440	62
1000	575	440	290	315	331	380	70	100	85	514	101	145	10.0	534	62
1250	575	440	290	315	331	380	70	100	85	514	100	143	12.0	534	62
1600	575	440	290	315	331	380	70	100	85	514	98.5	140	15.0	534	62

## Technical Information

Frame size	SI Unit	Size 00		Size 0			Size 1		Size 2		Size 3		Size 4	
Rated Operational Current $I_e$	A	63	100	125	160	200	250	320	400	630	800	1000	1250	1600
Rated Insulation Voltage $U_i$	Vac						1000							
Conventional free air thermal current $I_{th}$	A	63	100	125	160	200	250	320	400	630	800	1000	1250	1600
Conventional enclosed thermal current $I_e$	A	63	100	125	160	200	250	320	400	630	800	1000	1250	1600
Rated uninterrupted current $I_u$	A	63	100	125	160	200	250	320	400	630	800	1000	1250	1600
Rate Operational Voltage $U_e$	Vac						415							
Dielectric Strength 50 Hz	kV	5	5	5	5	5	5	5	8	8	10	10	10	10
Rated impulse withstand voltage ( $U_{imp}$ )	kV						8							
Conditional short circuit current	kA rms						80							
Making Capacity 436 V, AC 23 A PF-0.45 (100 A) / - 0.35 ( $I_e > 100$ A)	A	630	1000	1250	1600	2000	2500	3200	4000	6300	8000	10000	12500	16000
Breaking Capacity 436 V, AC 23 A PF-0.45 (100 A) / - 0.35 ( $I_e > 100$ A)	A	504	800	1000	1280	1600	2000	2560	3200	5040	6400	8000	10000	12800
Mechanical Durability		10000		8000			8000	5000	5000		3000	3000		
Electrical Durability		1500		1000			1000		1000		500	500		
Terminal Connection		25		50	70	95	150	185	240	300	40x8x2	50x8x2	50x10x2 63x12x2 50x8x4	
Aluminium Cable/Busbar Cross-section mm <sup>2</sup>	mm <sup>2</sup>	16	35	50	70	95	120	185	240	40x5x2	50x5x2	60x5x2 80x5x2 100x5x2		

The need for continuous power supply and its reliability has increased rapidly over the years, especially in all those areas where uninterrupted power supply is a must. Modern systems are power dependent. Their complexity has increased as continuous information and communications are needed to control automated process, be in industries, commercial complexes, hospitals, hotels or even modern residences.

The need, as such, for independent stand by power system has therefore increased manifold. The power distribution, control, monitoring and protection of stand by power system needs to be integrated. Stand by generator systems, for example, are required to cater to :-

- **Sensitive Loads** are supplied by UPS systems. The period of non-availability of power, before the stand by supply takes over, is bridged by battery banks. Typical loads are computers, hospital equipments, micro processor controlled industrial machines etc.
- **Critical Loads** mostly involve stand by generator systems which supply power to lighting systems, air conditioning, elevators etc in Airports, Hotels and commercial complexes.
- **Essential Loads** also use stand by generator systems mostly in process industries as they relate to high restarting times or high down times. Automatic transfer from main supply to stand by supply is vital for all the above kinds of loads.

In the event of power failure, the stand by power is usually expected to take over automatically. Electrical starting equipment, battery bank and diesel generator are required for the automatic operation.

The automatic transfer is achieved mostly by automatic mains failure systems. The process of onload transfer has to be monitored & controlled for a smooth Changeover and within safety limits of all elements of the system. This is achieved by Automatic Transfer Switch (ATS).

## Features:

- High speed transfer
- Superior making & breaking capacity
- Compact & light weight design
- Positive indication through flag indicator
- Neutral point transfer
- Liberal terminals
- Phase barriers Range
- Release operates in 2 modes - automatic and manual

## Range :

Current rating from 100 A to 630 A in four frame sizes in three pole and four pole execution.

## Specification :

Conforms to IS/IEC:60947-6-1





Automatic Transfer Switch



## Construction

The Switch comprises of upto four symmetrical poles coupled with the Main Operating Mechanism. The switching mechanism is quick make, quick break type. Load terminals are given on the Lower side but can also be provided on the upper side.

### Contact Mechanism

The contact system is housed in a frame made of Polyester reinforced glass material. Each pole has two independent set of Moving contact assemblies for Main & standby supply and one Fixed contact assembly for the common outgoing load terminals. The Moving assemblies are mechanically operated by Cams when rotated by the Main Operating Mechanism. Moving Contacts make on to Fixed Contacts under constant pressure with backup spring. Main Contacts are made of Silver-Tungsten to ensure anti-weld characteristics. The Arc Chute plates placed in the path of contact, efficiently quench the Arc and there by enhance the life of the contacts.

### Main Operating Mechanism

The main mechanism independently actuates two sets of Cam linkages, which in turn operate the two independent moving contact assemblies.

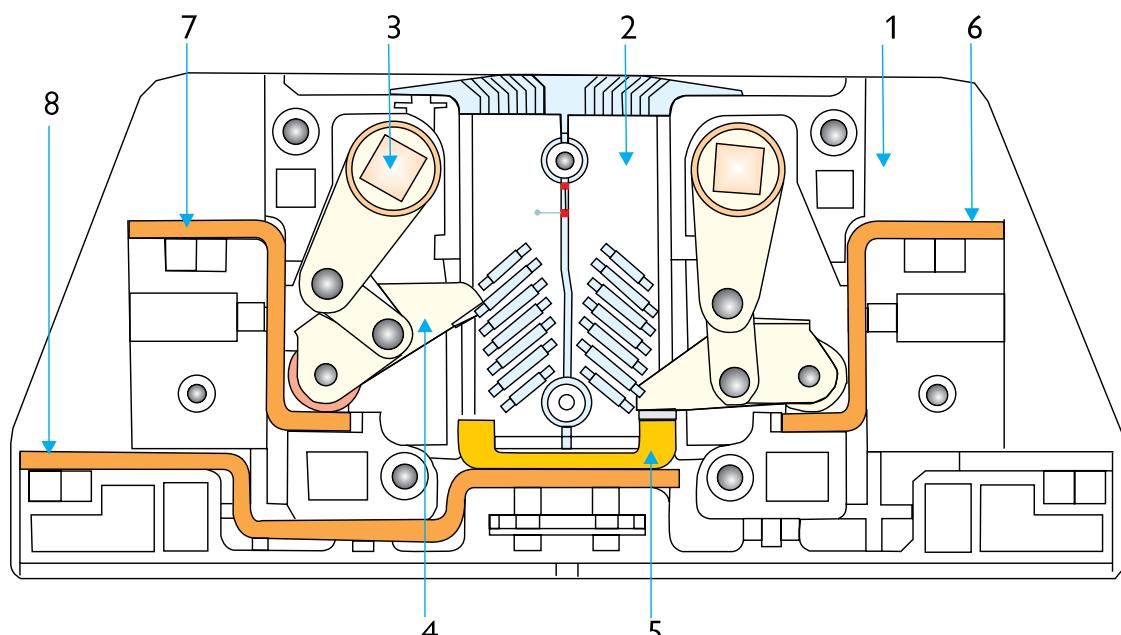
The closing command is through a Solenoid Coil supplied with 220 Vac. The operating mechanism always responds by closing on the main supply side and not on to standby supply side, when both supplies are present.

The tripping coil, when energised, is used to bring the ATS to OFF / Neutral position.

Closing on to the standby supply is achieved through the selective coil. The energisation of selective coil, disengages the main mechanism and prevents closing on to the main supply. The solenoid coil can then close the second set of moving contacts on to the standby supply.

The moving contact mechanism of the main supply and the standby supply are inherently mechanically interlocked through a double throw arrangement, which ensures that at no point of time two supplies are paralleled.

**Cross Sectional View of Single Pole of ATS**

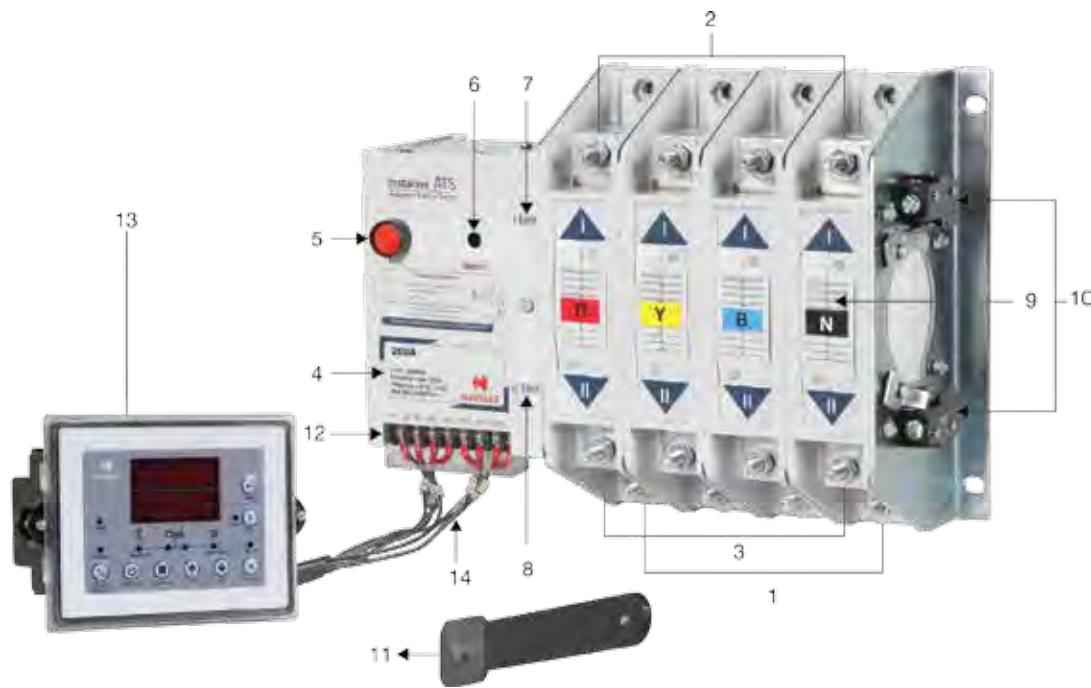


- 1 Frame
- 2 Housing for Arc Chute
- 3 Operating Shaft for Contacts
- 4 Moving Contact

- 5 Fixed Contact
- 6 Main Supply - Incoming Terminals
- 7 Standby Supply - Incoming Terminals
- 8 Common outgoing - Load Terminals



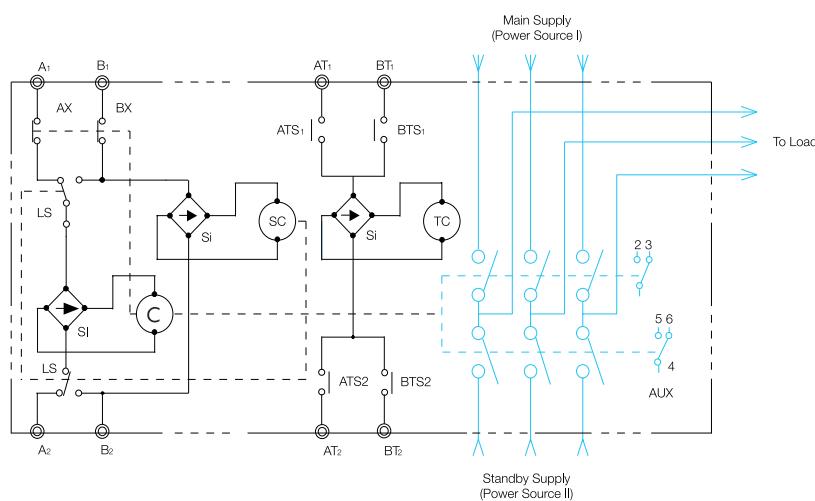
## External view with identification of parts



- |                             |                                    |                                    |
|-----------------------------|------------------------------------|------------------------------------|
| 1. Terminals For Load       | 6. Selector (Source-II)            | 11. Manual Operating Handle        |
| 2. Main Supply Terminals    | 7. On / Off Indicators (Source I)  | 12. Control Circuit Terminal Block |
| 3. Standby Supply Terminals | 8. On / Off Indicators (Source II) | 13. ATS Controller Unit            |
| 4. Name Plate               | 9. Arc Extinguishing Chambers      | 14. Control Wiring                 |
| 5. Trip Button              | 10. Auxiliary Switch (2 nos.)      |                                    |

## Operation

### I - Automatic



In the event of main supply being available, the ATS can be instantaneously switched ON, by the closing coil C, through terminals A1, A2, from its OFF / Neutral position.

If the ATS is ON at the standby supply position, then it is first tripped by the trip coil TC, through terminals BT1 - BT2. This ensures that the two sources of supply are not paralleled. A suitable external control circuit will ensure this, as shown in circuit diagram for Automatic Instantaneous Changeover mode.

The Auxiliary Switches AX or BX, disconnect the closing coil C, once the ATS is ON, thereby the power consumption of the coil C is zero, when the ATS is closed.

To switch the ATS to standby supply, the selective coil SC is first energised. Then the closing coil C is powered through limit switches LS and terminals B1, B2.

The Trip Coil TC, can be energised through AT<sub>1</sub> - AT<sub>2</sub> or BT1 - BT<sub>2</sub> to switch off the main supply or standby supply.



## II - Manual



*Click to lock*



*Keep selector pressed using a screwdriver*

ATS can be operated manually, but as an off-load switch only.

### Close on to Main Supply

A manual handle rotates the operating shaft by about 45° in anticlockwise direction, to achieve closure, under off-load conditions.

### Close on to Standby Supply

Closure on to standby supply side is achieved, when the "selective" mode is continuously pressed and the manual handle rotates the operating shaft by about 45° in anticlockwise direction.

**Trip:** Tripping can be achieved manually by pressing momentarily through the "Trip Button".

### Closing ATS manually to source-II

1. Keep selector pressed using a screwdriver through the selector hole as shown
2. Switch to source-II (mains) by rotating the handle upwards though an angle (approximately 45°)

### Closing ATS manually to source-I

Switch to source-I (mains) by rotating the handle upwards though an angle (approximately 45°)

## Technical Information



Frame Size	SI Unit	TNFO1			TNFO2	
Rated Operational Current $I_e$	A	100	125	160	200	250
Conventional free air thermal current $I_{th}$	A	100	125	160	200	250
Rated Operational Current $I_{the}$	A	100	125	160	200	250
Rated uninterrupted Current $I_u$	A	100	125	160	200	250
No. of Poles		3P / 4P	3P / 4P	3P / 4P	3P / 4P	3P / 4P
Rated Insulation Voltage $U_i$	V	1000	1000	1000	1000	1000
Rated Operational Voltage $U_e$	V	415 Vac / 110 Vdc			415 Vac / 110 Vdc	
Rated frequency	Hz	50	50	50	50	50
Class		PC	PC	PC	PC	PC
Utilization Category		AC 31 A	AC 31 A	AC 31 A	AC 31 A	AC 31 A
Di-electric Strength	kV	5	5	5	5	5
Rated Impulse withstand Voltage $U_{imp}$	kV	8	8	8	8	8
Rated making capacity at 415 V ( $\text{Cos}\phi = 0.80$ )	A	150	187.5	240	300	375
Rated breaking capacity at 415 V ( $\text{Cos}\phi = 0.80$ )	A	150	187.5	240	300	375
Rated short time withstand current (1 sec)	kA rms	5	6	7	10	11
Rated Conditional short circuit current	kA rms	80	80	80	80	80
Rated Short circuit making capacity	kA rms	7.65	14	17	17	17
Mech. Life (No. of ops.)		10,000	10,000	10,000	10,000	10,000
Elect. Life (No. of ops.)		6,000	6,000	6,000	6,000	6,000
Switching frequency (ops. per Hr)		60	60	60	60	60
Terminal Position		Front	Front	Front	Front	Front
Terminal Capacity - Cu (cable)	mm²	35	50	70	95	150
Al (cable)	mm²	50	70	95	150	185
Busbar	mm	---	---	---	---	---
Weight 3P kg		8.3	8.3	8.7	10.5	10.5
4P kg		9.3	9.3	9.7	11.5	11.5
Mounting		Vertical	Vertical	Vertical	Vertical	Vertical
Coil						
Operating Voltage	V	200 / 220	200 / 220	200 / 220	200 / 220	200 / 220
Operating Current	A					
Main Coil 3P / 4P		3.0 / 3.5	3.0 / 3.5	3.0 / 3.5	4.0 / 4.5	4.0 / 4.5
Trip Coil		0.5	0.5	0.5	0.5	0.5
Operating Time	(ms)					
Main Power Source	Make	55	55	55	55	55
	Break	20	20	20	20	20
Standby Power Source	Make	80	80	80	80	80
	Break	20	20	20	20	20
Changeover time		(Using Controller Mode)				
Changeover time				min	-	0.1 sec
				max	-	60 sec

3 P - Three Pole, 4 P - Four Pole



## Technical Information



Frame Size	SI Unit	TNFO3		TNFO4	
Rated Operational Current $I_e$	A	315	400	500	630
Conventional free air thermal current $I_{th}$	A	315	400	500	630
Rated Operational Current $I_{the}$	A	315	400	500	630
Rated uninterrupted Current $I_u$	A	315	400	500	630
No. of Poles		3P/4P	3P / 4P	3P / 4P	3P / 4P
Rated Insulation Voltage $U_i$	V	1000	1000	1000	1000
Rated Operational Voltage $U_e$	V	415 Vac / 110 Vdc			
Rated frequency	Hz	50	50	50	50
Class		PC	PC	PC	PC
Utilization Category		AC31 A	AC 31 A	AC 31 A	AC31 A
Dielectric Strength	kV	5	5	5	5
Rated Impulse withstand Voltage $U_{imp}$	kV	8	8	8	8
Rated making capacity at 415 V ( $\text{Cos}\phi = 0.80$ )	A	473	600	750	945
Rated breaking capacity at 415 V ( $\text{Cos}\phi = 0.80$ )	A	473	600	750	945
Rated Conditional short circuit current	kA rms	12	12	12	15
Fuse protected S/C withstand current	kA rms	80	80	80	80
Rated Short circuit making capacity	kA rms	17	17	17	25.2
Mech. Life (No. of ops.)		10,000	10,000	10,000	10,000
Elect. Life (No. of ops.)		4,000	4,000	4,000	2,000
Switching frequency (ops. per Hr)		60	60	60	60
Terminal Position		Front	Front	Front	Front
Terminal Capacity - Cu (cable)	mm <sup>2</sup>	185	240	---	---
Al (cable)	mm <sup>2</sup>	240	300	---	---
Busbar	mm	---	40 x 5 x 2	40 x 6 x 2	40 x 8 x 2
Weight 3P kg		11	18	18	19.5
4P kg		12	21	21	22.5
Mounting		Vertical	Vertical	Vertical	Vertical
Coil					
Operating Voltage	V	200 / 220	200 / 220	200 / 220	200 / 220
Operating Current	A				
Main Coil 3P / 4P		4.0/4.5	8.0/10.5	8.0/10.5	8.0/10.5
Trip Coil		0.5	0.7	0.7	0.7
Operating Time	(ms)				
Main Power Source	Make	55	60	60	60
	Break	20	25	25	25
Standby Power Source	Make	80	90	90	90
	Break	20	25	25	25
Changeover time		0.1 sec			
Changeover time		60 sec			

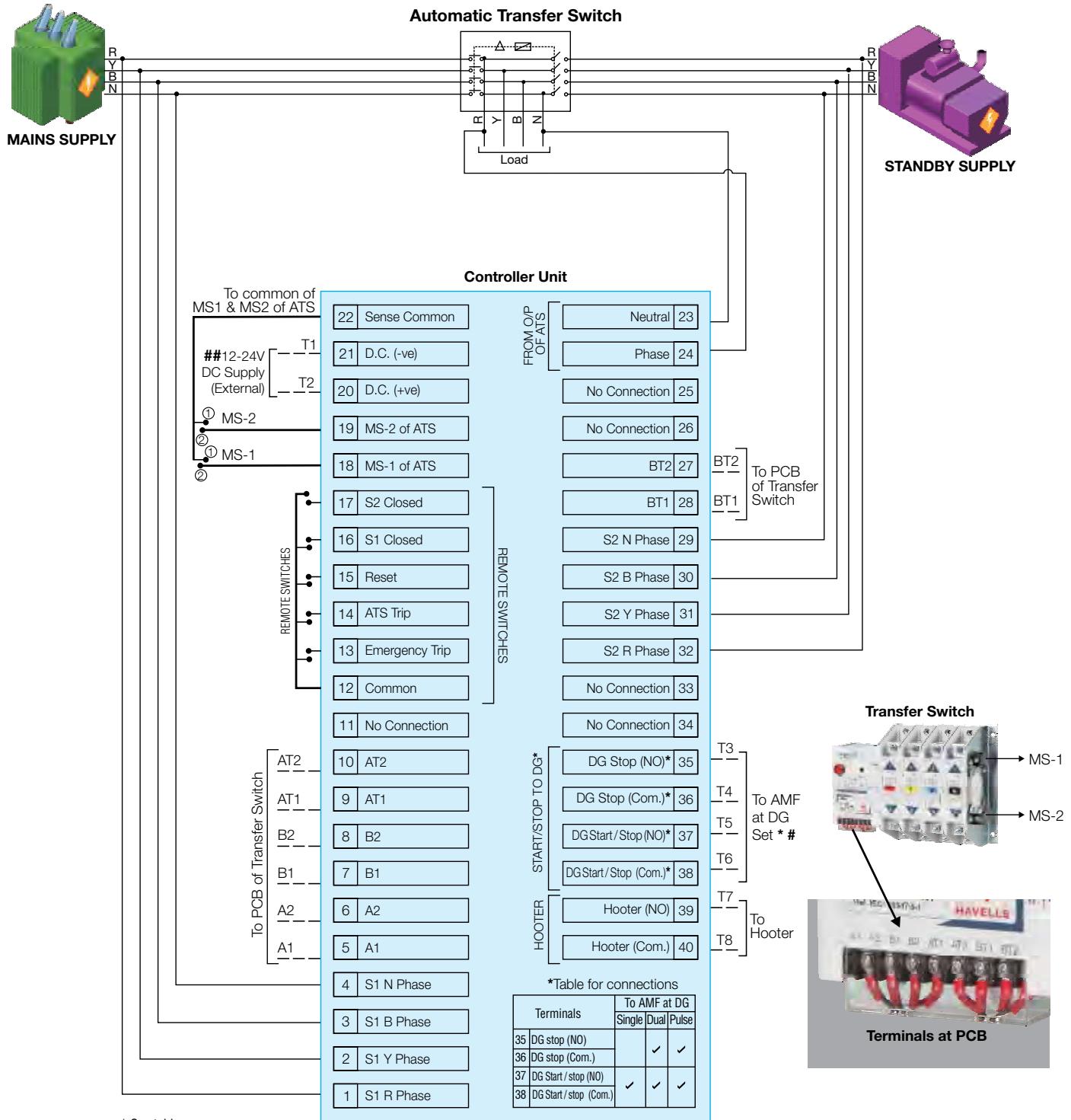
3 P - Three Pole

4 P - Four Pole



## Circuit Diagram

### Circuit Wiring Diagram



\* See table.

# Not required in Changeover (C) mode.

##Not required in Changeover (C) mode for operation.



## ATS Controller

### Introduction

- Havells ATS controller can be programmed for both ATS and Changeover (C) configurations.
- Both these configurations can be further operated in both Auto and Manual modes.
- Communication (Start / Stop) feature with DG for automatic starting and stopping of DG.
- In the Changeover mode, no external 12 Vdc supply is required for its operation.
- 3 types of provision for DG start/ stop command- Single Contact, Dual Contact or Pulse Contact.
- Capable of measuring 1 Phase / 3 Phase Voltage of both mains & DG, along with the mains frequency.
- Inbuilt protection for mains against Under/Over Voltage, Under/Over Frequency and the phase failure.
- Suitable for both Utility-DG and Utility-Utility applications
- Eight LED annunciations on its front panel to indicate the Source & Contacts Status.
- Records the last 50 events with date and time stamping
- 6 Digit, 2 Row, Alpha Numeric LCD Display with 7 segments for ease of readout.
- True RMS measurement of all measured parameters.
- Display of parameters in the auto scrolling mode which can be enable and disabled.
- Plug in connectors for prompt and error free replacement.

### ATS Configuration:

ATS controller monitors the Mains (S1) supply, if Mains (S1) supply varies beyond set limit of under/over voltage or under/over frequency for more than their individual programmed supervision time, ATS releases the Mains (S1) contacts, trips and the potential free contact(s)\* becomes NC to send a command to the AMF controller at DG Set (Source 2) to start it. On restoration of healthy Mains (S1) supply continuously for the programmed duration, the ATS releases the DG Set (Source 2) contacts, trips and the potential free contact(s)\* becomes NO which in itself acts as a command to the AMF controller at DG Set (Source 2) to stop it. The load is transferred to the mains (S1) and the generator is stopped after the programmed re-cooling time delay.

### Changeover Configuration:

This is similar to ATS configuration only except that the communication (Start/Stop) with the DG Set (Source2) is disabled. Also, in this mode, no external 12-24 Vdc. supply is required for its operation. The controller monitors the Mains supply, if Mains (S1) supply varies beyond set limit of under/over voltage or under/over frequency for more than their individual programmed supervision time, the ATS releases the Mains (S1) contacts and trips. In case, the source 2 becomes available in healthy condition, it shifts the contacts to DG (Source 2), otherwise it rests in TRIP position only. On restoration of healthy Mains (S1) supply continuously for the programmed duration, the ATS releases the source 2 contacts, trips and shifts the contacts to source1 to transfer the load to the Mains (S1) supply. In this configuration, in case if both the Mains (S1) and DG (S2) supplies are unavailable / unhealthy, then only to turn ON the display, the external 12-24 Vac supply is required.

### \*Potential Free Contacts for DG Start/Stop:

There are three types of potential free contacts for DG Start/Stop:

- i) **Single Contact:** Single potential free contact (at 37-38) is used for both Start & Stop. This potential free contact becomes NC to send a command to the AMF controller at DG Set (Source 2) to start it. And to give the Stop command, these contacts become NO and the same is the position by default also.
- ii) **Dual Contact:** Two separate potential free contacts are used, one each for Start & Stop to the AMF controller at DG Set (Source 2). To give the Start command, the potential free contact at 37-38 becomes NC and the other at 35-36 remains at NO position. Similarly, to give the Stop command the potential free contact at 35-36 becomes NC while the other at 37-38 becomes NO and the same is the position by default also.
- iii) **Pulse Contact:** This is similar to Dual contact (ii) only, except that the Start/Stop commands are given for a pulse duration (1 second) to the AMF controller at DG Set (Source 2). By default, both the potential free contacts remain at NO position. To give the Start command, the potential free contact at 37-38 becomes NC for a pulse duration of 1 second and then comes back to the NO position. Similarly, to give the Stop command, the potential free contact at 35-36 becomes NC for a pulse duration of 1 second and then comes back to the NO position.



## Display / Front Panel



- 6 Digit, 2 Row, Alpha Numeric, 7 segment display for ease of readout. Parameters are displayed in English. Normally the display auto scrolls and displays a parameter for 10 seconds, but any time the Next key (✓) can be pressed to select the next parameter window.

## Measurements, Protection and Supervision

### Measurements

- 1 Phase/ 3 Phase Voltage of mains
- Mains Frequency
- 1 Phase/ 3 Phase Voltage of DG

### Protection / Supervision Mains

- Under/Over Voltage
- Under/Over Frequency
- Phase Fail

### View Event Recording

Last 50 events can be viewed with date and time stamping

### Faults

- Trip Fail
- S1 Close Fail
- S2 Close Fail
- Emergency Trip (ATS)
- Fail To Start (DG/ Source 2)
- Fail To Stop (DG/ Source 2)

## Input and Output

### Potential Free Output:

ATS controller has 3 potential free output as below:

- Hooter (Com.)
- DG Start/Stop (Com.)
- DG Stop (Com.)
- Hooter (NO)
- DG Start / Stop (NO)
- DG Stop (NO)

### Digital Input:

ATS controller has 6 digital input as below

- MS-1 of ATS
- MS-2 of ATS
- Reset
- Emergency Trip
- S1 Closed
- S2 Closed
- ATS Trip

### Output:

ATS Controller has 8 outputs :

- |      |      |       |       |
|------|------|-------|-------|
| • A1 | • B1 | • AT1 | • BT1 |
| • A2 | • B2 | • AT2 | • BT2 |



## Specifications

AC voltage withstand	330 Vac (Phase to neutral)
Surge 1.2/50Usec	2.5 kV
Control Supply	Suitable for 12 Vac - 24 Vac (External) Supply
Cut out Dimensions	154 mm X 116 mm
Depth	72 mm

## LED Annunciations Description:

ATS Controller has eight annunciations on its front panel. These either announce the faults or indicate the supply & contacts' status of the system.

Nomenclature	Description
Auto	Led lights up when ATS controller is in Auto mode
Manual	Led lights up when ATS Controller is in Manual mode
Trip	Led light up when ATS is in tripped position
Source 1	LED lights up continuously if Mains is healthy and starts blinking in case Mains is absent or unhealthy
Source 1 Contacts	LED lights up in case the load is connected to Mains (Source 1)
Source 2 Contacts	LED lights up in case load is connected to DG (Source 2)
Source 2	LED lights up continuously if Generator supply is healthy and starts blinking in case Generator supply is unhealthy. By default, this LED remains OFF in case DG (S2) is in turned OFF (or Stop) state.
Fault	This LED blinks in case of fault

## Switches Description

ATS Controller has 8 switches provided on its front panel. The table below describes the operation of these.

Switch Symbols	Switch Function	Description
	Next	Normal operation mode: In this mode, it is used to change the measured system parameters being displayed on the LCD. Edit Parameter Mode: Next key is used to select or go to the next parameter to be edited.
	DG Start	It is used to send the start command to DG (S 2) in Manual mode.
	DG Stop	It is used to send the stop command to DG (S 2) in Manual mode.
	Reset	It resets the signals of Hooter, Faults, Emergency trip etc. The first press shall reset the hooter and next shall reset the faults. A long press of 1 Sec shall reset the both.
	Edit Parameter	If both these keys are pressed simultaneously, then the unit enters Edit Parameter Mode
	S 1	In Edit Parameter mode, it increment the values. In Normal Operation (Manual Mode), it is used to transit load from TRIP to Mains (S 1).
	S 2	In Edit Parameter mode, it decrement the values. In Normal Operation (Manual Mode), it is used to transit load from TRIP to DG Set (S 2).
	Auto / Manual	It is used to enter the Auto or Manual modes alternatively (on pressing).
	Trip	It is used to trip the ATS (either from Mains (S 1) or DG Set (S 2)).



## Setting Procedure:

Press Next & Reset switches simultaneously. The LCD shall display, "Edit"

To enter edit Parameter setting mode press Next Switch For any change in value in edit parameter press S1 switch and S2 switch.

### Edit:

Parameter Name on LCD & Icon	Explanation of Parameter	Factory Setting	Setting Range
SYS Ph	It is possible to select ATS and changeover configurations for any combination of Mains phases (1/3) and DG phases (1/3), where "C" indicates the changeover configuration. e.g. the factory setting " C 3M 3G" indicates to operate the ATS in changeover configuration and both Mains and DG are 3-phase systems.	C 3M 3G	C 1M 1G C 3M 1G C 3M 3G 1M 1G 3M 1G 3M 3G
S1 OV	Max. Permissible Mains voltage, above this the Mains voltage is treated unhealthy or over voltage condition.	270 V	080-300 V
S1 UV	Min. permissible voltage, below this the voltage is treated unhealthy or under voltage condition.	180 V	80-300 V
VD	Duration for which Mains Over / Under voltage condition is to be tolerated before tripping the ATS.	10	1-999 Sec.
OF	Max. permissible Mains frequency, above this frequency the Main is treated unhealthy or over frequency condition.	55.0 Hz	40.0-65.0 Hz
UF	Min. permissible Mains frequency, below this frequency the Mains is treated unhealthy or under frequency condition.	45.0 Hz	40.0-65.0 Hz
S1 Fd	Time for which the unhealthy Mains frequency is to be tolerated (under or over frequency as defined above) before tripping the ATS.	10	1-999 Sec.
S2 PV	This parameter specifies the generator voltage at which it is considered to be in healthy condition.	200 V	80-270 V
S1 FL	Some application require to trip the ATS on failure of one of the phases. Others want all the 3 phases to become unhealthy before tripping the ATS. The ATS Controller can handle both situations.	1P FAIL	1P FAIL 3P FAIL
StRT T	The time, for which the Controller will give starting command to the Generator*	150 Second	0-999 Second
S2 WT	DG (S2) warm up time after DG build up voltage has crossed the set limit (S2 PV).	0 Second	0-999 Second
S1 S2 d	User programmable delay when the load is transferred from Generator to Mains.	2.0 Second	0-99.9 Second
S1 RT	The time for which Mains should be continuously healthy before the load is transferred from DG (S2) to Mains (S1).	10 Second	1-999 Second
RCOL	The time for which after transferring load to Mains from DG (S2), the DG is allowed to run at no load for cooling. After this time the stop command is sent to the DG (S2).	10 Second	1-999 Second
C Ty	The type of potential free contacts which goes to the AMF at DG to give the start / stop command (Refer page 10 for potential free contacts).	S CO	P CO (Pulse) d CO (Dual) S CO (Single)
StOP T	The time for which the controller gives the stopping command to DG (S2).	20 Second	0-999 Second
HOOTER	Duration for which the hooter shall be ON (if not externally reset), while announcing a fault or emergency trip.	30 Second	0-999 Second
AUTO S	Setting ON will enable Auto Scroll of display. Disabling this will not scroll and the next parameters can be viewed by pressing next switch.	ON	ON / OFF

\*Not required in Changeover (C) mode.

### View Event:

Press Next and Reset Switches simultaneously. The LCD shall display "Edit".

To go to next menu after the "Edit" press S1 Switch, the LCD shall display "View Event". To View Display Event mode press Next Switch. ATS keeps a log of last 50 events. Parameter change, RTC Change, Mode Change and Fault are considered as event. Events are stamped along with date and time and to view them, keep on pressing Next Switch. To come out of this "View Event" mode, press the Reset switch.

### RTC Set:

After the "View Event" is displayed press S1 Switch, the LCD shall display "RTC set". To change the RTC (real time clock) press Next Switch. Firstly, the YEAR shall be displayed. For feeding value, use the S1 & S2 switches. Then pressing the Next switch, MON (Month) will be displayed. Similarly, then date, then SEC (seconds), MIN (minutes) and HOUR (hours) can be edited.



## ATS / Changeover Configuration

### ATS Configuration

#### Auto Mode

ATS controller monitors the Mains (S1) supply, if Mains (S1) supply varies beyond set limit of under/over voltage or under/over frequency for more than their individual programmed supervision time (S1 VD/FD), the ATS releases the Mains (S1) contacts, trips and sends a start command to the DG (S2). After successful start of the Dg (S2), the controller checks for the build-up voltage. If it crosses the limit "S2 PV" then it is considered that the DG supply is healthy. After this, it is allowed to warm up for a user programmed time before the load is transferred to generator.

If generator fails to start within the set "STRT T" time, the fault LED lights up along with the message on the display, indicating the start failure and the hooter is switched on. Also, in case if the DG (S2) voltage drops below the programmed "S2 PV" limit, the ATS trips & the fault LED lights up along with the message on the display (S2 VOL) and the hooter is switched on.

On restoration of healthy mains supply, continuously for the programmed duration (S1 RT), the ATS trips, the load is transferred to the mains and the controller allows the DG to run on no load for the programmed duration (R COL) for cooling. After this, the controller sends a STOP command to the DG (S2) to stop it.

In case, if the DG (S2) fails to stop within the set 'STOP T' time, the fault LED starts blinking along with the message on the display, indicating the stop failure and hotter is switched ON. To reset the Start / Stop fault, firstly the fault needs to be cleared by making the generator OFF.

#### Manual Mode

In this mode, the engine has to be started by manually pressing "DG Start" switch. The "DG Start" switch shall not operate if DG (S2) contact is already closed. Once the DG (S2) is started, the load can be switched to DG (S2) side by pressing "S2" switch. At any given time, any one either Mains (S1) or DG (S2) can be made operational. Attempt of pressing switch "S2" while load is connected to Mains (S1) and vice-versa will be denied. The controller will show a warning message to Trip the ATS first. For tripping, press the "Trip" switch.

To stop the DG (S2), first trip the ATS by pressing "Trip" switch and press "DG Stop" switch. By this, after the delay as per programmed "R COL" time, the controller will send the stop command to the DG (S2). Any attempt to stop the DG (S2), while the DG (S2) contact of ATS is engaged, shall be denied.

During the remote operation, the function of all the switches- "S1", "S2", "Reset" & "Trip" will remain the same as it was with the switches on the front fascia of the controller unit. Along with this we have "Emergency Trip" command in remote operation which will immediately trip the ATS as required in case of emergency. This emergency tripping will be unlike normal tripping which will light up fault LED and hooter will get ON.

## Changeover (C) Configuration

#### Auto Mode

This is similar to ATS configuration only except that the communication (Start/Stop) with the DG (S2) is disabled. Also, in this mode, no external 12-24 Vdc. supply is required for its operation. It automatically takes the power (control supply) from Mains (S1) or DG (S2) whichever is available for its operation. The controller monitors both the supplies, the Source 1 & Source 2, and shifts the contacts towards that supply which ever is available in healthy condition continuously for the user programmed duration keeping the Source 1 on priority.

If Source 1 supply varies beyond set limit of under/over voltage or under/over frequency for more than their individual programmed supervision time (S1 VD/FD), the ATS releases the Source 1 contacts and trips. In case the source 2 becomes available in healthy condition, it shifts the contacts towards Source 2. Otherwise, it rests in TRIP position only.

In case if the load is connected to Source 2, then on restoration of healthy mains supply continuously for the programmed duration (S1 RT), the ATS releases the Source 2 contacts, trips and shifts the contacts to Source 1 to transfer the load to the Source 1 side. During the transition from TRIP to any of the supplies, if that supply again becomes unhealthy then the fault LED will start blinking indicating the contact failure on that source (S1/S2 CNT Fault) and the hooter is switched ON.

In case both the supplies are unavailable / absent the controller brings the ATS to the trip position. At this time the controller gets switched OFF and it turns ON automatically as soon as anyone of the S1 or S2 becomes available in healthy condition.

#### Manual Mode

In this mode, the load can be shifted from one source to another by first pressing the Trip button followed by pressing of that source button (S1 or S2) to which the load is to be shifted. At any given time, either of Source 1 or Source 2 can be made operational. Any attempt to switch on S2 while S1 is ON and vice-versa will be denied with a warning message as "TRIP FIRST" on display. In this Changeover manual mode, unlike ATS manual mode it doesn't require to give the start or stop commands before shifting the load to S1 or S2 respectively.

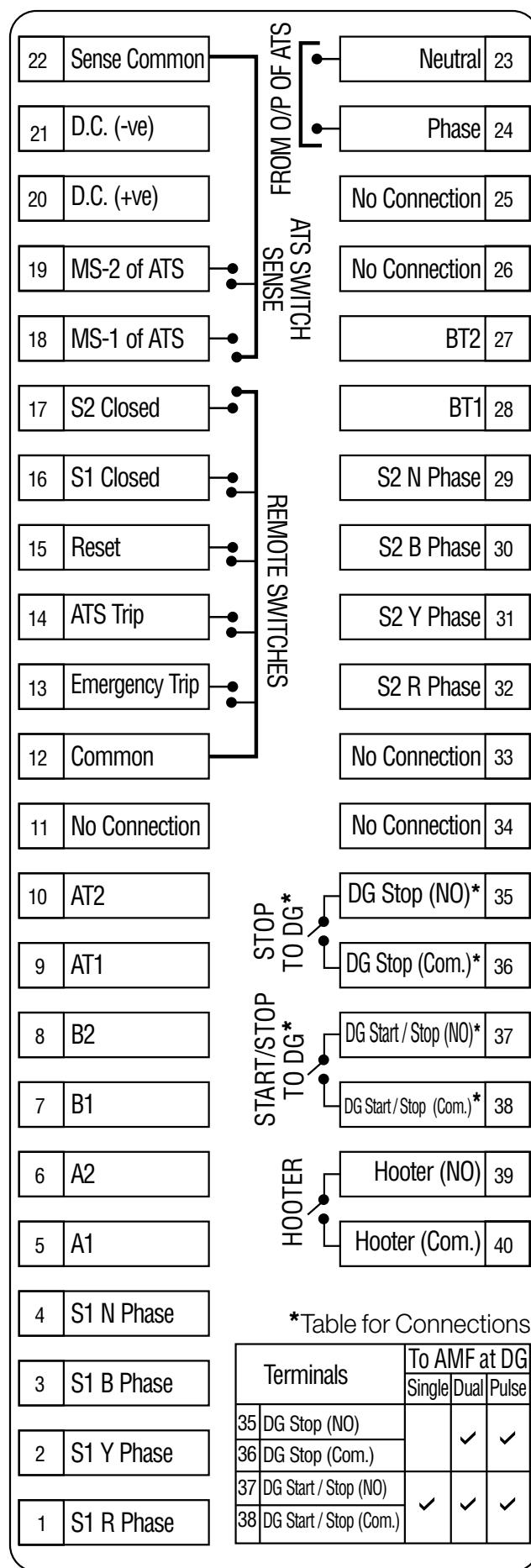
The remote operation is same as in the manual operation of ATS mode.

Note: In ATS configuration, the Controller unit requires 12 to 24 volts DC source input for its functioning. The same needs to be made available from an uninterrupted source such as external battery being used for self start generator set etc.

In Changeover (C) configuration, in case if both the Mains (S1) and DG (S2) supplies are unavailable / unhealthy, then only to turn ON the display, the external 12-24 Vac supply is required and not for operation.



## Terminal Numbers





## Utilization Scope

Auto Transfer Switch is a self-acting equipment containing the transfer switching devices and other necessary devices for monitoring supply circuits and for transferring one or more load circuits from one supply to another.

The operating sequence of ATS consists of an automatic transfer of a load from the normal supply to an alternate supply in the event of a monitored supply deviation and automatically returning the load to the normal supply when quality of mains supply is restored. The transfer is with a predetermined time delay and includes an interim off position.

In case of both the normal and the alternate supplies being present, the ATS shall assume the normal supply position, which is termed as 'preferred supply'.

The various utilization categories show the most popular applications of Auto Transfer Switch, as per IEC-60947-6-1.

Nature of current	Utilization Category		Typical applications
	Operations A	Operations B	
Alternating Current	AC-31A	AC-31B	Non-inductive or slightly inductive loads
	AC-32 A	AC-32B	Switching of mixed resistive and inductive loads, including moderate overloads
	AC-33 A	AC-33B	Motor loads or mixed loads including motors, resistive loads and up to 30% incandescent lamp loads
	AC-35 A	AC-35B	Electric discharge lamp loads
	AC-36 A	AC-36B	Incandescent loads
Direct Current	DC-31 A	DC-31B	Resistive loads
	DC-33 A	DC-33B	Motor loads or mixed loads including motors
	DC-36 A	DC-36B	Incandescent lamp load

## Ordering Information

### ATS unit with Controller

Current Rating (A)	Cat. No. 3 Pole	Cat. No. 4 Pole
<b>Open Execution</b>		
100	IHYTCDO100	IHYFCDO100
125	IHYTCDO125	IHYFCDO125
160	IHYTCDO160	IHYFCDO160
200	IHYTCDO200	IHYFCDO200
250	IHYTCDO250	IHYFCDO250
315	IHYTCDO315	IHYFCDO315
400	IHYTCDO400	IHYFCDO400
500	IHYTCDO500	IHYFCDO500
630	IHYTCDO630	IHYFCDO630
<b>In Enclosure</b>		
100	IHYTCDE100	IHYFCDE100
125	IHYTCDE125	IHYFCDE125
160	IHYTCDE160	IHYFCDE160
200	IHYTCDE200	IHYFCDE200
250	IHYTCDE250	IHYFCDE250
315	IHYTCDE315	IHYFCDE315
400	IHYTCDE400	IHYFCDE400
500	IHYTCDE500	IHYFCDE500
630	IHYTCDE630	IHYFCDE630

Note:

In Changeover (C) configuration, no external 12-24 Vac supply is required its operation.

In ATS configuration, the Controller unit requires 12 to 24 volts DC source input for its functioning. The same needs to be made available from an uninterrupted source such as external battery being used for self start generator set etc.

### Automatic Transfer Switch without Controller

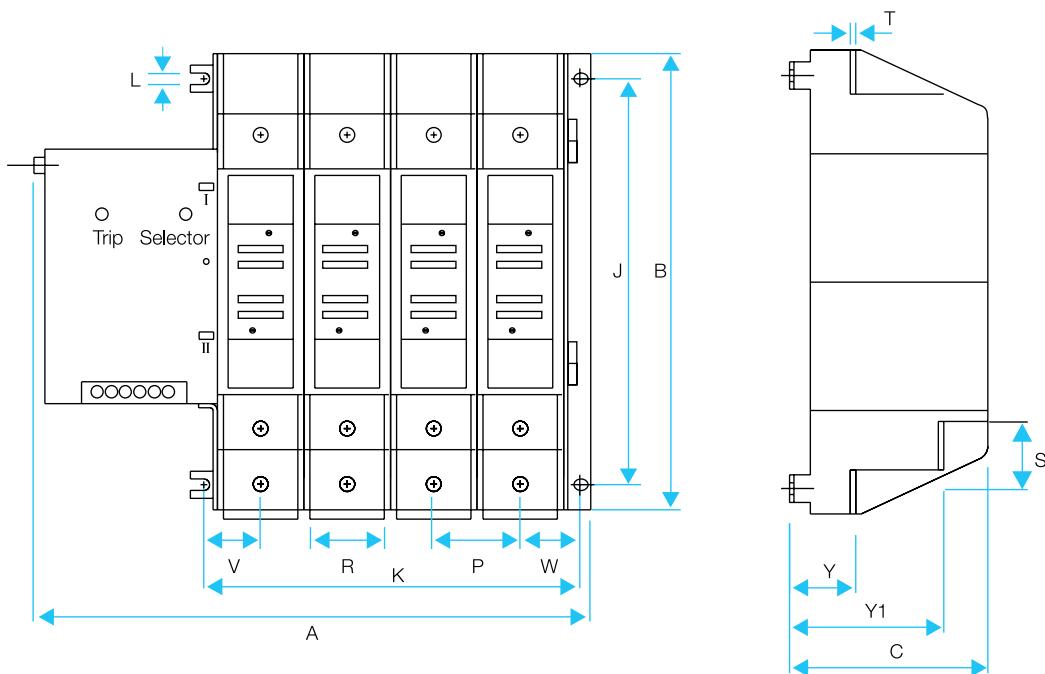
Rating (A)	Cat. No.
<b>Open Execution</b>	
100	IHYFNA0100
125	IHYFNA0125
160	IHYFNA0160
200	IHYFNA0200
250	IHYFNA0250
315	IHYFNA0315
400	IHYFNA0400
500	IHYFNA0500
630	IHYFNA0630





## I- Open Execution

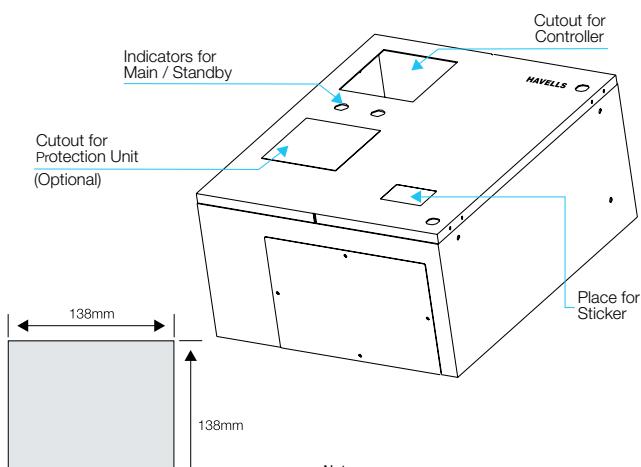
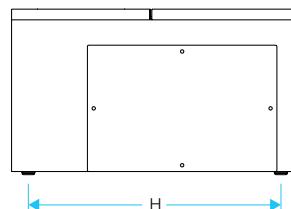
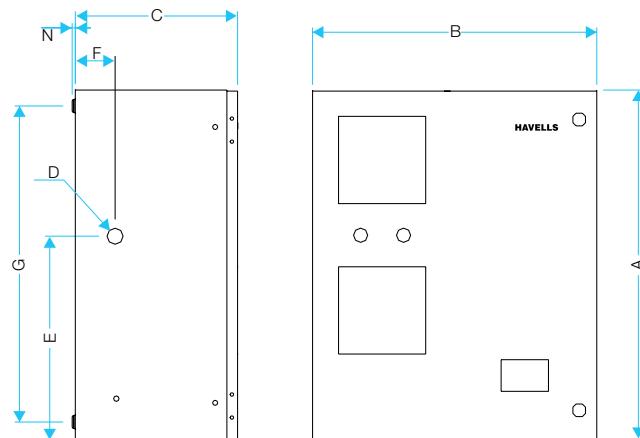
Dimensions (in mm)



Frame Size	Current rating (A)	No. of Poles	Over all dimensions		Switch mounting			Connection Terminals								Terminal Bolt Size (mm)	Weight (kg)	
			A	B	C	J	K	L	P	R	S	T	V	W	Y	Y1		
1	100-160	3P	257	241	122	201	139	Φ9	38	15	30	4	30	32	40	90	M8X25	8.3 (100 A), 8.7 (160 A)
		4P	295	241	122	201	177	Φ9	38	15	30	4	30	32	40	90	M8X25	9.3 (100 A), 125 A), 9.7 (160 A)
2	200-250	3P	290	253	122	213	172	Φ9	49	30	30	4.5	35	38	40	90	M8X30	10.5 (200 A), 11 (250 A)
		4P	338	253	122	213	221	Φ9	49	30	30	4.5	35	38	40	90	M8X30	11.5 (200 A), 12 (250 A)
3	315-400	3P	311	253	122	213	193	Φ10	56	40	28	5	46	52	38	110	M10X25	13.1 (315 A), 13.5 (400 A)
		4P	367	253	122	213	249	Φ10	56	40	28	5	46	52	38	110	M10X25	14.1 (315 A), 14.5 (400 A)
4	500-630	3P	340	337	144	290	208	Φ10	60	44	40	7	42	42	38	110	M10X40	20.6 (500 A), 21 (630 A)
		4P	400	337	144	290	270	Φ10	60	44	40	7	42	42	38	110	M10X40	20.6 (500 A), 22.5 (630 A)



## II- In Enclosure



CUTOUT SIZE IN PANEL  
FOR FLUSH MOUNTING  
OF CONTROLLER /  
PROTECTION UNIT(S)

Rating	A	B	C	D	E	F	G	H	N
100 A-250 A	550	450	255	ϕ 25.4	320	63	500	400	5
315 A-630 A	550	520	275	ϕ 25.4	328	68	500	470	5

A wide range of Front Operated Panel Mounting Switch Disconnector Fuse are offered for various power distribution applications. These switches have high short circuit making and breaking capacity and are suitable for stringent AC 23 A utilisation category. These can be used for both AC and DC applications.

## Features:

- Front operated, positive break double isolation switch mechanism
- Multi Break arcing contacts per pole for higher electrical life
- Stationary Fuse Links prevent loosening of fuses
- Handle with Padlock, Door interlock and defeat mechanism facility
- Add-on auxiliary switch
- Available in open execution and in sheet steel enclosure.
- Suitable for Aluminium cable termination

## Specification :

Conforms to IS / IEC: 60947-1 & 3

## Range :

- 32 A to 800 A with bolted type fuse links
- 32 A to 800 A with knife type fuse links
- 32 A to 800 A isolator version.

## Execution :

- Single Pole with Switched Neutral
- Double Pole
- Triple Pole
- Triple Pole & Neutral
- Triple Pole with Switched Neutral
- Four Pole





**Kompact Switch Disconnector Fuse**



## Construction



Havells SDF has been designed and developed to offer solutions sought by discerning customers where ease of installation and operation is required. The switches are compact and available in ratings 32 A, 63 A, 100 A, 125 A, 160 A, 200 A, 250 A, 320 A, 400 A, 630 A & 800 A with both DIN type and BS type fuses conforming to IEC: 947-3 and IS: 13947-3. The switch is suitable for use in stringent AC 23 A applications.



The complete mechanism is enclosed in a fully insulated DMC moulded housing having excellent combination of mechanical & electrical properties. Phase barriers are provided for protection against phase to phase flashover.

The switches are designed for base mounting. All steel components are zinc plated, and current carrying parts are silver plated.

### Operating Mechanism

Front handle operation makes possible concise and smaller panels. Sturdy operating handle incorporates features such as fool proof cover locking, inter lock with defeat facility, and padlocking for safety locking in OFF condition. Telescopic adjustable handle shaft is provided for maximum flexibility in order to suit varied mounting positions and to make them compatible to the bus bars.

### Contacts and Contact Mechanism

The contact system comprises of knife type double break contact. These are supported by leaf spring.

Due to the quadrable break per pole (two each on incoming & outgoing), the fuses are positively isolated from both the ends in "OFF" position ensuring safety during maintenance. They are particularly advantageous in ring distribution network where the network is fed from both sides.

### Enclosures

These switches are normally used in open execution for panel mounting. However, they are also available in enclosures. The enclosures are made of sheet steel which are robustly built, chemically phosphatized and electrostatically powder painted. They are ideally suited for adverse environmental conditions.





## Technical Information



Frame Size	SI Unit	Size I		Size II	
Rated Operational Current $I_e$	A	32	63	100	125
Conventional free air thermal current $I_{th}$	A	32	63	100	125
Conventional enclosed thermal current $I_{the}$	A	32	63	100	125
Rated Operational Voltage $U_e$	Vac	415	415	415	415
Rated uninterrupted current $I_u$	A	32	63	100	125
Rated Insulation Voltage $U_i$	Vac	1000	1000	1000	1000
Rated Impulse withstand Voltage $U_{imp}$	kV	8	8	8	8
Rated Frequency	Hz	50	50	50	50
Design temp./ Ambient Temp. Deg. C		40	40	40	40
Utilization category		AC 23 A			
Rated Enclosed Thermal Current	A	32	63	100	125
Rated Operational Power at 415V, 3Ø	kW	23	36	58	72
Rated Making Capacity AC 23 A	A	320	630	1000	1250
Rated Breaking Capacity AC 23 A	A	256	504	800	1000
Conditional short circuit current	kA <sub>rms</sub>	80	80	80	80
Rated Short-time withstand current (without fuses for 1 sec.)	kA	2	2	3.75	3.75
Type of HBC Fuse links					
- BS Type TIA/A2 , TSS/A3,TSD/A4,TSF/B2,TSK/B3,TSMF/B4,TTSC2,TLM/C3		H-TIA H-CD-00	H-TSS H-CD-00	H-TSD H-CD-00	H-TSD H-CD-00
- DIN Type CD/00, CD/1,CD/2,CD/3					
Electrical Endurance	No. of Operations	1500	1500	1500	1500
Mechanical Endurance	No. of Operations	10000	10000	10000	10000
Temperature withstand range (Ambient)	°C	5 to 40	5 to 40	5 to 40	5 to 40
Min. Cu cable section	mm <sup>2</sup>	6	16	35	50
Min. Al. cable section	mm <sup>2</sup>	10	25	50	70
Terminal Bolt Size Metric thread diameter x length	M6 x 16	M6 x 16	M6 x 16	M6 x 16	
Weight Open Execution	kg	1.2	1.2	1.5	1.5
In Enclosure	kg	4.2	4.2	4.5	4.5



## Technical Information

(Kompact Ezo)



Frame Size	SI Unit	Size III			Size IV		Size V	
Rated Operational Current $I_e$		160 A	200 A	250 A	320 A	400 A	630 A	800 A
Conventional free air thermal current $I_{th}$		160 A	200 A	250 A	320 A	400 A	630 A	800 A
Conventional enclosed thermal current $I_{the}$		160 A	200 A	250 A	320 A	400 A	630 A	800 A
No. of Poles								
TPN & FP								
Rated uninterrupted current $I_u$		160 A	200 A	250 A	320 A	400 A	630 A	800 A
Rated operational Voltage $U_e$	Vac	415	415	415	415	415	415	415
Rated Insulation Voltage $U_i$	Vac	690	690	690	690	690	690	690
Rated Frequency	Hz	50	50	50	50	50	50	50
Rated impulse withstand voltage (Uiimp)	kV	8	8	8	8	8	8	8
Utilization Category								
AC 23A								
Rated making capacity	A	1600	2000	2500	3200	4000	6300	8000
Rated breaking capacity	A	1280	1600	2000	2560	3200	5040	6400
Rated fused short-circuit current (Icn) With Havells fuses	kA	80	80	80	80	80	80	80
Capacitor duty-Connected-415V, 50-60 Hz	kVAr	57	92	115	145	175	250	270
Endurance (operations) Mechanical	Nos.	8000	8000	8000	5000	5000	5000	3000
Endurance (operations) Electrical	Nos.	1000	1000	1000	1000	1000	1000	500
Rated Short-time withstand current (Icw) with shorted links for 1.0 sec.	kA rms	5	5	5	10	10	10	10
Type of HBC Fuse links		B2	B2	B3	B3	B4	C2	C3
BS Type		Size 1	Size 1	Size 1	Size 2	Size 2	Size 3	Size 3
DIN Type								
Min. Cu cable section	mm <sup>2</sup>	70	95	120	185	240	40x5x2	50x5x2
							(Bus Bar)	(Bus Bar)
Min. Al. cable section	mm <sup>2</sup>	95	150	185	240	300	40x8x2	50x8x2
							(Bus Bar)	(Bus Bar)
Terminal Screw	mm	M10x30	M10x30	M10x30	M10x30	M10x30	M10x30	M10x30
Aprox Wt. of TP Switch (without fuse links)	kg	6.1	6.1	6.1	12.5	12.5	17.0	17.0

\* TPN - Three Pole & Neutral; FP - Four Pole

For ratings 630A and above, bus bar termination is required

# Switch can be used for DC application upto 250V by using 2 poles in series.



**Kompact**

Switch Disconnector Fuse

## Ordering Information



Double Pole Size 1

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
32	IHKDDO4032	IHKDDF4032	IHKDDW4032	IHHHTIA0032
32	IHKFDO4032	IHKFDF4032	IHKFDW4032	IHHCD00032
63	IHKDDO4063	IHKDDF4063	IHKDDW4063	IHHHTSS0063
63	IHKFDO4063	IHKFDF4063	IHKFDW4063	IHHCD00063

Double Pole Size 2

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
100	IHKDDO4100	IHKDDF4100	IHKDDW4100	IHHHTSD0100
100	IHKFDO4100	IHKFDF4100	IHKFDW4100	IHHCD00100
125	IHKDDO4125	IHKDDF4125	IHKDDW4125	IHHHTSD0125
125	IHKFDO4125	IHKFDF4125	IHKFDW4125	IHHCD00125



Three Pole & Neutral Size 1

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
32	IHKDTO4032	IHKDTF4032	IHKDTW4032	IHHHTIA0032
32	IHKFTO4032	IHKFTF4032	IHKFTW4032	IHHCD00032
63	IHKDTO4063	IHKDTF4063	IHKDTW4063	IHHHTSS0063
63	IHKFTO4063	IHKFTF4063	IHKFTW4063	IHHCD00063

Three Pole & Neutral Size 2

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
100	IHKDTO4100	IHKDTF4100	IHKDTW4100	IHHHTSD0100
100	IHKFTO4100	IHKFTF4100	IHKFTW4100	IHHCD00100
125	IHKDTO4125	IHKDTF4125	IHKDTW4125	IHHHTSD0125
125	IHKFTO4125	IHKFTF4125	IHKFTW4125	IHHCD00125

Three Pole & Neutral - Kompact Ezo Size 5

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
630	IHFSTO4630	IHFSTF4630	IHFSTW4630	IHHHTLM0630
630	IHFKTO4630	IHFKTF4630	IHFKTW4630	IHHCD03630
800	IHFSTO4800	IHFSTF4800*	IHFSTW4800*	BS Type
800	IHFKTO4800	IHFKTF4800*	IHFKTW4800*	Din Type

\* FSTW4800 and FKTW4800 are without Fuse Links

**HAVELLS**

**HAVELLS**



Three Pole &amp; Neutral - Kompact Ezo Size 3 &amp; 4

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
160	IHFSTO4160	IHFSTF4160	IHFSTW4160	IHHTSF0160
160	IHKTO4160	IHKTF4160	IHKTW4160	IHHCD01160
200	IHFSTO4200	IHFSTF4200	IHFSTW4200	IHHTSF0200
200	IHKTO4200	IHKTF4200	IHKTW4200	IHHCD01200
250	IHFSTO4250	IHFSTF4250	IHFSTW4250	IHHTSF0250
250	IHKTO4250	IHKTF4250	IHKTW4250	IHHCD01250
315	IHFSTO4320	IHFSTF4320	IHFSTW4320	IHHTSK0315
315	IHKTO4320	IHKTF4320	IHKTW4320	IHHCD02315
400	IHFSTO4400	IHFSTF4400	IHFSTW4400	IHHTSMF400
400	IHKTO4400	IHKTF4400	IHKTW4400	IHHCD02400



Four Pole Size 1 &amp; 2

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
32	IHKDFO4032	IHKDFF4032	IHKDFW4032	IHHHTIA0032
32	IHKFFO4032	IHKFFF4032	IHKFFW4032	IHHCD00032
63	IHKDFO4063	IHKDFF4063	IHKDFW4063	IHHHTSS0063
63	IHKFFO4063	IHKFFF4063	IHKFFW4063	IHHCD00063
100	IHKDFO4100	IHKDFF4100	IHKDFW4100	IHHHTSD0100
100	IHKFFO4100	IHKFFF4100	IHKFFW4100	IHHCD00100
125	IHKDFO4125	IHKDFF4125	IHKDFW4125	IHHHTSD0125
125	IHKFFO4125	IHKFFF4125	IHKFFW4125	IHHCD00125

Four Pole - Kompact Ezo Size 3

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
160	IHFSTO4160	IHFSTF4160	IHFSTW4160	IHHTSF0160
160	IHKTO4160	IHKTF4160	IHKTW4160	IHHCD01160
200	IHFSTO4200	IHFSTF4200	IHFSTW4200	IHHTSF0200
200	IHKTO4200	IHKTF4200	IHKTW4200	IHHCD01200
250	IHFSTO4250	IHFSTF4250	IHFSTW4250	IHHTSF0250
250	IHKTO4250	IHKTF4250	IHKTW4250	IHHCD01250

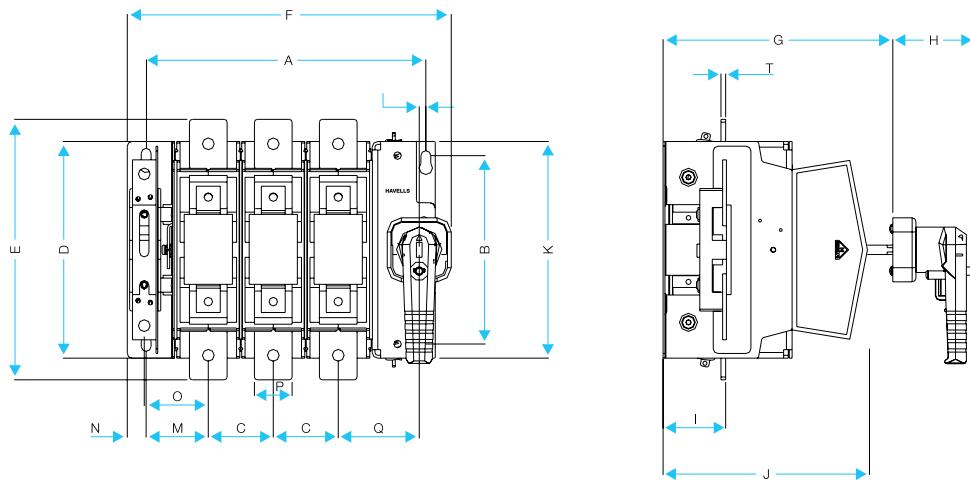
Four Pole - Kompact Ezo Size 4 &amp; 5

Current Rating (A)	Open Execution Cat. No.	Open Execution with Fuse Cat No.	In S/S Enclosure with Fuse Cat. No.	HBC Fuse Type Cat. No.
320	IHFSTO4320	IHFSTF4320	IHFSTW4320	IHHTSK0315
320	IHKTO4320	IHKTF4320	IHKTW4320	IHHCD02315
400	IHFSTO4400	IHFSTF4400	IHFSTW4400	IHHTSMF400
400	IHKTO4400	IHKTF4400	IHKTW4400	IHHCD02400
630	IHFSTO4630	IHFSTF4630	IHFSTW4630	IHHTLMO630
630	IHKTO4630	IHKTF4630	IHKTW4630	IHHCD03630
800	IHFSTO4800	IHFSTF4800	IHFSTW4800*	BS Type
800	IHKTO4800	IHKTF4800	IHKTW4800*	Din Type

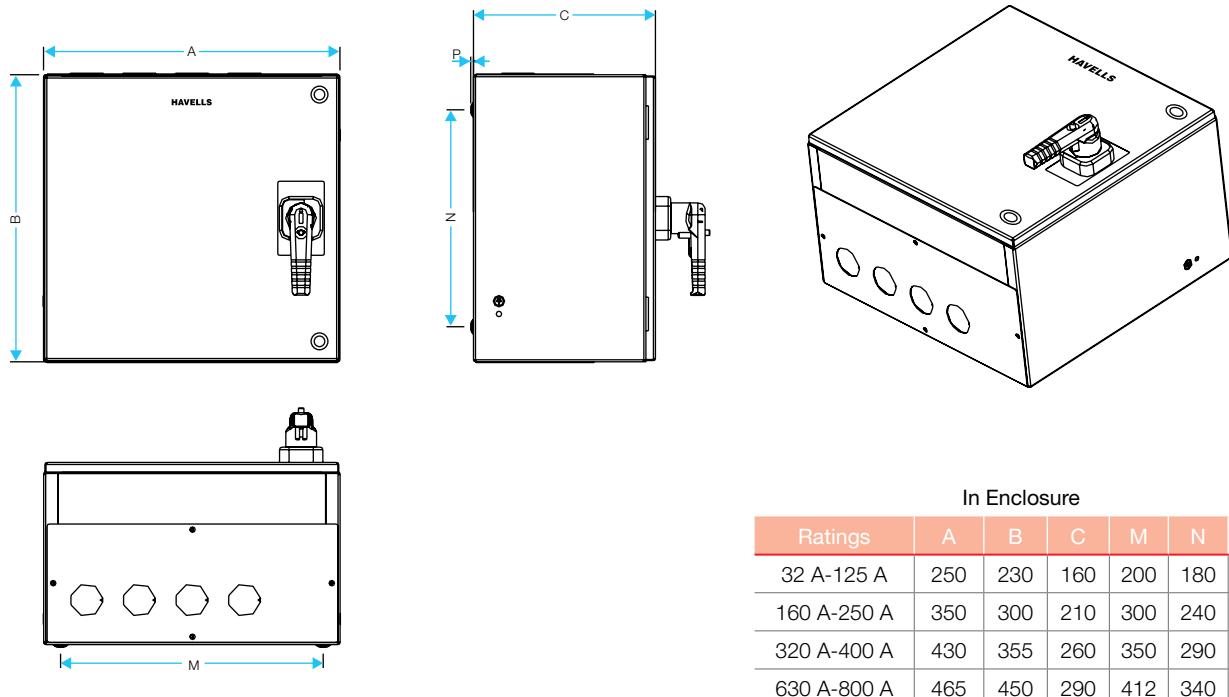
\* FSTW4800 and FKTW4800 are without Fuse Links



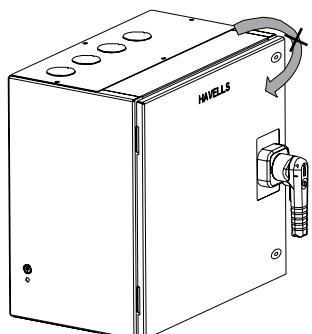
### Dimensions (in mm)



Rating	Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T
32 A to 63 A	DP	100	60	34	75	117	148	150-225	86.5	40	137	74	2	30	9	32	12	38	2
	TPN	134	60	34	75	117	182	150-225	86.5	40	137	74	2	30	9	32	12	38	2
	FP	168	60	34	75	117	216	150-225	86.5	40	137	74	2	30	9	32	12	38	2
100 A to 125 A	DP	100	60	34	107	156	148	150-225	86.5	40	137	74	2	30	9	32	20	38	2
	TPN	134	60	34	107	156	182	150-225	86.5	40	137	74	2	30	9	32	20	38	2
	FP	168	60	34	107	156	216	150-225	86.5	40	137	74	2	30	9	32	20	38	2
160 A to 250 A	TPN	235	159	57	190	190	284	203	86.5	50	174	179	4	48.5	19	51.5	30	68.5	4
	FP	292	159	57	190	190	341	203	86.5	50	174	179	4	84.5	19	51.5	30	68.5	4
320 A to 400 A	TPN	302	200	70	230	282	349	260	86.5	67	212	230	7	70	20	67.5	40	85	5
	FP	372	200	70	230	282	419	260	86.5	67	212	230	7	70	20	67.5	40	85	5
630 A	TPN	340	200	82.5	240	285	387	290	86.5	71	261	230	7	74	20	78.5	50	94	7
	FP	422.5	200	82.5	240	285	469.5	290	86.5	71	261	230	7	74	20	78.5	50	94	7

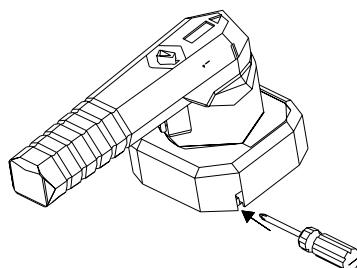


Door Interlock



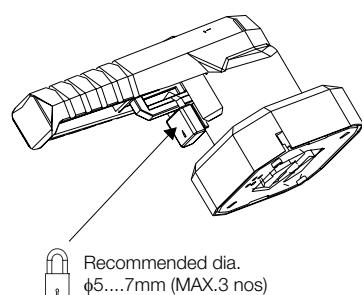
The Handle allows opening of the door in off condition only. In ON position, the door cannot be opened. The interlock can however be by-passed (defeat option on the handle) for maintenance / testing / commissioning. The interlock is restored automatically, on reclosing the panel door.

Defeat Facility



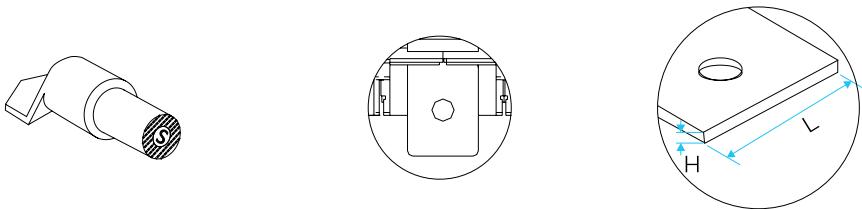
For safety reasons the door cannot be opened when the handle is padlocked. The defeat function allows qualified personnel to by-pass the door interlock when the switch is in on position.

Padlocking



Recommended dia.  
ϕ5....7mm (MAX.3 nos)

Handle can be padlocked in OFF position as well as in ON position



Aluminium / Copper Cable / Bus Bar Size for External Termination

I <sub>n</sub>	φT	S max. Nm	S max. (Al) mm <sup>2</sup>	H (Cu) mm <sup>2</sup>	L (Cu) mm	Switch mounting	Fastner
32 A	M6	3.7	10	6	2	12	M6 x 12
63 A	M6	3.7	25	16	2	12	
100 A	M8	9	50	35	2	20	
125 A	M8	9	70	50	2	20	
160 A	M10	48	95	70	4	30	
200 A	M10	48	150	95	4	30	
250 A	M10	48	185	120	4	30	
320 A	M10	48	240	185	5	40	
400 A	M10	48	300	240	5	40	
630 A	M10	48	2x40x8	2x40x5	7	50	
800 A	M12	48	2x50x8	2x50x5	7	50	

Switch mountings and fitments have been detailed in installation sheets which are supplied with every switch.

A comprehensive range of Euroload Switch Disconnector (Load Break Switches) have been designed and developed indegenously to meet various needs of distribution circuits. The switches are compact and suitable for AC 23 A duty.

## Features:

- High electrical & mechanical endurance
- Suitable for Coper and Aluminium cable lug termination
- Contacts and mechanism in enclosed housing to avoid dust ingress
- Double break contacts per pole
- Arc chutes and Arc barriers provided
- Staggered terminals for cable termination upto 400 A / 800 A in 3 pole / 4 pole execution
- Provision of Phase separators
- Easy add-on Auxiliary switch kit
- Separate main & arcing contacts
- Handle with door interlock and padlock facility.
- Front operated with two stable position : 0 - 1

## Range :

- 80 A to 400 A in 2 frame sizes in 3 pole .
- 40 A to 3150 A in 7 frame sizes in 4 pole execution with advance neutral.

## Specification :

Conforms to IS / IEC:60947-1&3





Euroload Switch Disconnector



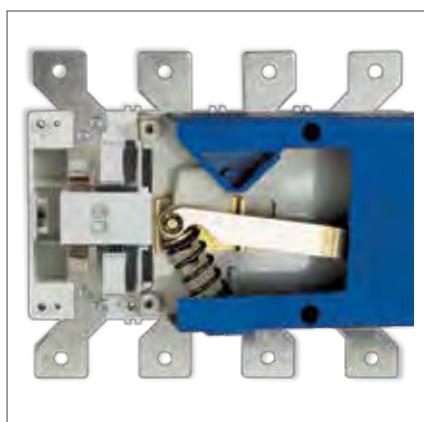
## Construction



The switching mechanism is quick make, quick break type independent of the speed of the operation. There are four breaks per pole thereby resulting into faster quenching of arc. The load and line can be connected on either side by virtue of isolation on both the sides. The entire switching mechanism alongwith the fixed and moving contact assembly are housed in a polyester reinforced, moulded frame/cover, having high dielectric strength & thermal withstand capacity.

### Contact Mechanism

The contact mechanism is knife blade type with self cleaning action during operation. The fixed contact terminals in each phase have separate main and arcing contacts. The moving contact assembly has three/four sets of contacts on moving carrier and the entire assembly rests on the spring loaded steel balls fitted in moving carrier in rating upto 320 A and spring loaded buttons which assists in its true movement during making and breaking.



The moving contact mates with the fixed contact by a roll and slide movement of the moving contact assembly. The contact is first made with the arcing contact and thereafter with the main contact. During breaking, the arc formation is across the arcing contacts thereby protecting the main contacts which results into enhanced life of the switch. The arc is effectively quenched & confined by the set of arc chutes / arc barrier in each phase.

The switches can be mounted inside a panel either in horizontal or vertical mode without any effect on the performance.

### Operating Mechanism

The operating mechanism consists of single/double side front operated handle which drives the spring assisted toggle mechanism, inturn operating the switch.





## Technical Information



Frame Size	SI Unit	Size 00			
Rated Operational Current at 40 °C $I_e$	A	40	63	80	100
Conventional free air thermal current $I_{th}$	A	40	63	80	100
Conventional enclosed thermal current $I_e$	A	40	63	80	100
Rated uninterrupted current $I_u$	A	40	63	80	100
Nos. of Poles		4	4	4	4
Rated Operational Voltage $U_e$	Vac	415	415	415	415
Rated Insulation Voltage $U_i$	Vac	1000	1000	1000	1000
Rated Impulse Voltage $U_{imp}$	kV	8	8	8	8
Dielectric strength, 50 Hz,	kV	5	5	5	5
Pollution Degree		3	3	3	3
Utilizational Category		AC-23 A			
Rated Operational Power 415 Vac	kW	23	36	46	58
Rated Making Capacity AC 23 A at PF-0.45 436 V	A	400	630	800	1000
Rated Breaking Capacity AC 23 A at PF-0.45 436 V	A	320	504	640	800
Max. Allowed cut off current	kA <sub>peak</sub>	8.8	8.8	8.8	8.8
Conditional Short circuit current 415 Vac	kA	80	80	80	80
Fuse Ratings gG	A	40	63	80	100
Rated Short Time Withstand Current for 1 Sec. rms value	kA	5	5	5	5
Mechanical Endurance Operations		10000	10000	10000	10000
Electrical Endurance Operations		1500	1500	1500	1500
Cu cable section	mm <sup>2</sup>	10	16	25	35
Al. cable section	mm <sup>2</sup>	16	25	35	50
Overall Dimensions H X W X D	mm	105 X 122 X 101			
Weight Open Execution	kg	0.8	0.8	0.9	0.9
In Enclosure	kg	1.9	1.9	2.0	2.0



## Technical Information

Frame Size	SI Unit	Size 0				
Rated Operational Current $I_e$	A	80	100	125	160	200
Conventional free air thermal current $I_{th}$	A	80	100	125	160	200
Conventional enclosed thermal current $I_{the}$	A	80	100	125	160	200
Rated uninterrupted current $I_u$	A	80	100	125	160	200
Nos. of Poles		3	3	3/4	3/4	3/4
Rated operational voltage, $U_e$	Vac	415	415	415	415	415
Rated insulation voltage, $U_i$	Vac	1000	1000	1000	1000	1000
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8	8	8
Di-electric strength, 50 Hz	kV	5	5	5	5	5
Pollution Degree		3	3	3	3	3
Utilizational Category		AC-23 A				
Rated Operational Power 415 V	kW	46	58	72	92	115
Rated making capacity at 436 Vac p.f.- 0.45	A	800	1000	1250	1600	2000
Rated breaking capacity at 436 Vac p.f.- 0.45	A	640	800	1000	1280	1600
Rated conditional short circuit current	kA <sub>rms</sub>	80	80	80	80	80
With Havells Fuse rating gG	A	80	100	125	160	200
Max. Allowed cut off current	kA <sub>peak</sub>	12	15	17	18	22
Rated short time withstand current (1sec.)	kA <sub>rms</sub>	7.5	7.5	7.5	7.5	8
Electrical Endurance		1500	1500	1000	1000	1000
Mechanical Endurance		10000	10000	8000	8000	8000
Temperature withstand range (ambient)	°C	-5 to 40				
Al. Cable /Bus Bar cross section	mm <sup>2</sup>	35	50	70	95	150
Cu. Cable /Bus Bar cross section	mm <sup>2</sup>	25	35	50	70	95
Weight Open Execution	kg	1.4	1.4	1.4/1.8	1.6/2.0	1.6/2.0
In Enclosure	kg	4.0	4.0	4.0/6.0	4.2/6.2	4.2/6.2

Frame Size	SI Unit	Size I		Size II		Size III
Rated operated Current $I_e$	A	250	320	400	630	800
Conventional free air thermal current $I_{th}$	A	250	320	400	630	800
Conventional enclosed thermal current $I_{the}$	A	250	320	400	630	800
Rated uninterrupted current $I_u$	A	250	320	400	630	800
Nos. of Poles		3/4	3/4	4	4	4
Rated operational voltage, $U_e$	Vac	415	415	415	415	415
Rated insulation voltage, $U_i$	Vac	1000	1000	1000	1000	1000
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8	8	8
Di-electric strength, 50 Hz	kV	5	5	8	8	10
Pollution Degree		3	3	3	3	3
Utilizational Category		AC-23 A				
Rated Operational Power 415 V, 3Ø	kW	144	184	230	362	460
Rated making capacity A, 436 Vac 23 A, p.f.- 0.35	A	2500	3200	4000	6300	8000
Rated breaking capacity A, 436 Vac 23 A, p.f.- 0.35	A	2000	2560	3200	5040	6400
Rated conditional short circuit current	kA <sub>rms</sub>	80	80	80	80	80
With Havells Fuse rating gG	A	250	320	400	630	800
Max. Allowed cut off current	kA <sub>peak</sub>	27	33	39	55	70
Rated short time withstand current (1sec.)	kA <sub>rms</sub>	15	15	30	30	35
Electrical Endurance		1000	1000	1000	1000	500
Mechanical Endurance		8000	5000	5000	5000	3000
Temperature withstand range (ambient)	°C	-5 to 50	-5 to 50	-5 to 50	-5 to 50	-5 to 50
Al. Cable /Bus Bar cross section	mm <sup>2</sup>	185	240	300	40x8x2	50x8x2
Cu. Cable /Bus Bar cross section	mm <sup>2</sup>	120	185	240	40x5x2	50x5x2
Weight Open Execution	kg	2.8/3.6	3.1/3.9	3.1	8.20	11.80
In Enclosure	kg	10.0/13.1	10.0/13.4	10.0	23.90	28.00

\* For ratings 630A & above bus bar terminals in recommended.



## Technical Information

Frame Size	SI Unit	Size IV		Size V		
Rated Operated Current $I_e$	A	1000	1250	1600	2000	2500
Conventional free air thermal current $I_{th}$		1000	1250	1600	2000	2500
Conventional enclosed thermal current $I_{the}$		1000	1250	1600	2000	2500
Rated uninterrupted current $I_u$		1000	1250	1600	2000	2500
Nos. of Poles		4	4	4	4	4
Rated operational voltage, $U_e$	Vac	415	415	415	415	415
Rated insulation voltage, $U_i$	Vac	1000	1000	1000	1000	1000
Rated impulse withstand voltage, $U_{imp}$	kV	8	8	8	8	8
Di-electric strength, 50 Hz	kV	5	5	5	5	5
Pollution Degree		3	3	3	3	3
Utilizational Category		AC-23 A				
Rated operational current, $I_e$ at 415 Vac 23 A	A	1000	1250	1600	2000	2500
Rated making capacity A, 436 Vac 23 A, p.f.- 0.35		10000	12500	16000	20000	25000
Rated breaking capacity A, 436 Vac 23 A, p.f.- 0.35		8000	10000	12800	16000	20000
Rated operational power at 415 V, 3Ø	kW	575	519	920	1150	1438
Rated conditional short circuit current	kA <sub>rms</sub>	80	80	80	80	80
With Havells Fuse rating gG	A	1000	1250	1600	2000	2500
Electrical Endurance		500	500	500	500	500
Mechanical Endurance		3000	3000	3000	3000	3000
Temperature withstand range (ambient)	°C	-5 to 50				
Al. Cable /Bus Bar cross section	mm <sup>2</sup>	50x10x2	63x12x2	50x8x4	100x10x3	100x10x4
Cu. Cable /Bus Bar cross section	mm <sup>2</sup>	60x5x2	80x5x2	100x5x2	100x5x3	100x5x4
Weight						
Open Execution	kg	22.00	23.70	25.00	45.00	51.20
In Enclosure	kg	52.00	53.50	55.00	**	**

\*\* Details on request

## Ordering Information



Size 00 (Four Pole)		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
40	IHCSFO0040	IHCSFE0040
63	IHCSFO0063	IHCSFE0063
80	IHCSFO0080	IHCSFE0080
100	IHCSFO0100	IHCSFE0100

Size 0 (Three Pole)		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
80	IHCSTO0080	IHCSTE0080
100	IHCSTO0100	IHCSTE0100
125	IHCSTO0125	IHCSTE0125
160	IHCSTO0160	IHCSTE0160
200	IHCSTO0200	IHCSTE0200

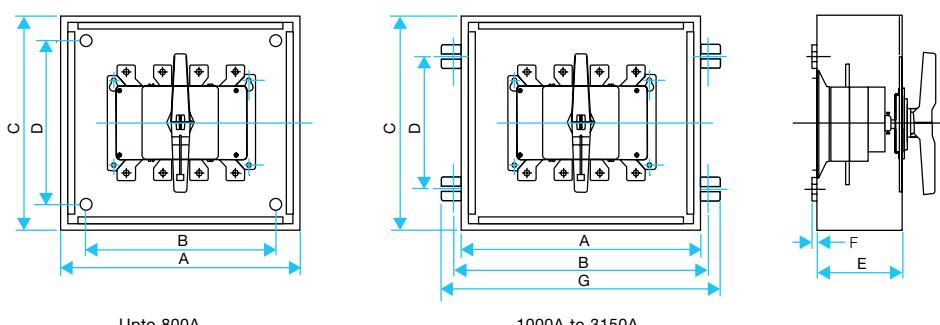
Size 1 (Three Pole)		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
250	IHCSTO0250	IHCSTE0250
320	IHCSTO0320	IHCSTE0320
400	IHCSTO0400	IHCSTE0400

Size 0 (Four Pole)		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
125	IHCSFO0125	IHCSFE0125
160	IHCSFO0160	IHCSFE0160
200	IHCSFO0200	IHCSFE0200



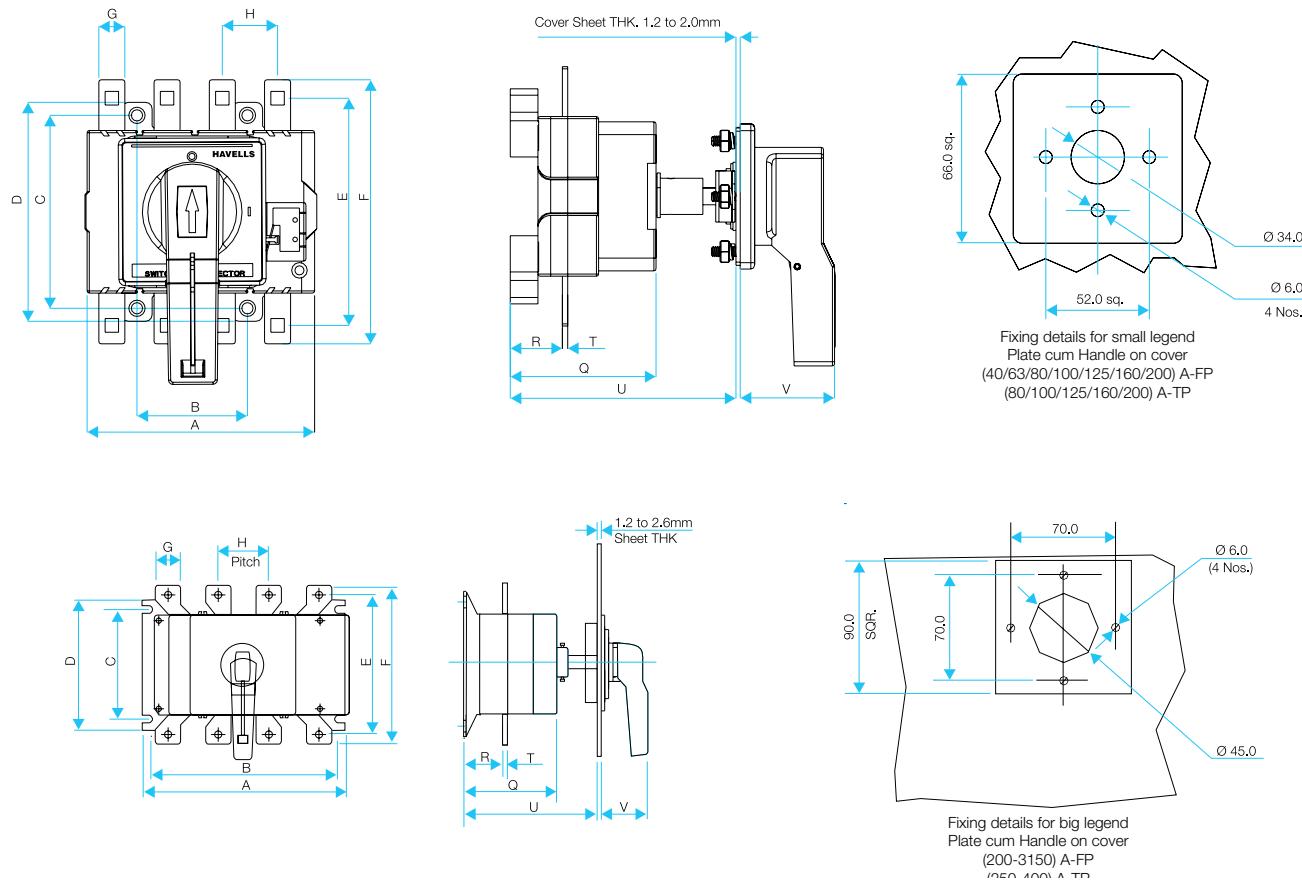
Size 1 (Four Pole)		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
250	IHCSFO0250	IHCSFE0250
320	IHCSFO0320	IHCSFE0320
Size 2		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
400	IHCSFO0400	IHCSFE0400
630	IHCSFO0630	IHCSFE0630
Size 3		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
800	IHCSFO0800	IHCSFE0800
Size 4		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
1000	IHCSFO1000	IHCSFE1000
1250	IHCSFO1250	IHCSFE1250
1600	IHCSFO1600	IHCSFE1600
Size 4		
Current Rating (A)	Open Execution Cat. No.	In Enclosure Cat. No.
2000	IHCSFO2000	IHCSFE2000
2500	IHCSFO2500	IHCSFE2500
3150	IHCSFO3150	IHCSFE3150

## Dimension in (mm)



DIMENSIONS (in mm) - ENCLOSURE

CURRENT (A)	A	B	C	D	E	F	G
80/100/125/160/200 A TP	270	220	290	188	150	5	-
250/320/400 A TP	310	260	380	250	160	5	-
40/63/80/100 A FP	210	160	200	150	100	5	-
125/160/200 A FP	270	220	290	188	150	5	-
250/320 A FP	310	260	380	250	160	5	-
400/630 A FP	475	415	425	365	210	5	-
800 A FP	520	470	480	430	230	5	-
1000/1250/1600 A FP	730	770	630	480	300	6	810
2000/2500/3150 A FP	730	770	800	560	430	6	810



**DIMENSIONS (in mm) - OPEN EXECUTION**

CURRENT (A)	A	B	C	D	E	F	G	H	Q	R	T	U	V
80/100/125 A TP	136	122	113	132	124	148	15	34	90	36	3.2	148	44
160 A TP	136	122	113	132	124	148	24	34	90	36	3.2	148	62
200 A TP	136	122	113	132	124	148	24	52	90	36	3.2	148	62
250 A TP	186	172	134	156	147	177	28	58	112	40	4	158	62
320 A TP	186	172	134	156	165	198	35	63	112	40	4	158	62
400 A TP	186	172	134	156	165	198	35	63	109	40	4	158	62
40/63 A FP	105	51	89	101	93	110	12	26	68	24	2.5	98	44
80/100 A FP	105	51	89	101	105	122	12	26	68	24	3.2	98	44
125 A FP	170	156	113	132	122	148	20	46	90	37.5	3.2	148	62
160/200 A FP	170	156	113	132	122	148	24	46	90	37.5	3.2	148	62
250 A FP	234	223	134	156	147	177	28	58	110	40	4	158	62
320 A FP	234	223	134	156	165	198	35	63	110	40	4	158	62
400 A FP	325	297	184	206	221	251	40	80	134	47	5	208	62
630 A FP	325	297	184	206	241	281	55	80	134	47	5	208	62
800 A FP	368	336	212	234	280	331	45	97	144	52	8	210	62
1000 A FP	480	440	290	315	340	380	70	100	204	101	10	276	62
1250 A FP	480	440	290	315	340	380	70	100	204	101	12	276	62
1600 A FP	480	440	290	315	340	380	70	100	204	101	15	276	62
2000/2500/3150 A FP	480	440	290	315	387	480	80	100	308	74	15	402	62

HiBreak range of low voltage HRC based fuse links have been designed to meet the requirements set for modern industrial installations & electrical power plants. Their breaking capacity is sufficient even for the highest short circuit levels, which are normally reached in practice.

The breaking capacity of the fuse links is 80 kA at 415 AC. The fuse links are suitable for use in both AC/DC applications for over current and short circuit protection and have very low let through energy resulting in reduced electro magnetic stress and reliable short circuit clearance.

They have excellent non-deterioration performance and low power loss values well within the limits of the specification.

## Features:

- Excellent AC and DC performance
- Low watt loss
- Interchangeable with compatible brands
- ISI Marked

## Range :

- 2 A - 800 A in Bolted design (BS Type)
- 6 A - 630 A in Blade Contact design (DIN Type)
- 4 A - 63 A in Round Head design (RH Type)

## Specification :

Conforms to IEC:60269-1 & 2-1 / IS:13703-1 & 2-1





Fuse Link

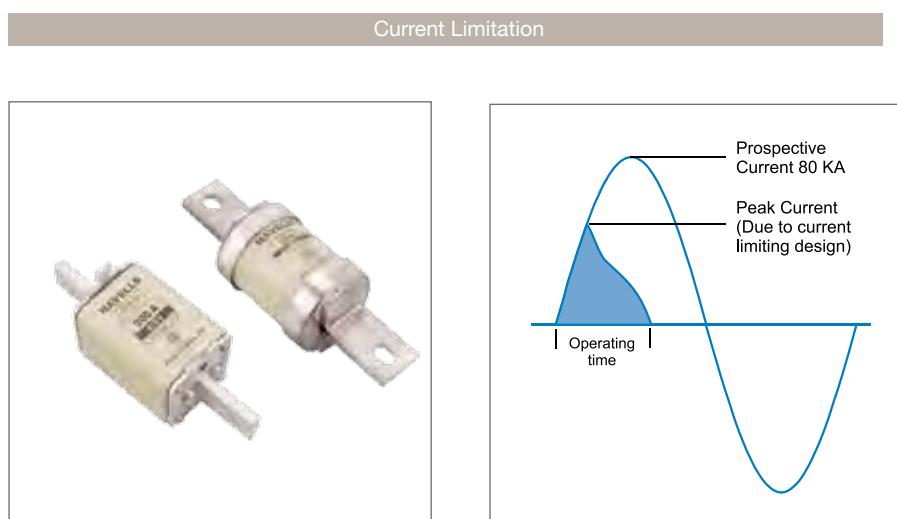
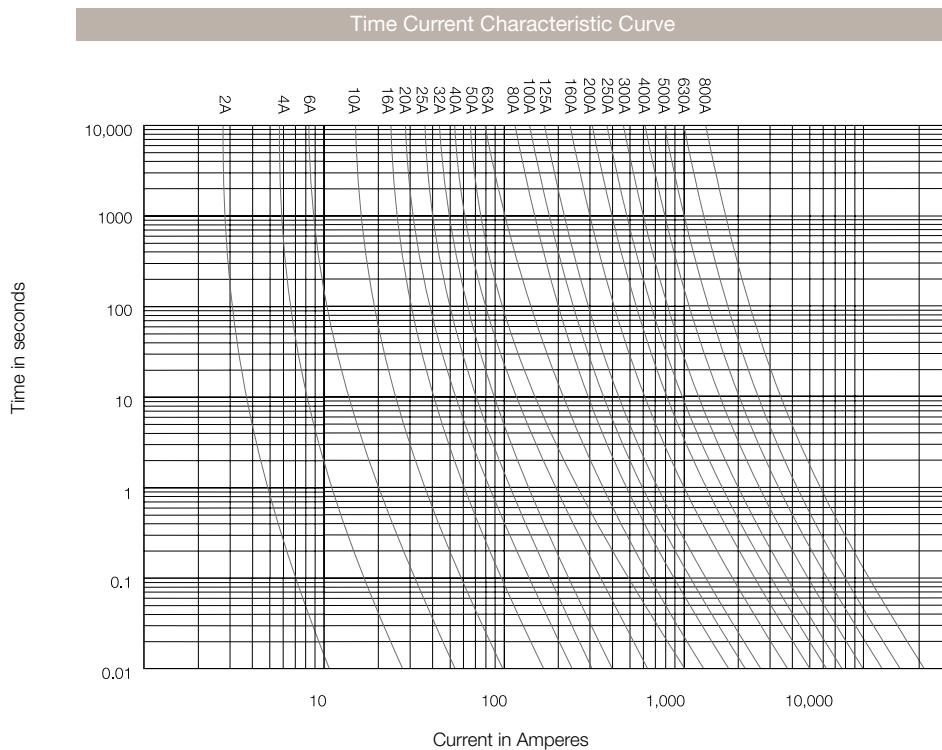


## Technical Information



Type	BS (Bolted Connection)	DIN (Blade Contact)	RH (Cylindrical Cap)
Rated Voltage	415 V	415 V	415 V
Rated Current	2 A - 800 A*	6 A - 630 A*	4 A - 63 A*
Rated Frequency	50 Hz	50 Hz	50 Hz
Breaking Capacity	80 kA	80 kA	80 kA
Utilization Category	“gG”	“gG”	“gG”
Non Fusing Current	1.25 In	1.25 In	1.25 In
Fusing Current	1.6 In	1.6 In	1.6 In
Size	F-1, A-2, A-3, A-4 B-1, B2, B-3, B-4 C-1, C-2, C-3	CD-000, CD-00, CD-1, CD-2, CD-3	--
Cut-off Characteristics	As per specification	As per specification	As per specification
Material of Body	Steatite ceramic	Steatite ceramic	Steatite ceramic
Material of Filler	Silica Quartz	Silica Quartz	Silica Quartz
Material of Blade	Brass (6 A - 63 A) Copper (80 A - 630 A)	Brass (6 A - 400 A) Copper (425 A - 630 A)	--
Indication of Blown Fuse	--	Provided	--

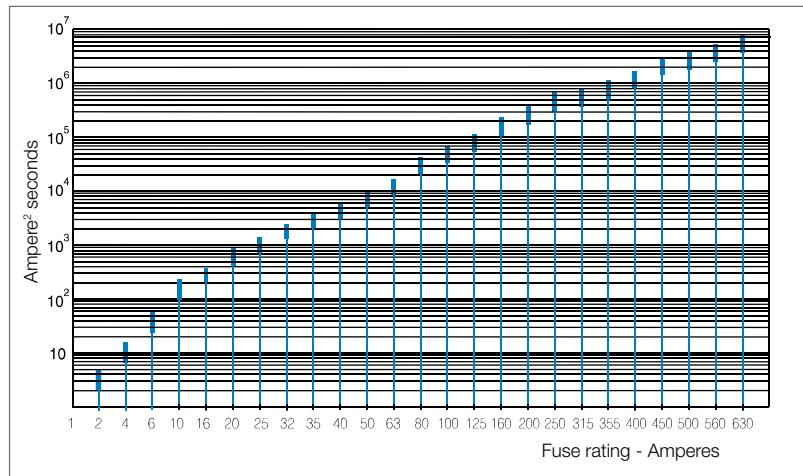
\* Current Ratings : 2 A, 4 A, 6 A, 10 A, 16 A, 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A, 315 A, 350 A, 400 A, 425 A, 500 A, 630 A, 800 A.



Fuses are of current limiting design & hence the short circuit currents cannot rise to the full prospective value owing to the very short clearing time. Adverse effects of the short circuit on the switchgear are thus prevented.



## Discrimination



Total operating  $I^2t$

Pre-arcng  $I^2t$

Positive discrimination under short-circuit conditions is achieved when the higher rated fuse link is unaffected by the fault current, which can cause the lower rated fuse link to operate. The total operating  $I^2t$  let through by the lower rated fuse link must be less than the prearcng  $I^2t$  of the higher fuse link.

The  $I^2t$  characteristics of fuse links with a prospective current upto 80 kA, 0.15 power factor and at 415 Vac, is shown for quick selection.

Fuse Selection Table for Motors

Direct On Line Starting			Star Delta Starting		
Motor Rating 3ϕ, 415 V, 50 Hz		Recommended Fuse Link	Motor Rating 3ϕ, 415 V, 50 Hz		Recommended Fuse Link
kW	HP	(A)	kW	HP	(A)
0.37	0.5	4	2.2	3	6
0.55	0.75	4	3.7	5	10
0.75	1	6	5.5	7.5	16
1.1	1.5	6	7.5	10	20
1.5	2	10	9.3	12.5	25
2.2	3	16	11	15	25
3.7	5	20	15	20	32
5.5	7.5	25	18.5	25	50
7.5	10	25	22	30	50
9.3	12.5	32	30	40	63
11	15	50	37	50	80
15	20	63	45	60	100
18.5	25	80	55	75	100
22	30	100	75	100	160
30	40	125	90	125	160
37	50	125	110	150	200
45	60	160	132	180	250
55	75	160	160	215	315
75	100	200	200	270	400
90	125	250	250	335	400
110	150	315			
132	180	400			
160	215	400			
200	270	500			
250	335	500			



## Ordering Information



Bs Type with Bolted Connection

Current Rating (A)	Type	Cat. No.
2, 4, 6, 10, 16, 20, 25, 32	Offset	IHHNS00002-032
2, 4, 6, 10, 16, 20, 25, 32	Offset	IHHHTIA0002-032
36, 40, 50, 63	Offset	IHHHTSS0036-063
80, 100, 125	Offset	IHHHTSD0080-125
80, 100, 125	Central	IHHHTSDC080-125
125, 160, 200, 250	Central	IHHTSF0125-250
225, 250, 300, 315	Central	IHHTSK0225-315
400	Central	IHHTSMF400
400	Central	IHHTSMS400
400, 500	Central	IHHHTS0400-500
400, 500	Central	IHHTTM0400-500
630	Central	IHHTLM0630
800	Central	IHHTLM0800



DIN Type with Blade Contact

Current Rating (A)	Type
6, 10, 16, 20, 25, 32, 40	IHHCD11006-100
50, 63, 80, 100	
6, 10, 16, 20, 25, 32, 40	IHHCD00006-100
50, 63, 80, 100	
125	IHHCD00125
160	IHHCD00160
32, 40, 50, 63, 80, 100, 125	IHHCD01032-125
160, 200	IHHCD01160-200
250	IHHCD01250
200, 250, 315	IHHCD02200-315
350, 400	IHHCD02350-400
425	IHHCD03425
500, 630	IHHCD03500-630

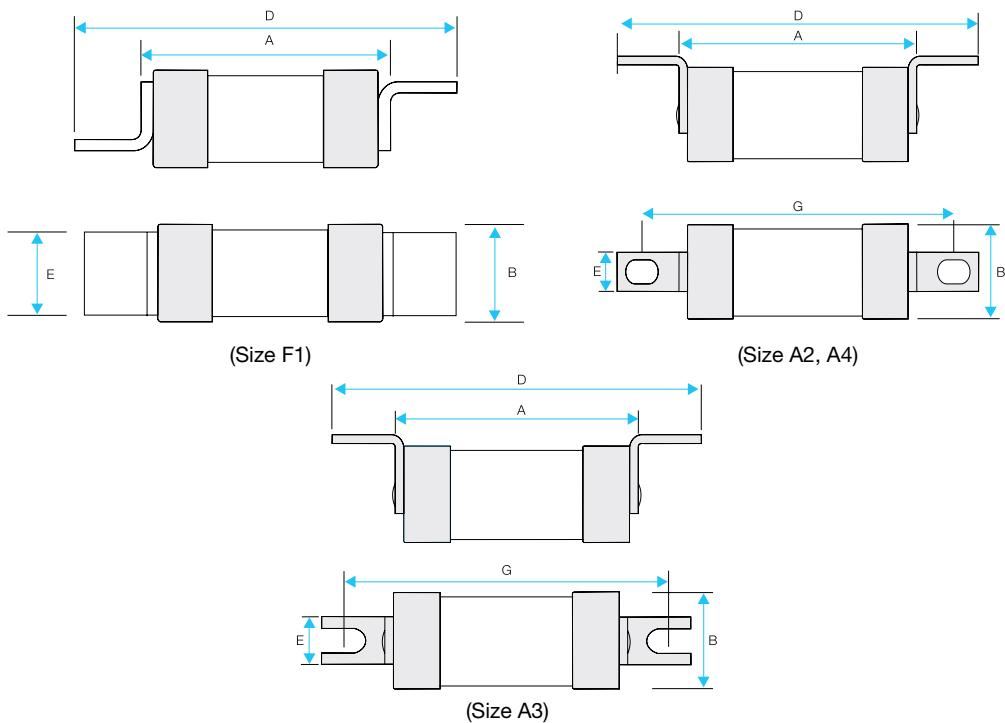


RH Type with Cylindrical Cap

Current Rating (A)	Type
2, 4, 6, 10	IHHRH00002-10
16, 20, 25, 32, 40	IHHRH00016-40
50	IHHRH00050
63	IHHRH00063

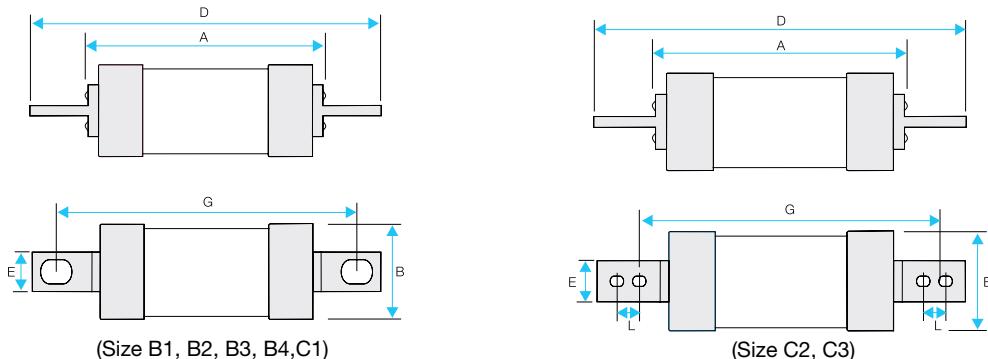


## Dimensions (in mm)



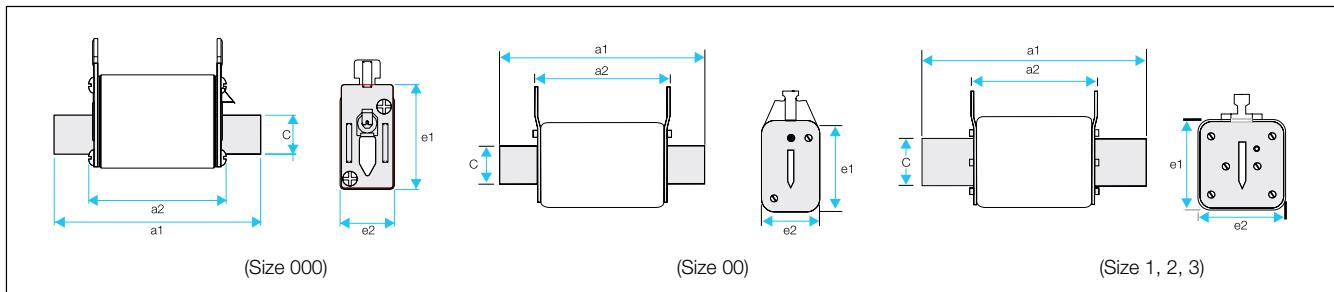
#### Dimensions (in mm) - BS Type with Bolted Connections

IS Size	Rating (A)	Cat. No.	A	B	D	E	G	L
F-1	2,4,6,10,16,20,25,32	IHHNS00002-032	33.5	13.4	60	11.5	-	-
A-2	2,4,6,10,16,20,25,32	IHHHTIA0002-32	55	22	84.6	9	73	-
A-3	36, 40, 50, 63	IHHHTSS0036-63	55	22	89.6	13	73	-
A-4	80, 100, 125	IHHHTSD0080-125	56.5	24	109	19	94	-



#### Dimensions (in mm) - BS Type with Bolted Connections

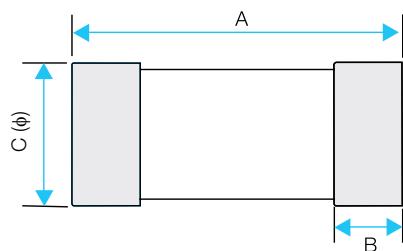
Dimensions (in mm) - BC type with Bolted Connections								
IS Size	Rating (A)	Cat. No.	A	B	D	E	G	L
B-1	80, 100, 125	IHHHTSDC080-125	57	24	134	19	111	-
B-2	125, 160, 200, 250	IHHHTSF0125-250	64	33	135	19	111	-
B-3	225, 250, 300-315	IHHHTSK0225-315	72.6	39.5	134	25.4	111	-
B-4	400	IHHHTSMF400	74.5	51.2	134	25.4	111	-
C-1	400	IHHHTSMS400	75	51.2	156	25.4	133	-
C-2	400,500	IHHHTTS0400-500	72.5	73	164	25.4	133	-
C-2	400, 500	IHHHTTM0400-500	72	73	208	25.4	133	25.4
C-2	630	IHHHTLM0630	72	73	208	25.4	133	25.4
C-3	800	IHHHTLM0800	72	73	208	25.4	133	25.4



### Din Type with Blade Contact

IS Size	Rating (A)	Cat. No.	a <sub>1</sub>	a <sub>2</sub>	c	e <sub>1</sub>	e <sub>2</sub>
000	6,10,16, 20,25,40 32,50,63,80,100	IHHCD11***	78.5	52.6	15	40	20
00	6,10,16, 20,25,40 32,50,63,80,100,125,160	IHHCD00***	78.5	52.6	15	49	29.4
1	32,40,50,63,80,100 125,160,200,250	IHHCD01***	137	72	20	46	46
2	200,250,315,350,400	IHHCD02***	150	72	25	57	57
3	425,500,630	IHHCD03***	150	72	35	72	72

### \*\*\* Rating



### RH Type with Cylindrical Cap

Rating (A)	Cat. No.	A	B	C( $\phi$ )
2, 4, 6, 10, 16, 20, 25 32, 40, 50, 63	IHHRH	50.5	9.8	14.3

HiBreak range of low voltage HRC based DIN fuse base have been designed to meet the requirements set for modern industrial installations & electrical power plants. Their breaking capacity is sufficient even for the highest short circuit levels, which are normally reached in practice.

DIN Type Fuse Base - Size 00, 1, 2 & 3 are designed for DIN Type Fuse Links upto 630 A.

The Modular type Fuse Base is available in single pole. Two or more single pole can be connected side by side (straight or diagonally) into 2 pole and 3 pole configuration as per the customer requirement / availability of space.

#### **Features:**

- Fibre glass reinforced Thermoplastic / Thermoset material provide excellent mechanical, thermal & electrical properties.
- Ease and Speed of installation - by Screws or on DIN Rail.
- Snap on mounting of phase barriers.

#### **Type:**

- Modular
- Fixed

#### **Range :**

100 A to 630 A.

#### **Specification :**

IEC 60269-1 & 2-1 /  
IS 13703-1 & 2-1.

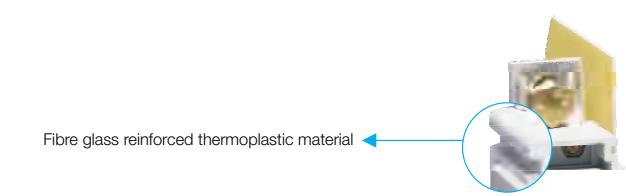




**HiBreak DIN Fuse Bases**

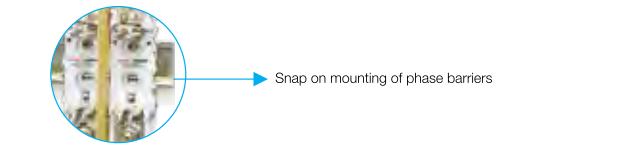


## Construction - Modular Type

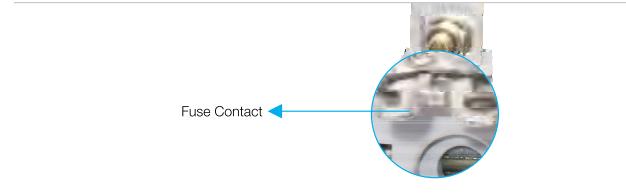


Fixing by Screws

Fixing on DIN Rail



Snap on mounting of phase barriers



Fuse Contact

Pressure Circlip

### Material of Base

Fibre glass reinforced thermoplastic material with high mechanical strength, thermal & electrical withstand.

### Mounting

By Screws for all sizes of fuse base & on DIN Rail (only for size 00)

### Phase Barriers

Snap on mounting phase barrier of insulating material to increase creepage distance & clearance between phases.

### Fuse Contact

Current carrying contacts / terminals are made from precisely pressed copper material and are silver plated to ensure long life & non-deteriorating contact surface for high efficiency mating.

### Pressure Circlip

Pressure Circlip of spring steel material which do not lose its property at high temperature are suitably placed to ensure perfect mating of male - Fuse and female - Fuse Contact part and maintain sufficient pressure to ensure temperature rise is well within specified limits in continuous operation.

### Size - DIN



Size 00



Size 1



Size 2



Size 3



## Technical Information



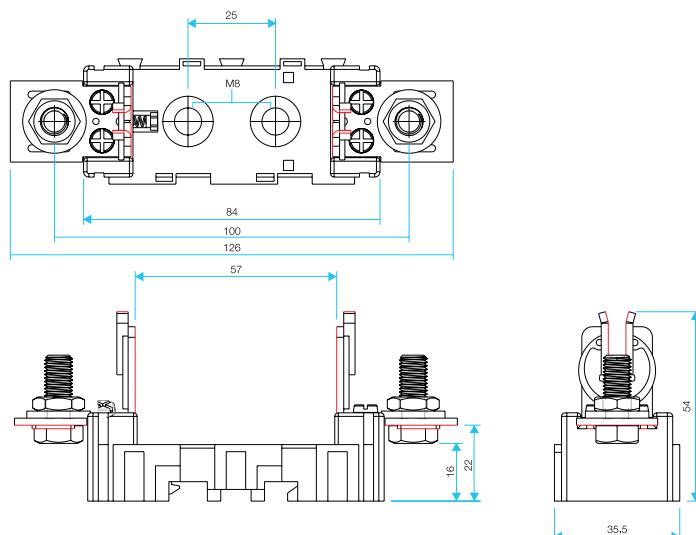
Type-single phase	IHMC000160*	IHMC010250	IHMC020400	IHMC030630
IEC Size -Din	0	1	2	3
Size of fuse link	0	1	2	3
Accommodated Fuse link current	6 A - 160 A	32 A - 250 A	200 A - 400 A	425 A - 630 A
Rated current of fuse base	160 A	250 A	400 A	630 A
Rated voltage of fuse base		415 V <sub>a</sub> c		
Rated insulation voltage		1000 V <sub>a</sub> c		
Weight (kg)	0.12	0.40	0.50	0.65

\* Size 00 Fuse base is suitable for mounting both size 000 & size 00 fuse links.

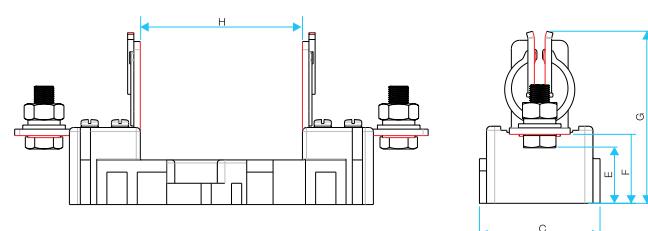
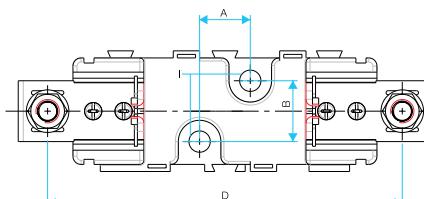
## Dimension (in mm)

Modular Type:

Side - 00  
160 A



Side - 1 / 2 / 3  
250 A / 400 A / 630 A



Dimension

Size	A	B	C	D	E	F	G	H	I
1	25	30	59.5	175	27	34	84.9	80	M10
2	25	30	59.5	200	28	35	98	80	M10
3	25	30	59.5	210	29	36	109	80	M10



## Construction - Fixed Type



### Moulding (Casing)

The Bases are manufactured from high grade thermosetting plastics. These are non-inflammable & non-hygroscopic.

### Contacts

Current carrying parts of the holders are made from precisely pressed copper/brass material and have extruded brass base contacts. These are mounted on moulded seats to ensure perfect alignment. The current carrying parts of the fuse base are electro plated with silver to ensure long life & non-deteriorating contact surface for high efficiency mating.

### Back up Clips

Back up pressure clips are precisely formed from Phosphor Bronze/Spring Steel material to ensure perfect mating of male and female parts for long life.

### Terminals

Copper/Brass terminals are used for cable termination through Cable lugs for open type Fuse Bases complete with Cable holding fasteners.

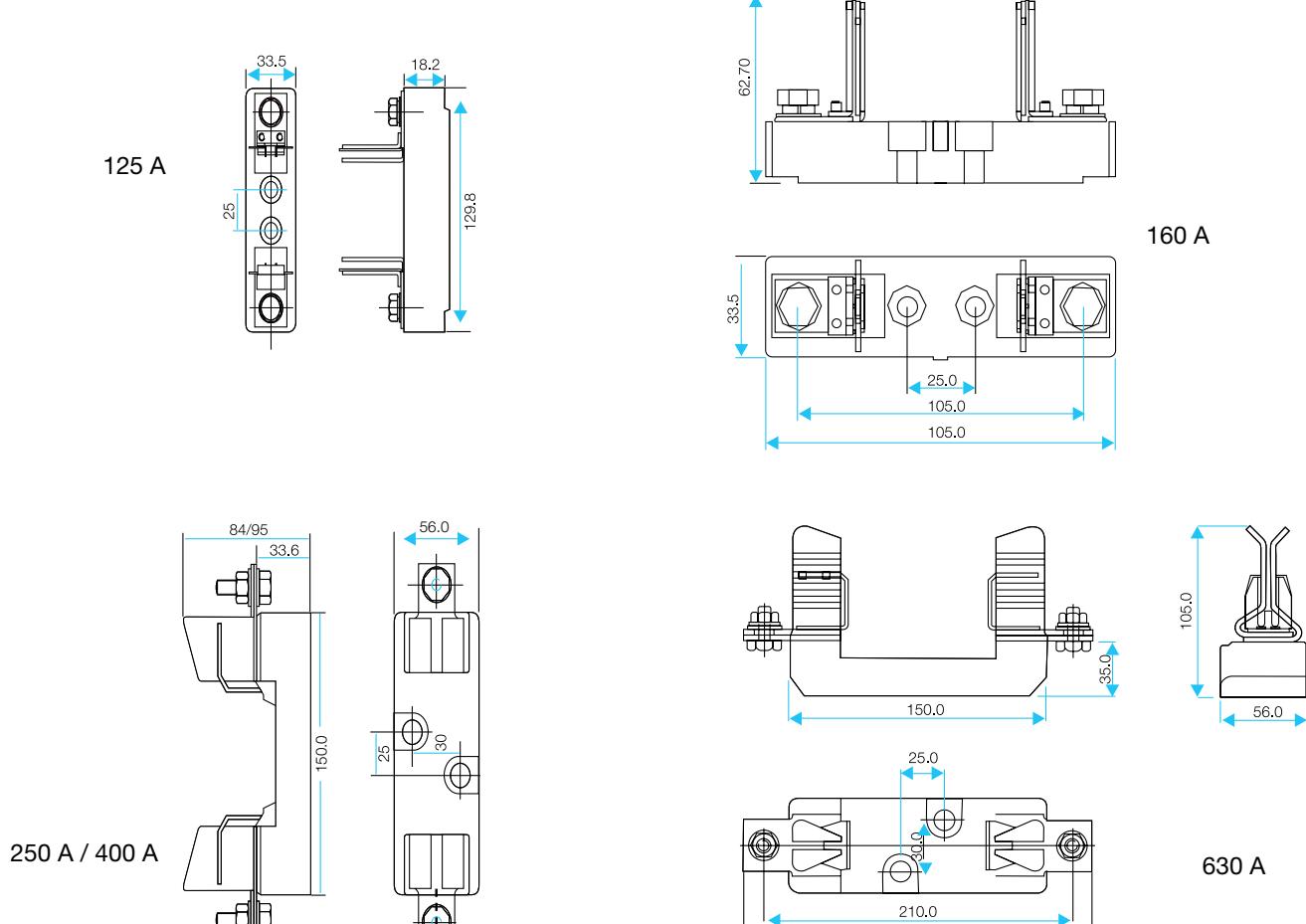
## Ordering Information



Fuse Bases		
Current Rating (A)	Type	Cat. No.
100 A	Open Fuse Base	IHUC000100
125 A	Open Fuse Base	IHUC000125
160 A	Open Fuse Base	IHUC000160
250 A	Open Fuse Base	IHUC010250
400 A	Open Fuse Base	IHUC020400
630 A	Open Fuse Base	IHUC030630

## Dimension (in mm)

Fixed Type:



Havells Busbar Chamber system is designed for safe, reliable & economical distribution of power to various loads as per the requirements of the system. The modular construction of the bus bar chamber provides for compact & easy add-on modules on the basic unit for system expansion (if the need be). These can be wall mounted and can also be made suitable for floor mounting by using optional pedestal set.

## Features:

- Readymade & customised solution for safe power distribution
- Modular/compact design provides economy of space and cost
- Simple and efficient system configuration
- Easy, flexible and time saving installation
- Shock proof design
- Elegant & sleek in appearance

## Application :

The busbar chambers find wide application in power distribution in areas namely:

- Construction site
- Shop floor
- Multi-storeyed complexes
- Building installation etc.

## Range :

The busbar chambers are available for 100 A / 200 A, 250 A / 315 A / 400 A & 630 A / 800 A current ratings with short circuit withstand capacity of 25 kA, 35 kA & 50 kA respectively. These are offered in 4 way, 6 way & 8 way in Four Pole configuration.

## Specification :

Fully application oriented as per  
IS:8623 / IEC 60439 (Panel sub assemblies)  
IS: 2147 / IEC60529 (Degree of protection)





**Busbar Chamber System**



## Optima Busbar Chamber



Ready made & customised solution for safe power distribution

- Incoming from Top / Bottom & Centre by rotation of enclosure
- Outgoing provision from Left / Right and Top / Bottom side
- Enclosure can be mounted vertically and horizontally
- Removable gland plate with knock out provision
- Liberal space between cable / busbar and live parts

### Busbar Chamber

#### Introduction

Havells new **Optima** Busbar Chamber System is designed for safe, reliable & economical distribution of power to various loads as per the requirements of the system. The busbar chamber conforms to IEC-61439-3 / IS-8623 & IEC-60529 / IS-2147.

#### Construction

The busbar chamber is fabricated using sheet steel (CRCA) and epoxy powder coated to give superior & lasting finish. The bus bar sections are made of ETP grade copper & dull tin plated and the bus bar supports are made of DMC (Dough moulding compound). Left & Right side end plates are detachable.





## Technical Information

Frame	SI Unit	Size 1			Size 2			Size 3	
Incoming Current Rating	A	63	100	200	250	315	400	630	800
Operational Voltage	V	415 / 440	415 / 440	415 / 440	415 / 440	415 / 440	415 / 440	415 / 440	415 / 440
Frequency	Hz	50	50	50	50	50	50	50	50
Insulation Voltage	V	1000	1000	1000	1000	1000	1000	1000	1000
Execution (No. of Poles)		FP							
Conditional Short Circuit withstand Capacity	kA	10	25	25	25	25	35	50	50
Short time withstand current for 1 second (I <sub>c</sub> )	kA	20 I <sub>n</sub>							
Outgoing (No. of Ways)		4, 6, 8	4, 6, 8	4, 6, 8	4, 6, 8	4, 6, 8	4, 6, 8	4, 6, 8	4, 6, 8
Degree of Protection		IP-31							
Busbar Layout		Single layer (side by side)							
Maximum cumulative load current per phase	A	63	100	200	250	315	400	630	800
Outgoing cable size (Copper)	mm <sup>2</sup>	16	35	95	120	150	240	185*2	240*2
Outgoing cable size (Alunimum)	mm <sup>2</sup>	25	50	150	185	240	300	40*8*2	50*8*2

## Ordering Information

### Frame -1

Current Rating	No. of ways	Dimension (WxHxD)	Item Code
63 A	4	400*300*150	IHBC006304
	6	480*300*150	IHBC006306
	8	560*300*150	IHBC006308
100 A	4	400*300*150	IHBC010004
	6	480*300*150	IHBC010006
	8	560*300*150	IHBC010008
200 A	4	400*300*150	IHBC020004
	6	480*300*150	IHBC020006
	8	560*300*150	IHBC020008





## Frame -2

Current Rating	No. of ways	Dimension (WxHxD)	Item Code
250 A	4	600X525X200	IHBC025004
	6	600X635X200	IHBC025006
	8	600X745X200	IHBC025008
315 A	4	600X525X200	IHBC031504
	6	600X635X200	IHBC031506
	8	600X745X200	IHBC031508
400 A	4	800X600X250	IHBC040004
	6	800X725X250	IHBC040006
	8	800X900X250	IHBC040008

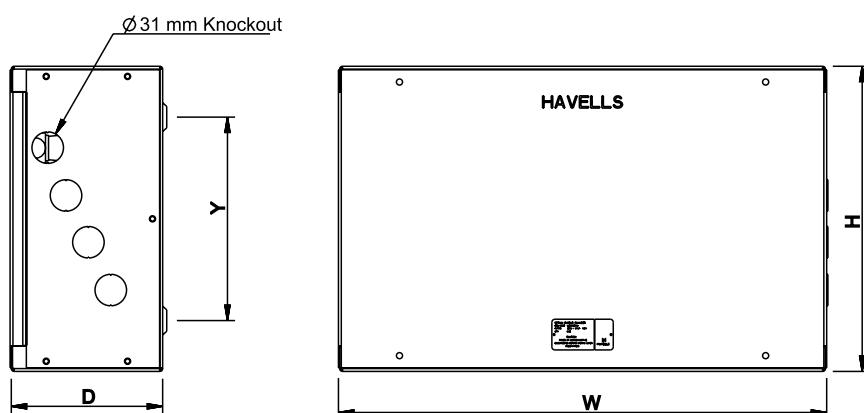


## Frame -3

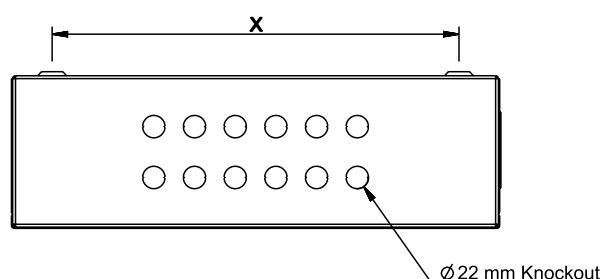
Current Rating	No. of ways	Dimension (WxHxD)	Item Code
630 A	4	850X700X300	IHBC063004
	6	850X825X300	IHBC063006
	8	850X975X300	IHBC036308
800 A	4	850X700X300	IHBC080004
	6	850X825X300	IHBC080006
	8	850X975X300	IHBC080008



Dimension in (mm)  
Frame-1



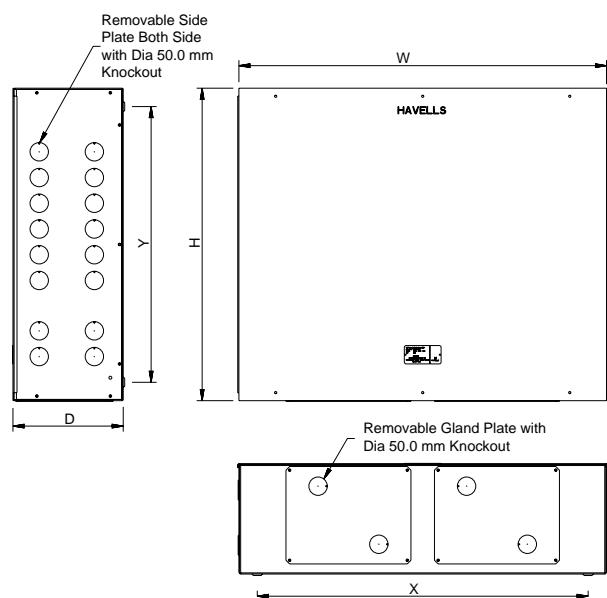
	Encl. Size	Mtg. Dimm.
No. of Ways	W * H * D	X * Y
4 Way	400 * 300 * 150	300 * 200
6 Way	480 * 300 * 150	380 * 200
8 Way	560 * 300 * 150	460 * 200





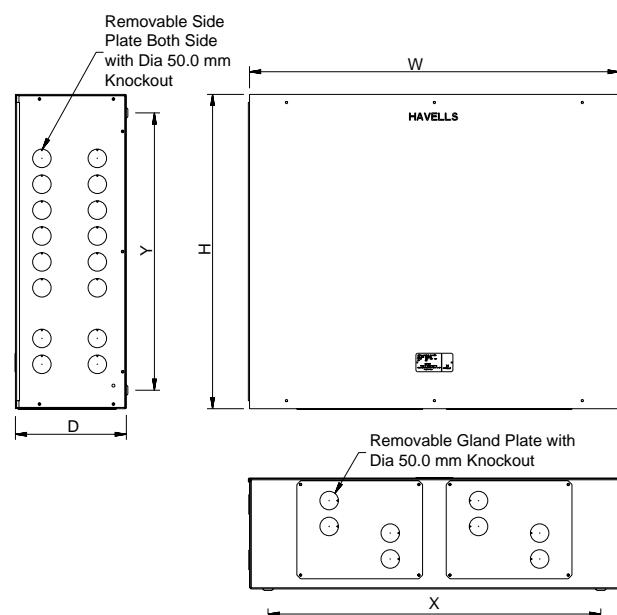
**Dimension in (mm)**  
**Frame-2**

		Encl. Size	Mtg. Dimn.
Rating	No. of Ways	W * H * D	X * Y
250-315 A	4 Way	600 * 525 * 200	500 * 425
	6 Way	600 * 635 * 200	500 * 535
	8 Way	600 * 745 * 200	500 * 645
400 A	4 Way	800 * 600 * 250	700 * 500
	6 Way	800 * 725 * 250	700 * 625
	8 Way	800 * 850 * 250	700 * 800



**Dimension in (mm)**  
**Frame-3**

	Encl. Size	Mtg. Dimn.
No. of Ways	W * H * D	X * Y
4 Way	850 * 700 * 300	750 * 600
6 Way	850 * 825 * 300	750 * 725
8 Way	850 * 975 * 300	750 * 875



A comprehensive range of General Purpose Load Changeover Switches with side handle operation find wide application in all general industries where individual system require safe and reliable transfer of power from main supply to standby supply and vice versa.

Load Changeover Switches are supplied in Sheet Steel enclosure, side operated with three stable positions; I-O-II, (centre-off position).

## Features:

- Suitable for individual mounting, inner mounting holes and mounting brackets provided in enclosures.
- Sheet steel enclosure duly phosphatised and powder painted for longer life.
- Provision for door interlocking.
- Termination suitable for Aluminum cables, adequate knockouts provided in the enclosure for cable entry.

## Range :

Onload Changeover Switch - AC 23 (side handle)

- 32 A, 63 A, 240 V in Double Pole version
- 32 A-100 A, 415 V in Three Pole version
- 16 A-100 A, 415 V in Four Pole version

Offload Changeover Switch - AC 20 A (side handle)

- 200 A - 2000 A, 415 V in Four Pole version

## Specification :

Conforms to IS / IEC:60947-1&3





Load Changeover Switch



## Construction



### Contacts

Contacts are made of silver plated, electrolyte copper to increase current carrying capacity, ensure temperature rise within permissible limits and for long contact life.

### Operating Handle and Interlocking

The operating handle is made of steel and is provided on the right hand side of the switch enclosure. Door interlock ensures the door cannot be opened when the switch is in ON position thereby providing safety.

### Terminal Blocks

Terminal blocks are provided for cable termination. These are made of DMC/Porcelain which has excellent mechanical, thermal and dielectric properties.

### Enclosure:

The enclosure is made of sheet steel suitable for individual mounting. They are provided with adequate knockout for cable entry and inner mounting holes for switch ratings upto 320 A and mounting brackets for switch rating of 400 A and above.

## Ordering Information



Double Pole Onload Changeover Switch AC 23 (side handle)

Current Rating (A)	Cat. No.
32 A	IHCFDE0032
63 A	IHCFDE0063



Three Pole Onload Changeover Switch AC 23 (side handle)

Current Rating (A)	Cat. No.
32 A	IHCFTE0032
63 A	IHCFTE0063
100 A	IHCFTE0100



#### Four Pole Load Changeover Switch

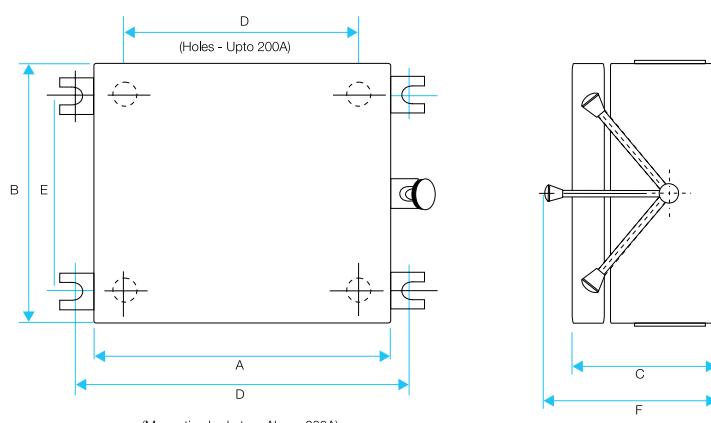
#### Onload Changeover Switch - AC 23 A (side handle)

Current Rating (A)	Cat. No.
16	IHCFFE0016
32	IHCFFE0032
63	IHCFFE0063
100	IHCFFE0100

#### Offload Changeover Switch - AC 20 A (side handle)

200	IHCFFE0200
320	IHCFFE0320
400	IHCFFE0400
630	IHCFFE0630
800	IHCFFE0800
1000	IHCFFE1000
1250	IHCFFE1250
1500	IHCFFE1500
2000	IHCFFE2000

#### Dimensions in (mm)



Rating	A	B	C	D	E	F	Size for Cable entry & exit	Size of Al. conductor	Size of knock-out
Double Pole 32 A	136	205	100	76	140	155	--	16 mm <sup>2</sup>	25.4φ
63 A	210	217	100	166	173	165	--	25 mm <sup>2</sup>	25.4φ
Three Pole 32 A	210	217	100	166	173	165	--	16 mm <sup>2</sup>	25.4φ
63 A	270	318	134	205	236	205	--	25 mm <sup>2</sup>	38φ
100 A	316	320	141	254	258	240	282x60	50 mm <sup>2</sup>	38φ
Four Pole 16 A	210	217	100	166	173	165	--	4 mm <sup>2</sup>	25.4φ
32 A	210	217	100	166	173	165	--	16 mm <sup>2</sup>	25.4φ
63 A	270	318	134	205	236	205	--	25 mm <sup>2</sup>	38φ
100 A	400	320	138	338	260	245	366x60	50 mm <sup>2</sup>	38φ
200 A	425	495	250	322	390	400	--	150 mm <sup>2</sup>	
320 A	425	495	250	322	390	400	--	240 mm <sup>2</sup>	
400 A	515	594	302	545	484	418			
630 A	605	595	310	640	480	505			
800 A	605	595	310	640	480	505			
1000 A	730	700	348	780	535	--			
1250 / 1500 A	1155	688	440	1205	438	680			
2000 A	1250	760	520	1270	545	770			

A complete range of HRC based Fuse Switch & Switch Fuse units are offered to suit varied power distribution applications. The heavy duty Fuse Switches are fully type tested with short circuit breaking capacity of 80 kA at 415 V suitable for utilisation category AC 22 A / AC 23 A. Four frame sizes cover the full range.

The Switch Fuse units are suitable for utilisation category AC 22 A.

## Features:

### Fuse Switches

- Double break with side handle operation
- Positive indication of contacts
- Suitable for surface mounting
- Door interlock facility
- Sheet steel enclosure duly phosphatised and powder painted

### Switch Fuses

- Side handle operation
- Suitable for surface mounting
- Sheet steel enclosure duly phosphatised and powder painted
- Provision of conduit knockouts and detachable gland plates.

## Range :

Fuse Switch	: 63 A to 800 A in TPN & FP Execution
Switch Fuse	: 16 A to 63 A in SPN / DP Execution
	16 A to 320 A in TPN Execution

## Specification :

Conforms to IS / IEC:60947-1&3





**Fuse Switch & Switch Fuse**



## Construction



### Fuse Switch

Fuse Switch units are fitted with sturdy side operating handle which drives the quick make-break mechanism incorporating operating springs. Liberal sized silver plated terminals, suitable for aluminium cable/bus-bar termination, are provided with terminal cover shields to prevent any accidental contact with live metal parts. Positive ON-OFF indication is provided on the switch door.

### Contacts

Contacts are made of electrolytic copper, electro-plated with silver, for better contact and greater resistance to corrosion. Specially designed female contacts ensure low contact resistance and better arc-control.

### Fuses

Fuse switches are designed for use with HBC Cartridge fuselinks conforming to IS:13703.

### Enclosures

The enclosure is made of sheet steel, rust protected, phosphatized and powder coated. They are fitted with removable top and bottom end plates provided with knock-outs for bus bars/cables entry. Front accessible door, fitted with dust-excluding gasket, is interlocked to prevent opening when the switch is in 'ON' condition. They are suitable for surface mounting.



### Switch Fuse

Switch Fuse Unit comprises of vitreous steatite porcelain rewireable fuses or HBC fuse fittings complete with their conducting parts. The switch is fitted with sturdy side operating handle with quick make-break type mechanism.

### Contacts

Contacts are made of electrolytic copper, silver-plated. The fixed contacts are provided with removable shield.

### Fuses

Switch Fuse units are provided with rewirable fuse or HBC Fuse Links.

### Enclosures

The Enclosure is made of sheet steel duly phosphatised and power-coated. They are provided with conduit knock-outs and have detachable gland plates. Door interlock is provided to prevent opening when the switch is in 'ON' condition.



## Technical Information



Fuse Switch					
Rating Thermal (A)	AC-22 Fuse Switch rating (A)	AC-23 Fuse Switch rating (A)	Suggested Fuse Type	AC-23 Motor Switch rating	Mechanical Endurance (Operating Cycles)
63	80	63	H TS	28 KW	10,000
100	125	100	H TSD	45 KW	10,000
160	200	160	H TSF	80 KW	8,000
200	250	200	H TSF	90 KW	8,000
320	320	320	H TSK	150 KW	5,000
400	460	400	H TSMF	185 KW	5,000
500	630	500	H TTM	225 KW	5,000
800	750	630	H TLM	300 KW	3,000



Rating (A)	Short Circuit Making Capacity	Rated Fused Short Circuit Current	Switch Fuse			AC-23 (Motor Rating)	Recommended Fuses (for Non-rewirable types)
			AC-21	AC-22	AC-23		
16	4.6 kA	45 kA	16	16	16	5.5 kW	HNS
32	7.2 kA	45 kA	32	32	32	11 kW	HTIA
63	8.4 kA	65 kA	63	63	63	22 kW	HTIA/HTSS
100	9.8 kA	65 kA	100	100	100	41 kW	HTSD
200	--	--	200	200	200	55 kW	--
320	--	--	320	--	--	70 kW	--



## Ordering Information



Switch Fuse Unit (Rewirable Type) SPN & DP

Current Rating (A / V)	SPN Cat. No.	DP Cat. No.
16/240	IHSRSE2016	IHSRDE2016
32/240	IHSRSE2032	IHSRDE2032
63/415	IHSRSE4063	IHSRDE4063



Switch Fuse Unit (Rewirable Type) TPN

Current Rating (A)	Rewireable Porcelain Fuse Units Cat No.	HBC cum Rewireable Porcelain Fuse Units Cat No.
16	IHSRTE4016	IHSHTE4016
32	IHSRTE4032	IHSHTE4032
63	IHSRTE4063	IHSHTE4063
100	IHSRTE4100	IHSHTE4100
200	IHSRTE4200	--
320	IHSRTE4320	--

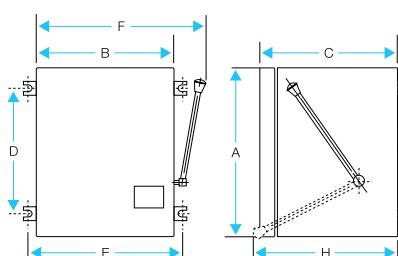


Fuse Switch Unit - HBC Fuse Type

Current Rating (A)	TPN Cat. No.
63	IHFNTW4063
100	IHFNTW4100
160	IHFNTW4160
200	IHFNTW4200
320	IHFNTW4320
400	IHFNTW4400
500	IHFNTW4500
800*	IHFNTW4800

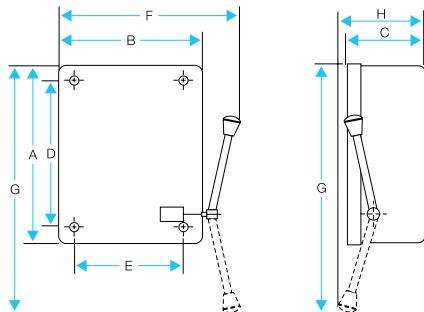
\*Switch suitable for 800 Amp. but fitted with 630Amp. Fuse.

Dimensions in (mm)

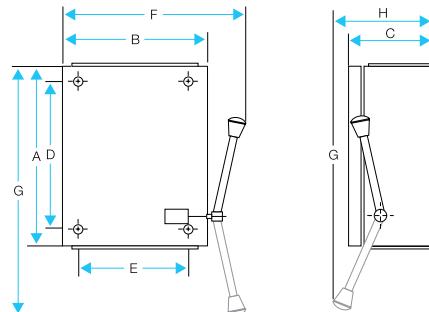


Fuse Switch Unit, TPN

Rating	A	B	C	D	E	F	G	H	Size for Cable entry & exit	Size of Al. conductor	Size of knock out
63/415	292	270	237	244	328	340	--	270	235x80	35mm <sup>2</sup>	25φ/31φ
100/415	292	270	237	244	328	340	--	270	235x80	70mm <sup>2</sup>	25φ/31φ
160/415	360	350	339	312	408	435	--	360	295x140	185mm <sup>2</sup>	--
200/415	360	350	339	312	408	435	--	360	295x140	185mm <sup>2</sup>	--
320/415	360	350	339	312	408	435	--	360	295x140	350mm <sup>2</sup>	--
400/415	360	350	339	312	408	435	--	360	295x140	2(32x10)*	--
500/415	360	430	339	312	488	535	--	380	295x140	2(40x10)*	--
800/415	480	498	408	433	556	605	--	425	428x183	1(50x10)*	--



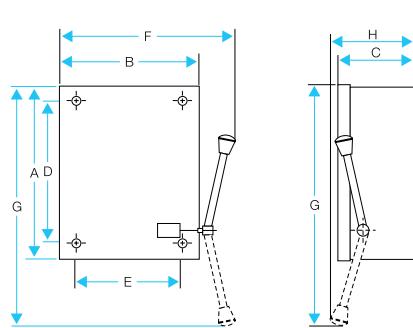
16A - 63A (Deep Drawn Enclosure)



63A - 320A (Fabricated Enclosure)

**Switch Fuse Units**

Rating	A	B	C	D	E	F	G	H	Size for Cable entry & exit	Size of Al. conductor	Size of knock-out
<b>SPN/DP Rew</b>											
16/240	145	95	55	110	60	130	180	--	--	4 mm <sup>2</sup>	19φ
32/240	220	140	75	166	85	180	285	--	--	6 mm <sup>2</sup>	25φ
<b>TP Rew/HBC-Rew/BFF</b>											
16/415	225	175	75	172	123	210	285	--	--	6 mm <sup>2</sup>	25φ
32/415	260	205	82	213	171	260	315	--	--	16 mm <sup>2</sup>	25φ
<b>DP Rew/HBC-Rew/BFF</b>											
32/415	265	215	85	213	171	260	315	--	--	16 mm <sup>2</sup>	25φ
63/415	278	210	116	213	128	250	380	160	--	35mm <sup>2</sup>	25φ/31φ
<b>TP Rew / BFF</b>											
32/415	265	215	85	213	171	260	315	--	--	16 mm <sup>2</sup>	25φ
63/415	265	215	85	213	171	260	315	--	--	35 mm <sup>2</sup>	25φ
100/415	347	310	120	285	248	380	435	170	--	70mm <sup>2</sup>	25φ/31φ
<b>Rew. T.P. / STD</b>											
63/415	280	270	116	223	205	325	390	175	--	35mm <sup>2</sup>	25φ/31φ
100/415	347	310	120	285	248	380	435	170	--	70mm <sup>2</sup>	25φ/31φ
<b>DLX. TP / HBC cum Rew</b>											
63/415	350	280	120	288	218	360	445	160	246x61	35mm <sup>2</sup>	25φ/31φ
100/415	400	330	150	338	268	400	490	160	296x80	70mm <sup>2</sup>	25φ/31φ
<b>TP Rew</b>											
200/415	554	315	160	450	215	385	565	260	280x97	185mm <sup>2</sup>	38φ
320/415	565	398	182	465	298	475	585	260	363x104	300mm <sup>2</sup>	38φ



Fabricated Enclosure

**Isolator Switch TPN**

Rating	A	B	C	D	E	F	G	H	Size for Cable entry & exit	Size of Al. conductor	Size of knock-out
16/415	167	207	80	121	163	250	220	100	174x30	6mm <sup>2</sup>	25φ/31φ
32/415	167	207	80	121	163	250	220	100	174x30	16mm <sup>2</sup>	25φ/31φ
63/415	238	310	125	176	248	365	345	160	275x60	35mm <sup>2</sup>	25φ/31φ
100/415	238	310	125	176	248	365	345	160	275x60	70mm <sup>2</sup>	25φ/31φ

## Note

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## REGIONAL BRANCH OFFICES

**NORTH - REGIONAL OFFICE:** Corporate Office: QRG Towers, 2D, Sector-126, Expressway, Noida-201304, Tel: 0120-3331000,

**Delhi:** Tel: 011-47676700, 23888200,

**Chandigarh:** Tel: 0172-4232400-401,

**Dehradun:** Tel: 0135-6670202,

**Noida / Haryana:** Tel: 0120-3331000,

**Ludhiana:** Tel: 0161-4676000 / 24,

**Jammu:** Tel: 0191-2490424,

**Sri Nagar:** Tel: 0194-2490431,

**Jaipur:** Tel: 0141-3914645, 3988210

**Jodhpur:** Tel: 0291-9214201640 / 45,

**Lucknow:** Tel: 0522-6672100,

**Kanpur:** Tel: 0512-6710400, 6710409

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**Siliguri:** Tel: 0353-2525907,

**Ranchi:** 0651-2244861, 2244862, 2244864, 2244868, 2244869,

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**Ahmedabad:** Tel: 079-40061111, 40060738-740,

**Indore:** Tel: 0731-2572340-41, 4009998 (Airtel),

**Rajkot:** Tel: 0281-2481112, 2921212,

**Nagpur:** Tel: 0712-2240932, 2242692, 2242699

**Pune:** Tel: 020-64016413 / 14,

**Raipur:** Tel: 0771-4243400 / 01,

**Surat:** Tel: 0261-2350137, 9979890137,

**Jabalpur:** Tel: 0761-4064491

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Rukmani Lakshmi Pathy Road, Egmore, Chennai-600008, Tel: 044-42280600, 605,

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**Vishakapatnam:** Tel: 0891-6514339,

**Vizag:** Tel: 0891-6514339,

**Vijayawada:** Tel: 91+9247058847/57,

**Calicut:** 09895855499,

**Madurai:** 09994493242,

**Trivandrum:** 09633817795,

**Hubli:** 09448146028,

**Trichy:** 09944460160

## REPRESENTATIVE OFFICES

- Goa
- Solapur
- Gwalior
- Kathmandu
- Bhopal

Although every effort has been made to ensure accuracy in the compilation of the technical detail within this publication. Specifications and performance data are constantly changing. Current details should therefore be checked with Havells Group.



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