



HAVELLS

Experience the Latest & Safest in Building Circuit Protection



Catalogue

- Protection Device
- Control & Monitoring Device
- Photovoltaic Switchgear Device
- Industrial Plug & Socket
- Distribution Boards

ABOUT US

Redefining the modern homes with innovation and excellence

Havells is at the forefront of transforming modern living spaces by offering innovative solutions that elevate everyday experiences. With a deep understanding of consumer needs, the company has expanded its footprint across every aspect of home life, creating environment that are not only functional but also comfortable, stylish, and future-ready. To make these solutions accessible, Havells leverages an extensive distribution network encompassing 18,000 dealers, over 1,000 exclusive brand stores, intensifying presence in modern retail, e-commerce and quick commerce.

The company's portfolio includes power brands like Havells, Havells Crabtree, Lloyd, REO, Havells Studio, and Standard each designed to cater to the unique demands of today's consumers.

Anchored in the 'Make in India' initiative, Havells operates 16 cutting-edge manufacturing facilities across India, producing 90% of its products in-house. At the forefront of Havells product evolution lies its Customer Experience & Designs (CXD) Studio, where creativity and user-centric design converge. This is complemented by its Centre for Research & Innovation (CRI), supported by four advanced R&D centres, enabling Havells to consistently deliver products that are both functional and visually compelling.

Driven by a commitment to innovation, quality, and design, the company also upholds sustainable practices throughout its operations, including eco-friendly manufacturing processes and energy-efficient product design, contributing to a greener and more sustainable future.



CORPORATE OFFICE, NOIDA



State-of-the-Art Manufacturing Unit



Industry 4.0 Process



Center For Research & Innovation



Customer Experience & Design

16 Manufacturing Units

~18000 Strong Dealer Network

4 Research Centres

48 Offices

Protection Device

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B

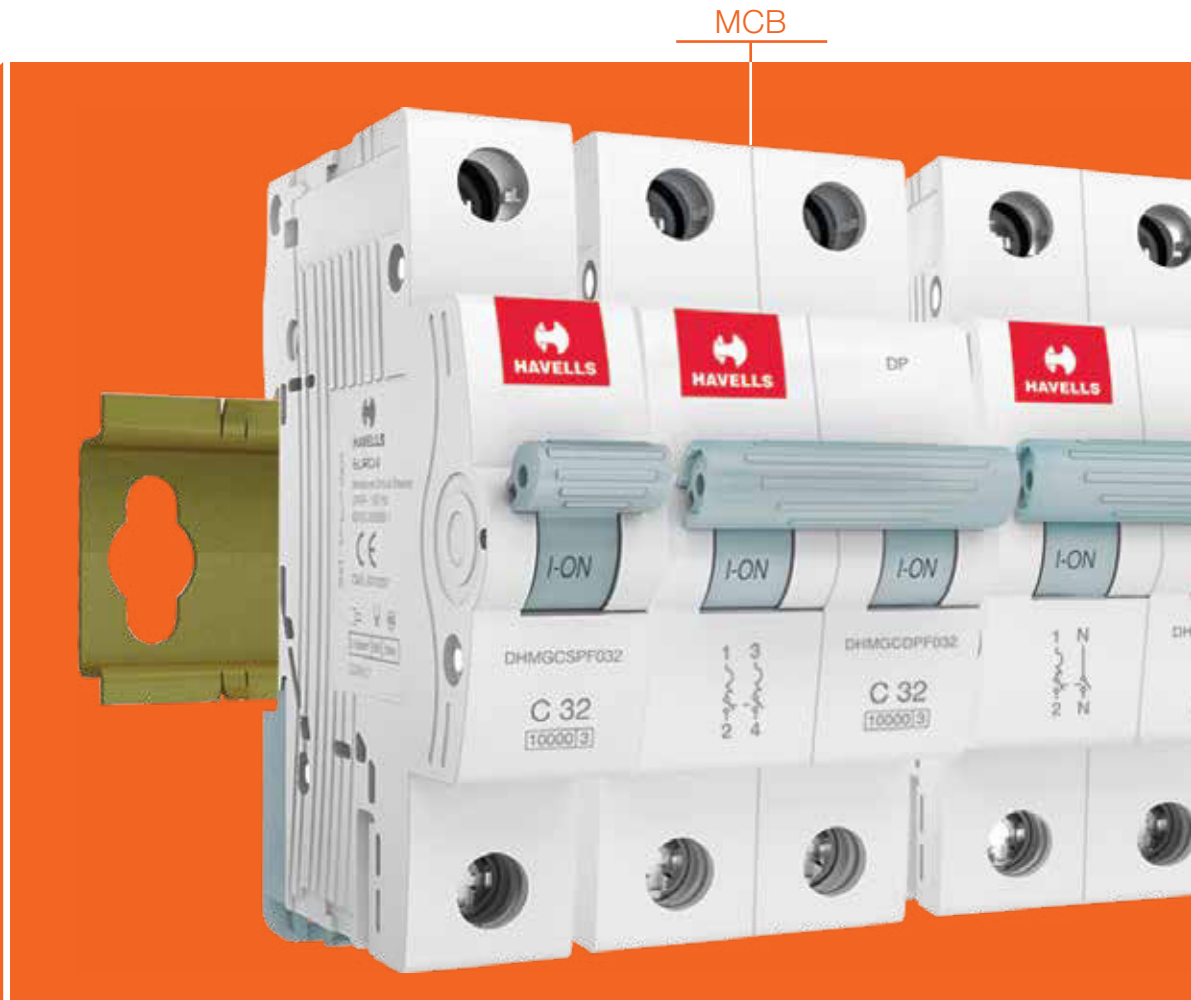


C



D





◆ PRODUCT OVERVIEW



MCB Range

6 A to 63 A - 'B' Curve
0.5 A to 63 A - 'C' Curve
0.5 A to 63 A - 'D' Curve
0.5 A to 63 A for DC Application

Execution

Single Pole (1P), Single Pole & Neutral (1P+N),
Double Pole (2P), Three Pole (3P),
Three Pole & Neutral (3P+N) & Four Pole (4P)

Specification

IS/IEC 60898-1, IEC 60898-2, IEC 60947-2

Isolator Range

40 A - 125 A

Execution

Single Pole (1P), Double Pole (2P)
Three Pole (3P), & Four Pole (4P)

Specification

IS/IEC 60947-3

RCCB Range

16 A, 25 A, 32 A, 40 A & 63 A - Type 'A' /
Type 'AC'
80 A & 100 A - Type 'AC'

Execution

Double Pole (2P), Four Pole (4P)

Specification

IS 12640 Part 1
IEC 61008-1 / EN 61008-1

SPD Range

AC SPD's
Type 1+2, Type 2
DC SPD's
Type 1+2, Type 2
DataLine SPD
6 V, 12 V, 24 V, 48 V



◆ MINIATURE CIRCUIT BREAKER

Electrical Distribution needs are continuously evolving in residential, commercial and industrial sectors. Improved operational safety, continuity of service, greater convenience and operating cost have assumed a tremendous significance. Miniature Circuit Breakers have been designed to continuously adapt to these changing needs.

Features

- Precise hammer action
- Low power consumption, thus cost effective & energy saving
- 13 Plates Arc Chute for effective arc quenching
- Dual termination for bus-bar as well as cable connection.
- Easy DIN-Rail extraction
- Energy Limiting Class 3 to ensure low let through energy to limit thermal & mechanical stress on cables.
- Trip free mechanism : MCB trips even if held in ON position.
- Longer electrical life
- ISI and CE marking. RoHS Complaint, 'Green Product'

Range

- 6 A to 63 A - 'B' Curve
- 0.5 A to 63 A - 'C' Curve
- 0.5 A to 63 A - 'D' Curve
- 0.5 A to 63 A for DC Application

Accessories

- Auxiliary Switch
- Shunt Trip

Execution

- Single Pole (1P)
- Single Pole & Neutral (1P+N)
- Double Pole (2P)
- Three Pole (3P)
- Three Pole & Neutral (3P+N)
- Four Pole (4P)

Specification

- IS/IEC 60898-1
- IEC 60898-2 for DC Application
- IEC 60947-2 for Industrial Application



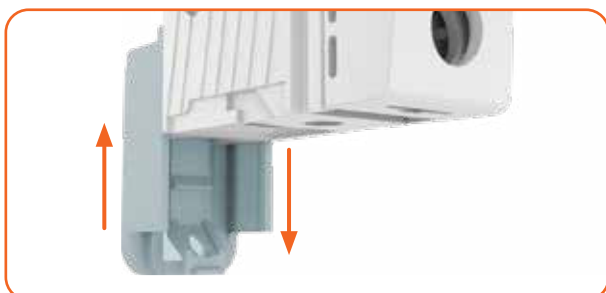
Safety Terminals

To avoid improper cable termination, the safety terminals guide the cable towards the cage terminal for systematic termination



Large Cable Terminals

Suitable for copper and aluminum cables, these terminals are compatible with cables upto 35 mm² cross section area



Bi Stable Clip

Every device is provided with a dual position DIN rail clip, so it becomes much easier to change a device from a device bank connected to a bus-bar, without disturbing the existing wiring



Cooler Operation

Grooves provided on outer body, so that when individual poles are placed adjacent to each other in a distribution board it forms a very effective channel for better air circulation, resulting into a cooler operation

Construction

Miniature Circuit Breakers have precisely formed moulded case & cover of flame retardant high strength thermo-plastic material having high melting point, low water absorption, high dielectric strength and temperature withstand.

The Switching Mechanism is independent, manual and trip free, i.e., the breaker trips internally even if the operating knob is held in ON position.

The Contact Mechanism comprises of fixed & moving contacts specially designed for reliability, long life and anti-weld properties. The Arc Extinguishing Device comprises of 13 plates arc chute. The arc under the influence of the magnetic field and arc guide is moved into the arc chute where it is rapidly split and quenched. The tripping mechanism is Thermal Magnetic Type.

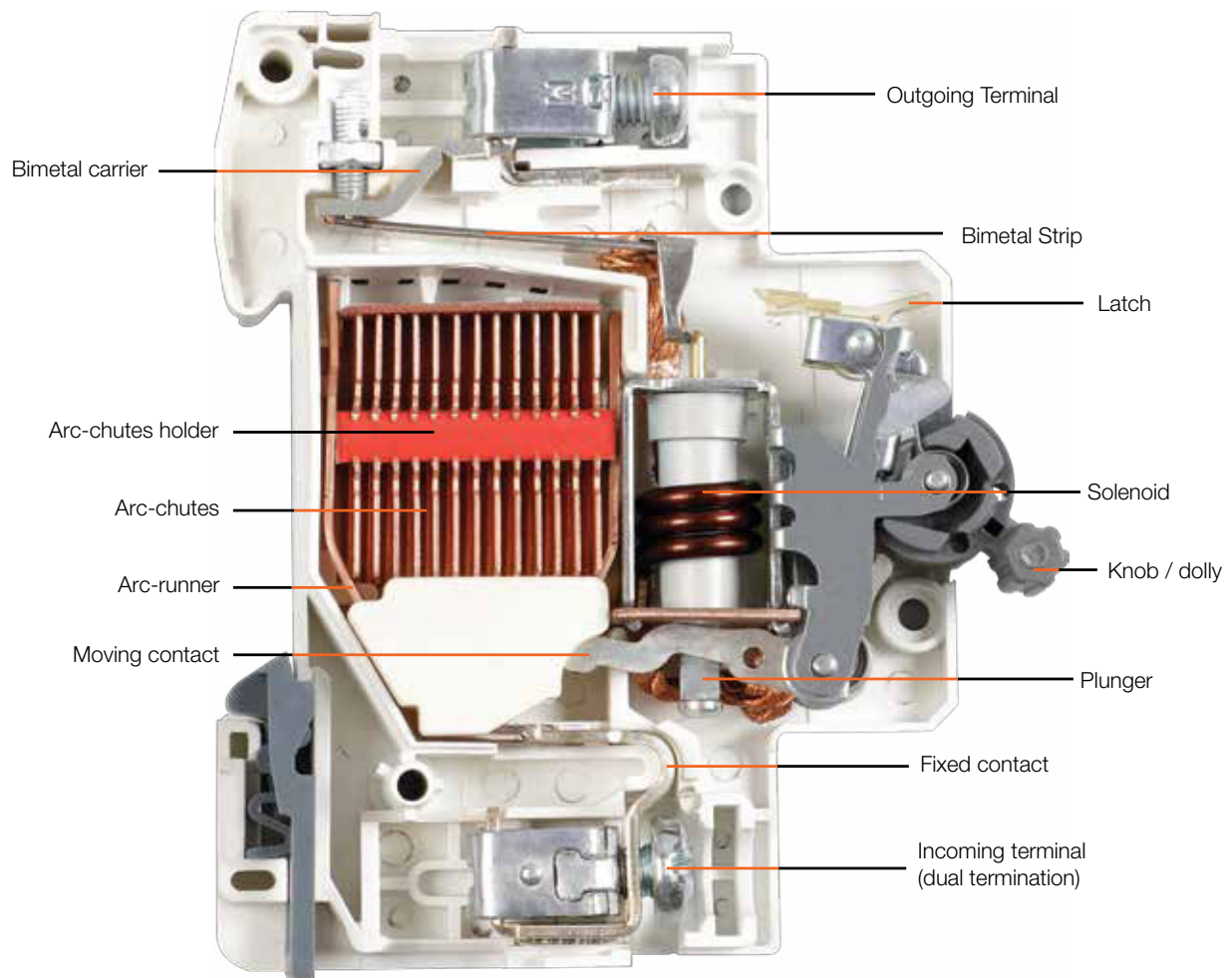
Thermal Operation

The thermal operation provides protection from moderate overloads. Under overload condition, a thermo-metallic element (bimetallic strip) deflects until it operates a latching mechanism allowing the main contacts to open.

Magnetic Operation

In magnetic operation, large overloads or short circuit current actuates a solenoid causing a plunger to strike the latching mechanism rapidly opening the main contacts.

Internal View



Technical Specification			
Standard Conformity	IS / IEC 60898 - 1		
Type / Series	B	C	D
Rated Current (In)	6 A-63 A*	0.5 A-63 A*	0.5 A-63 A*
Rated Voltage (Ue)	240 V~/415 V~	240 V~/415 V~	240 V~/415 V~
Rated Frequency (f)	50 Hz		
No. of Poles (Execution)	1P, 1 P+N, 2P, 3P, 3P+N, 4P**		
Rated Short Circuit Breaking Capacity	10 kA	10 kA	0.5 A-32 A-10 kA 40 A-63 A-4.5 kA
Magnetic Release Setting	(3-5) In	(5-10) In	(10-20) In
Rated Insulation Voltage (Ui)	690 V		
Rated Impulse Voltage (Uimp)	4 kV		
Electrical / Mechanical Endurance ≤32 A (No. of operations)	20000		
Electrical / Mechanical Endurance >32 A (No. of operations)	10000		
Ambient Working Temperature	-5 °C to + 55 °C		
Terminal Capacity (max)	35 mm ²		
Vibration	3 g		
Shock Resistance	40 mm free fall		
Protection Class	IP 20		
Installation Position	Vertical / Horizontal		
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)		
Case & Cover	Moulded, flame-retardant thermoplastic material		
Auxiliary Contacts	Yes		
Shunt Trip	Yes		

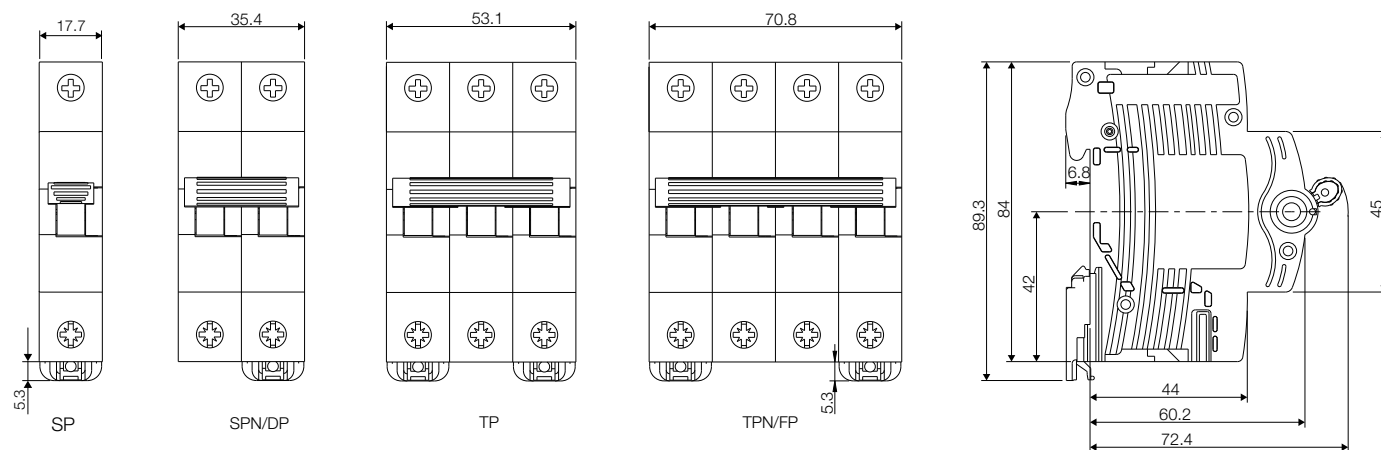
* Current Ratings (A) -

0.5 A, 1 A, 2 A, 3 A, 4 A, 5 A, 6 A, 8 A, 10 A, 13 A, 16 A,

20 A, 25 A, 32 A, 40 A, 50 A, 63 A

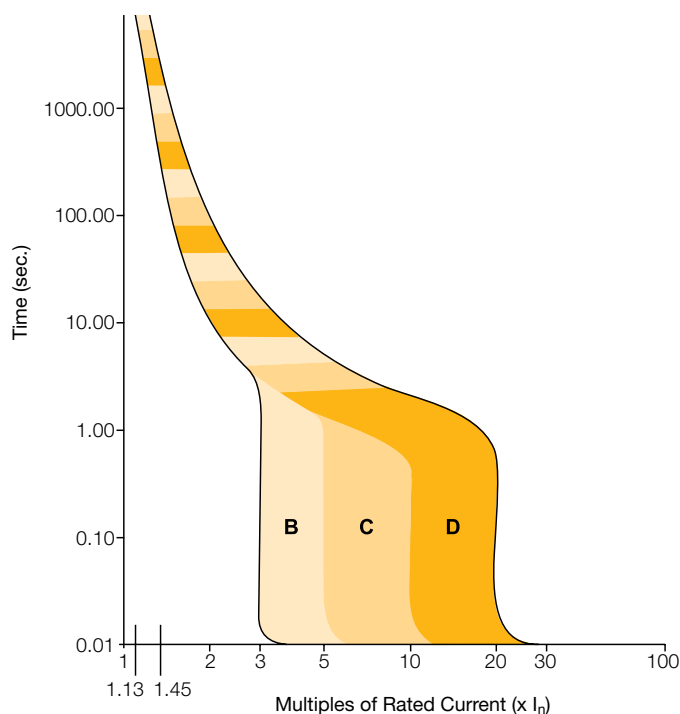
** 1P Single Pole
1P+N Single Pole Neutral
2P Double Pole
3P Three Pole
3P+N Three Pole Neutral
4P Four Pole

Dimensions (in mm)



Characteristics Curves

As per	Thermal Tripping			Magnetic Tripping		
	No tripping	Tripping	Time	Hold	Trip	Time
IS/IEC 60898-1	Current	Current	Limits	Current	Current	Limits
	I_1	I_2	t	I_4	I_5	t
B Curve	$1.13 \times I_n$		≥ 1 h	$3 \times I_n$		≥ 0.1 s
		$1.45 \times I_n$	< 1 h		$5 \times I_n$	< 0.1 s
C Curve	$1.13 \times I_n$		≥ 1 h	$5 \times I_n$		≥ 0.1 s
		$1.45 \times I_n$	< 1 h		$10 \times I_n$	< 0.1 s
D Curve	$1.13 \times I_n$		≥ 1 h	$10 \times I_n$		≥ 0.1 s
		$1.45 \times I_n$	< 1 h		$20 \times I_n$	< 0.1 s
$I_3 = 2.55 \times I_n$	$1 \text{ s} < t < 60 \text{ s}$ for $I_n (\ln \leq 32 \text{ A})$ $1 \text{ s} < t < 120 \text{ s}$ for $I_n (\ln > 32 \text{ A})$					



Tripping Characteristics

Based on the Tripping Characteristics, MCBs are available in 'B', 'C' and 'D' curve to suit different types of applications.

'B' Curve: for protection of electrical circuits with equipment that does not cause surge current (lighting and distribution circuits). Short circuit release is set to $(3-5) I_n$

'C' Curve: for protection of electrical circuits with equipment that causes surge current (inductive loads and motor circuits). Short circuit release is set to $(5-10) I_n$

'D' Curve: for protection of electrical circuits which causes high inrush current, typically 12-15 times the thermal rated current (transformers, X-ray machines etc.) Short circuit release is set to $(10-20) I_n$

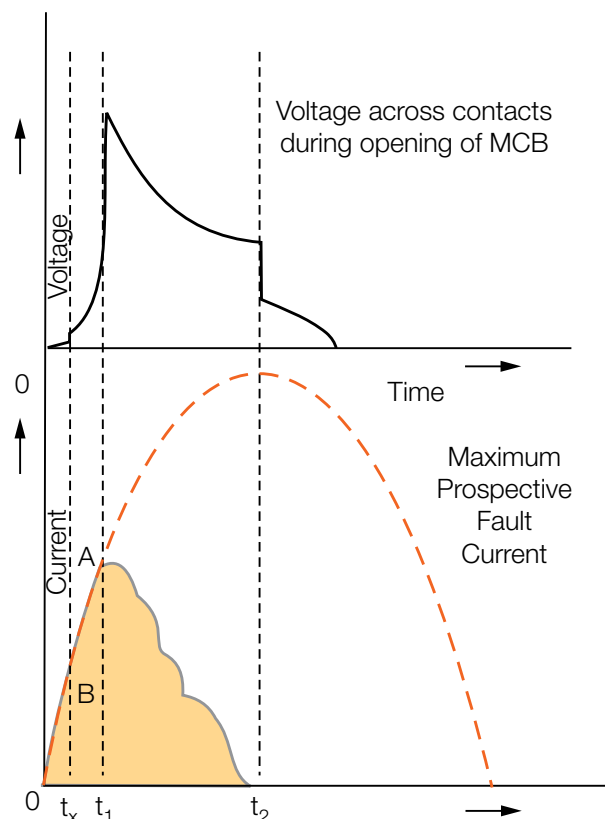
Current Limiting Design

In a current limiting breaker, the tripping & arc control mechanism are so designed that under short circuit conditions, the contacts are physically separated and the electrodynamic forces set up by fault current, assist the extinction in less than half cycle.

The figure shows the current limiting effect of circuit breakers.

Fault Traces for Voltage & Current

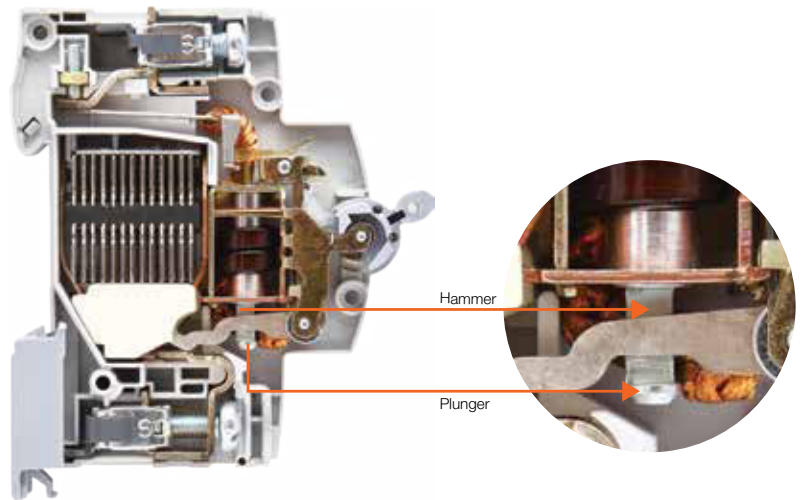
- 0 = Point of fault initiation
- t_x = Contact opening time (i.e., creation of arc)
- t_1 = Current / Voltage peak (i.e., current limitation)
- t_2 = Time to total extinction of arc (i.e., complete shutdown of fault current)



Hammer Trip Mechanism

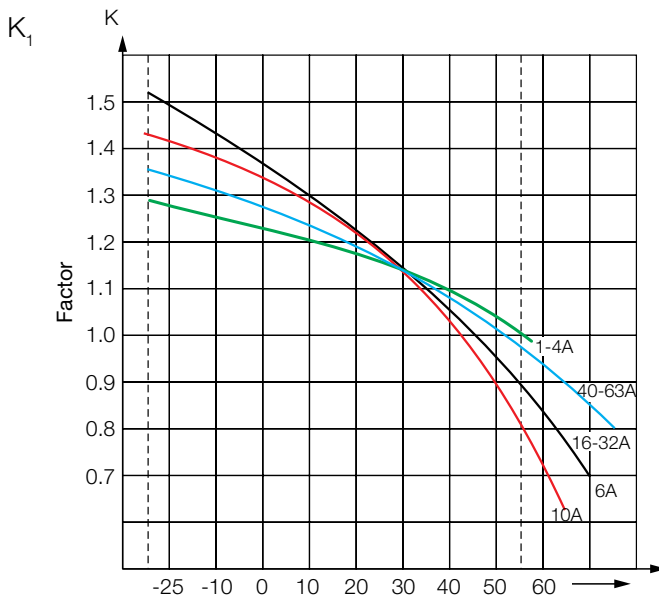
Current Limiting design in itself may not fulfil the requirement of quick breaking (instantaneous action) mainly due to inertia of the Latch mechanism and interconnected sequence of operations.

A Hammer directly connected to the plunger strikes the moving contact arm with a force proportional to the peak current there by forcibly separating the moving contact from the fixed contact much before the latch mechanism operates. This further reduces the opening time of the circuit breaker.



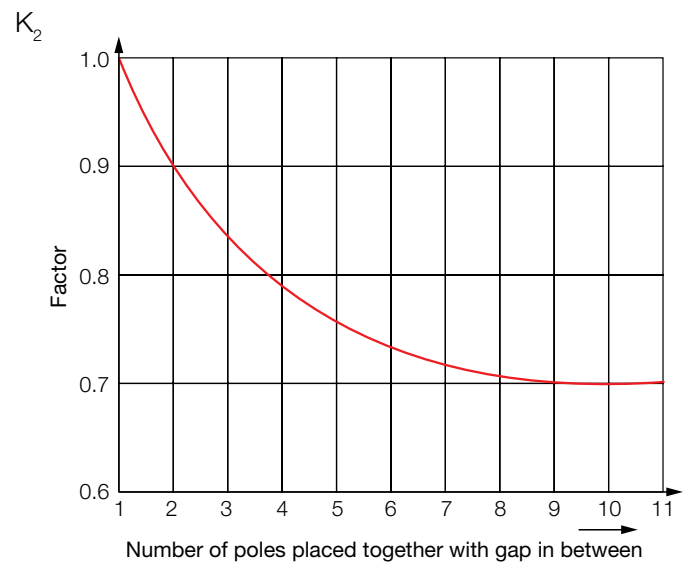
Ambient Temperature Compensation / Diversity Factor Chart

Maximum Permissible Rated Current (K_1 Factor)



Graph 1

Diversity Factor (K_2 Factor)



Graph 2

Calculation $I_n / \text{MCB} = K_1 \times K_2 \times I_n$

Example 4 MCBs with $I_n = 10$ A, and the amb. temp. is 50°C kept with no gap in between

Solution $K_1 = 0.89$ (from graph 1)

$K_2 = 0.78$ (from graph 2)

$I_n / \text{pole} = 0.89 \times 0.78 \times 10 = 6.94$ A

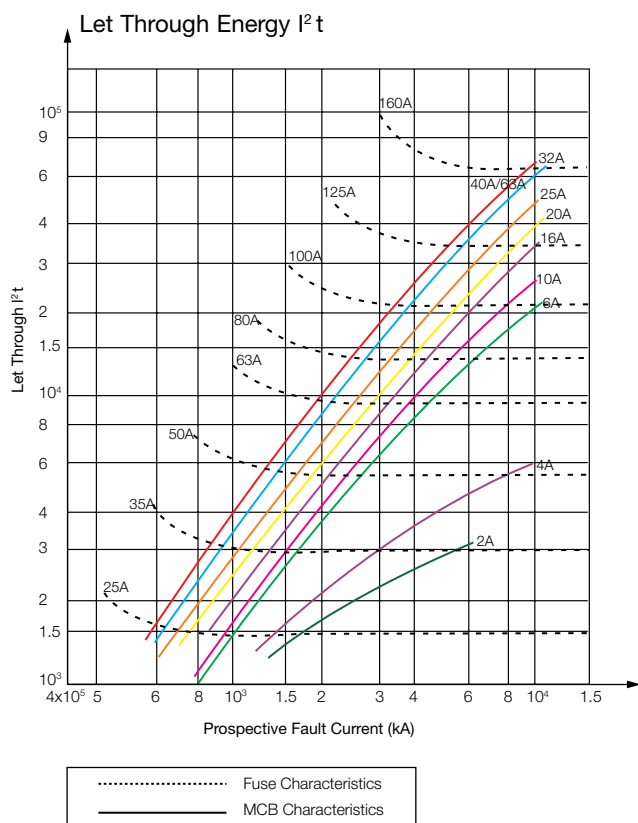
Effect Of Frequency Variation

MCBs are designed to operate at AC frequency 50/60 Hz. However, MCBs specially suitable for DC applications and for frequencies upto 400 Hz can be supplied on request.

These can be used on different frequencies in supply from 50-60 Hz without any deration.

For higher frequencies, normal MCBs can be used with a multiplication factor which shall only affect its magnetic trip current.

Supply	AC			DC
Frequency	100 Hz	200 Hz	400 Hz	
Multiplication Factor	1.1	1.2	1.5	1.5



Energy Limiting Class 3

MCBs are designed to have low-let through energy during faults, thus ensuring a better protection of cables and equipment.

Maximum Backup Protection

At site, no. of MCBs are used for outgoing connection. To protect the MCBs under short circuit (higher breaking capacity), we need to put fuses in the incoming side. The current rating of fuses should not be more than the values given in the table.

MCB Current Rating	Backup Fuse Rating
1 A	25 A
2 A	35 A
4 A	50 A
6 A	80 A
10-63 A	100 A

Cold Resistance & Power Loss Details

The power loss value declared are at rated current.

Rated Current I_n (A)	Cold Resistance R_l (mΩ)	Power Loss per Pole P_v (W)
0.5	3100.00	0.8
1	860.80	1.0
2	280.00	1.2
4	70.00	1.2
6	25.00	1.3
10	11.68	1.4
13	10.10	1.6
16	8.00	2.2
20	4.50	2.3
25	3.78	3.1
32	2.57	3.3
40	1.94	3.6
63	1.30	6.2

Remarks:- Tolerance $\pm 5\%$

DC Application

MCBs for DC application are specially designed to meet tough arc quenching conditions. While selecting circuit breaker for DC applications following parameters have to be taken into consideration.

Normal Circuit Currents

The rating and normal running temperature of the MCB are unaffected by DC. The MCB can be selected using the thermal section of the standard time / current curves .

Magnetic tripping on DC is different from the equivalent AC by a peak factor of 1.4

ie., for 'B' curve AC MCB, magnetic range = $(3-5)I_n$

for DC MCB, magnetic range = $1.4(3-5)I_n = (4-7)I_n$

for 'C' curve AC MCB, magnetic range = $(5-10)I_n$

for DC MCB, magnetic range = $1.4(5-10)I_n = (7-14)I_n$



Short Circuit Currents

The maximum short circuit current possible on a DC system is determined by the voltage of the battery and the total internal resistance of the cells.

It is given by Ohm's law : $I_{sc} = V_b/R_b$

Where, I_{sc} is the Short Circuit Current

V_b is the voltage of the battery (with 100% charged battery)

R_b is the internal resistance of the battery cells
(this is usually stated by the manufacturer)

Circuit Time Constant

The time constant is given by : $L/R = 15 \text{ ms max}$ where L is the inductance of the circuit

R is The Resistance Of The Circuit

The time constant is usually given in milliseconds (ms.). Ideally, DC circuits would be mainly resistive (i.e. a low number), as inductive circuits produce a back emf when the current suddenly falls. This in turn tends to prolong arcing during switching operations, and so reduce contact life.

Circuit Voltage

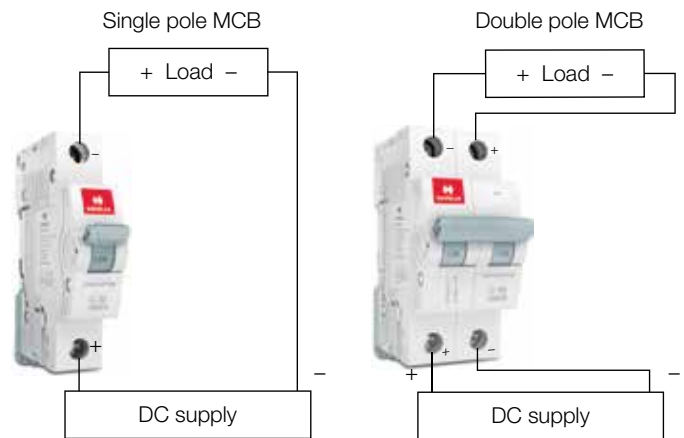
The voltage of the circuit is dependent upon the power supply. The lower the voltage the easier switching operations will be, but the voltage makes no difference to the running of the MCBs.

Contact life can be significantly increased by reducing the voltage, drop across each pole. This can be achieved by wiring poles in series.

Technical data

Correct polarity connections for DC MCBs

- Connection diagram



Standard Conformity		IS/IEC 60947-2
Rated Current (In)	A	0.5-63
Rated Voltage (Ue)	V $\cdots$	220
No. of Poles (Execution)		1P, 2P
Rated Short Circuit Breaking Capacity	kA	3

*Also available in 130 Vdc

Shunt Trip

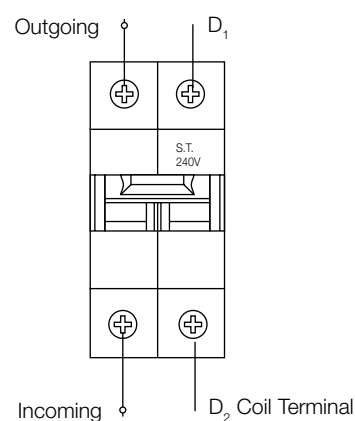
Attachment Used For Remote Tripping		
Standard Conformity		IS / IEC 60947-3
Coil Consumption		6 VA
Rated Voltage	(ac) (Ue)	240 V
	(dc) (Ue)	48 V, 24 V, 12 V
Frequency		50 Hz
Operating Voltage Range		70%-110% of rated voltage
Electrical Endurance (No. of operations)		10000
Terminal Capacity (Max)		35 mm ²
Protection Class		IP 20 as per IS 2147 & IEC 60529
Mounting		Right side of MCB (Factory assembled)



Shunt Trip Coil

1. To trip the Circuit Breaker through Shunt Trip Coil, 70% to 110% of the rated voltage is to be applied across D1 & D2.
2. The Shunt Trip coil is supplied for a short time rated voltage and it trips the breaker instantaneously. (i.e., continuous duty not required).

Shunt Trip Connection Diagram



Discrimination Data

MCB Downstream		MCB Upstream C Curves								
C curve	10 A	13 A	16 A	20 A	25 A	32 A	40 A	50 A	63 A	
0.5 A to 5 A	50	65	80	100	125	160	200	250	315	
6 A		65	80	100	125	160	200	250	315	
10 A				100	125	160	200	250	315	
13 A					125	160	200	250	315	
16 A						160	200	250	315	
20 A							200	250	315	
25 A								250	315	
32 A									315	
40 A										
50 A										

MCB Downstream			MCB Upstream B Curves							
B curve	6 A	10 A	13 A	16 A	20 A	25 A	32 A	40 A	50 A	63 A
0.5 A to 5 A		30	39	48	60	75	96	120	150	189
6 A		30	39	48	60	75	96	120	150	189
10 A				48	60	75	96	120	150	189
13 A					60	75	96	120	150	189
16 A						75	96	120	150	189
20 A							96	120	150	189
25 A								120	150	189
32 A										189

MCB Downstream										MCCB Upstream											
C curve	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	320 A	400 A	500 A	630 A	800 A	1000 A	1250 A	1600 A
0.5 to 6 A	1100	1200	1400	1700	2000	2500	3400	4800	5800	6700	T	T	T	T	T	T	T	T	T	T	T
10 A	-	1100	1200	1400	1700	2100	2500	3000	3500	4300	T	T	T	T	T	T	T	T	T	T	T
16 A	-	-	-	1300	1600	1900	2100	2400	2700	3200	8300	T	T	T	T	T	T	T	T	T	T
20 A	-	-	-	-	1600	1900	2100	2400	2700	2500	8300	T	T	T	T	T	T	T	T	T	T
25 A	-	-	-	-	-	1700	1800	2000	2200	2500	5400	8700	T	T	T	T	T	T	T	T	T
32 A	-	-	-	-	-	-	1800	2000	2200	2500	5400	8700	T	T	T	T	T	T	T	T	T
40 A	-	-	-	-	-	-	-	1500	1700	2000	4300	7000	T	T	T	T	T	T	T	T	T
50 A	-	-	-	-	-	-	-	-	1300	1500	3600	5900	9000	T	T	T	T	T	T	T	T
63 A	-	-	-	-	-	-	-	-	-	1100	2800	5200	8200	T	T	T	T	T	T	T	T

Prospective Fault Levels to which selectivity is achieved (T = Total Selectivity)

Discrimination With Fuses

HRC Fuse Upstream Type gG

MCBs Downstream	HRC Fuse Link Upstream									
	20 A	25 A	32 A	40 A	50 A	63 A	80 A	100 A	125 A	160 A
0.5 A to 6 A	700	850	960	1200	1350	1750	2800	4500	5200	6000
10 A		700	960	1200	1350	1750	2800	4500	5200	6000
13 A			850	1200	1200	1750	2800	4500	5200	6000
16 A				960	1100	1500	2500	3200	5200	6000
20 A					1100	1500	2500	3200	4500	5200
25 A					960	1350	2000	3200	4500	5200
32 A						1200	1750	2800	4500	5200
40 A							1750	2800	4500	5200
50 A								2500	3200	4500
63 A									3200	4500

MCB Selection Chart For Household Applications

Appliances	Capacity / W (Load) (240 V~ 1 phase)	Current Rating of MCB	Type of MCB
Air Conditioner	3.5 kW (1.0 Ton)	10 A*	"C" series
	5.28 kW (1.5 Ton)	16 A*	"C" series
	7.03 kW (2.0 Ton)	20 A*	"C" series
Refrigerator	165 L (litres)	3 A*	"C" series
	350 L (litres)	4 A*	"C" series
Oven cum Griller	4500 W	32 A	"B" series
	1750 W	10 A	"B" series
Oven only Hot Plate only Room Heater	750 W	6 A	"B" series
	2000 W	10 A	"B" series
	1000 W	6 A	"B" series
	2000 W	10 A	"B" series
Washing Machine	300 W	2 A	"C" series
Washing Machine (with heater)	1300 W	8 A	"C" series
(storage/instant)	1000 W	6 A	"B" series
	2000 W	10 A	"B" series
	3000 W	16 A	"B" series
	6000 W	32 A	"B" series
Electric iron	750 W	6 A	"B" series
	1250 W	8 A	"B" series
(2 slices)	1200 W	8 A	"B" series
Electric Kettle	1500 W	10 A	"B" series

* It may vary from manufacturer to manufacturer. Please check before installation.

Rating Of MCBs For Specified No. of Fittings ("B" Series MCBs)

Lamp (W)	Number of Lamps	Rating (A)
20 W	8	1 A
	12	1.5 A
40 W	2	0.5 A
	10	2 A
	12	2.5 A
60 W	1	0.5 A
	4	1.5 A
	8	3 A
	12	4 A
80 W	1	0.5 A
	2	1 A
	5	2 A
	8	4 A
	12	5 A
100 W	1	1 A
	2	1.5 A
	4	2.5 A

"B" series MCB is used for all Lighting Applications

MCB Selection Chart For Motor Protection

S. No.	kW	HP	1 Phase 230 V DOL Starting		3 Phase 400 V DOL Starting		3 Phase 400 V Assisted Starting Star Delta		
			Full Load Current	MCB Selection	Full Load Current	MCB Selection	Full Load Current	MCB Selection	
1	0.18	0.24	2.8	10	0.9	2	—	—	—
2	0.25	0.34	3.2	10	1.2	2	—	—	—
3	0.37	0.50	3.5	10	1.2	2	—	—	—
4	0.55	0.74	4.8	16	1.8	3	—	—	—
5	0.75	1.01	6.2	20	2.0	3	—	—	—
6	1.1	1.47	8.7	25	2.6	6	—	—	—
7	1.5	2.01	11.8	32	3.5	10	—	—	—
8	2.2	2.95	17.5	50	4.4	10	—	—	—
9	3	4.02	20.0	63	6.3	16	6.3	16	10
10	3.75	5.03	24.0	80	8.2	20	8.2	20	10
11	5.5	7.37	26.0	80	11.2	25	11.2	32	16
12	7.5	10.05	47.0	125	14.4	40	14.4	40	25
13	10	13.40	—	—	21.0	50	21.0	50	32
14	15	20.11	—	—	27.0	100	27.0	63	40
15	18.5	24.80	—	—	32.0	125	32.0	—	50
16	22	29.49	—	—	38.0	125	38.0	—	63
17	30	40.21	—	—	51.0	125	51.0	—	63

Calculation Formulae :

$$\text{Incomer Current Rating, For Single Phase : } \frac{\text{Total Load in Ws}}{240 \text{ V}}$$

$$\text{Incomer Current Rating, For Three Phase : } \frac{\text{Total Load in Ws}}{\sqrt{3} \times 240 \text{ V}}$$

“C” series MCB is used for all Motor Applications

Note : One lighting circuit can have up to 800 W or up to 10 lighting points
One power circuit can have up to 2000 W or 1 power points

'B' Series MCB**'B' Series SP MCB**

(In accordance with IS/IEC 60898-1) 240 V, 50 Hz, 10 kA Suitable for lighting and other domestic loads.

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.
6 A-32 A	12 N	DHMG BSPF006-032
40 A-63 A	12 N	DHMG BSPF040-063

'C' Series MCB**'C' Series SP MCB**

(In accordance with IS/IEC 60898-1) 240 V, 50 Hz, 10 kA Suitable for Motor and other Inductive loads.

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.
0.5 A-5 A	12 N	DHMG CSPF0x5-005
6 A-32 A	12 N	DHMG CSPF006-032
40 A	12 N	DHMG CSPF040
50 A	12 N	DHMG CSPF050
63 A	12 N	DHMG CSPF063

'C' Series SPN MCB

(In accordance with IS/IEC 60898-1) 240 V, 50 Hz, 10 kA Suitable for Motor and other Inductive loads.

Rating	Std. / Master Packing (No. of Unit/s)	SPN Cat. No.
0.5 A-5 A	6 N	DHMG CSNF0x5-005
6 A-32 A	6 N	DHMG CSNF006-032
40 A	6 N	DHMG CSNF040
50 A	6 N	DHMG CSNF050
63 A	6 N	DHMG CSNF063

'C' Series DP MCB

(In accordance with IS/IEC 60898-1) 240 V/415 V, 50 Hz, 10 kA Suitable for Motor and other Inductive loads.

Rating	Std. / Master Packing (No. of Unit/s)	DP Cat. No.
0.5 A-5 A	6 N	DHMG CDPF0x5-005
6 A-32 A	6 N	DHMG CDPF006-032
40 A	6 N	DHMG CDPF040
50 A	6 N	DHMG CDPF050
63 A	6 N	DHMG CDPF063



**'C' Series TP MCB**

(In accordance with IS/IEC 60898-1) 240 V/415 V, 50 Hz, 10 kA Suitable for Motor and other Inductive loads.

Rating	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
0.5 A-5 A	4 N	DHMGCTPF0x5-005
6 A-32 A	4 N	DHMGCTPF006-032
40 A	4 N	DHMGCTPF040
50 A	4 N	DHMGCTPF050
63 A	4 N	DHMGCTPF063

**'C' Series TPN MCB**

(In accordance with IS/IEC 60898-1) 240 V/415 V, 50 Hz, 10 kA Suitable for Motor and other Inductive loads.

Rating	Std. / Master Packing (No. of Unit/s)	TPN Cat. No.
0.5 A-5 A	3 N	DHMGCTNF0x5-005
6 A-32 A	3 N	DHMGCTNF006-032
40 A	3 N	DHMGCTNF040
50 A	3 N	DHMGCTNF050
63 A	3 N	DHMGCTNF063

**'C' Series FP MCB**

(In accordance with IS/IEC 60898-1) 240 V/415 V, 50 Hz, 10 kA Suitable for Motor and other Inductive loads.

Rating	Std. / Master Packing (No. of Unit/s)	FP Cat. No.
0.5 A-5 A	3 N	DHMGCFPF0x5-005
6 A-32 A	3 N	DHMGCFPF006-032
40 A	3 N	DHMGCFPF040
50 A	3 N	DHMGCFPF050
63 A	3 N	DHMGCFPF063

'D' Series MCB



'D' Series SP MCB

(In accordance with IEC 60898-1) 240 V/415 V, 50 Hz Suitable for high inrush current loads.

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.
0.5 A-5 A	12 N	DHMGDSPF0x5-005
6 A-32 A	12 N	DHMGDSPF006-032
40 A	12 N	DHMGDSPF040
50 A	12 N	DHMGDSPF050
63 A	12 N	DHMGDSPF063

'D' Series DP MCB

(In accordance with IEC 60898-1) 240 V/415 V, 50 Hz Suitable for high inrush current loads.



Rating	Std. / Master Packing (No. of Unit/s)	DP Cat. No.
0.5 A-5 A	6 N	DHMGDDPF0x5-005
6 A-32 A	6 N	DHMGDDPF006-032
40 A	6 N	DHMGDDPF040
50 A	6 N	DHMGDDPF050
63 A	6 N	DHMGDDPF063

'D' Series TP MCB

(In accordance with IEC 60898-1) 240 V/415 V, 50 Hz Suitable for high inrush current loads.



Rating	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
0.5 A-5 A	4 N	DHMGDTPF0x5-005
6 A-32 A	4 N	DHMGDTPF006-032
40 A	4 N	DHMGDTPF040
50 A	4 N	DHMGDTPF050
63 A	4 N	DHMGDTPF063

'D' Series FP MCB

(In accordance with IEC 60898-1) 240 V/415 V, 50 Hz, 10 kA Suitable for high inrush current loads.



Rating	Std. / Master Packing (No. of Unit/s)	FP Cat. No.
0.5 A-5 A	3 N	DHMGDFPF0x5-005
6 A-32 A	3 N	DHMGDFPF006-032
40 A	3 N	DHMGDFPF040
50 A	3 N	DHMGDFPF050
63 A	3 N	DHMGDFPF063

'DC' Series MCB**'DC' Series SP MCB**

For DC Supply, upto 220 V (IS/IEC 60947-2)

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.
0.5 A-5 A	12 N	DHMCESPF0x50013 - 0050013
6 A-32 A	12 N	DHMCESPF0060013 - 0320013
40 A	12 N	DHMCESPF0400013
50 A	12 N	DHMCESPF0500013
63 A	12 N	DHMCESPF0630013

'DC' Series DP MCB

For DC Supply, up to 220 V (IS/IEC 60947-2)



Rating	Std. / Master Packing (No. of Unit/s)	DP Cat. No.
0.5 A-5 A	6 N	DHMCEDPF0x50013 - 0050013
6 A-32 A	6 N	DHMCEDPF0060013 - 0350013
40 A	6 N	DHMCEDPF0400013
50 A	6 N	DHMCEDPF0500013
63 A	6 N	DHMCEDPF0630013

'DC' Series Railway MCB

For Railway Applications (with extended terminals & mounting brackets)



Rating	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
0.5 A-5 A	12 N	DHMCRSPF0x50013 - 0050013
6 A-35 A	12 N	DHMCRSPF0060013 - 0350013
40 A	12 N	DHMCRSPF0400013
50 A	12 N	DHMCRSPF0500013
60 A	12 N	DHMCRSPF0600013

Suitable for Railway application as per RDSO, Drg. SKEL. 3700 alt-1 and specification No. SPEC/E-12/1/04 (with extended terminals and mounting brackets)



◆ MINIATURE CIRCUIT
BREAKER (80 A-125 A)

Electrical Distribution needs are continuously evolving in residential, commercial and industrial sectors. Improved operational safety, continuity of service, greater convenience and operating cost have assumed a tremendous significance. Miniature Circuit Breakers have been designed to continuously adopt to these changing needs.

Features

- Trip Free mechanism
- Positive Contact Indication
- Thermal and Magnetic trip function
- Current Limiting design for short circuit fault protection
- CE marking, RoHS Complaint, 'Green Product'

Range

80 A, 100 A & 125 A - 'C' Curve

Execution

Single Pole (1P), Double Pole (2P)
Three Pole (3P), Four Pole (4P)

Specification

IS/IEC 60947-2



Positive Contact Indication

It clearly indicates true contact position through Flag Indication (Red-ON, Green-OFF) thus enhancing safety



Large Cable Terminals

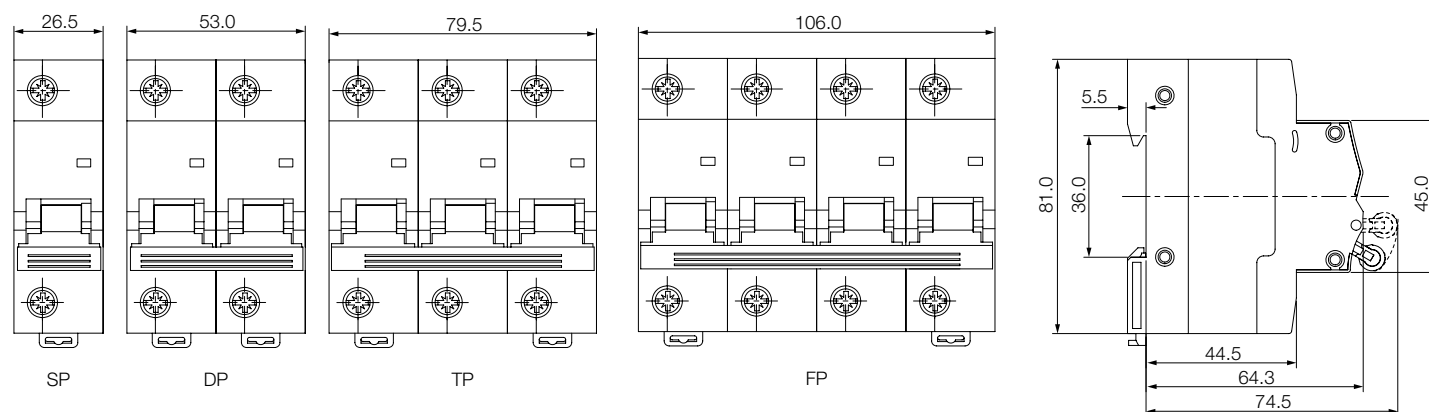
Suitable for copper and aluminum cables, these terminals are compatible with cables upto 35 mm² cross section area

Technical Specification		
Standard Conformity		IS/IEC 60947-2
Type / Series		C
Rated Current (In)		80 A-125 A*
Rated Voltage (Ue)		240 V~/415 V~
Rated Insulation Voltage (Ui)		690 V
Rated Impulse Withstand Voltage (Uimp)		6 kV
Rated Frequency		50 Hz/60 Hz
No. of Poles		1P, 2P, 3P, 4P**
Rated Short Circuit Breaking Capacity (Icn)		10 kA
Rated Ultimate Short Circuit Breaking Capacity (Icu)		10 kA
Rated Service Short Circuit Breaking Capacity (Ics)		75% of Icu
Magnetic Release Setting (In)		(5 A-10 A)
Mechanical Life	No. of Operations	20000
Electrical Life	No. of Operations	5000
Ambient Temperature		-5 °C to + 55 °C
Terminal Capacity		50 mm ²
Tightening Torque		3.5 Nm
Protection Class		IP 20
Installation Position		Vertical / Horizontal
Mounting		Clip on DIN Rail (35 mm x 7.5 mm)

* Current Ratings: 80 A, 100 A, 125 A

** 1P Single Pole 3P Three Pole
2P Double Pole 4P Four Pole

Dimensions (in mm)



Higher Rating MCB



Higher Rating SP MCB (80 A-125 A) 'C' Series,
(In accordance with IS/IEC 60947-2) 240 V/415 V, 50 Hz, 10 kA

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.
80 A	6 N	DHMJCSPF080
100 A	6 N	DHMJCSPF100
125 A	6 N	DHMJCSPF125



Higher Rating DP MCB (80 A-125 A) 'C' Series,
(In accordance with IS/IEC 60947-2) 240 V/415 V, 50 Hz, 10 kA

Rating	Std. / Master Packing (No. of Unit/s)	DP Cat. No.
80 A	3 N	DHMJCDPF080
100 A	3 N	DHMJCDPF100
125 A	3 N	DHMJCDPF125



Higher Rating TP MCB (80 A-125 A) 'C' Series,
(In accordance with IS/IEC 60947-2) 240 V/415 V, 50 Hz, 10 kA

Rating	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
80 A	2 N	DHMJCTPF080
100 A	2 N	DHMJCTPF100
125 A	2 N	DHMJCTPF125



Higher Rating FP MCB (80 A-125 A) 'C' Series,
(In accordance with IS/IEC 60947-2) 240 V/415 V, 50 Hz, 10 kA

Rating	Std. / Master Packing (No. of Unit/s)	FP Cat. No.
80 A	1 N	DHMJCFFPF080
100 A	1 N	DHMJCFFPF100
125 A	1 N	DHMJCFFPF125



◆ RESIDUAL CURRENT
CIRCUIT BREAKER
(16 A-63 A)

The flow of current through electrical facilities always involves risks. Poorly insulated equipment, faulty wires and incorrect use of an electrical device can cause current to flow through the wrong path (i.e. through the insulation/human body) to the earth.

RCCB (also popularly known as ELCB) is a mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the leakage current attains a given value under specified conditions. Havells offers a wide range of RCCBs for protecting human life against fatal electric shocks as well as for providing protection against fire caused by earth faults.

Features

- Type AC and Type A RCCB
- Simple and Robust operating mechanism
- Rotary handle with ON/OFF indication in FP
- Dual termination for Bus Bar as well as cable connection
- Advance Neutral
- Test button for regular inspection
- Conditional Short-circuit current capacity 10 kA
- ISI and CE marking. RoHS Complaint, 'Green Product'

Range

16 A - 63 A

Sensitivity

30 mA, 100 mA & 300 mA

Execution

Double Pole (2P)

Four Pole (4P)

Specification

IS 12640 Part 1/ IEC 61008-1
/EN 61008 - 1



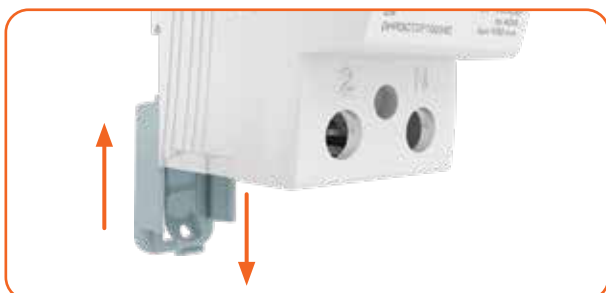
Safety Terminals

To avoid improper cable termination, the safety terminals guide the cable towards the cage terminal for systematic termination



Large Cable Terminals

Suitable for copper and aluminum cables, these terminals are compatible with cables upto 35 mm² cross section area



Bi Stable Clip

Every device is provided with a dual position DIN rail clip, so it becomes much easier to change a device from a device bank connected to a bus-bar, without disturbing the existing wiring



Cooler Operation

Grooves provided on outer body, so that when individual poles are placed adjacent to each other in a distribution board it forms a very effective channel for better air circulation, resulting into a cooler operation

The use of exposed, substandard, badly wired, wrongly connected or damaged equipment as well as frayed or badly repaired cables reduces the safety of an installation and increases the risk of person receiving an electric shock. RCCBs are electrical devices which afford a very high degree of protection against the risks of electrocution and fire caused by earth faults.

Protection Against Electrocution

Electrocution is a passage of current through human body, which is dangerous. The flow of current through human body affects vital functions of breathing & heartbeat.

Effect of electric current through human body has been well researched and following chart summarizes the results:

500 mA			Immediate cardiac arrest resulting in death
70 mA-100 mA			Cardiac fibrillation; the heart begins to vibrate and no longer beats at a steady rate. This situation is dangerous since it is irreversible
20 mA-30 mA			Muscle contraction can cause respiratory paralysis
10 mA			Muscle contraction : the person remains "stuck" to the conductor
1 mA-10 mA			Prickling sensations

However, electrocution should not be viewed in terms of "current" alone, but in terms of "contact voltage". A person gets electrocuted by coming in contact with an object that has a different potential from his/her own. The difference in potential causes the current to flow through the body.

The human body has known limits:

- Under normal dry conditions, voltage limit = 50 V
- In damp surroundings, voltage limit = 25 V

A correctly chosen RCCB can detect small currents flowing to earth and reduces the risk of electrocution.

Protection Against Indirect Contact

Over current protection devices like MCB are unable to act promptly on small earth leakage currents. To comply with wiring regulations,

the earth fault loop impedance in Ohms, multiplied by the rated tripping current of the RCD in amperes must not exceed 50.

Example

For an RCD with a rated tripping current of 30 mA, the maximum permissible earth fault loop impedance is calculated as follows:
 $Z_s (\text{max}) = 50 / I_{\Delta n} = 50 / 0.03 = 1,666 \Omega$

Protection Against Fire

The majority of fires which occur as a result of faulty wiring are started by current flowing to earth. Fire can be started by fault current of less than 1 ampere. The normal domestic overload protective device such as a fuse or MCB will not detect such a small current. A correctly chosen RCD will detect this fault current and interrupt the supply, hence, reducing the risk of a fire starting.

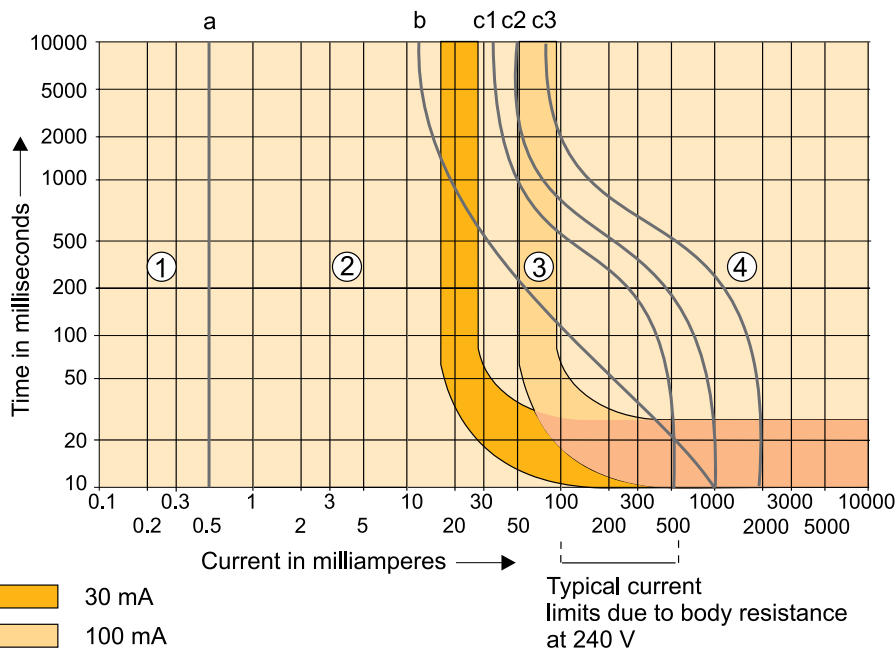
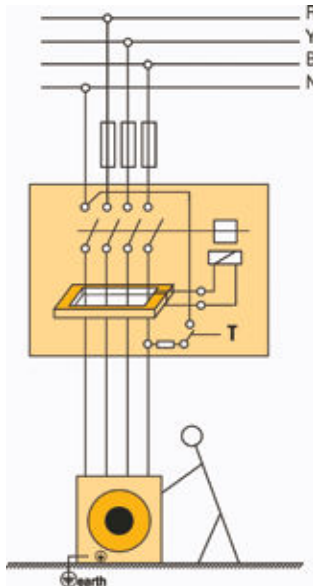
Rated Tripping Current of the RCD ($I_{\Delta n}$)	Maximum permissible earth fault loop impedance (Ohms)
10 mA	5,000 Ω
30 mA	1,666 Ω
100 mA	500 Ω
300 mA	166 Ω

Working Principle

The RCCB works on the current balance principle. The supply conductors, i.e. the phases and the neutral, are passed through a toroid and form the primary windings of a current transformer. Its secondary winding is connected to a highly sensitive electromagnetic trip relay, which operates the trip mechanism.

In a healthy circuit, sum of the currents in phases, is equal to the

current in the neutral and the vector sum of all currents is equal to zero. If there is any insulation fault in the current and leakage current flows to earth, the currents do not balance and their vector sum is not equal to zero. This imbalance is detected by the core balanced current transformer, the RCCB is tripped and supply to load is interrupted. The trip mechanism is operated at a residual current between 50-100% of its rated tripping current.



Zone Physiological Effects

Zone 1 Usually no reactions

Zone 2 Usually no harmful physiological effects

Zone 3 Usually no organic damage to be expected. Likelihood of muscular contraction and difficulty in breathing, reversible disturbances of formation and conduction of impulse in the heart and transient cardiac arrest without ventricular fibrillation increases with current magnitude and time.

Zone 4 In addition to the effects of Zone 3, probability of ventricular fibrillation increased upto 5% (curve C_2) upto 50% (curve C_3) and above 50% beyond curve C_3 . It increases with magnitude and time, and pathophysiological effects such as cardiac arrest, breathing arrest and heavy burns may occur.

Sensitivity Selection

• 30 mA

A 30 mA RCCB will provide a high degree of protection against electrocution in an accidental shock hazard situation. The current flowing through human body could be between 80 mA and 240 mA depending on the resistance of the human body and the voltage across it.

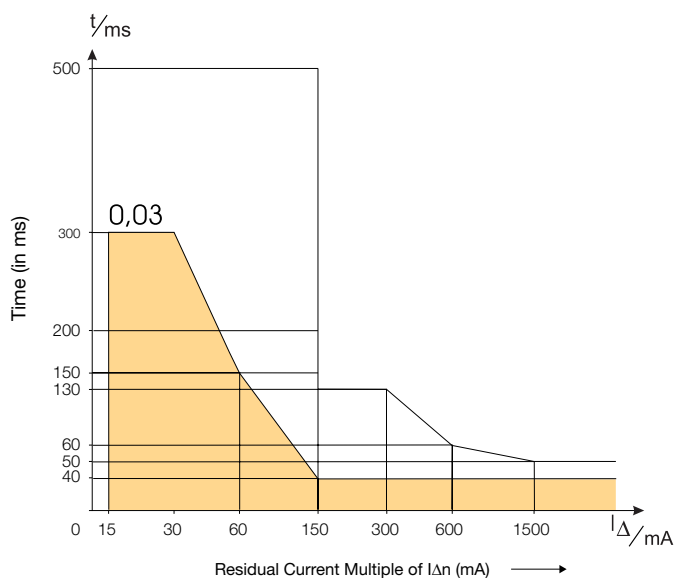
To be within zone of the IEC curve, It is necessary for the RCCB to operate within 50 ms at 240 mA and 150 ms at 80 mA. Both these conditions are satisfied by 30 mA RCCB.

For households, individual outlets, wet areas and temporary installations, RCCB with sensitivity not exceeding 30 mA is advisable.

• 100 mA

A 100 mA RCCB will normally give high degree of protection against electrocution but there is a possibility that the shock current could fall below the tripping level of RCCB. This could occur if additional resistances to that of human body are included in the earth path.

Actuation Time Characteristics



The 100 mA RCCB protects against leakage currents and indirect contact with earth loop impedance up to 500 Ohm.

• 300/500 mA

A 300/500 mA RCCB may be used where only fire protection is required. e.g., on lighting circuits, where the risk of electric shock is small. 300/500 mA RCCB will not give any protection against electrocution.

Selection of RCCB Type

RCCB Type AC

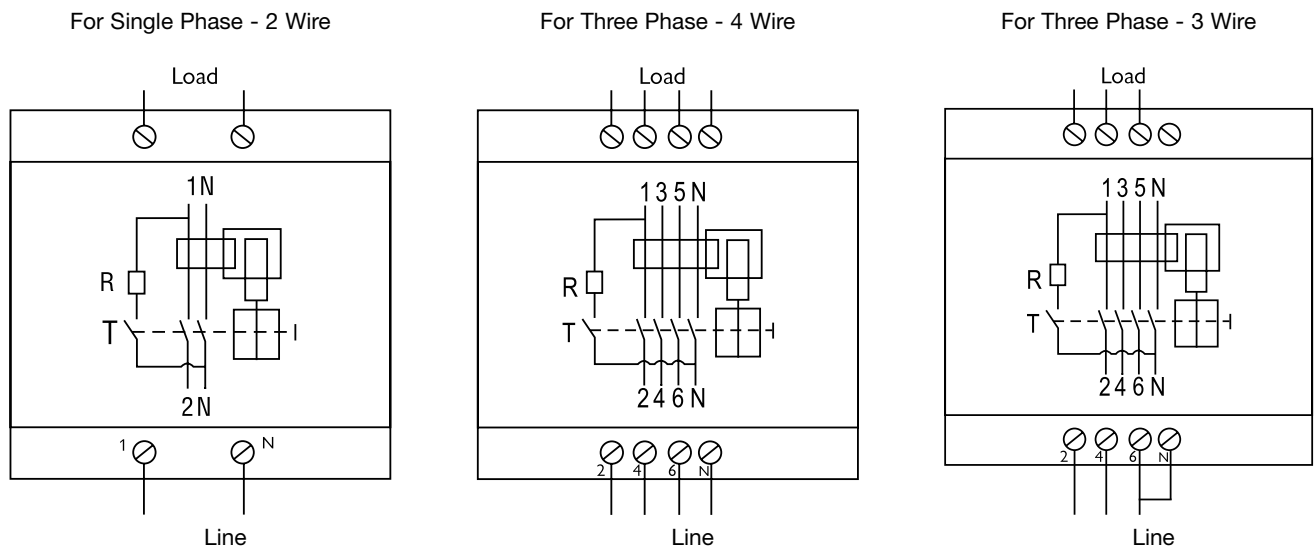
AC Type RCCB are used for residual sinusoidal alternating current.

RCCB Type A

A Type RCCB is used for residual sinusoidal alternating currents and residual pulsating direct currents, whether suddenly applied or slowly rising. It can therefore handle the residual current waveforms which can occur in the power supply units of single-phase loads with electronic components (e.g. ECG, dimmer switches). This type of residual current protective device is suitable for electronic equipment with input current circuits 1 to 6 in table 1.

Suitable RCD-Type		Circuit	Load Current	Residual Current
A AC	1			
	2			
	3			
	4			
	5			
	6			

Wiring Diagram

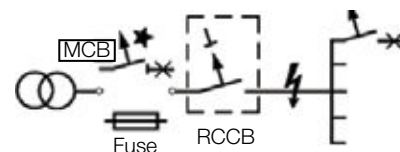


The Havells range of four pole RCCBs can be used to provide residual current protection in 3 phase, 3 wire circuits (no neutral), however a link from the neutral to an incoming should be made on the supply side of the RCCB, to enable the operation of the RCCB.

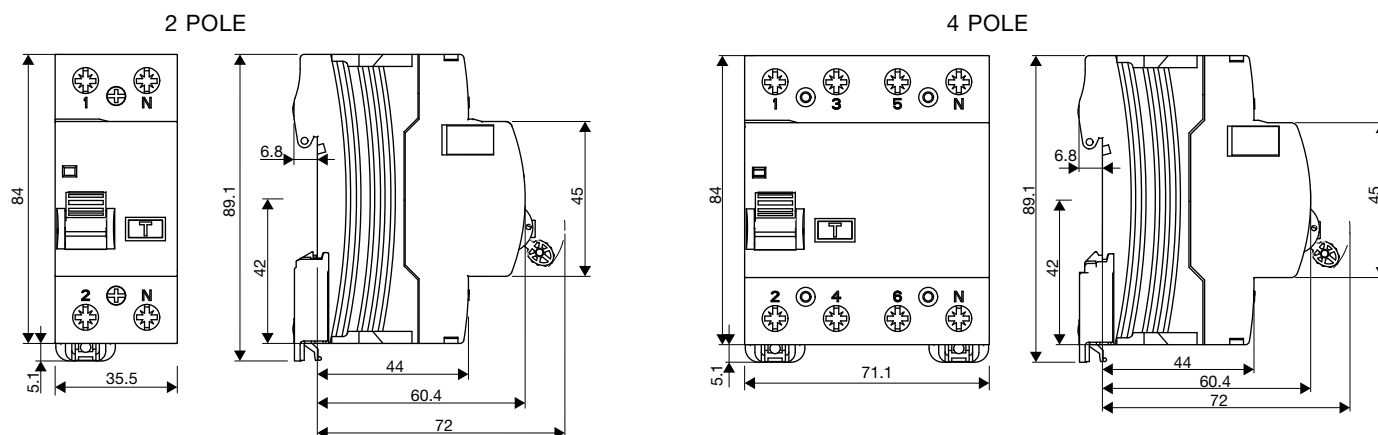
Technical Specifications	DP	FP
Standard	IS 12640 Part 1/IEC 61008-1/EN 61008-1	IS 12640 Part 1/IEC 61008-1/EN 61008-1
Type	A, AC	A, AC
Rated Current (In)	16 A, 25 A, 32 A, 40 A, 63 A	25 A, 40 A, 63 A (Type AC) 16 A, 25 A, 32 A, 40 A, 63 A (Type A)
Sensitivity (In)	30 mA, 100 mA, 300 mA*	30 mA, 100 mA, 300 mA*
Rated Voltage (Un)	240 V~	415 V~
Rated Insulation Voltage (Ui)	690 V	690 V
Rated Frequency	50 Hz	50 Hz
Conditional short circuit capacity (Inc)**	10 kA	10 kA
Residual Making Breaking Capacity	500 A or 10 In whichever is greater	500 A or 10 In whichever is greater
Ambient Temperature	-25 °C to +55 °C	-25 °C to +55 °C
Shock Resistance	40 mm free fall	40 mm free fall
Vibration Resistance	3 G	3 G
Electrical /Mechanical (No. of operations)	10000	10000
Mounting	Din Rail (35 mm x 7.5 mm)	Din Rail (35 mm x 7.5 mm)
Degree of Protection	IP 20	IP 20
Terminal Capacity (max)	35 mm ²	35 mm ²

*500 mA is available on request

** In combination with an upstream SCPD (Fuse gL/ MCB) of same or higher rating w.r.t. RCCB, to achieve the minimum values of I_{2t} and I_p to be withstood by the RCCB (as per IEC)"



Dimensions (in mm)



D7 RCCB - 'AC' Type



D7 RCCB - 'AC' Type DP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V/415 V, 50 Hz with 10 kA short circuit withstand capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
16 A	DHRACMDF030016	DHRACMDF100016	DHRACMDF300016
25 A	DHRACMDF030025	DHRACMDF100025	DHRACMDF300025
32 A	DHRACMDF030032	DHRACMDF100032	DHRACMDF300032
40 A	DHRACMDF030040	DHRACMDF100040	DHRACMDF300040
63 A	DHRACMDF030063	DHRACMDF100063	DHRACMDF300063

D7 RCCB - 'AC' Type



D7 RCCB - 'AC' Type FP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V/415 V, 50 Hz with 10 kA short circuit withstand capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
16 A	DHRACMFF030016	DHRACMFF100016	DHRACMFF300016
25 A	DHRACMFF030025	DHRACMFF100025	DHRACMFF300025
32 A	DHRACMFF030032	DHRACMFF100032	DHRACMFF300032
40 A	DHRACMFF030040	DHRACMFF100040	DHRACMFF300040
63 A	DHRACMFF030063	DHRACMFF100063	DHRACMFF300063

RCCB - 'AC' Type



RCCB - 'AC' Type DP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V, 50 Hz with 10 kA conditional short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
16 A	DHRGCTDF030016	DHRGCTDF100016	DHRGCTDF300016
25 A	DHRGCTDF030025	DHRGCTDF100025	DHRGCTDF300025
32 A	DHRGCTDF030032	DHRGCTDF100032	DHRGCTDF300032
40 A	DHRGCTDF030040	DHRGCTDF100040	DHRGCTDF300040
63 A	DHRGCTDF030063	DHRGCTDF100063	DHRGCTDF300063

RCCB - 'AC' Type FP

(In accordance with IS 12640-1 & IEC 61008-1) 415 V, 50 Hz with 10 kA conditional short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
25 A	DHRGCRFF030025	DHRGCRFF100025	DHRGCRFF300025
40 A	DHRGCRFF030040	DHRGCRFF100040	DHRGCRFF300040
63 A	DHRGCRFF030063	DHRGCRFF100063	DHRGCRFF300063

RCCB - 'A' Type



RCCB - 'A' Type DP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V, 50 Hz with 10 kA Conditional short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
25 A	DHRMAMDF030025	DHRMAMDF100025	DHRMAMDF300025
40 A	DHRMAMDF030040	DHRMAMDF100040	DHRMAMDF300040
63 A	DHRMAMDF030063	DHRMAMDF100063	DHRMAMDF300063

RCCB - 'A' Type FP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V, 50 Hz with 10 kA Conditional short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
25 A	DHRMAMFF030025	DHRMAMFF100025	DHRMAMFF300025
40 A	DHRMAMFF030040	DHRMAMFF100040	DHRMAMFF300040
63 A	DHRMAMFF030063	DHRMAMFF100063	DHRMAMFF300063

Higher Rating RCCB



Higher Rating RCCB (80 A-100 A) DP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V/415 V, 50 Hz with 10 kA short circuit withstand capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
80 A	DHRMCMDF030080	DHRMCMDF100080	DHRMCMDF300080
100 A	DHRMCMDF030100	DHRMCMDF100100	DHRMCMDF300100

Higher Rating RCCB (80 A-100 A) FP

(In accordance with IS 12640-1 & IEC 61008-1) 240 V/415 V, 50 Hz with 10 kA short circuit withstand capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
80 A	DHRMCMFF030080	DHRMCMFF100080	DHRMCMFF300080
100 A	DHRMCMFF030100	DHRMCMFF100100	DHRMCMFF300100



◆ RESIDUAL CURRENT
CIRCUIT BREAKER
(80 A-100 A)

The flow of current through electrical facilities always involves risks. Poorly insulated equipment, faulty wires and incorrect use of an electrical device can cause current to flow through the wrong path (i.e. through the insulation/human body) to the earth.

RCCB (also popularly known as ELCB) is a mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the leakage current attains a given value under specified conditions. Havells offers a wide range of RCCBs for protecting human life against fatal electric shocks as well as for providing protection against fire caused by earth faults.

Features

- Conditional short circuit capacity 10 kA
- Different knob position to indicate whether it is switched by a fault or manually switched OFF (Mid Trip)
- Test button for regular inspection
- Positive contact indication
- Dual termination for simultaneous connection of bus-bars and wires.
- CE marking, RoHS Complaint, 'Green Product'

Range

80 A - 100 A

Sensitivity

30 mA, 100 mA &
300 mA

Execution

Double Pole (2P)
Four Pole (4P)

Specification

IS 12640 Part 1/IEC 61008-1
/ EN 61008 - 1



Mid Trip

Different knob position to indicate whether the device is Switched OFF by a fault or Switched OFF manually



Positive Contact Indication

It clearly indicates true contact position through Flag Indication (Red-ON, Green-OFF) thus enhancing safety



Large Cable Terminals

The terminals are suitable for cables up to 50 mm² cross section area thus making it suitable for copper and aluminium cables

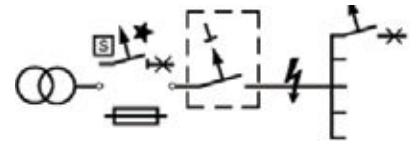


Test Button

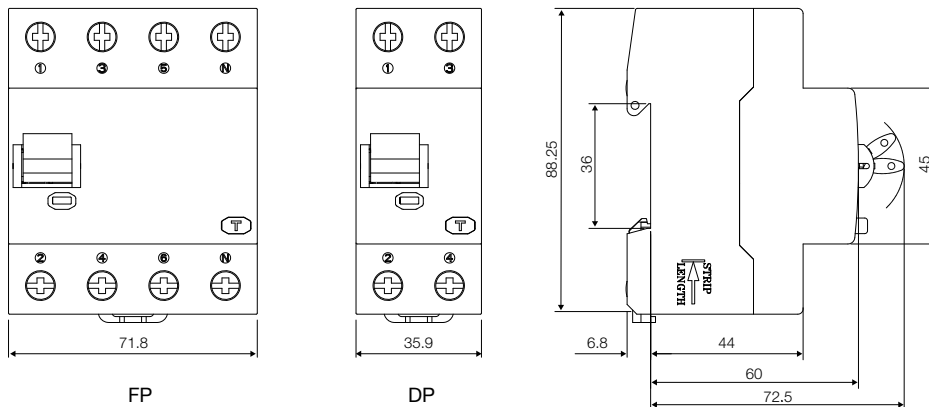
Test button for regular inspection/testing

Technical Specification	DP	FP
Specification Reference	IEC 61008-1 & IS 12640-1	IEC 61008-1 & IS 12640-1
Type	AC	AC
Rated current (In)	80 A, 100 A	80, 100
Sensitivity (IDn)	30 mA, 100 mA, 300 mA	30, 100, 300
Rated Voltage (Ue)	240 V~	415 V~
Rated Insulation voltage (Ui)	690 V	690 V
Rated Frequency	50 Hz	50 Hz
Trip Time	$I\Delta n < 300$ ms, $5 I\Delta n < 40$ ms	$I\Delta n < 300$ ms, $5 I\Delta n < 40$ ms
Conditional short circuit Capacity**	10 kA	10 kA
Residual Making Breaking capacity	10 In (A)	10 In (A)
Ambient Working Temperature	-25 °C to +55 °C	-25 °C to +55 °C
Shock Resistance	40 mm free fall	40 mm free fall
Vibration Resistance	5 G	5 G
Electrical Endurance (No. of operations)	>2000	>2000
Mechanical Endurance (No. of operations)	>3000	>3000
Mounting	Din Rail (35 mm x 7.5 mm)	Din Rail (35 mm x 7.5 mm)
Degree of protection	IP 20	IP 20
Terminals Capacity (Max)	50 mm ²	50 mm ²

** In combination with an upstream SCPD (Fuse gL/MCB) of same or higher rating w.r.t. RCCB, to achieve the minimum values of I_{2t} and I_p to be withstood by the RCCB (as per IEC)"



Dimensions (in mm)



Higher Rating RCCB

**Higher Rating RCCB (80 A-100 A) DP**

(In accordance with IS 12640-1 & IEC 61008-1) 415 V, 50 Hz with 10 kA Conditional short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
80 A	DHRMCMDF030080	DHRMCMDF100080	DHRMCMDF300080
100 A	DHRMCMDF030100	DHRMCMDF100100	DHRMCMDF300100

**Higher Rating RCCB (80 A-100 A) FP**

(In accordance with IS 12640-1 & IEC 61008-1) 415 V, 50 Hz with 10 kA Conditional short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
80 A	DHRMCMFF030080	DHRMCMDF100080	DHRMCMDF300080
100 A	DHRMCMFF030100	DHRMCMDF100100	DHRMCMDF300100



◆ RCBO - RESIDUAL CURRENT
CIRCUIT BREAKER WITH OVERLOAD
& SHORT CIRCUIT PROTECTION

Havells New RCBO is a single composite device which provides protection against over currents, short circuit and earth leakage faults. It comes in the same width and profile as that of a standard MCB. It is designed for use in domestic, commercial and industrial distribution systems at the most downstream circuit for ensuring high degree of protection to the user for a particular circuit. In normal use, it is safe to use and free of threat to user as well as to environment.

Features (Electromechanical RCBO)

- Proper cable termination with 25 mm² slot and safety shutter
- Dual termination on the outgoing terminal
- Field fittable auxiliary contact
- Inscription window with On and Off Indication

Features (Electronic RCBO)

- Pulsating DC protection - Type A
- Discrimination using time delay - Type S RCBO
- Controlled response VD RCBO (Electronic)
- Short-circuit breaking capacity 10 kA Protection in case of N-E faults Higher stacking density in distribution boards
- Enhanced immunity to nuisance tripping
- ISI and CE marking. RoHS Complaint, 'Green Product'

Execution

Electromechanical RCBO (SPN & 2P RCBOs)
Electromechanical RCBO (TPN & FP RCBOs)
Electronic RCBO - A Type (SPN - 2M)
Electronic RCBO - A Type (TPN - 4M)

Range

32 A, 40 A & 63 A
6 A to 40 A

Specification

IS 12640 : Part 2/IEC 61009-1/EN : 61009-1

Sensitivity

30 mA, 100 mA & 300 mA



Test Button

Test button for regular inspection/testing



Inscription Window

Inscription window with ON & OFF indication



Proper Cable Termination

Proper cable termination with 25 mm² slot and safety shutter

Construction

Havells new RCBO is a single composite device which provides protection against over currents, short-circuit and earth leakage faults, it comes in the same width and profile as that of a standard MCB. It is designed for use in domestic, commercial and industrial distribution systems at the most downstream circuit for ensuring high degree of protection to the user for a particular circuit. In normal use, it is safe to use and poses no threat to user as well as to environment.

Features

- Positive contact indication: Red for ON, Green for OFF
- Short circuit breaking capacity 10 kA.
- Large terminal capacity: RCBOs have 35 mm² for cool running while in operation.
- Protection in case of loss of supply neutral: Even in event of loss of supply neutral, Havells RCBO provides protection against earth faults. The Functional Earth (FE) white color wire connected to earth provides this protection.
- Controlled response & immunity to nuisance tripping: The trip level and the response time of the Havells VD (Voltage Dependent) RCBO using electronic circuit is set to very precise values and thereby provide greater immunity to nuisance tripping that can be caused by mains borne noise, surge voltages, lighting surges, reactive loads, mains filters, etc.
- Neutral to earth faults: A connection that occurs between N and E on the load side of any RCBO will impact on its performance and cause the trip level to increase. In the case of a N - E fault, the user may have no way of knowing that this fault exists and that the RCBO has been desensitized. Under this condition, the Havells VD RCBO provides a far greater level of protection than a normal VI (Voltage Independent) RCBO.

Aesthetics & Convenience

- The new module's unique compact construction enables far more devices to be fitted into a distribution board than previously possible, and 2 Module RCBO can simply replace existing MCB 2 pole when upgrading a board.
- High stacking density = smaller chassis & distribution boards.

Reliability & Continuity Of Service

- Enhanced discrimination with Havells MCBs
- Retrofits Havells MCBs in distribution boards with no modifications in general
- Robust construction.

Energy Limiting

Havells RCBO meets the requirements for energy let through by IEC & British Standard for energy limiting class 3.

Additional Range - Type A & S

Type A - Pulsating DC Protection: Any electrical appliance with power control has the ability to produce earth fault currents with pulsating DC (rectified AC) components. RCBOs that provide this type of protection are referred to as Type A RCBOs.

Standard VI RCBOs do not provide this protection, and are referred to as Type AC RCBOs. Havells VD RCBOs have been specifically designed to provide protection against pulsating DC fault currents.

- Type S- Selective or Time Delay: RCBOs are also divided into two categories determined by their response time to an earth fault current, as follows
- General Type - having a trip time <300 ms for fault currents of $I_{\Delta n}$ and <40 ms for fault currents >5 $I_{\Delta n}$.

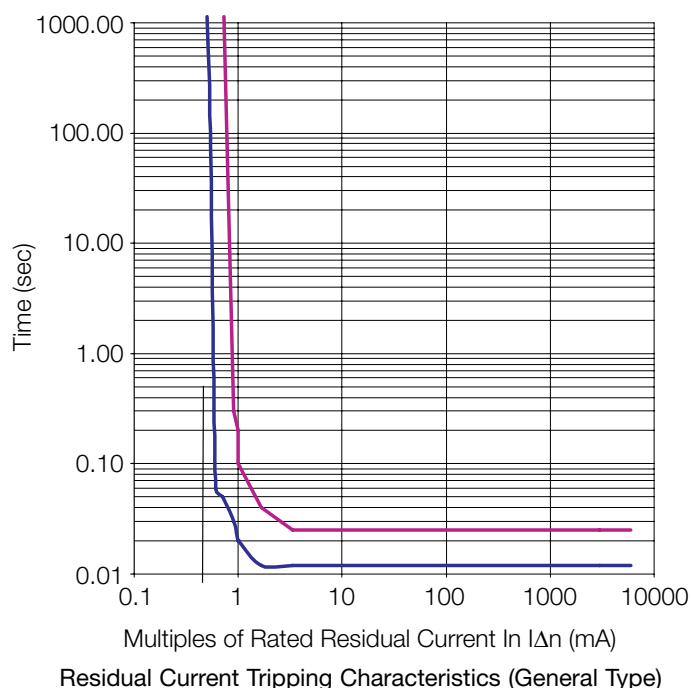
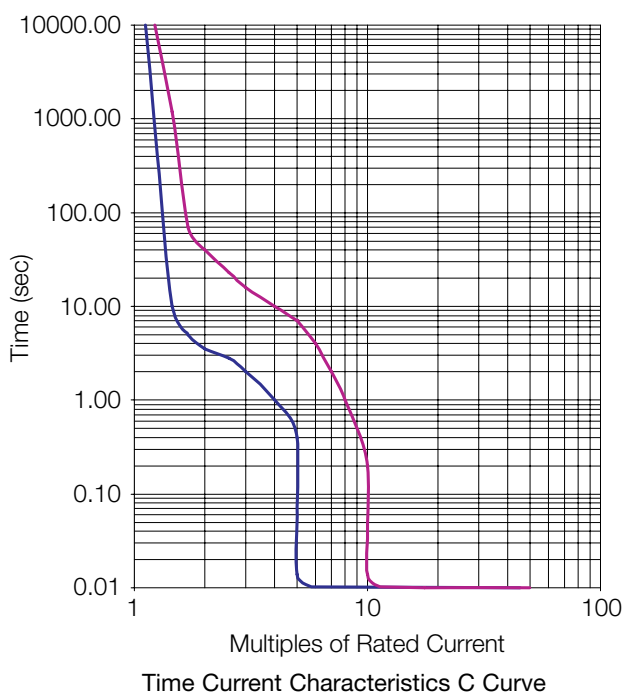
Technical Information	Electromechanical 2P RCBOs used as (SPN & 2P RCBOs)
Specification Reference	IS 12640 (Part 2) & IEC 61009-1
Rated Current (In)	32 A, 40 A & 63 A
Rated Residual Operating Current (I Δ n)	30 mA, 100 mA, 300 mA
Instantaneous Tripping Current	'C' curve
Rated Voltage (Un)	240 V~
Rated Insulation Voltage (Ui)	660 V
Rated impulse withstand voltage	4 kV
Rated Frequency	50 Hz
No. of Pole	2 Pole
Rated Short Circuit Capacity (Icn)	10 kA
Rated Service Short Circuit Capacity (Ics)	7.5 kA
Rated Residual Making Breaking Capacity (I Δ m)	630 A for 63 A (500 A-32 A to 40 A)
Operating Characteristics in case of Residual Currents	'A' & 'AC' Type
Nature of Supply	Pulsating DC
Method of Mounting	Panel Board Type (DIN Rail)
Degree of Protection	IP 20
Terminals for External Conductors	25 mm ²
Net Weight	0.424 kg
Ambient Working Temperature	-5 °C to +55 °C
Electrical & Mechanical Endurance	4000 (No. of Operations)
Trip Time	<40 ms
Shock Resistance	40 mm free fall
Vibration Resistance	3 G

- S Type - having a trip time of 150 - 500 ms for $I_{\Delta n}$, and 40 - 130 ms for $>5 I_{\Delta n}$.

($I_{\Delta n}$ is the rated residual operating current of the RCBO)

As the name implies, general types are intended for general purpose use. However, S (selective) types are normally used in conjunction with downstream general type RCBOs.

The S type effectively provides discrimination in terms of the response time to earth fault currents for upstream and downstream RCBOs. For example, when two RCBOs are connected in series the first RCBO will often be an S type.



Electromechanical 4P RCBOs used as (TPN & FP RCBOs)	Electronic RCBO - A Type (SPN - 2M)	Electronic RCBO - A Type (TPN - 4M)
IS 12640 (Part 2) & IEC 61009-1	IS 12640 (Part 2) & IEC 61009-1	IS 12640 (Part 2) & IEC 61009-1
32 A, 40 A & 63 A	6 A, 10 A, 16 A, 20 A, 25 A, 32 A, 40 A	6 A, 10 A, 16 A, 20 A, 25 A, 32 A, 40 A
30 mA, 100 mA, 300 mA	30 mA, 100 mA, 300 mA	30 mA, 100 mA, 300 mA
'C' curve	'C' curve	'C' curve
415 V~	240 V~	415 V~
660 V	660 V	660 V
4 kV		
50 Hz	50 Hz	50 Hz
4 Pole	1P+N	3P+N
10 kA	10 kA	10 kA
7.5 kA		
630 A for 63 A (500 A-32 A to 40 A)	500 A	500 A
'A' & 'AC' Type	'A' Type	'A' Type
Pulsating DC		
Panel Board Type (DIN Rail)	Panel Board Type (DIN Rail)	Panel Board Type (DIN Rail)
IP 20	IP 20	IP 20
25 mm ²	35 mm ²	35 mm ²
0.740 kg	0.420 kg	0.84 kg
-5 °C to +55 °C	-5 °C to +55 °C	-5 °C to +55 °C
4000 (No. of Operations)	4000 (No. of Operations)	4000 (No. of Operations)
<40 ms	<40 ms	<40 ms
40 mm free fall	40 mm free fall	40 mm free fall
3 g	3 g	3 g

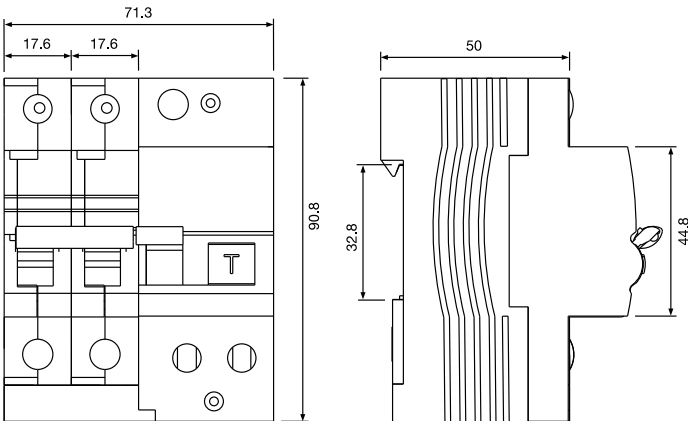
RCBO - SPN & 2P



Electromechanical 2P RCBOs used as (SPN & 2P RCBOs)
(In accordance with IS 12640-2 & IEC 61009-1) 240 V, 50 Hz, with 10 kA short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
32 A	DHBMACDP4030032	DHBMACDP4100032	DHBMACDP4300032
40 A	DHBMACDP4030040	DHBMACDP4100040	DHBMACDP4300040
63 A	DHBMACDP4030063	DHBMACDP4100063	DHBMACDP4300063

Dimensions (in mm)



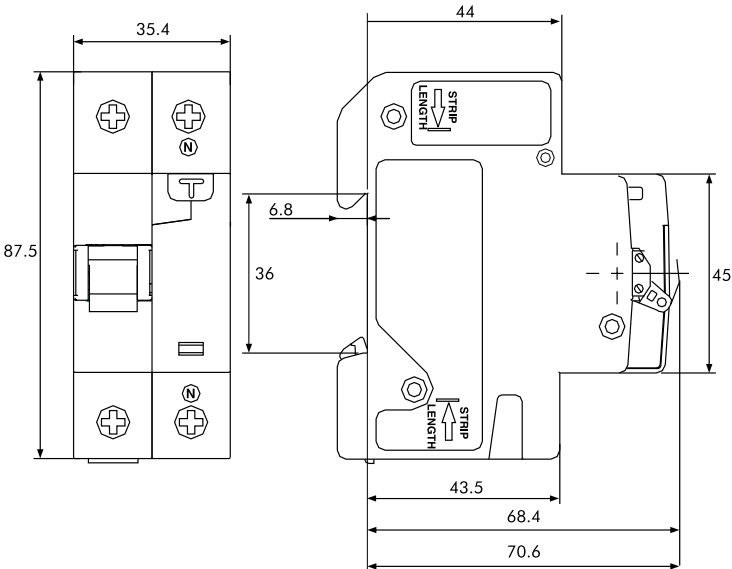
RCBO - A Type SPN



RCBO - A Type (SPN - 2M)
(In accordance with IS 12640-2 & IEC 61009-1) 240 V, 50 Hz, with 10 kA short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
6 A	DHCEACSN2030006	DHCEACSN2100006	DHCEACSN2300006
10 A	DHCEACSN2030010	DHCEACSN2100010	DHCEACSN2300010
16 A	DHCEACSN2030016	DHCEACSN2100016	DHCEACSN2300016
20 A	DHCEACSN2030020	DHCEACSN2100020	DHCEACSN2300020
25 A	DHCEACSN2030025	DHCEACSN2100025	DHCEACSN2300025
32 A	DHCEACSN2030032	DHCEACSN2100032	DHCEACSN2300032
40 A	DHCEACSN2030040	DHCEACSN2100040	DHCEACSN2300040

Dimensions (in mm)



RCBO - TPN & FP

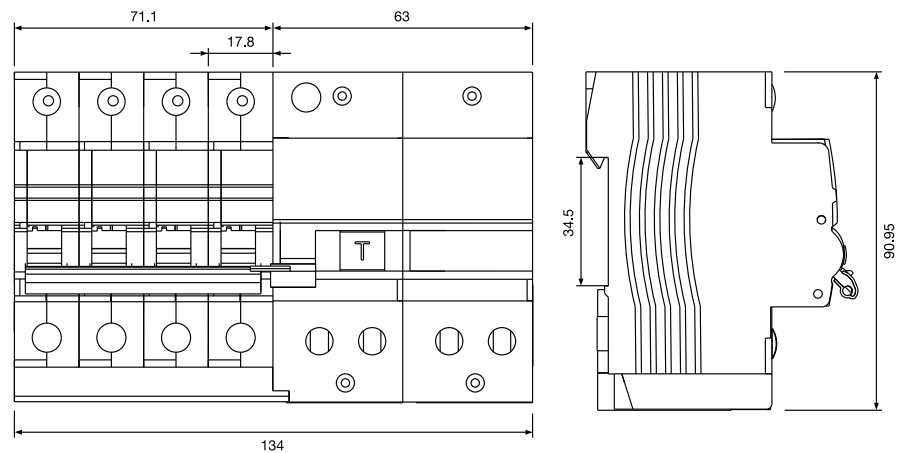


RCBO - A Type (TPN - 4M)

(In accordance with IS 12640-2 & IEC 61009-1) 415 V, 50 Hz, with 10 kA short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
32 A	DHBMACTN8030032	DHBMACTN8100032	DHBMACTN8300032
40 A	DHBMACTN8030040	DHBMACTN8100040	DHBMACTN8300040
63 A	DHBMACTN8030063	DHBMACTN8100063	DHBMACTN8300063

Dimensions (in mm)



RCBO - A Type TPN

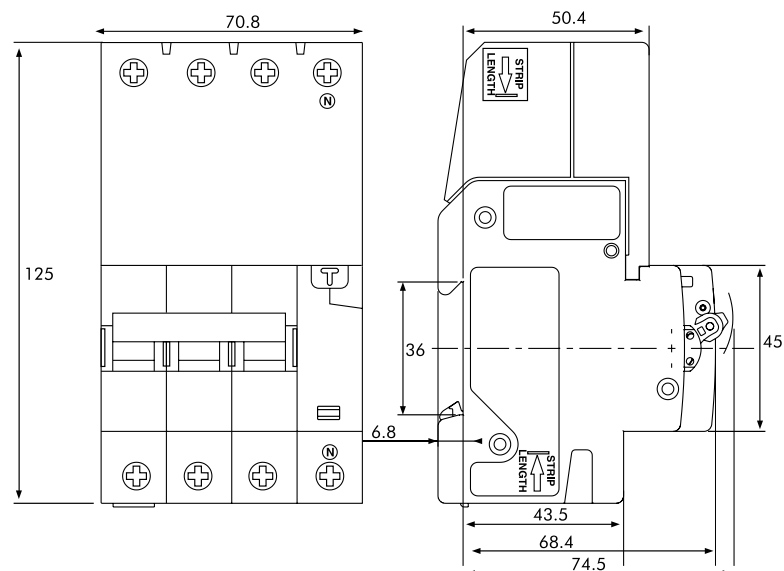


RCBO - A Type (TPN - 4M)

(In accordance with IS 12640-2 & IEC 61009-1) 415 V, 50 Hz, with 10 kA short circuit capacity

Rating	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.
6 A	DHCEACTN4030006	DHCEACTN4100006	DHCEACTN4300006
10 A	DHCEACTN4030010	DHCEACTN4100010	DHCEACTN4300010
16 A	DHCEACTN4030016	DHCEACTN4100016	DHCEACTN4300016
20 A	DHCEACTN4030020	DHCEACTN4100020	DHCEACTN4300020
25 A	DHCEACTN4030025	DHCEACTN4100025	DHCEACTN4300025
32 A	DHCEACTN4030032	DHCEACTN4100032	DHCEACTN4300032
40 A	DHCEACTN4030040	DHCEACTN4100040	DHCEACTN4300040

Dimensions (in mm)





◆ SURGE PROTECTION DEVICES

Today's residential, commercial and industrial set-ups are heavily reliant on the continuous and efficient running of electrical and electronic systems. Over-voltage surges are a major cause of failure of these equipment.

Such transient over-voltage surges are often generated due to direct/indirect effects of lightning strikes, switching of utility grid or capacitor banks, electrical accidents, turning on/off of nearby heavy load machines, AC chillers, motors, pumps, circuit-breaker tripping etc.

Surges can cause destruction of electronic circuitry components, logic failures and breakdowns. Loss of operation, loss of service, loss of data, and loss of production can be huge and by far higher than the cost of damaged equipment. Long term exposure to lower level transient over-voltages can also lead to premature ageing of equipment.

Havells offers a comprehensive range of Surge Protection Devices designed to protect your installation by limiting transient over-voltages and diverting surge currents to ground.

Features:

- Visual as well as Remote end-of-life indicators.
- Simple, Professional Installation of Arrester Modules
- High Terminal Capacity - 35 mm² for Ease of Installation.
- Bi-stable Snap-pusher for Easy Installation and Extraction from DIN-rail.
- Finger Touch-Proof IP 20.
- TUV Tested and approved. CE compliant.

Range

AC SPD's

Type 1+2

Type 2

DC SPD's

Type 1+2

Type 2

Dataline SPD

6 V, 12 V, 24 V, 48 V



Remote Signaling Contact

- Option to remotely monitor the status of the surge protector.
- Simplified cabling thanks to a single terminal for monitoring all poles.



- Satisfactory operation
- Cartridge must be replaced

End of Life Indicator

Green shows the satisfactory operation and Red indicates that Cartridge must be replaced.



Pluggable Cartridges

- Faulty cartridges can be replaced without changing the entire SPD.
- Cartridges can be replaced with mains voltage ON.
- All cartridges are marked with characteristics for ease of maintenance.



Dedicated Protection of the Neutral

The 1 P+N and 3 P+N SPDs with dedicated protection of the neutral pole discharge the common and differential mode overvoltages that may occur in installations with TT and TNS systems, when there is a voltage surge.

Type 1+2 AC Surge Protection Devices

These are very compact SPDs which protect both from overvoltage surges due to direct lightning strikes (10/350 μ s waveform) as well as indirect lightning strikes and switching surges (8/20 μ s waveform). They are an integrated solution, equivalent to an automatically coordinated Type 1 and Type 2 SPDs.

They are used as the first step of protection in incoming power supply panels and areas with exposure to the atmosphere, where installations are usually provided with an external lightning protection system.



Configuration

SPN, TPN

Specification

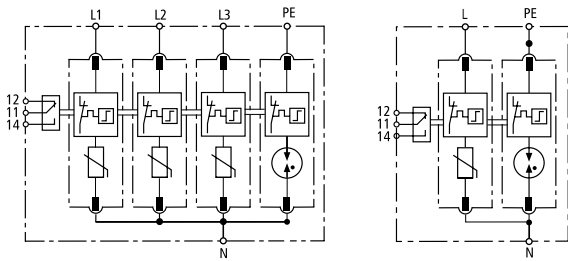
IEC 61643-11: 2011, EN 61643-11: 2012

Features

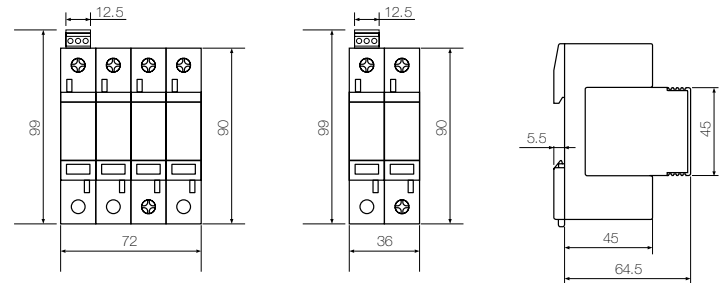
- Tested and approved by TUV.
- High Discharge Current (Imax 50 kA (L – N) 70 kA (N – E)).
- Compact Size Integrated Type-1 & Type-2 protection in small module width (Ideal in all reduced-size spaces).
- Better Protection due to reduced Up(Voltage protection level 1.5 kV).
- Both Common & Differential Mode Protection.

Technical Specification	
Standard Compliance	IEC/EN 61643-11
Type / Class	Type 1+2 / Class I+II
Max Continuous Operating AC Voltage Uc	320 V (L – N), 255 V (N – PE)
Lightning Impulse (10/350 microsecond) Iimp	12.5 kA
Nominal Discharge Current (8/20 microsecond) In	20 kA (L – N), 40 kA (N – PE)
Max Discharge Current (8/20 microsecond) Imax	50 kA (L – N), 70 kA (N – PE)
Voltage Protection Level Up	<1.5 kV
Voltage Protection Level 5 kA Up	<1.2 kV
Max Backup Fuse	125 A gL/gG
Temporary Overvoltage Charactersitics (5 second) Ut	335 V
Residual Current At Uc - Ipe	<100 μ A
Response Time	<25 ns
Short Circuit Current Rating ISCCR	3 kA
Follow Current extinguishing Capability [N-PE] a.c. Ifi	100 Arms
Number of Ports	One Port SPD
Location	Indoor
Humidity	5-95%
Operating Temperature Range	-40 °C - 80 °C
Operating State/Fault Indication	Green/Red
Cross-section Area	4-35 Sq. mm
For Mounting on	35 mm Din Rail
Enclosure Material	Thermoplastic UL94-V0
Degree of Protection	IP20

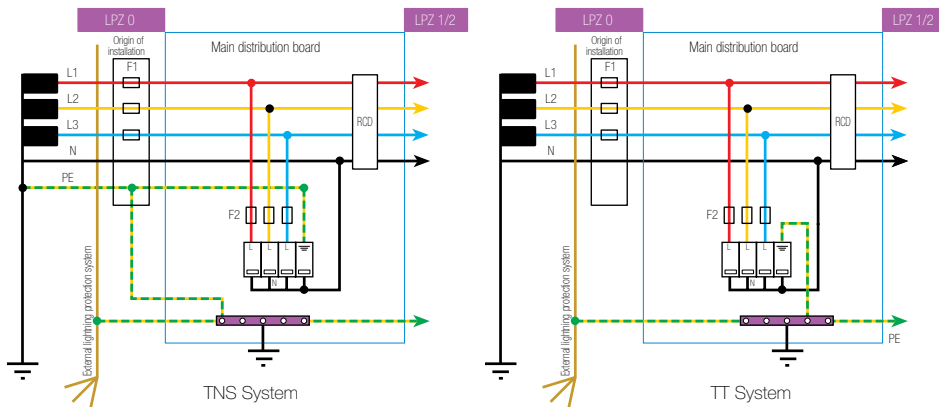
Circuit Diagram:



Dimensions:



Connections:



F1: Overcurrent protection device
F2: Backup protection



Type 1+2 AC Surge Protection Device

Order Code	Poles	Uc (V)	In (kA)	Iimp (kA)	Imax (kA)	Up (kV)	Remote Signaling
DHSAANBC50320	TP+N	320	20	12.5	50	1.5	No
DHSAANAC50320	1P+N	320	20	12.5	50	1.5	No
DHSAARBC50320	TP+N	320	20	12.5	50	1.5	Yes
DHSAARAC50320	1P+N	320	20	12.5	50	1.5	Yes

Cartridges

Order Code	Pole	Uc (V)	In (kA)	Iimp (kA)	Imax (kA)	Up (kV)
DSSRCX0149	L - N	320	20	12.5	50	1.5
DSSRCX0150	N - PE	255	40	12.5	70	1.5

Type 2 AC Surge Protection Devices

Type 2 SPDs provide protection from over-voltage surges due to indirect lightning strikes hitting the building or surrounding area and switching surges (8/20 μ s waveform). They are necessary for second level of protection in applications where Type 1 protectors are installed upstream. They are also used for first stage of protection in residential, commercial or industrial applications not exposed to direct strikes or with no external lightning protection system.

Type 2 SPDs are suitable for use at the entrance of the installation (main DB), in intermediate distribution boards (sub DB) and by the terminal equipment.



Configuration

SP, SPN, TPN

Specification

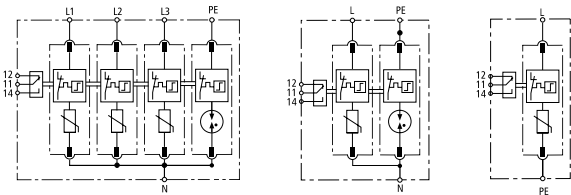
IEC 61643-11: 2011, EN 61643-11: 2012

Features

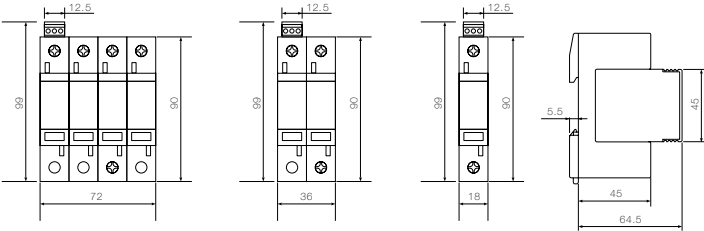
- Tested and Approved by TUV.
- Applicable in Two Voltage Rating - Uc 320 V & 275 V.
- Both Common & Differential Mode Protection.
- Better Protection (Voltage protection level Up upto 1.3 kV, suitable for protection of all terminal equipments).

Technical Specification		
Standard Compliance	IEC/EN 61643-11	IEC/EN 61643-11
Type/Class	Type 2/Class II	Type 2/Class II
Max Continuous Operating AC Voltage Uc	275 V	320 V
Max Continuous Operating AC Voltage [N-PE] Uc	255 V	255 V
Nominal Discharge Current (8/20 microsecond) In	20 kA	20 kA
Max Discharge Current (8/20 microsecond) Imax	40 kA	40 kA
Voltage Protection Level Up	<1.3 kV	<1.5 kV
Voltage Protection Level 5 kA Up	<1 kV	<1.2 kV
Voltage Protection Level [N-PE] Up	<1.5 kV	<1.5 kV
Temporary Overvoltage with Stand (5 second) Ut	335 V	335 V
Residual Current At Uc- Ipe	<100 μ A	<100 μ A
Short Circuit Current Rating I _{SCCR}	3 kA	3 kA
Follow Current extinguishing Capability [N-PE] a.c. I _{fi}	100 Arms	100 Arms
Max Backup Fuse	125 A gL/gG	125 A gL/gG
Response Time	<25 ns	<25 ns
Response Time [N-PE]	<100 ns	<100 ns
Operating Temperature Range	-40 °C - 80 °C	-40 °C - 80 °C
Operating State/Fault Indication	Green/Red	Green/Red
Cross-section Area	4-35 Sq. mm	4-35 Sq. mm
For Mounting on	35 mm Din Rail	35 mm Din Rail
Enclosure Material	Thermoplastic UL94-V0	Thermoplastic UL94-V0
Degree of Protection	IP 20	IP 20

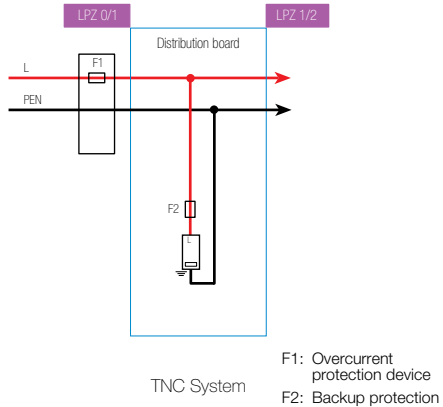
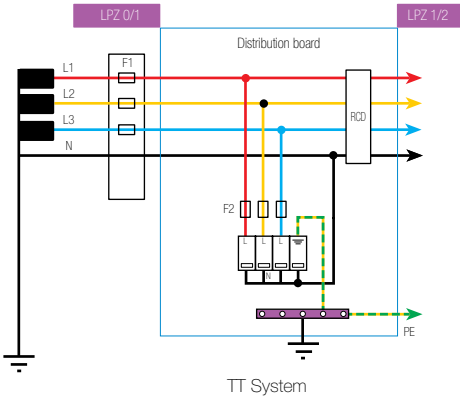
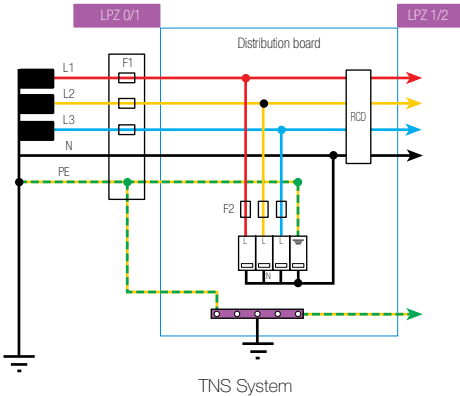
Circuit Diagram:



Dimensions:



Connections:



F1: Overcurrent protection device
F2: Backup protection

Type 2 AC Surge Protection Device

Order Code	Poles	Uc (V)	In (kA)	I _{max} (kA)	Up (kV)	Remote Signaling
DHSA2N1N40320	1P	320	20	40	1.5	No
DHSA2N1N40275	1P	275	20	40	1.3	No
DHSA2NAN40320	1P+N	320	20	40	1.5	No
DHSA2NAN40275	1P+N	275	20	40	1.3	No
DHSA2NBN40320	TP+N	320	20	40	1.5	No
DHSA2NBN40275	TP+N	275	20	40	1.3	No
DHSA2R1N40320	1P	320	20	40	1.5	Yes
DHSA2R1N40275	1P	275	20	40	1.3	Yes
DHSA2RAN40320	1P+N	320	20	40	1.5	Yes
DHSA2RAN40275	1P+N	275	20	40	1.3	Yes
DHSA2RBN40320	TP+N	320	20	40	1.5	Yes
DHSA2RBN40275	TP+N	275	20	40	1.3	Yes

Cartridges

Order Code	Pole	Uc (V)	In (kA)	I _{max} (kA)	Up (kV)
DSSRCX0151	L-N	320	20	40	1.5
DSSRCX0152	L-N	275	20	40	1.3
DSSRCX0153	N-PE	255	20	40	1.5

Data Line Surge Protection Devices

Lightning can also propagate through telecommunications and data networks. It can damage all the equipment connected to these networks: telephones, modems, computers, servers, faxes, fire alarms etc.

Today's telecommunication and data transmission devices are increasingly more vulnerable to lightning induced voltage surges due to their sensitive and complex nature as well as possible connection across several different networks. As these devices are critical to a companies' communications and information processing, it is advisable to insure them against potentially costly and disruptive events.

A data line SPD installed in-line, directly in front of a sensitive piece of equipment will increase their useful life and maintain the continuity of flow of your information.



Range

Data Line Surge Protection Devices (6 V, 12 V, 24 V, 48 V)

Specification

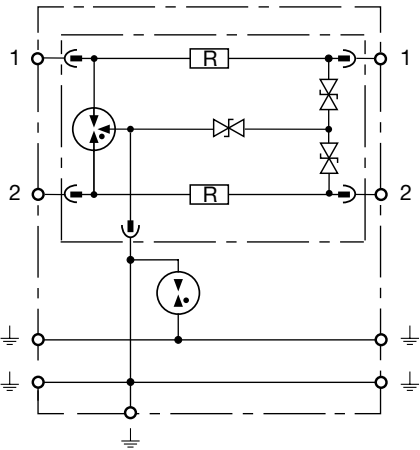
IEC 61643-21

Features

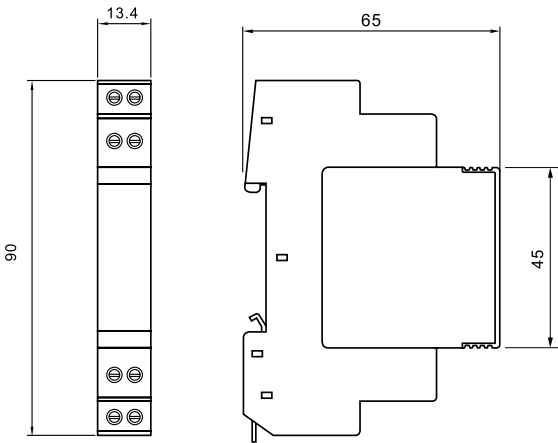
- Reduced Dimensions (only 13.4 mm module width).
- Pluggable Cartridges.
- Operational Continuity (Faulty module can be changed with mains voltage ON).
- Quick Response (Less than 1 nano second).
- Shield wire protection facility.

Technical Specification				
Nominal Voltage type	6 V	12 V	24 V	48 V
Network	RS 422	RS 232, RS 485	4-20 mA, Analog Signals, Digital Signals	ISDN, 48 V Line
SPD Configuration	1 Pair + Shielded	1 Pair + Shielded	1 Pair + Shielded	1 Pair + Shielded
Nominal Line Voltage Un	6 V	12 V	24 V	48 V
Max DC Operating Voltage Uc	8 V	15 V	28 V	53 V
Max Load Current IL	300 mA	300 mA	300 mA	300 mA
Max Frequency fmax	>3 MHz	>3 MHz	>3 MHz	>3 MHz
Insertion Loss	<1 dB	<1 dB	<1 dB	<1 dB
Nominal Discharge Current (8/20 Microsec) In	5 kA	5 kA	5 kA	5 kA
Max Discharge Current (8/20 Microsecond) Imax	20 kA	20 kA	20 kA	20 kA
Impulse Current (10/350 microsecond) Iimp	5 kA	5 kA	5 kA	5 kA
Voltage Protection Level Up	20 V	30 V	40 V	70 V
Response Time	<1 ns	<1 ns	<1 ns	<1 ns
Series Resistance	2Ω	2Ω	2Ω	2Ω
Humidity	5-95%	5-95%	5-95%	5-95%
Operating Temperature Range	-40 °C - 80 °C			
For Mounting on	35 mm Din Rail			
Cross-section Area	0.4-2.5 Sq. mm			
Enclosure Material	Thermoplastic UL94-0			
Degree of Protection	IP 20			

Circuit Diagram:



Dimensions:



Dataline Surge Protection Device

Order Code	Un (V)	In (kA)	Iimp (kA)	Imax (kA)	Up (V)	Remote Signaling
DHSDDN1A20006	6	5	5	20	20	No
DHSDDN1A20012	12	5	5	20	30	No
DHSDDN1A20024	24	5	5	20	40	No
DHSDDN1A20048	48	5	5	20	70	No



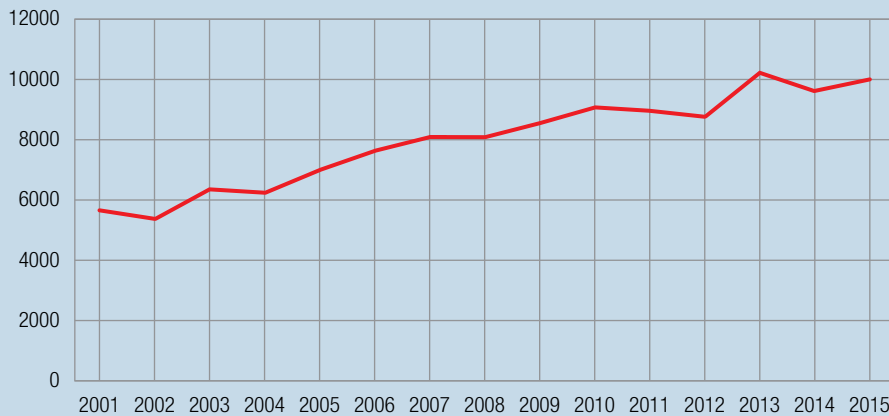
◆ DOWNSTREAM PROTECTION DEVICES



Electricity is an indispensable part of our daily lives. Its safe use is a blessing for mankind. At the same time, its improper handling can have catastrophic consequences in the form of accidents, fire, or death.

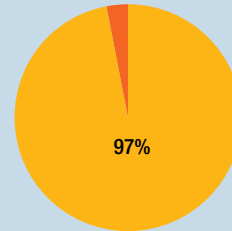
Havells has always been at the forefront of providing safe, reliable and innovative circuit breakers for protection of electrical installations. Our range of downstream protection devices is the latest technical solution that seamlessly covers all potential hazards in electrical installation (protecting life and assets) and ensures best level of service continuity with highest level of safety. Downstream protection is advantageous in all installations due to their comfort and hassle free nature. However it is fundamental in installations requiring high level of availability to the user.

Electricity can be a **LIFELINE** as well as a **LIFE-TAKER**

Death due to Electrocution¹

Approx **25** people die in India daily due to electrocution

- The number could be much higher due to many cases of unreported deaths!
- If we analyse the frequent cases of non-fatal accidents, the number would be shockingly huge!



97% of all electricians have been shocked or injured on the job.

Central Electricity Authority (CEA): amendment regulation 2015, Rule 42 - "Earth Leakage protection devices" states that: 'The supply of electricity to every installation other than voltage not exceeding 250 V, below 2 kW, shall be controlled by an 30 mA Earth Leakage protection device for domestic connection and 100 mA for all other installation so as to disconnect the supply instantly on occurrence of earth fault or leakage of current.'

However millions of old and new installations in India do not have RCDs and continue to be unsafe.

Benefits of Downstream Protection Devices

1. High level of protection

Downstream protection can be used to achieve **discrimination**, when used in coordination with upstream breaker.

In case of any fault, the downstream device will provide **first level of protection (sensitive and accurate fast trip action)** and upstream breaker will give second level **back-up protection**. This is quite useful for sensitive appliances.

2. Relief from nuisance tripping & Higher service continuity

An RCD (either RCCB or RCBO) installed at the switchboard mains is often the best option as it protects all the electrical wiring and appliances used in the house. But nuisance tripping of RCDs is a common complaint. Main reasons behind this are supply transients (e.g. lightning) and harmonics, accumulation of earth leakage currents due to lowered insulation resistance (typical problem of old equipment/ moisture tracking in rainy season), incorrect installation design and segregation of circuit etc.

Thus, in many of the old and new electrical installations, **incomer ELCBs are not installed or bypassed** because they cause frequent power-cut of entire house. Sometimes **ELCBs with a higher sensitivity (100 mA, 300 mA etc.) are installed** which are insufficient to give electric shock protection. All these are not recommended as user remains open to risk from electrocution.

In such installations, it is advisable to use dedicated downstream residual current devices, especially in the high risk areas like kitchen, bathroom etc.

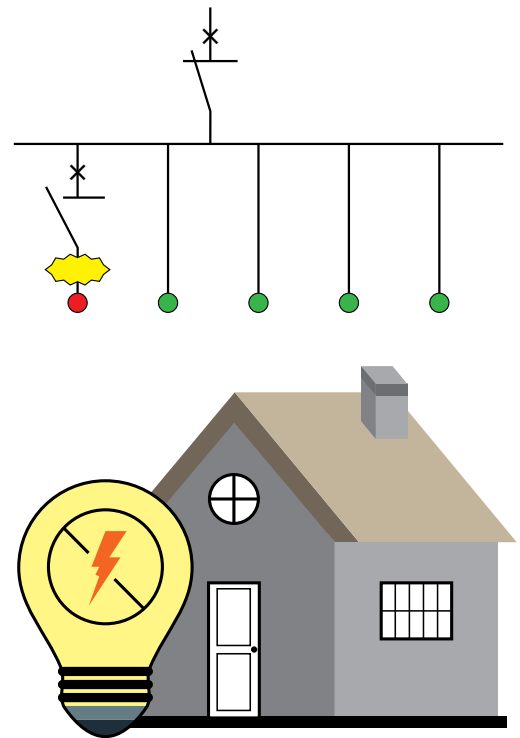
This would give following advantages:

- **Selective tripping : only faulty appliance is disconnected**
- **Higher level of service continuity**
- **Easy and quick fault identification**

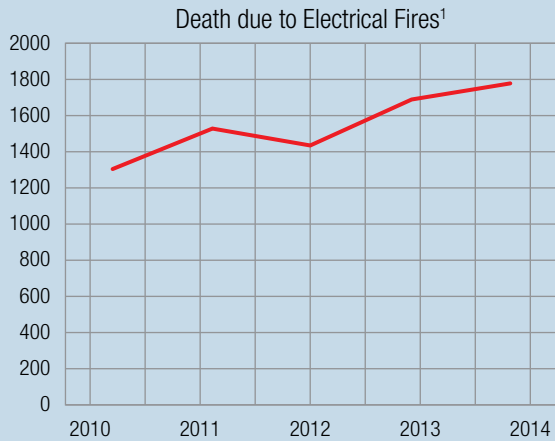
3. Close to user: Easy and immediate resetting

These devices are installed at the **exact point-of-use**, so user can reset them easily and immediately once the fault is cleared.

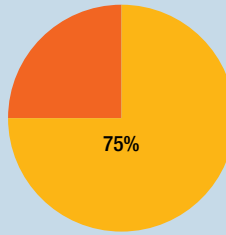
- This saves time to go, identify and turn-on the tripped breaker located in distribution board elsewhere.
- It also avoids any possible risk of operating circuit breakers in a live switchboard.



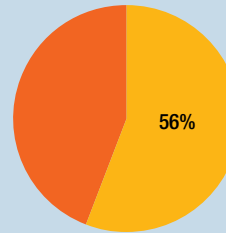
It's better to **PLAY SAFE** - and **STAY SAFE**.



Electric defaults are a major cause of fires. From 2010 to 2014, 7743 people died due to fires caused by electrical short circuit



According to a survey², approx 75% fire-related accidents in Mumbai are due to electrical defaults and short-circuit



56% of industrial fire accidents in India are caused by electrical faults.³

1. National Crime Records Bureau : Annual report on 'Accidental Deaths & Suicides in India'.
2. Fire Risk Survey (FRS) 2013, carried out by Pinkerton & Federation of Indian Chambers and Industry
3. Fire and Security Association of India (FSAI)

4. Peace of mind: Easy to 'test'

Residual current devices save lives and should be tested once a month to ensure they are working properly. Proximity and thus higher visibility of downstream RCDs means that one is likely to test (using the 'Test button') them more frequently and easily, thus always remaining sure of his safety.



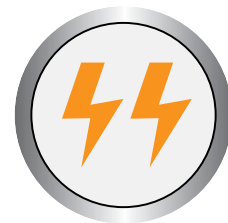
5. Best suited for unplanned additions

Downstream protection devices can be added to protect sensitive areas or appliances which were not provided for when designing mains electrical distribution board.



6. Protection From All Possible Hazards

Different devices are offered for different requirements: protecting human beings from electric shock hazards, protecting appliances from over-current and short circuit faults, or both.



7. Retro-fittable Plug-and-Play Solutions

Downstream socket protection devices are designed such that they can replace existing socket boards. Hence house owners of existing installations can also easily upgrade their electrical installation and get added built in protection of MCB/RCCB/RCBO.





◆ RCDs - DOWNSTREAM
RESIDUAL CURRENT DEVICES

Electricity is a ubiquitous energy agent and life without it is unimaginable. Many people know that the principal danger from electricity is that of electrocution, but few really understand how minute a quantity of electrical energy can be fatal. It is one of the most under-estimated cause of accidents in India.

Thus, Havells has designed a range of downstream residual current devices to protect people from electric shock due to direct or indirect contact with electricity. These are fast-trip safety devices which are easy to install and can also be easily fitted in place of existing switch boards.

Features:

- Provide protection from the risks of leakage current (life saving).
- All-in-one devices (SRCD DBOXx & HafeSafe SRCD), which also provide protection from overload & short circuit faults
- Manual reset and test button for safety checks.
- In case of fault it disconnects both line & neutral of output supply.

Range:

- HomeSafe SRCD
- SRCD DBOXx
- 2-Way SRCD
- 1-Way SRCD

Specification
IEC 62640



HomeSafe SRCD:

Havells HomeSafe SRCD is ready to use all-in-one device that provides protection to humans from electric shock due to direct or indirect contact as well as also provide protection from overload and short circuit. It is a one stop solution to protect appliances as well as humans operating it.

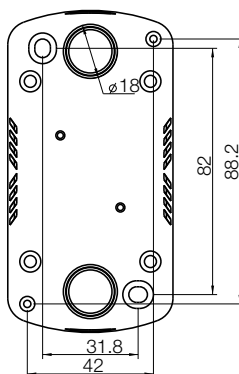
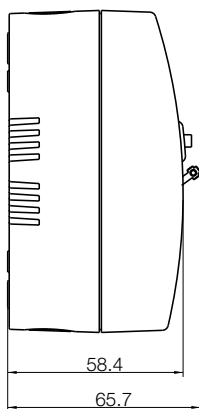
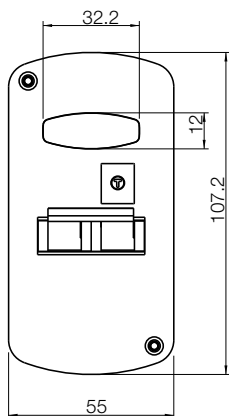
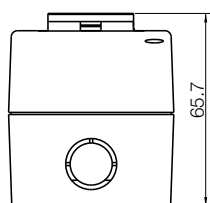
Applications:

Can be used as dedicated protecting device with appliances such as Water cooler, AC, Fridge, Geyser etc.

Features:

- Provide protection from the risks of leakage current (life saving).
- Protects appliances from possible fire hazard.
- Provide protection from overload & short circuit.
- Type A: Residual current faults of AC as well as pulsating DC
- Manual reset and test button for safety checks.
- In case of fault it disconnects both line & neutral of output supply.
- Red indicator shows when the device is ON.
- Finger touch proof (IP 20).

Dimensions (in mm)



LIFE SAVING DEVICE



Technical Specification:

Rated Current	16 A	20 A	25 A
Ref. Standard	IEC 62640	IEC 62640	IEC 62640
Rated Voltage	230 V	230 V	230 V
Rated Residual Current	30 mA	30 mA	30 mA
Tripping Curve	C	C	C
Rated Insulation Voltage	500 V	500 V	500 V
Rated Frequency	50 Hz	50 Hz	50 Hz
No. of Pole	SPN	SPN	SPN
Rated Short Circuit Capacity	3 kA	3 kA	3 kA
Rating	Description		Cat. Number
25 A	Havells SRCD WOCP HomeSafe		DHDPACSN2030025
20 A	Havells SRCD WOCP HomeSafe		DHDPACSN2030020
16 A	Havells SRCD WOCP HomeSafe		DHDPACSN2030016

SRCD DBOXx (Socket Residual Current Device):

Havells DBOXx SRCD is ready plug & play all-in-one device that provides protection to humans from electric shock due to direct or indirect contact as well as provides protection from overload and short circuit faults.

It is designed such that user can easily upgrade his installation by replacing existing socket boxes and get built-in protection.

Applications:

1. With Dedicated appliances such as Water cooler, AC, Fridge, Geyser etc.
2. Also can be used as a plug and play box in Kitchen, bathroom etc.

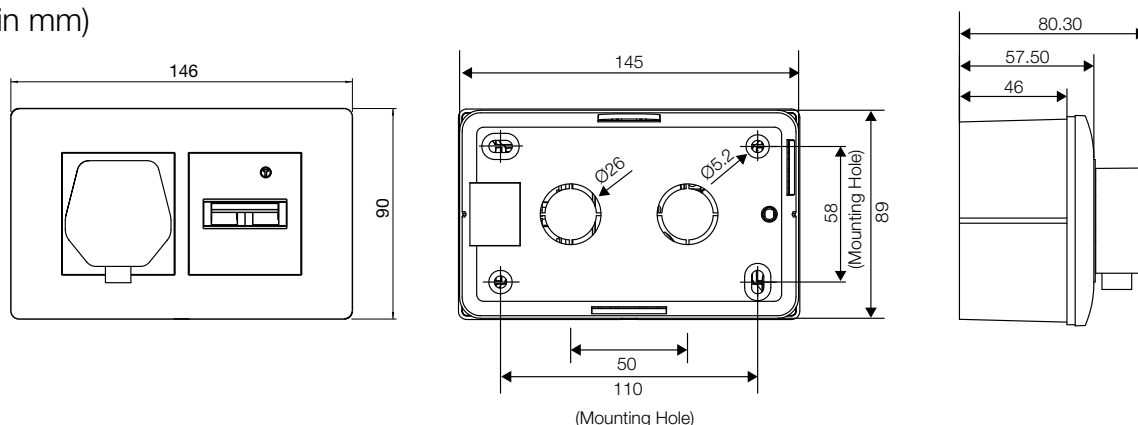
Features:

- Provide protection from the risks of leakage current (life saving).
- Protects appliances from possible fire hazard.
- Provide protection from overload & short circuit.
- Manual reset and test button for safety checks.
- Type A: Residual current faults of AC as well as pulsating DC
- Easy to fit in existing switch boards.
- In case of fault it disconnects both line & neutral of output supply.



LIFE SAVING DEVICE

Dimensions (in mm)



Technical Specification:

Rated Current	16 A	20 A	25 A
Ref. Standard	IEC 62640	IEC 62640	IEC 62640
Rated Voltage	230 V	230 V	230 V
Rated Residual Current	30 mA	30 mA	30 mA
Tripping Curve	C	C	C
Rated Insulation Voltage	500 V	500 V	500 V
Rated Frequency	50 Hz	50 Hz	50 Hz
No. of Pole	SPN	SPN	SPN
Rated Short Circuit Capacity	3 kA	3 kA	3 kA

Rating	Description	Cat. Number
DBOXX SRCD Protected Socket (With Steel Enclosure)		
16 A	Havells SRCD WOCP Dboxx Steel Encl	DHDDCDP0252016030
20 A	Havells SRCD WOCP Dboxx Steel Encl	DHDDCDP0252020030
25 A	Havells SRCD WOCP Dboxx Steel Encl	DHDDCDP0252025030
DBOXX SRCD Protected Socket (With Plastic Enclosure for surface mounting)		
16 A	Havells SRCD WOCP Dboxx Plastic box	DHDBCDP0252016030
20 A	Havells SRCD WOCP Dboxx Plastic box	DHDBCDP0252020030
25 A	Havells SRCD WOCP Dboxx Plastic box	DHDBCDP0252025030
DBOXX MCB Protected Socket (Without Enclosure)		
16 A	Havells SRCD WOCP Dboxx Plastic box	DHDACDP0252016030
20 A	Havells SRCD WOCP Dboxx Plastic box	DHDACDP0252020030
25 A	Havells SRCD WOCP Dboxx Plastic box	DHDACDP0252025030

2-Way SRCD (Socket Residual Current Device):



Havells 2-Way SRCD is ready plug & play device that provides protection to humans from electric shock due to direct or indirect contact.

It is designed such that user can easily upgrade his installation by replacing existing socket boxes and get built-in protection.

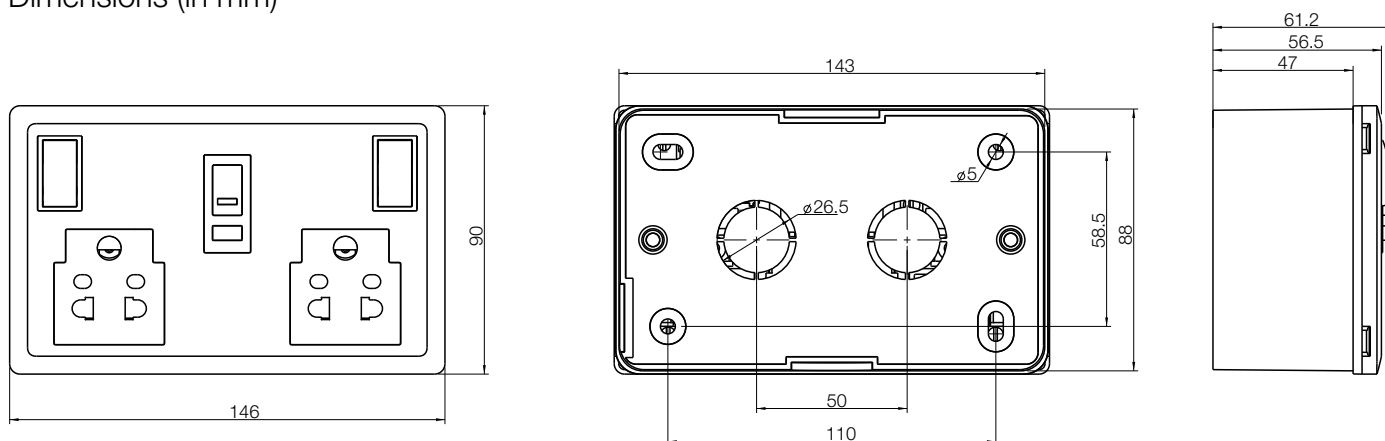
Applications:

1. With Dedicated appliances such as Washing machine, Water coolers, Fridge, Geyser etc.
2. Also can be used as a plug and play box in Kitchen, bathroom etc.

Features:

- Provide protection from the risks of leakage current (life saving).
- Type A: Residual current faults of AC as well as pulsating DC
- Manual reset and test button for safety checks.
- Easy to fit in existing switch boards.
- In case of fault it disconnects both line & neutral of output supply.
- Indicator light glows when the device is ON.

Dimensions (in mm)



Technical Specification:

Rated Current		6 A x 2/10 A x 2
Ref. Standard		IEC 62640
Rated Voltage		230 V
Rated Residual Current		30 mA
Rated Insulation Voltage		500 V
Rated Frequency		50 Hz
No. of Pole		SPN
Supply Indication		Yes

Rating	Description	Cat. Number
6 A x 2	Havells 2-Way SRCD	DHDEUTW0102006030
10 A x 2	Havells 2-Way SRCD	DHDEUTW0102010030

1-Way SRCD (Socket Residual Current Device):

Havells 1-Way SRCD is ready plug & play device that provides protection to humans from electric shock due to direct or indirect contact.

It is designed such that user can easily upgrade his installation by replacing existing socket boxes and get built-in protection.

Applications:

1. With Dedicated appliances such as Washing machine, Water coolers, Fridge, Geyser etc.
2. Also can be used as a plug and play box in Kitchen, bathroom etc.

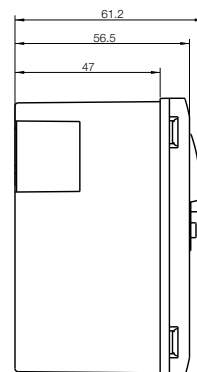
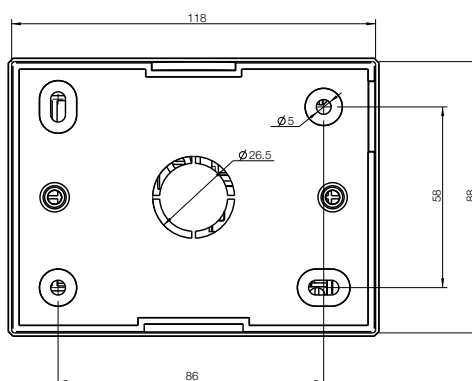
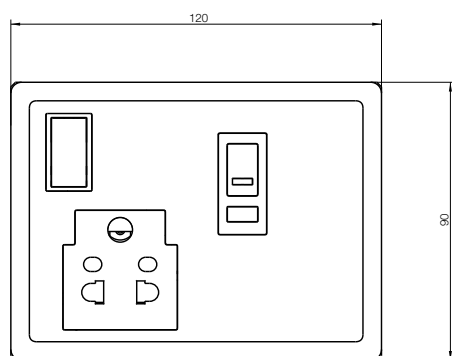
Features:

- Provide protection from the risks of leakage current (life saving).
- Type A: Residual current faults of AC as well as pulsating DC
- Manual reset and test button for safety checks.
- Easy to fit in existing switch boards.
- In case of fault it disconnects both line & neutral of output supply.
- Indicator light glows when the device is ON.



LIFE SAVING DEVICE

Dimensions (in mm)



Technical Specification:

Rated Current		6 A / 10 A
Ref. Standard		IEC 62640
Rated Voltage		230 V
Rated Residual Current		30 mA
Rated Insulation Voltage		500 V
Rated Frequency		50 Hz
No. of Pole		SPN
Supply Indication		Yes
Rating	Description	Cat. Number
6 A	Havells 1-Way SRCD	DHDEUSW0102006030
10 A	Havells 1-Way SRCD	DHDEUSW0102010030



◆ MCBs - DOWNSTREAM MINIATURE CIRCUIT BREAKER

Downstream miniature circuit breakers are an important part of new age domestic, commercial and industrial distribution systems. These devices fulfill the requirement of dedicated localized protection of valuable appliances. They are installed at the most downstream circuit, ensuring even higher degree of protection for discriminating applications.

Features

- Suitable for both DESB (Decorative Electrical Switch Board) & switch board
- Mini MCB offers protection in switchboard against overload and short-circuit with a short-circuit capacity 3 kA
- Reliability & Continuity of service
- Compact in size
- Low W loss thus cost effective and energy saving
- Longer electrical life
- Finger touch proof terminals (IP 20)

Range:

- HomeSafe MCB
- DBOXx MCB
- Plug & Socket Box
- Mini MCB/Isolator

Specification

IEC 60898-1



Separate the front plate from Mini MCB/ Mini Isolator by pulling off.



Screw mount its front plate on the switchboard.

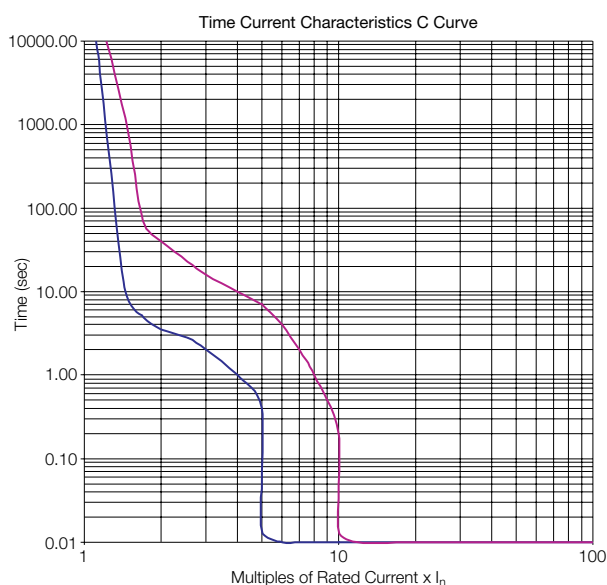


Connect the outgoing phase wire on upper terminal & tight it. Similarly connect the incoming phase wire on lower terminal & tight it.

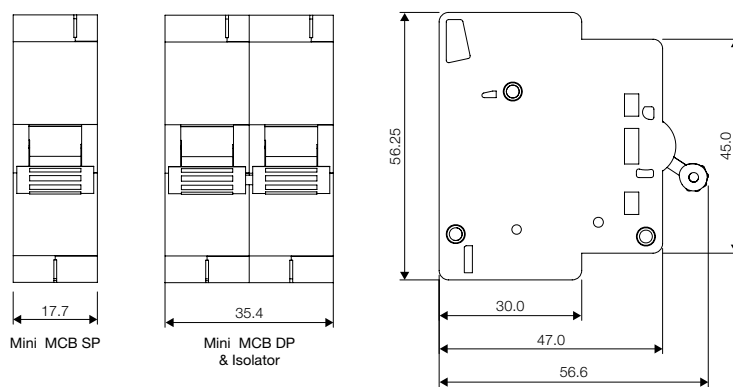


Push fit Mini MCB/ Mini Isolator onto the front plate. It is now successfully installed.

Technical Specification	Mini Single Pole MCB (1P)	Mini Double Pole MCB (2P)	Mini Double Pole Isolator (2P)
Reference	IS/IEC 60898-1	IS/IEC 60898-1	IS/IEC 60947-3
Rated Current I_n	6 A, 10 A, 16 A, 20 A, 25 A, 32 A	6 A, 10 A, 16 A, 20 A, 25 A, 32 A	40 A
Rated Voltage U_n	240 V~	240 V~/415 V~	240 V~/415 V~
Tripping Curve	C	C	-
Rated Insulation Voltage	500 V	500 V	500 V
Rated Frequency	50 Hz	50 Hz	50 Hz
No. of Pole	Single Pole	Two Pole	Two Pole
Rated Short Circuit Capacity I_{cn}	3 kA	3 kA	-
Conditional Short Circuit withstand Capacity	-	-	3 kA



Dimensions (in mm)



Mini MCB



Mini MCB SP / DP

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.	DP Cat. No.
6 A	6 N	DHMNCSPA006	DHMNCDDPA006
10 A	6 N	DHMNCSPA010	DHMNCDDPA010
16 A	6 N	DHMNCSPA016	DHMNCDDPA016
20 A	6 N	DHMNCSPA020	DHMNCDDPA020
25 A	6 N	DHMNCSPA025	DHMNCDDPA025
32 A	6 N	DHMNCSPA032	DHMNCDDPA032

Mini Isolator



Mini DP Isolator

Rating	Std. / Master Packing (No. of Unit/s)	DP Cat. No.
40 A	6 N	DHMNIDPX040

Mini MCB DP with Enclosure **HOME SAFE**



Havells launches HomeSafe a compact & aesthetic protection device which provides protection against overload & short circuit with help of MCB. It is designed for quick & easy installation.

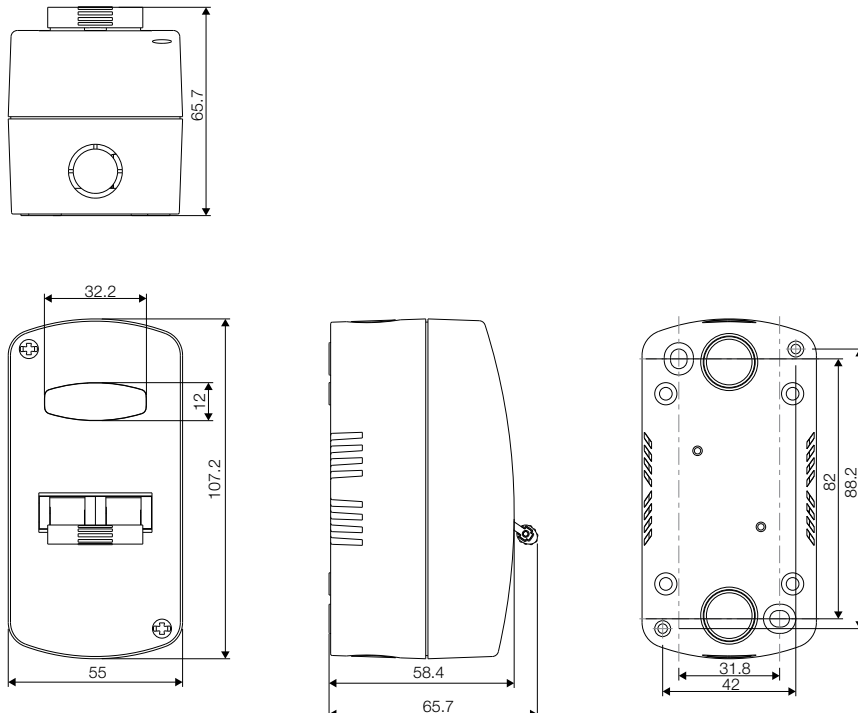
Features

- Appealing & Contemporary Aesthetics
- Compact & Space saving design
- Overload & Short Circuit Protection
- Proven MCB mechanism for longer life
- Easy to Operate & replace
- Completely insulated design
- Indication of Supply

Specification

Reference	:	IS/IEC: 60898-1
Rated Current In	:	32 A
Rated Voltage Un	:	240 Vac
Rated Insulation Voltage	:	500 Vac
Rated Frequency	:	50 Hz
No. of Poles	:	DP
Rated Short Circuit Capacity	:	3 kA
Degree of Protection	:	IP 20
Line / Load terminals	:	6 mm ²

Dimensions (in mm)



Mini MCB DP with Enclosure Home Safe

Rating	Description	Cat No.
32 A	DP C 32 A Mini MCB with Enclosure	DHMPCDPA032

DBOXx MCB Protected Socket



Range

MCB Protected Socket – 16 A, 20 A & 25 A

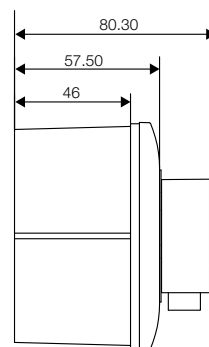
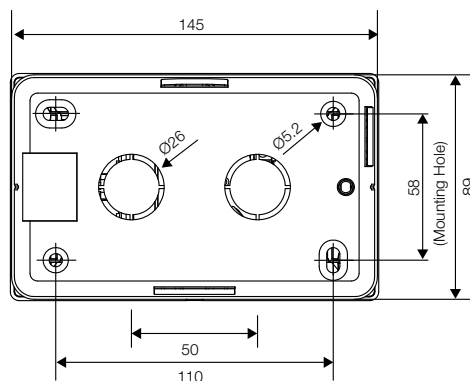
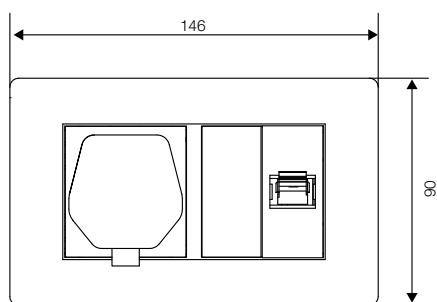
Specification

IS 13032 & IS 8623

Features

- Aesthetic appeal
- Ideal for local sectioning - Selectivity
- High quality contacts of single phase starter ensures reliability & long life during operations
- Built in MCBs protection, short circuit breaking capacity (3 kA)
- Suitable for protection of home appliances like ACs, LCD Geyser, Microwave & Computer etc.

Dimensions (in mm)



(Mounting Hole)

DBOXx MCB Protected Socket

No. of Ways	Cat. No.	Description
(With Sheet Steel Enclosure)		
16 A	DHDMCSN0251016	16 A MCB DBOXX COMBO
20 A	DHDMCSN0251020	20 A MCB DBOXX COMBO
25 A	DHDMCSN0251025	25 A MCB DBOXX COMBO
16 A	DHDMCDP0253016	16 A MCB DBOXX COMBO DP
20 A	DHDMCDP0253020	20 A MCB DBOXX COMBO DP
25 A	DHDMCDP0253025	25 A MCB DBOXX COMBO DP
With Plastic Enclosure (for surface mounting)		
16 A	DHDTCSN0251016	16 A MCB DBOXX COMBO Plastic
20 A	DHDTCSN0251020	20 A MCB DBOXX COMBO Plastic
25 A	DHDTCSN0251025	25 A MCB DBOXX COMBO Plastic
Without Enclosure		
16 A	DHDWCSN0251016	16 A MCB DBOXX COMBO W/O ENCL.
20 A	DHDWCSN0251020	20 A MCB DBOXX COMBO W/O ENCL.
25 A	DHDWCSN0251025	25 A MCB DBOXX COMBO W/O ENCL.
16 A	DHDWCM30251016	16 A MCB DBOXX COMBO 3M W/O ENCL.
20 A	DHDWCM30251020	20 A MCB DBOXX COMBO 3M W/O ENCL.
25 A	DHDWCM30251025	25 A MCB DBOXX COMBO 3M W/O ENCL.

DBOXx MCB Protected Power Unit



Range

DBOXx MCB Protected Power Unit

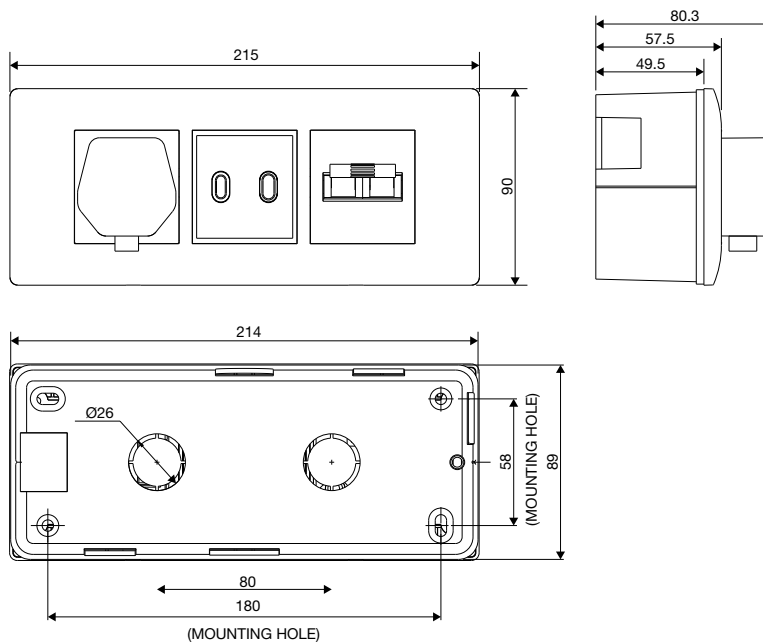
Specification

IS 13032 & IS 8623

Features

- Aesthetic appeal
- Ideal for local sectioning - Selectivity
- High quality contacts of single phase starter ensures reliability & long life during operations
- Built in MCBs protection, short circuit breaking capacity (3 kA)
- Suitable for protection of home appliances like ACs, LCD Geyser, Microwave & Computer etc.

Dimensions (in mm)



DBOXx MCB Protected Power Unit

Rating	Description	Cat. No.
16 A	16 A MCB Protected Power Unit	DHDUCDP0253016
20 A	20 A MCB Protected Power Unit	DHDUCDP0253020
25 A	25 A MCB Protected Power Unit	DHDUCDP0253025

HomeSafe PRCD: Plug & Adaptor

PRCD Plug is a modern human protection device. It provides socket level protection to human from electric shock by shutting off the appliance in case of detection of current leakage. User friendly plug easily fits with various appliances and ensures protection from electric shock.

PRCD Adaptor is a modern human protection device. It provides socket level protection to human from electric shock by shutting off the appliance in case of detection of current leakage. It can be easily plugged to various appliances.

Applications:

Can be used as dedicated protecting device with appliances such as Water cooler, AC, Fridge, Geyser etc.

Features: Plug

- 6 A/16 A power adaptor with inbuilt RCD.
- Shuttered socket for child safety
- Engineered Double pole switching
- Auto trip feature
- Indication for Power ON
- Manual reset provision to restore supply
- Built in TEST & RESET Buttons
- Compliance to IEC 61540
- Brass current carrying parts
- Compact size
- IP 40 protection

Features: Adaptor

- Engineered Double pole switching
- Auto trip feature
- Indication for Power ON
- Manual reset provision to restore supply
- Built in TEST & RESET Buttons
- Compliance to IEC 61540
- Screw guide for cable protection
- Brass current carrying parts
- Compact size
- IP 40 protection



Dimensions (in mm)

HomeSafe PRCD Plug & Adaptor

Description	Cat. No.	Description	Cat. No.
16 A 30 mA Euro II PRCD Plug	DHPLJWH016201603	16 A 30 mA Euro II PRCD Adaptor	DHPSJWH016201603

Plug & Socket



Range

SPN – 20 A SP, 20 A DP & 30 A TP

Color

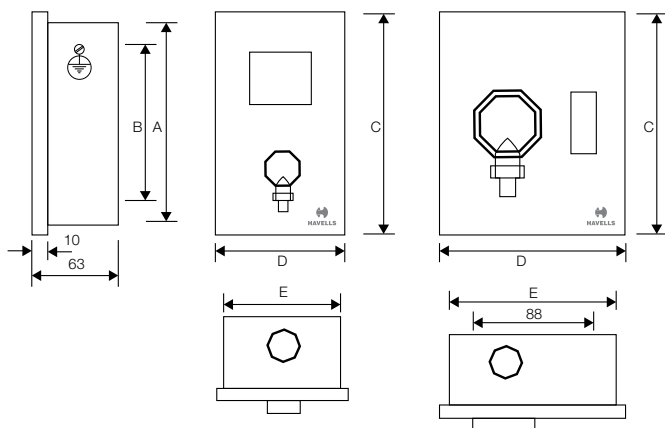
Regal Grey

Specification

IS 13032 & IS 8623

Features

- Compact DBs which occupy minimum space
- Suitable for surface mounting
- Suitable for the protection of application like ACs, Motors etc.



Dimensions (in mm)

No. of Ways	A	B	C	D	E	Top	Bottom	Sheet Thickness
20 A SP	152	116	167	139	124	2	2	1
20 A DP	152	116	167	139	124	2	2	1
30 A TP	278	230	293	129	114	1	1	1

Knockout Holes (Ø25)

Plug & Socket Boards

SPN enclosure with 2 Pole and Earth Metal Plug & Socket for incorporating 10 A / 20 A SPN / DP MCB		TPN enclosure with 3 Pole and Earth Metal Plug & Socket for Incorporating TP MCB	
Rating	Cat. No.	Rating	Cat. No.
20 A	DHDPUSN020 / DHDPUDP020	30 A	DHDPUTN030 / DHDPUTN030

DBOXx Plug & Socket DB



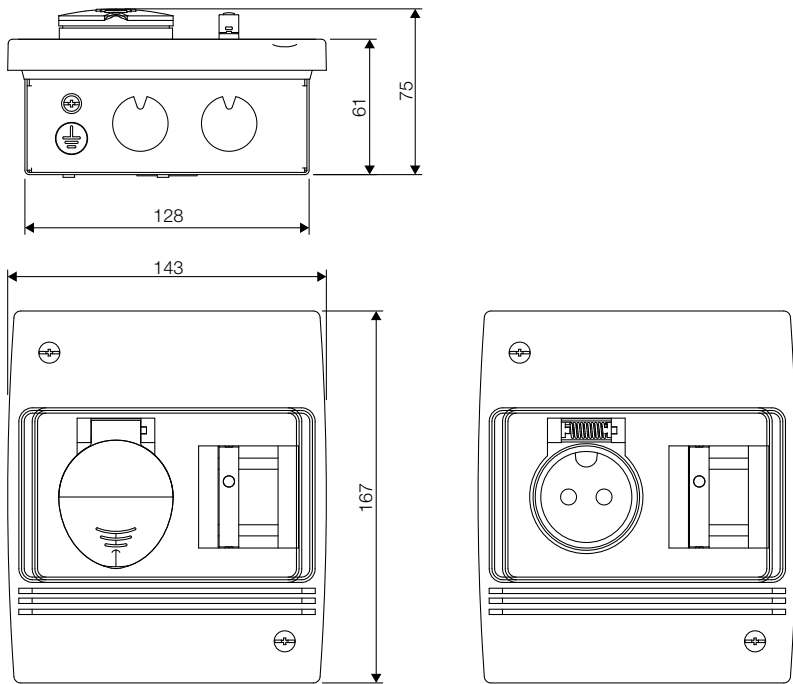
Applications

- Air Conditioner
- Refrigeration
- Motors
- Commercial Loads
- Test Equipment

Features

- Insulated Engineered plastic Cover prevents Electric Shock
- Auto-shut Spring loaded Shutter Cap
- Indicator for Power ON-OFF Indication
- Metal base for proper Earthing
- Din Mounted Shrouded Neutral
- Elegant Aesthetics
- Ample space for wiring
- Complete Din Mounting arrangement
- IP 42

Dimensions (in mm)



DBOXx Plug & Socket DB

Rating	Cat. No.	Description
20 A	DHDCUDP020	Plug & socket 20 A DP With Plastic Cover D
20 A	DHDCUSN020	Plug & socket 20 A SPN With Plastic Cover D

Plug & Socket Box with Plastic Plug



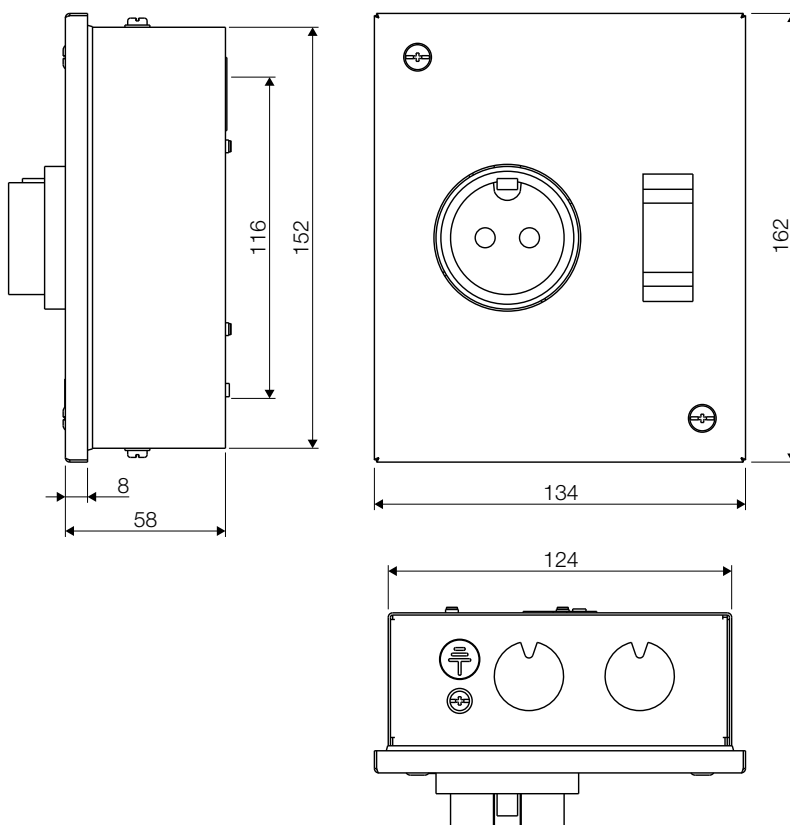
Applications

Air Conditioner
Refrigeration
Motors
Commercial Loads
Test Equipment

Features

- Insulated plastic plug & socket prevents Electric Shock
- Metal body for proper Earthing
- Din Mounted Shrouded Neutral
- Ample space for wiring
- Complete Din Mounting arrangement
- IP 40

Dimensions (in mm)



Plug & Socket Box with Plastic Plug

Rating	Cat. No.	Description
20 A	DHDPHDP020	Plug & socket 20 A DP With Plastic Plug
20 A	DHDPHSN020	Plug & socket 20 A SPN With Plastic Plug



◆ MCB ISOLATOR SWITCHING DEVICES

They are switch disconnectors with independent manual operation, capable of making, carrying and breaking currents under normal circuit conditions, which may includes operating under overload condition and also carry currents under specified abnormal circuit conditions such as those of short circuit for a specified time.

Features

- Low W Loss
- Longer Electrical Life
- Wide Range
- Value for Money
- Low power consumption, thus cost effective & energy saving
- Dual termination for simultaneous connection of bus-bars and wires.
- CE and RoHS Complaint. 'Green Product'

Range

40 A-63 A
80 A-125 A

Specification

IS/IEC 60947-3

Execution

Single Pole (1P)
Double Pole (2P)
Three Pole (3P)
Four Pole (4P)



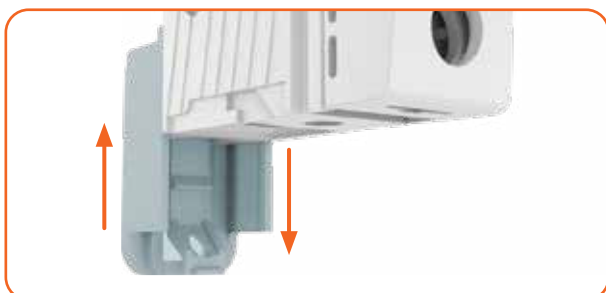
Safety Terminals

To avoid improper cable termination, the safety terminals guide the cable towards the cage terminal for systematic termination



Large Cable Terminals

Suitable for copper and aluminum cables, these terminals are compatible with cables having cross-section area upto 35 mm² (below 63 A) and upto 50 mm² (80 A-125 A)



Bi Stable Clip

Every device is provided with a dual position DIN rail clip, so it becomes much easier to change a device from a device bank connected to a bus-bar, without disturbing the existing wiring



Cooler Operation

Grooves provided on outer body, so that when individual poles are placed adjacent to each other in a distribution board it forms a very effective channel for better air circulation, resulting into a cooler operation

Technical Specification		
Standard Conformity	IS / IEC 60947-3	
Rated Current (In)	40 A - 63 A & 80 A - 125 A	
Rated Voltage (Ue)	240 V~/415 V~	
Rated Frequency (f)	50 Hz	
No. of Poles (Execution)	1P, 2P, 3P, 4P	
Utilization Category	AC 22 A	
Rated Insulation Voltage (Ui)	690 V	
Rated Impulse Voltage (Uimp)	4 kV	
Electrical / Mechanical Endurance	(No. of operations)	10000
Ambient Temperature	-5 °C to +55 °C	
Terminal Capacity (Max)	35 mm ² upto 63 A & 50 mm ² for 80 A-125 A	
Vibration	5 g	
Shock Resistance	40 mm free fall	
Protection Class	IP-20	
Installation Position	Vertical / Horizontal	
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	
Case & Cover	Molded, flame retardant thermoplastic material	

MCB Isolator



SP MCB Isolator (Switching Devices)

MCB Isolators (AC-22 A, In accordance with IS/IEC 60947-3) 240 V, 50 Hz

Rating	Std. / Master Packing (No. of Unit/s)	SP Cat. No.
40 A	12 N	DHMGISPX040
63 A	12 N	DHMGISPX063



DP MCB Isolator (Switching Devices)

MCB Isolators (AC-22 A, In accordance with IS/IEC 60947-3) 240 V/415 V, 50 Hz

Rating	Std. / Master Packing (No. of Unit/s)	DP Cat. No.
40 A	6 N	DHMGIDPX040
63 A	6 N	DHMGIDPX063
80 A	6 N	DHMGIDPX080
100 A	6 N	DHMGIDPX100
125 A	6 N	DHMGIDPX125



TP MCB ISOLATOR (Switching Devices)

MCB Isolators (AC-22 A, In accordance with IS/IEC 60947-3) 240 V/415 V, 50 Hz

Rating	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
40 A	4 N	DHMGITPX040
63 A	4 N	DHMGITPX063
80 A	4 N	DHMGITPX080
100 A	4 N	DHMGITPX100
125 A	4 N	DHMGITPX125

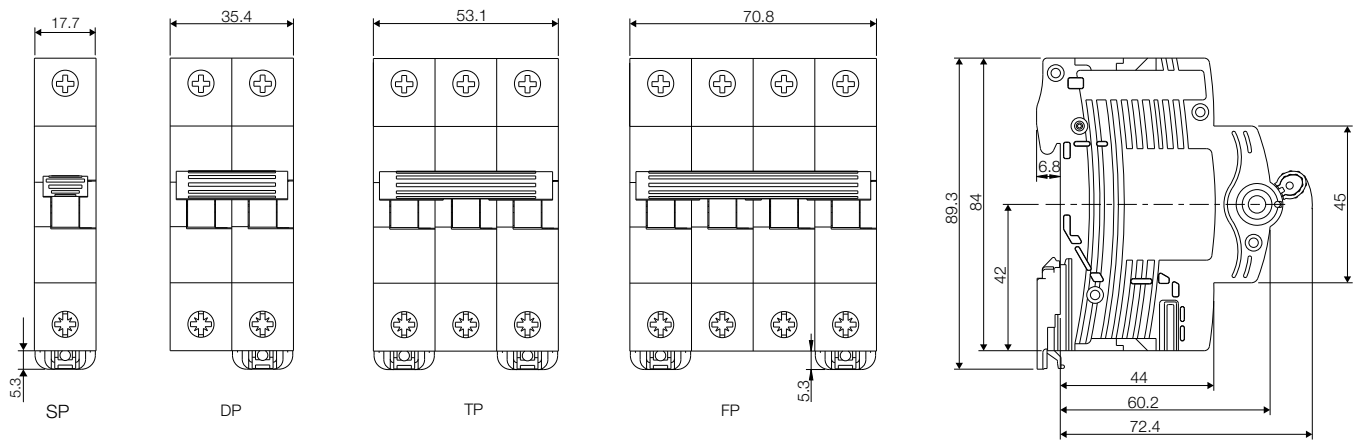


FP MCB ISOLATOR (Switching Devices)

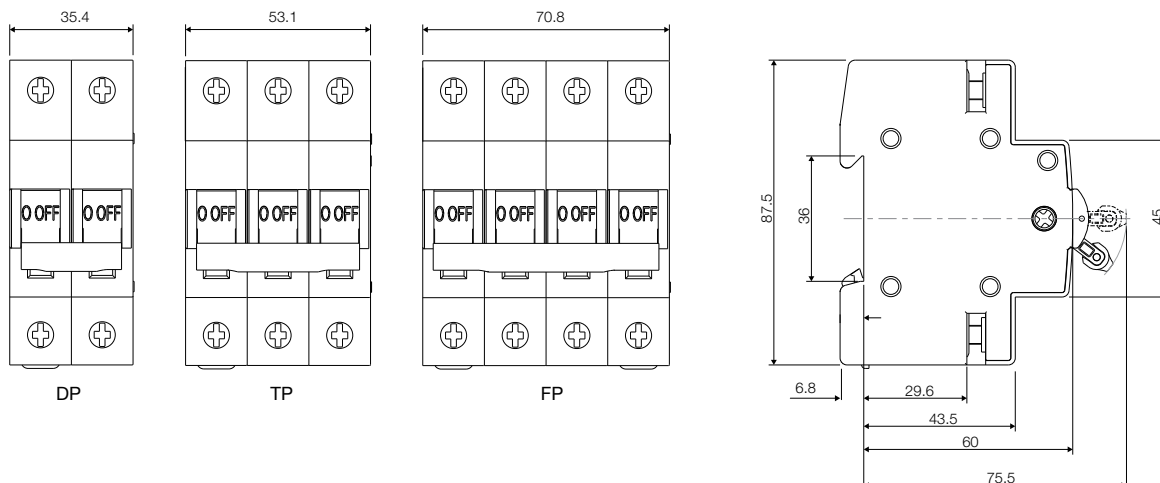
MCB Isolators (AC-22 A, In accordance with IS/IEC 60947-3) 240 V/415 V, 50 Hz

Rating	Std. / Master Packing (No. of Unit/s)	FP Cat. No.
40 A	3 N	DHMGIFPX040
63 A	3 N	DHMGIFPX063
80 A	3 N	DHMGIFPX080
100 A	3 N	DHMGIFPX100
125 A	3 N	DHMGIFPX125

Dimensions (in mm) for 40 A & 63 A



Dimensions (in mm) for 80 A, 100 A & 125 A





◆ MCB CHANGEOVER

MCB Changeover switch finds wide & varied applications in industries as well as in domestic sphere for use in low voltage distribution circuits, wherever continuity of supply is necessary, for switching to an alternate source of supply from main supply and vice - versa.

Features

- Compact construction
- Double break contacts
- Silver cadmium oxide contact tips
- Shrouded terminals
- Can be mounted with other products viz. MCB, RCCBs, Isolator in Distribution Board
- CE and RoHS Compliant. 'Green Product'

Range

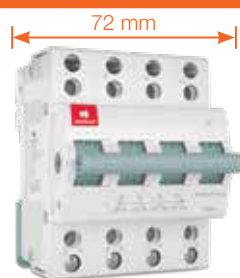
25 A, 40 A & 63 A

Execution

Double Pole (2P), Four Pole (4P)

Specification

IS/IEC 60947-3



Compact Size

Optimized space in the distribution board.



Center Position OFF

Front operation with three stable positions I-O-II, where center position is OFF.



Large Cable Terminals

Suitable for copper and aluminum cables, these terminals are compatible with cables 10 mm² upto 40 A/ 25 mm² for 63 A cross section area



Cooler Operation

Grooves provided on outer body, which form an effective channel for better air circulation, resulting into a cooler operation

Construction

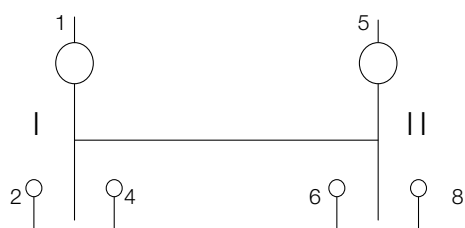
The entire switching mechanism along with the fixed and moving contact assembly are housed in FR thermo plastic moulded case / cover, having high dielectric strength, excellent mechanical & thermal properties.

The switching mechanism is double break type. The contacts tips are made of Silver Cadmium oxide for long electrical life, sustained current carrying capacity and they ensure temperature rise is within specified limits.

Technical Specification		
Standard Conformity		IS/IEC 60947-3
No. of Poles (Execution)		2 Pole, 4 Pole
Rated Current (In)		25 A, 40 A, 63 A
Rated Voltage (Ue)		240 V~/415 V~
Rated Frequency		50 Hz
Rated Insulation Voltage		690 V
Dielectric Strength		2.5 kV
Rated Impulse Voltage		4 kV
Utilization Category		AC 21 A
Ambient Temp.		-5 °C to +55 °C
Mechanical Life	(No. of operations)	10000
Electrical Life	(No. of operations)	10000
Mounting		Clip on DIN Rail (35 mm x 7.5 mm)
Mounting Position		Vertical / Horizontal
Terminal Capacity 25 A & 40 A		10 mm ²
Terminal Capacity 63 A		25 mm ²
Weight	Double Pole 40 A	134 g
Weight	Four Pole 40 A	268 g
Weight	Double Pole 63 A	156 g
Weight	Four Pole 63 A	314 g

Connection Diagrams / Terminal Marking

Two Pole



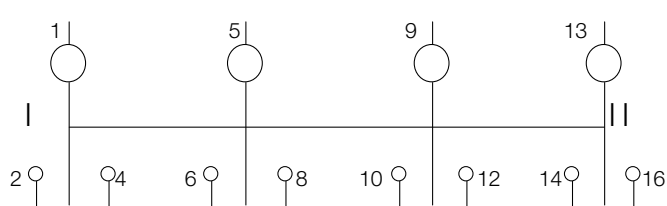
"I" - Incoming terminals (main supply) - 2 & 6

"II" - Incoming terminals (standby supply) - 4 & 8

Outgoing terminals (to load) - 1 & 5

*Mid position of knob is 'OFF' position

Four Pole



"I" - Incoming terminals (main supply) - 2 , 6, 10 & 14

"II" - Incoming terminals (standby supply) - 4 , 8, 12 & 16

Outgoing terminals (to load) - 1, 5, 9 & 13

*Mid position of knob is 'OFF' position

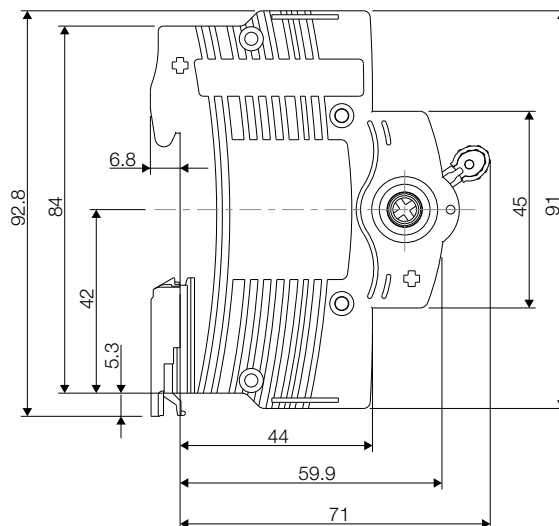
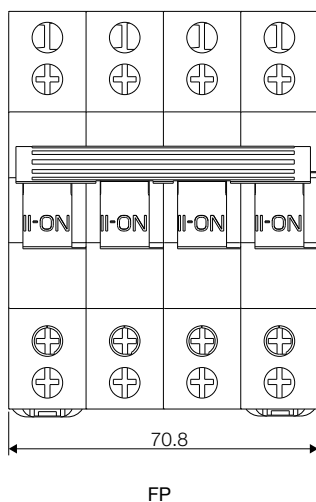
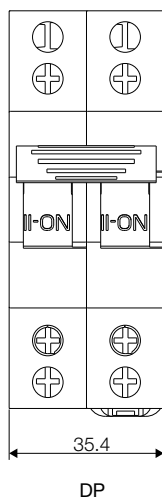
MBC Changeover



Two Way Centre Off MCB Changeover
For Dual Electricity Supply Management (In accordance with IS/IEC 60947-3)

Rating	DP Cat. No.	FP Cat. No.
25 A	DHMGODPX025	DHMGOFPX025
40 A	DHMGODPX040	DHMGOFPX040
63 A	DHMGODPX063	DHMGOFPX063

Dimensions (in mm)





◆ AUTOMATIC SOURCE CHANGEOVER DEVICES

The power instability in developing countries along with changing modern lifestyle creates a need for alternative power sources such as gen-sets to back-up the utility supply. Most residential and commercial complexes today go for automatic solutions to meet 24 x 7 power.

Havells offers its wide range of modular and compact Automatic Changeover solutions to meet the ever-changing requirements. These devices overcome the disadvantages of manual changeovers such as increased downtime, disruption in key activities as well as possible damage of expensive equipment, human error, accidents etc. In addition, ACCL devices also offer current limiting function, thereby ensuring proper rationalization of generator power between multiple users.

With these inherent strengths along-with a host of user-friendly features, Havells Automatic Changeover devices have proven to be strong and effective power distribution management tools for all sectors.

Features for ACCL

- Automatic Changeover between Mains and Generator supply
- Current limiting function on Generator side
- Provision of automatic reset*
- Operational Status Indication through LEDs
- Consumes less power
- Easy maintenance
- Microcontroller based design
- Provision of auto/manual mode (TPN ACCL)

*Available in basic version

Range

Mains 40 A/63 A/80 A, Gen 10 A-80 A (TPN)
Mains 30 A/Gen 1.5 A to 20 A (SPN)
Mains 30 A/Gen 30 A (Automatic Changeover)

Execution

Three Pole with Neutral (TPN)
Single Pole with Neutral (SPN)

Specification

IEC 60947-6-1



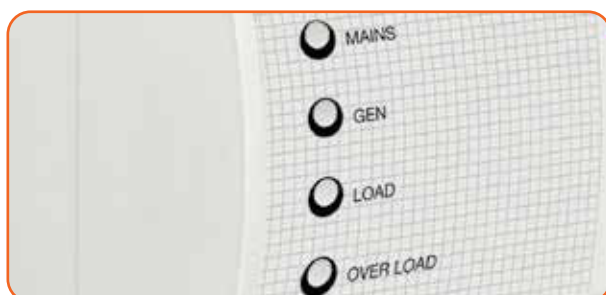
Reset Button

Manual reset provision for restoring supply, when in sleep mode



Mountable in Distribution Boards

Modular design - easy to mount in distribution boards



LEDs Indication

Operational Status Indication through LEDs- Main ON, Genset ON, Genset Overload etc.



Cable Terminals

Staggered terminal design with bottom wiring for better isolation between phase & neutral

SPN ACCL

Havells offers SPN ACCL for single phase systems - fully automatic high precision microcontroller based source changeover devices which also have current limiting function and offer easy and 'controllable' changeover between main power supply and generator supply. They are ideally suited for efficient utilization of standby generator used in multi-storied apartments, commercial complexes etc.

They are available in two versions – Basic and Premium to meet the varying needs of commercial/ residential installations.



Premium SPN ACCL

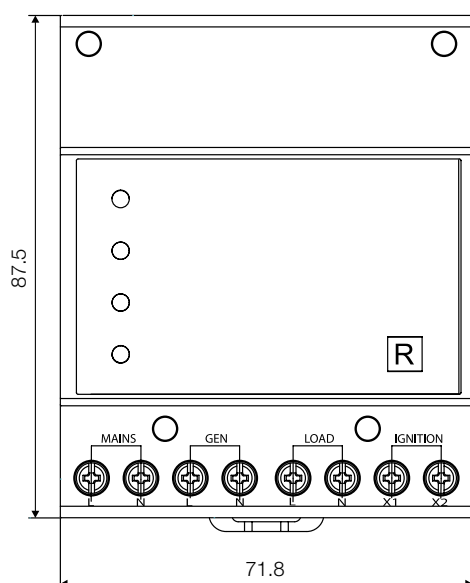


SPN ACCL 3 Module (basic)

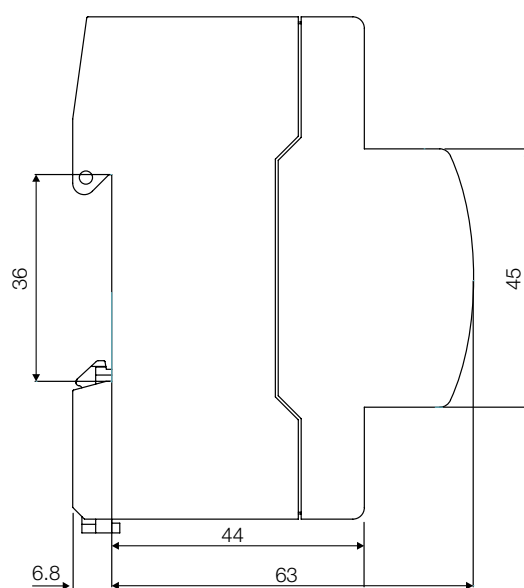
Features		Havells Premium SPN ACCL		Havells 3 Module SPN ACCL		Other Competitor Products
OFF loadChangeover	✓	First Load is disconnected then changeover to other supply takes place, ensuring the isolation of two power supplies hence there is no chance of short circuiting between them.	✓	ON Load Changeover	✓	ON Load Changeover
Zero Crossing Detection Technology	✓	Relay changeover takes place during zero crossing mark of the sinusoidal AC supply. Which reduces the danger of Transient surges and Increases life of relay.	✗	Can takes place on peak of sinusoidal AC supply which may result in harsh effect of Transient surges and decrease in life of relay.	✗	Can takes place on peak of sinusoidal AC supply which may result in harsh effect of Transient surges and decrease in life of relay.
Advance Neutral	✓	First Neutral makes and last neutral breaks	✗	Neutral makes and break with phase.	✗	Neutral makes and break with phase.
Terminal for external conductors	✓	Indirect pressure type terminals	✓	Indirect pressure type terminals	✗	Direct Pressure type
Bottom Wiring	✓	Yes	✓	Yes	✗	No
Staggered Wiring	✓	Provides better isolation between phase and neutral	✓	Provides better isolation between phase and neutral	✗	Not Available
Conditional Shortcircuit current	✓	3 kA	✓	3 kA	✗	Not Mentioned
Eco friendly housing	✓	Thermoplastic, PA6 FR grade	✓	Thermoplastic, PA6 FR grade	✓	Thermoplastic
Local reset facility	✓	Reset button Provided, for restoring supply	✗	Not Provided	✗	Not Provided
Overload indication facility	✓	Seperate LED for Overload condition	✓	Generator LED blinks to show overload condition	✗	Not Provided
Standard conformity	✓	IEC 60947 –6-1	✓	IEC 60947 –6-1	✗	No marking on product
Rated impulse voltage	✓	2.5 kV	✓	2.5 kV	✗	Not mentioned
Operational voltage	✓	80-300 Vac	✓	150-270 Vac	✓	180-240 Vac
Pre trip indication in overload condition	✓	Provided	✗	Not Provided	✗	Not Provided
Compact design	✓	87.5 mm × 71.8 mm × 63 mm	✓	87.5 mm × 53.1 mm × 63 mm	✓	108 mm × 72 mm × 68 mm

Technical Specification	Premium SPN ACCL	SPN ACCL 3 Module
Standard Conformity	IEC 60947-6-1	IEC 60947-6-1
No. of Poles	1P+N	1P+N
Rated current (In)	30 A on mains, 1.5-20 A on generator	30 A on mains, 1.5-20 A on generator
Rated voltage (Ue)	240 V~	240 V~
Rated frequency	50 Hz	50 Hz
Rated insulation voltage	500 V	500 V
Transfer time	8 s-12 s	8 s-12 s
Restoring time	2 s-4 s	0 s-2 s
Utilization category	AC 31 A	AC 31 A
Class of equipment	PC	PC
Environment	B	B
Indication	Mains, Generator, Load, Overload	Mains, Generator, Overload
Ambient temp.	-5 °C to +55 °C	-5 °C to +55 °C
Electrical life (No. of operations)	6000	6000
Rated impulse voltage	2.5 kV	2.5 kV
Duty	Uninterrupted	Uninterrupted
Pollution degree	2	2
Conditional short circuit current (Isc)	3 kA	3 kA
Protection class	IP20	IP20
Mounting	standard mounting RAIL (35 mm x 7.5 mm)	standard mounting RAIL (35 mm x 7.5 mm)
Mounting position	Vertical /Horizontal	Vertical /Horizontal
Terminal Capacity	10 mm ²	10 mm ²
Weight	350 g	350 g

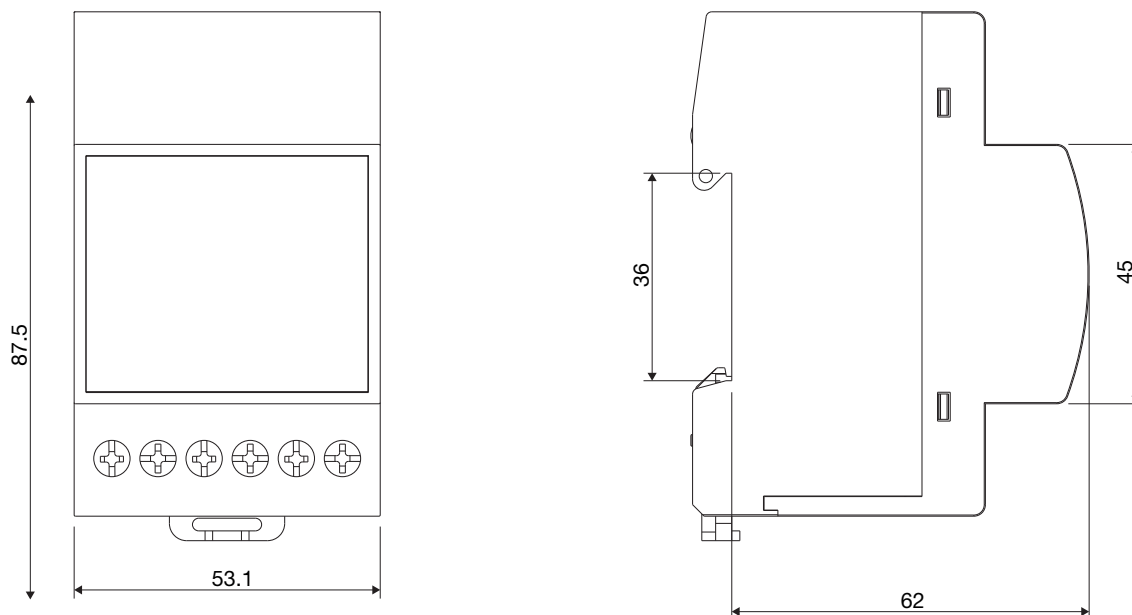
Dimensions (in mm) - Premium SPN ACCL



Front view



Side view

Dimensions (in mm) - SPN ACCL 3 Module (basic)**PREMIUM SPN ACCL****PREMIUM SPN ACCL**

Gen Rating	Description	Cat. No. w/o GEN Start/Stop	Cat. No. with GEN Start/Stop
SPN 1.5 (300 W)	30 A/1.5 A ACCL	DHABOSN301X	–
SPN 2.5 (500 W)	30 A/2.5 A ACCL	DHABOSN302X	–
SPN 3 (600 W)	30 A/03 A ACCL	DHABOSN3003	DHABWSN3003
SPN 4 (800 W)	30 A/4 A ACCL	DHABOSN3004	–
SPN 5 (1000 W)	30 A/5 A ACCL	DHABOSN3005	–
SPN 6 (1200 W)	30 A/06 A ACCL	DHABOSN3006	DHABWSN3006
SPN 9 (1800 W)	30 A/09 A ACCL	DHABOSN3009	DHABWSN3009
SPN 12 (2400 W)	30 A/12 A ACCL	DHABOSN3012	DHABWSN3012
SPN 15 (3000 W)	30 A/15 A ACCL	DHABOSN3015	DHABWSN3015
SPN 20 4000 W)	30 A/20 A ACCL	DHABOSN3020	DHABWSN3020

SPN ACCL**SPN ACCL (3 Module)**

Mains Rating	Gen Rating	Product Code	Description
SPN 30 (6000 W)	SPN 1.5 (300 W)	DHADOSN301X	30 A/1.5 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 2.5 (500 W)	DHADOSN302X	30 A/2.5 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 3 (600 W)	DHADOSN3003	30 A/03 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 4 (800 W)	DHADOSN3004	30 A/4 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 5 (1000 W)	DHADOSN3005	30 A/5 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 6 (1200 W)	DHADOSN3006	30 A/06 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 9 (1800 W)	DHADOSN3009	30 A/09 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 12 (2400 W)	DHADOSN3012	30 A/12 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 15 (3000 W)	DHADOSN3015	30 A/15 A ACCL W/O GEN START/STOP
SPN 30 (6000 W)	SPN 20 (4000 W)	DHADOSN3020	30 A/20 A ACCL W/O GEN START/STOP

TPN ACCL

Havells offers TPN ACCL for three phase systems - fully automatic high precision microcontroller based source changeover devices which also have current limiting function and offer easy and 'controllable' changeover between main power supply and generator supply. They are ideally suited for efficient utilization of standby generator used in multi-storied apartments, commercial complexes etc.



FUNCTIONS

1. When mains supply is available

The device will run the load on mains supply if the R phase is available irrespective of the availability of all other phases. It is recommended to connect the entire essential load to R phase.

2. When mains supply fails

If mains supply goes off (detected by R phase), the device will automatically sense and actuate the inbuilt changeover mechanism to the generator supply. This takes 8-12 seconds so as to avoid sudden loading on generator. TPN ACCL also allows user to opt for manual mode for manual transfer of load to gen-set

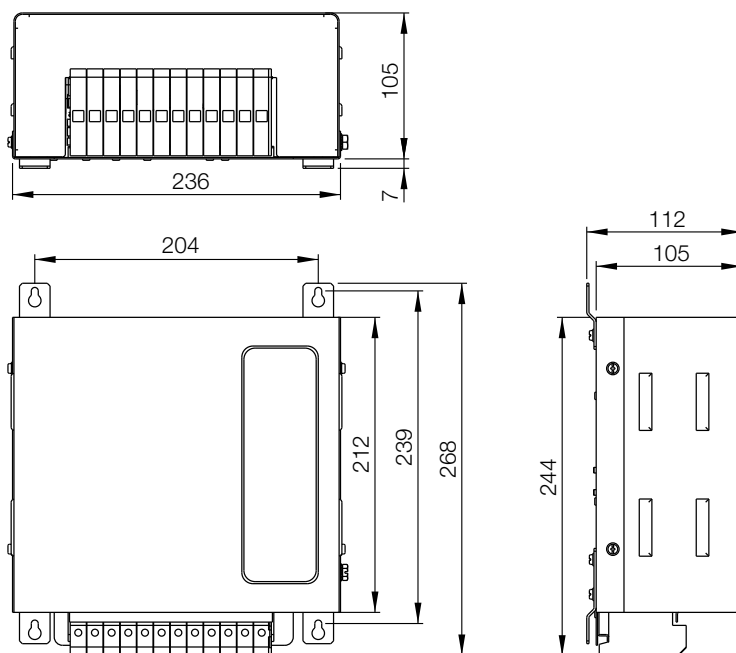
Current Limiting feature on Generator side: If load current exceeds the preset allowable limit, then Overload LED will start glowing, but load will remain connected for 5 seconds to ignore the surge current. But if load still persists beyond the preset limit, it is disconnected for 8 seconds as a warning and then automatically reconnected. Such cycle of interruptions continue for a number of times during which the user is expected to switch off nonessential loads.

3. When mains supply restores

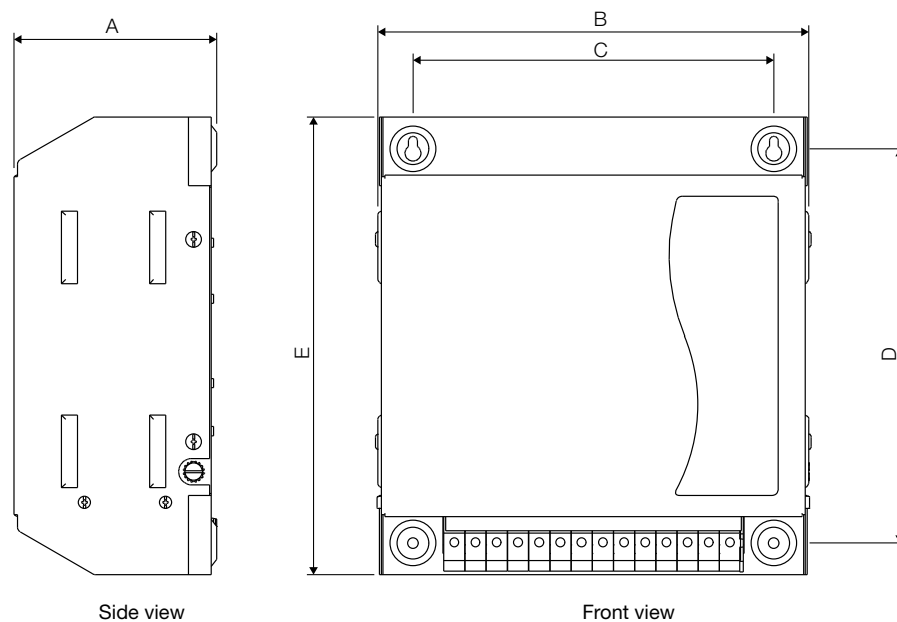
On resumption of mains, the load is automatically transferred to main supply after a time delay of 2-4 seconds.

Parameters	TPN ACCL (TPN ACCL in Sheet metal)	
Automatic Changeover	✓	
Overload Protection on Gen side	✓	
Range	Mains	Gen
	TPN 63 A	TPN/SPN 2.5 A-50 A
	TPN 40 A	TPN/SPN 2.5 A-40 A
Dimensions	(268 mm x 236 mm x 112 mm) for 40 A TPN ACCL (260 mm x 243 mm x 150 mm) for 63 A TPN ACCL	
Mode selection	✓	
Local reset facility	Required, as ACCL goes into the sleep mode after 5 cycles of interruption	
Indications	Mains, Gen, Load, Overload on R, Y and B phase, Auto/manual mode through membrane keypad	
Mounting	Surface mounted	
Housing	Sheet metal	

Technical Specification	TPN ACCL
Standard Conformity	IEC 60947-6-1
No. of Poles	3P+N
Rated current (In)	40 A/63 A/80 A on mains, 10 A-63 A on gen
Rated voltage (Ue)	415 V~/220 V~
Rated frequency	50 Hz
Transfer time	8 s-12 s
Restoring time	2 s-4 s
Utilization category	AC 31 A
Class of equipment	PC
Environment	B
Indication	Mains, Generator, Load, Overload (R,Y,B), mode of operation (auto/manual)
Ambient temp.	-5 °C to +55 °C
Electrical life (No. of operations)	6000
Rated impulse voltage	6 kV
Duty	Uninterrupted
Pollution degree	2
Conditional short circuit current (Inc)	5 kA
Protection class	IP 20
Mounting	surface mounting
Mounting position	Vertical
Terminal Capacity	16 mm ² /35 mm ²
Weight	4.5 kg/9.4 kg

Dimensions (in mm) - TPN ACCL

For Gen rating upto 40 A & mains rating upto 63 A ACCL



For Gen rating above 63 A & mains rating above 80 A ACCL

Gen Rating	A	B	C	D	E
63 A TPN ACCL	150	243	205	224	260
80 A TPN ACCL	150	333	293	337	383

TPN ACCL



TPN ACCL (TPN/SPN)
(Automatic Source Changeover with Current Limiter)

Main Rating	Gen Rating	Cat. No.
40 A	30 A	DHACOTN4030
63 A	30 A	DHACOTN6330
63 A	40 A	DHACOTN6340



TPN ACCL (TPN/TPN)
(Automatic Source Changeover with Current Limiter)

Main Rating	Gen Rating	Cat. No.
40 A	30 A	DHACOTT4030
40 A	40 A	DHACOTT4040
63 A	40 A	DHACOTT6340
63 A	63 A	DHACOTT6363
80 A	63 A	DHACOTT8063
80 A	80 A	DHACOTT8080

Automatic Changeover

Havells Automatic Changeover is a fully automatic high precision microcontroller based device and is ideally suited for unmanned power transfer operations between two sources in bungalows, multi storied apartments, commercial complexes, etc.



30 A Automatic Changeover



63 A Automatic Changeover

Functions

1. When the Mains Supply is available:

- Load is connected to mains supply after time delay of 1 to 2 seconds (63 A) / 2 to 4 seconds (30 A) allows to draw full load current.

2. When the Mains supply fails:

(a) With AGS (automatic generator stop features)

- When the mains supply goes off i.e. fails, automatic changeover will sense Gen supply and actuate the inbuilt changeover mechanism.
- A consumer is automatically connected to the Generator supply after a time delay of 6 to 12 seconds (63 A) / 12 to 15 seconds (30 A) in order to limit the sudden load on the Generator.

When the Mains supply is restored:

- On resumption of the mains supply, the load is automatically transferred to the main supply after a time delay of 1 to 2 seconds (63 A) / 2 to 4 seconds (30 A) and stop signal is sent to Gen.

(b) Without AGS (automatic generator stop features)

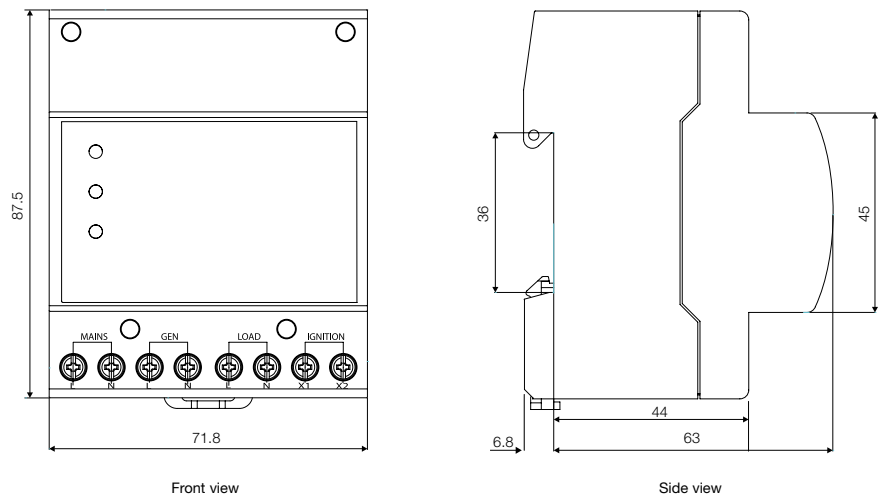
- When the mains supply goes off i.e. fails, automatic changeover will sense Gen supply and actuate the inbuilt changeover mechanism.
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When the Mains supply is restored:

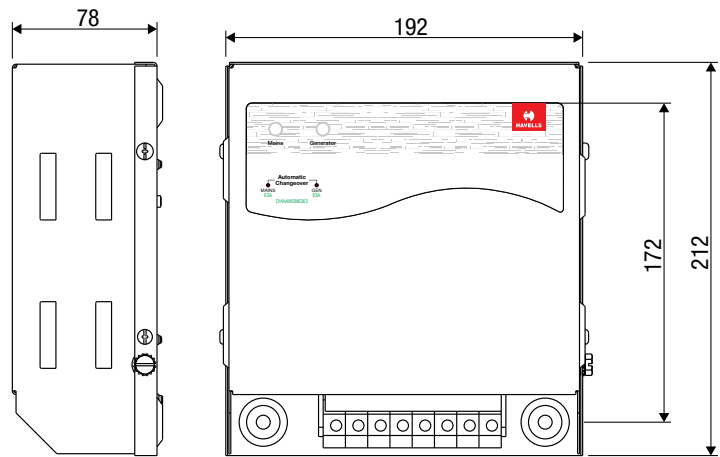
- On resumption of the mains supply, the load is automatically transferred to the main supply after a time delay of 1 to 2 seconds (63 A) / 2 to 4 seconds (30 A).

Technical Specification	30 A Automatic Changeover	63 A Automatic Changeover
Standard Conformity	IEC 60947-6-1	IEC 60947-6-1
No. of Poles	1P+N	1P+N
Rated current (In)	30 A	63 A
Rated voltage (Ue)	240 V~	240 V~
Rated frequency	50 Hz	50 Hz
Mains to Gen transfer time	12 s-15 s	6 s-12 s
Restoring time	2 s-4 s	1 s-2 s
Utilization category	AC 31 A	AC 31 A
Indication	Mains, Generator, Load	Mains, Generator, Load
Ambient temp.	-5 °C to +55 °C	-5 °C to +55 °C
Electrical life (No. of operations)	6000	6000
Rated impulse voltage	2.5 kV	2.5 kV
Rated insulation voltage	500 V	500 V
Conditional short circuit current (Inc)	3 kA	3 kA
Protection class	IP 20	IP 20
Mounting	din-rail (35 mm x 7.5 mm)	wall mounting
Mounting position	Vertical/Horizontal	Vertical/Horizontal
Terminal Capacity	10 mm ²	16 mm ²

Dimensions (in mm) - 30 A Automatic Changeover



Dimensions (in mm) - 63 A Automatic Changeover



Automatic Changeover



30 A Automatic Changeover

Gen Rating	Description	Cat. No. w/o GEN Start/Stop	Cat. No. with GEN Start/Stop
SPN 30 (6000 W)	SPN 30 (6000 W)	DHAAOSN3030	DHAAWSN3030



63 A Automatic Changeover

Gen Rating	Description	Cat. No. w/o GEN Start/Stop	Cat. No. with GEN Start/Stop
SPN 63 (6000 W)	SPN 63 (6000 W)	DHAAOSN6363	DHAAWSN6363



◆ TIME SWITCH

Havells introduces an advanced range of time switches. It is used in residential, commercial and industrial premises to improve comfort and save energy by switching loads automatically as per real time. The range offers a variety of feature benefits such as controlling the opening and closing of electrical circuits according to a scheduled program, minimum switching time, internal battery to enable the timing function in case of power failure along with daily, weekly and annual versions with simple and compact design. It will help in the optimization of energy. Once installed they can program a schedule for a limited period or permanently to help optimize how and when energy is used.

Features:

- Digital time switch with daily and weekly program
- Text-oriented user guidance in display
- 3 year power reserve (For multifunction time switch 10 year power reserve)
- Automatic summer/winter time changeover
- Preset date and time
- Holiday program
- Permanent switching ON/OFF for better user experience.
- Reset option
- Programmable in 5 languages

Range

- Multifunction Time Switch
- Digital Weekly Time Switch
- Astronomical + Digital Time Switch
- 24 Hours Analog Time switch
- Twilight Time Switch
- Staircase Time Switch



Large LCD Display

Easy snap on din-rail mounting



Protective Cover

For protecting the LCD from mechanical shocks & scratches



Manual Override Option

All time switches have the option to manually override the programming and permanently ON/OFF the circuit for emergent situations (without disturbing the pre-set program).

Technical Specification	
Operating Voltage	AC/DC 24 V-264 V
Program Functions	ON / OFF
Number of programs	80
Number of Channels	2
Max. Switching Capacity	4000 VA/AC
Frequency	50 Hz/60 Hz
Power consumption	2 W
Program	Weekly, annual, astronomical
Data readout	LCD display with backlight
Supply terminals	A1-A2
Power Reserve	10 years
Supply voltage tolerance	±10%
Operating modes	Manual, automatic, holiday, random
Summer/winter time	off, automatic changeover
Mechanical life	10 ⁶
Electrical life	10 ⁵
Rated insulation voltage	250 V
Wire size	1 mm ² -4 mm ²
Tightening torque	0.5 Nm
Mounting	DIN rail mounting
Dimensions	90 mm × 36 mm × 65 mm
Standard	IEC 60730-1/IEC 60730-2-7

Multi-function Time Switch

Multi-function time switch is for realization of time functions in the systems of automatics and steering. It calculates the sunrise and sunset time in the set geographic area and time zone, without the use of a photocell sensor. There is an internal battery which can protect real time clock and all the settings when the electric power supply is off.

Application

This dual channel time switch is mainly used in environments requiring management of multiple loads according to a scheduled program. It offers flexibility to program ON/OFF switching times based on the days of the week.

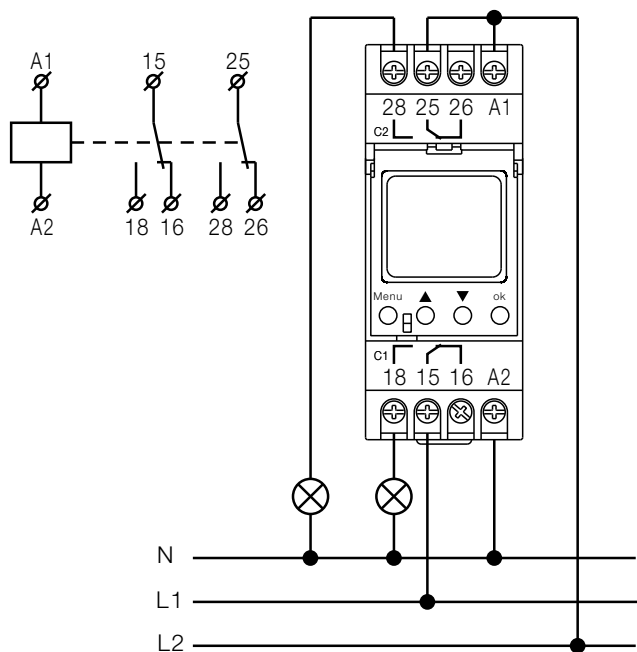
In this case the time switch enables the daily activation of the heating system at a preset time. So the geyser can be set ON from 6:00hrs to 6:30 hrs from MON to SUN. The lighting system can be set as per the user's requirement on different channel.

Features

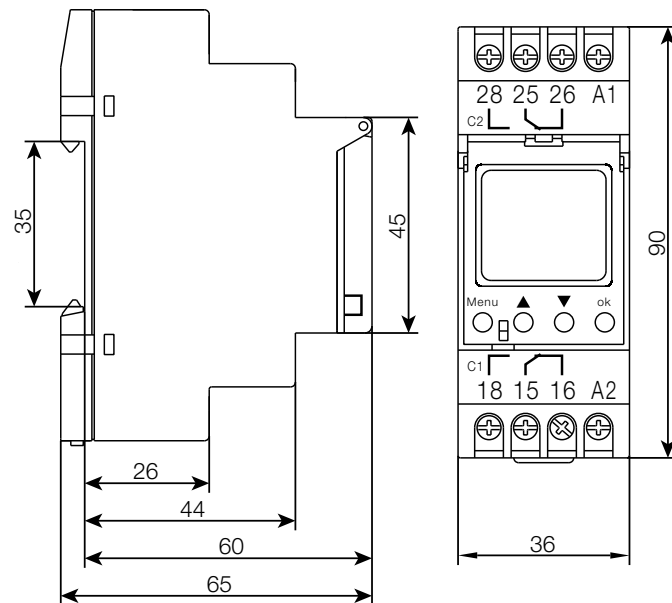
- Interactive LCD display for better user experience.
- Easy to program.
- Astronomical and digital daily/weekly/annually programming can be done.
- Battery backup of 10 years.
- Dual channel.
- ON-OFF switching times can be programmed.
- Different operating modes: Holiday, Random, Auto, Manual
- Permanent ON/Permanent OFF setting.
- DIN rail mountable.



Wiring Diagrams Multiple Load



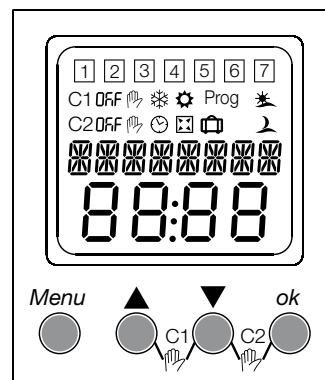
Dimension (in mm)



Maximum Pilotable Power

2300 W	2300 W	1000 W	500 W	500 W

Key Legend



Symbol legend

1 2 3 4 5 6 7	— Days of the week Monday, Tuesday, ...Sunday
C1	— Channel 1
C2	— Channel 2
OFF	— Relay status
☀	— Automatic mode
☾	— Manual mode
🏠	— Holiday mode
🎲	— Random mode
☀	— Sunrise
☾	— Sunset
❄	— Winter time
⚙	— Summer time
Prog	— Program setting

Time Switch

Multi-function Time Switch

Description	Cat. No.
Multi-function Time Switch	DHTLB01016

Technical Specification	
Supply terminals	A1-A2
Operating Voltage	220 Vac-240 Vac
Program Functions	ON/OFF
Number of programs	52
Number of Channels	1
Power Reserve	3 years
Max. Switching Capacity	2300 W
Frequency	50 Hz/60 Hz
Power consumption	1 W
Program	Weekly, daily
Data readout	LCD display
Supply voltage tolerance	±10%
Operating modes	Manual, automatic, holiday
Summer/winter time	off, automatic changeover
Mechanical life	10 ⁶
Electrical life	10 ⁵
Rated insulation voltage	250 V
Wire size	1 mm ² -4 mm ²
Tightening torque	0.5 Nm
Mounting	DIN rail mounting
Dimensions	90 mm × 36 mm × 65 mm
Standard	IEC 60730-1/IEC 60730-2-7

Digital Weekly Time Switch

The digital time switch is used for realization of time functions in the control systems and automation. It operates according to the set time schedule planned by the user. There is an internal battery which can protect real time clock and all the settings in case of electricity failure. Depending on the day of the week (Mon-Sun) different daily programs can be configured.

Application

It involves controlling loads such as heating, lighting and ventilation systems of residential or commercial places.

In this example the digital weekly time switch controls the operation of a lighting system in a workplace. It offers flexibility to program ON/OFF switching times based on the days of the week. So the lighting system can be set ON from

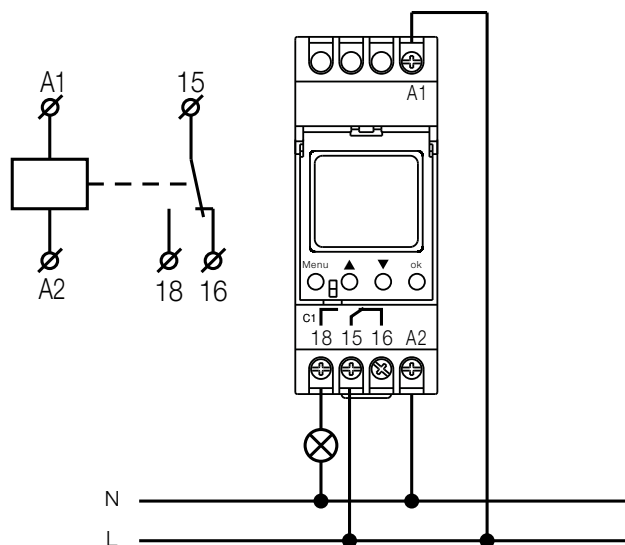
8:00 h to 17:00 h from MON to FRI and it will remain in the OFF condition on the weekends.

Features

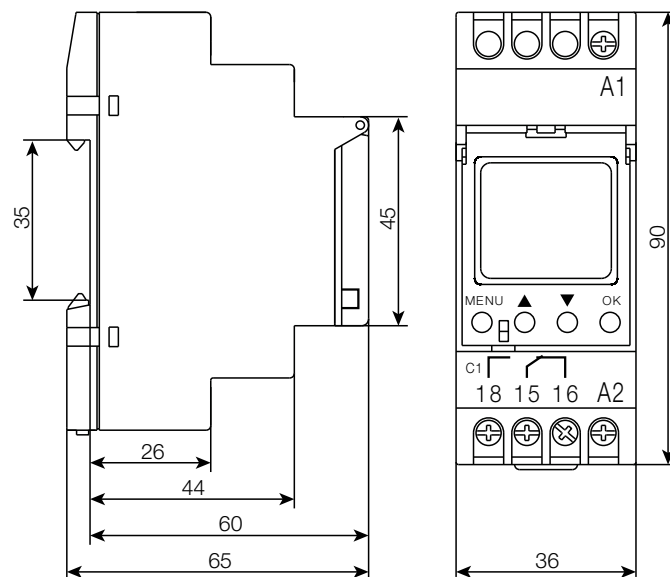
- Digital time switch with daily and weekly programming.
- Interactive LCD display for better user experience.
- Battery backup of 3 years.
- Single channel.
- Easy to program.
- Different operating modes: Holiday, Auto, Manual.
- Permanent ON/Permanent OFF setting
- DIN rail mountable.



Wiring Diagrams Single Load



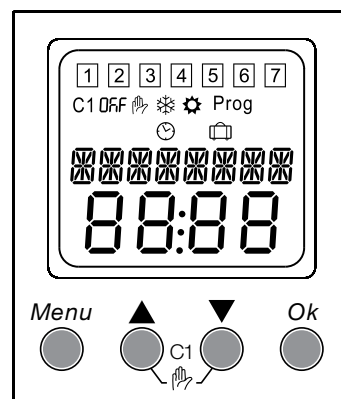
Dimension (in mm)



Maximum Pilotable Power

2300 W	2300 W	1000 W	500 W	500 W

Key Legend



Symbol legend

- 1 2 3 4 5 6 7 — Days of the week Monday, Tuesday, ...Sunday
- C1 — Channel 1
- OFF — Relay status
- ⌚ — Automatic mode
- ☞ — Manual mode
- 🏠 — Holiday mode
- ❄️ — Winter time
- ⚙️ — Summer time
- Prog — Program setting

Time Switch

Digital Weekly Time Switch

Description	Cat. No.
Digital Weekly Time Switch	DHTJW01016

Technical Specification	
Operating Voltage	AC 220 V-240 V
Number of Channel	1
Power Reserve	3 years
Frequency	50 Hz/60 Hz
Power consumption	1 W
Program	weekly, annual, astronomical
Data readout	LCD display with backlight
No. of programs	100
Mechanical life	10 ⁶
Electrical life	10 ⁵
Supply terminals	A1-A2
Supply voltage tolerance	±10%
Operating modes	Manual, automatic, holiday, random
Summer/winter time	off, automatic changeover
Rated insulation voltage	250 V
Wire size	1 mm ² -4 mm ²
Tightening torque	0.5 Nm
Mounting	Din rail mounting
Dimensions	90 mm × 36 mm × 65 mm
Standard	IEC 60730-1/IEC 60730-2-7

Astronomical + Digital Time Switch

Astronomical + Digital Time switch time switch is for realization of time functions in the systems of automatics and steering. Night break program can be used to turn off the output at night, set the offset times and operation time of sunrise and sunset. Programming is carried out by defining the latitude and longitude parameters of the geographical area where the switch is to be placed. There is an internal battery which can protect real time clock and all the settings when the electric power supply is off.

Application

Astronomical + Digital Time switch time switch automatically switches lighting circuits according to the sunrise and sunset time. Programming is based on the latitude as well as the longitude and time zone of the geographical area where the time switch will be installed. In this case the street light will be switched ON at the time of sunset till sunrise.

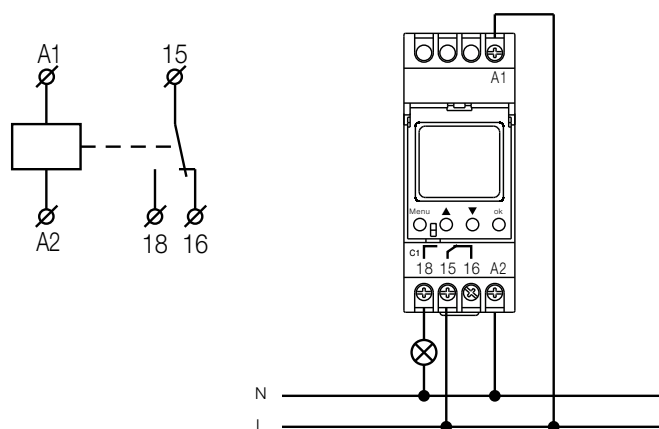
Additionally it offers flexibility to program ON/OFF switching times based on the days of the week.

Features

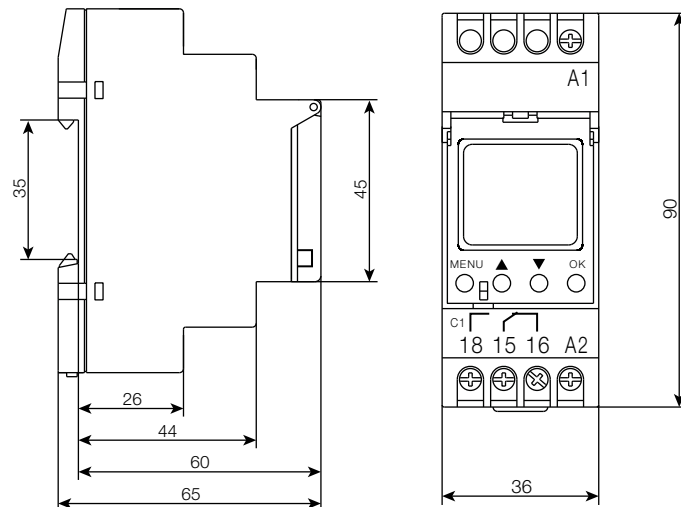
- Astronomical and digital daily/weekly/annually programming.
- Interactive LCD display with backlight for better user experience.
- Easy to program.
- Latitude and longitude setting.
- Offset to adjust sunrise and sunset times.
- Battery backup of 3 years.
- Different operating modes: Holiday, Random, Auto, Manual.
- Permanent ON/Permanent OFF setting.
- DIN rail mountable.



Wiring Diagrams Single Load



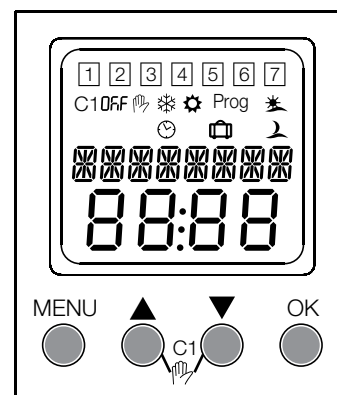
Dimension (in mm)



Maximum Pilotable Power

2300 W	2300 W	1000 W	500 W	500 W

Key Legend



Symbol legend

1 2 3 4 5 6 7	— Days of the week Monday, Tuesday, ...Sunday
C1	— Channel 1
OFF	— Relay status
⌚	— Automatic mode
👉	— Manual mode
🏠	— Holiday mode
☀	— Sunrise
🌅	— Sunset
❄	— Winter time
⚙	— Summer time
Prog	— Program setting

Time Switch

Astronomical + Digital Time Switch

Description	Cat. No.
Astronomical + Digital Time Switch	DHTQB01016

Technical Specification	
Operating Voltage	220-240 Vac
Rated Frequency	50-60 Hz
Width	54.5 mm
Weight	0.2 kg
Installation Type	DIN Rail
Type of Contact	Changeover Contact
Program Functions	ON/OFF
Number of Memory Locations	48
Power Reserve	150 h
Max. Switching Capacity at 250 Vac, $\cos\Phi = 1$	16 A
Max. Switching Capacity at 250 Vac, $\cos\Phi = 0.6$	4 A
Shortest Switching Time	30 min
Mechanical Life	10^7
Electrical Life	10^5
Time Accuracy	≤ 1 s/day Quartz
Power Consumption	5 VA
Degree of Protection	IP 20
Ambient Temperature	-10 °C to +55 °C

24 Hours Analog Time Switch

24-Hours Analog Time Switch has a 24-hours dial and is used to switch an electrical circuit "ON" or "OFF" at selected times, during the day, programmed in advance. The start of the program has to be set on the dial by pulling a segment on the desired time.

Application

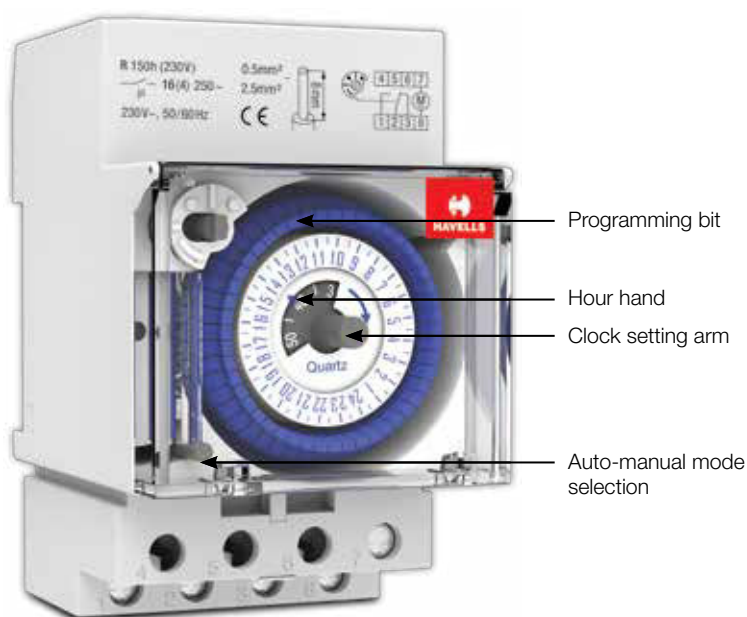
The 24 Hour Analog Time Switch is used in pre-programmed switching of:

- Lighting (car parking, advertising sign boards)
- Heating equipment (home & work environment, water heating, etc.)
- Motors for pumps & fans

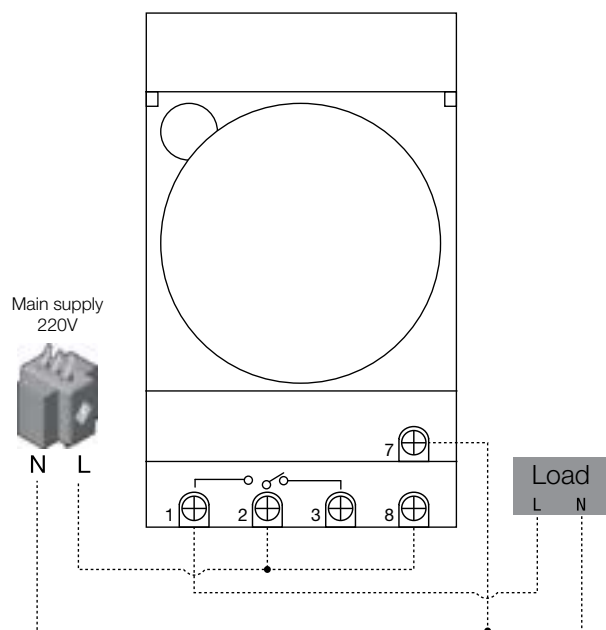
The lighting in parking areas can be switched On/OFF using the 24 hour analog time switch. This can be achieved by setting the program in advance. The starting time has to be scheduled on the dial which is done by pulling a segment on the desired time.

Features

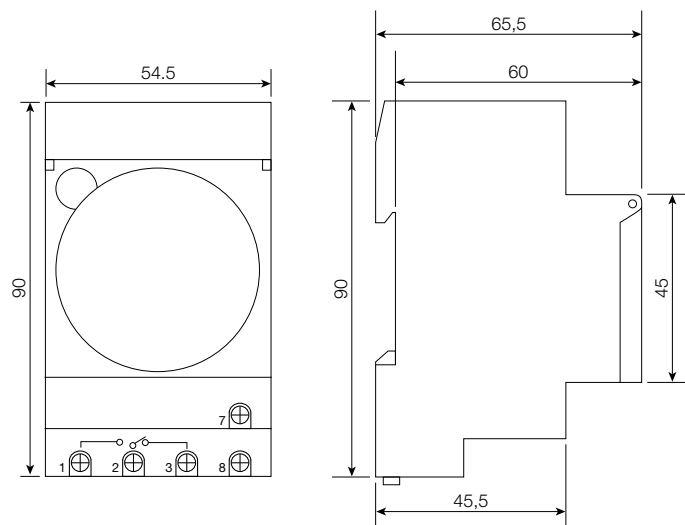
- Electromechanical general purpose time switch with daily programs.
- Repeat programs with 48 ON/OFF settings.
- Minimum switching time of 30 minutes.
- Cover for protecting the LCD from mechanical shocks and scratches.
- Din rail mountable.



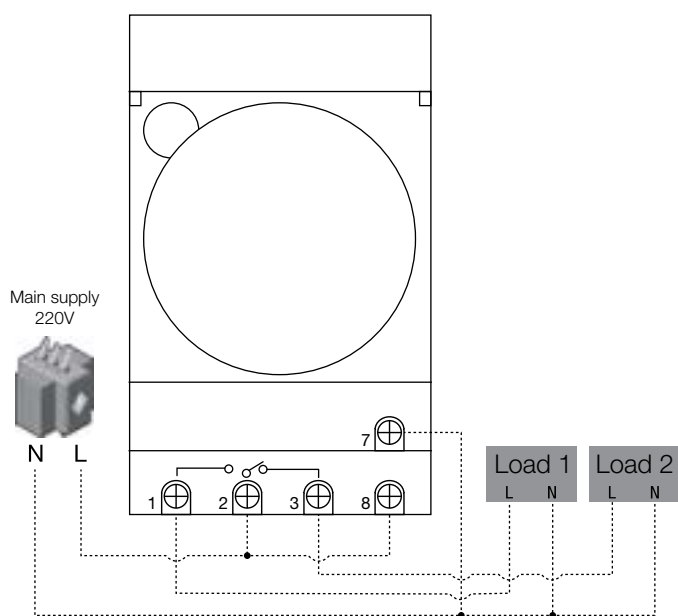
Wiring Diagrams Single Load



Dimension (in mm)



Wiring Diagrams Multiple Load



Time Switch

24 Hours Analog Time Switch

Description	Cat. No.
24 Hours Analog Time Switch	DHTED30016

Technical Specification	
Rated control voltage	220 Vac - 240 Vac
Frequency	50/60 Hz
Sensitivity threshold	2~100 lux adjustable
Switch-on delay (ton)	2 s - 5 s
Switch-off delay (toff)	10 s - 15 s
Hysteresis (switching off/on ratio)	1.20
Ambient temperature	-25 °C to +40 °C
Output contact	1 NO
Current rating	25 A/250 Vac1

Twilight Time Switch

Twilight time switch is used to control lighting devices depending on ambient light intensity thereby enabling power savings. The main function is to switch on lighting at dusk and switch them off at dawn. The switching on threshold can be adjusted by a knob on the front panel. The twilight switch is available with a light sensor.

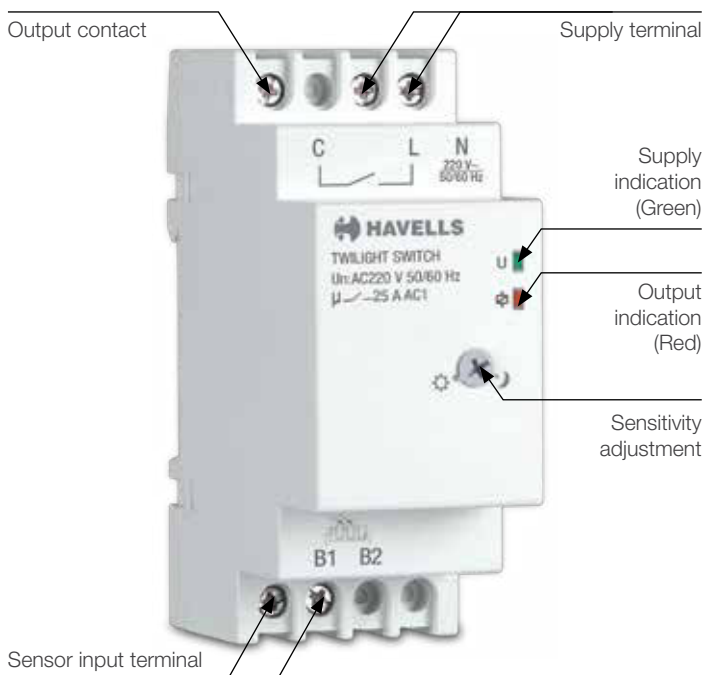
The light sensor contains a variable resistor sensitive to strength of illumination, it must be placed with permanent access to sunlight, but not be affected from any external or switch's own illumination system. At dusk, when the strength of light goes below the set lux value, after switch on delay, switch energizes its contacts. Delay can avoid any command caused by temporary illumination or headlights. At dawn, when the strength of light goes above the set lux value, after switch off delay, switch de-energizes its contacts. They are especially useful in places accessible to the public (gardens, car parking's etc.), because their features enable power savings.

Application

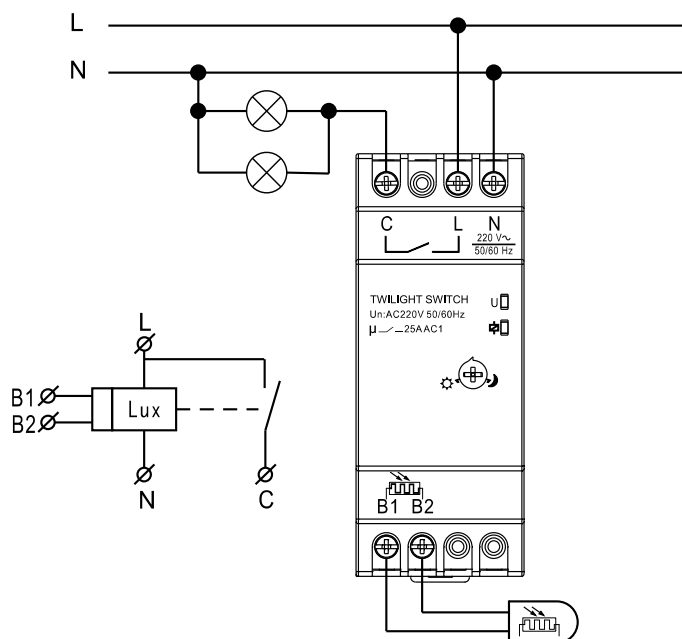
Energy efficient use of lighting systems is possible with the use of twilight switches. The light sensor switches the load on and off according to the defined level of the ambient light intensity. In this example it is installed in a shop so that when the light intensity drops under a certain level like in the evening the time switch turns on the lighting. It will turn off the lights when the daylight raise above the set lux level.

Features

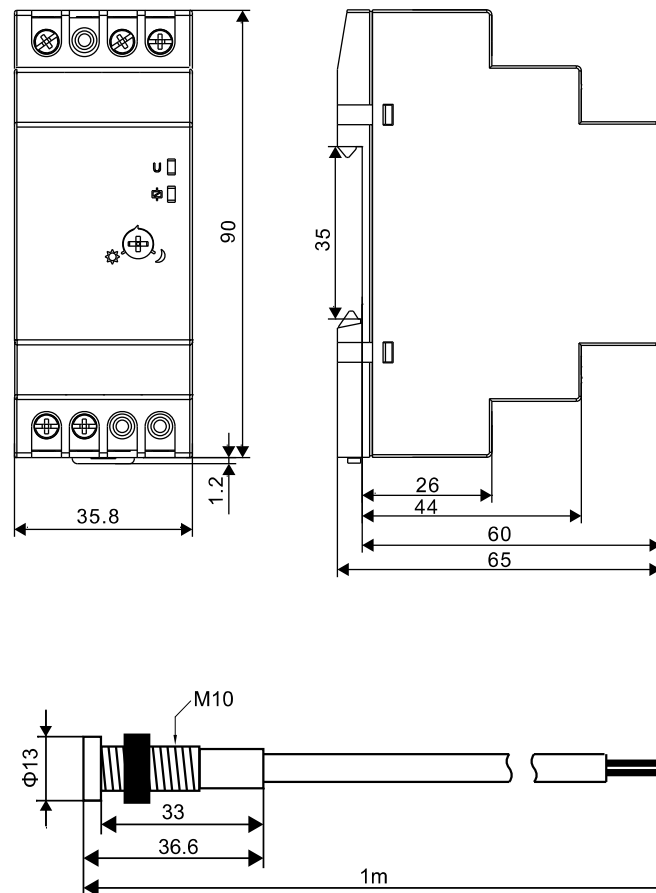
- Factory fit external light sensor.
- Adjustable lux sensitivity.
- User friendly.
- DIN rail mountable.



Wiring Diagrams Single Load



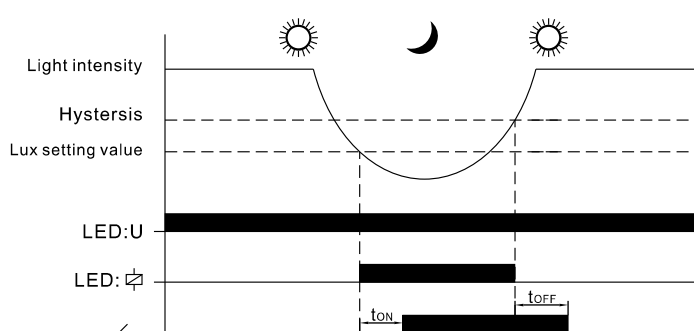
Dimension (in mm)



Maximum Pilotable Power

2300 W	2300 W	1000 W	500 W	500 W

Functional Setting



Time Switch

Twilight Time Switch

Description	Cat. No.
Twilight Time Switch	DHTPNN025

Technical Specification	
Operating Voltage	AC 220 V - 240 V
Adjustment Range	30 s - 20 min
Type of Contact	NO Contact
Type of Connection	3-/4- conductor
Max. Switching Capacity at 250 Vac, cos ϕ = 1	16 A
Max. Switching Capacity at 250 Vac, cos ϕ = 0.6	10 A
Switch for Permanent Light	Sliding Switch
Rated current	16 A/250 V AC
Incandescent lamp load	2000 W
Electrical life	10 ⁵
Mechanical life	10 ⁶
Protection degree	IP 20
Pollution degree	3
Ambient Temperature	-5°C to + 40°C
Altitude	≤2000 m

Staircase Time Switch

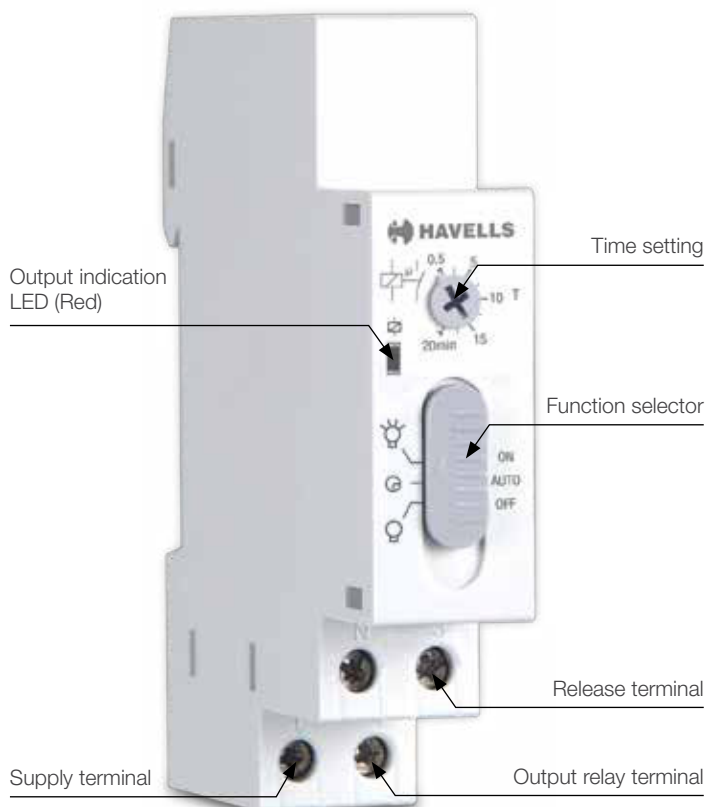
This time switch is a variable delay timer to control stairwell lighting. A momentary action push button will initiate its output, which will then 'time out' after a pre - set delay has elapsed.

Application

It is required for management of lighting in staircases and corridors. Time range can be adjusted between 30 s to 20 min using the knob. The lights will switch according to the set delay range thereby saving energy.

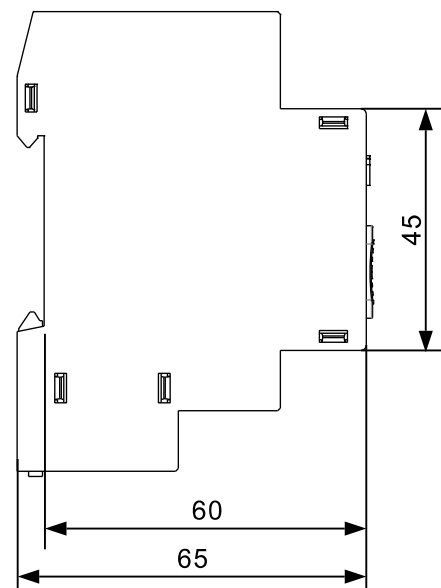
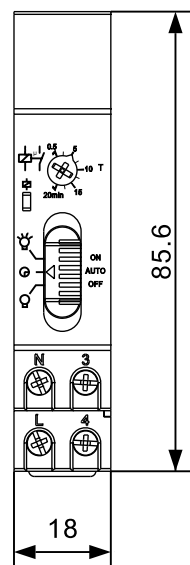
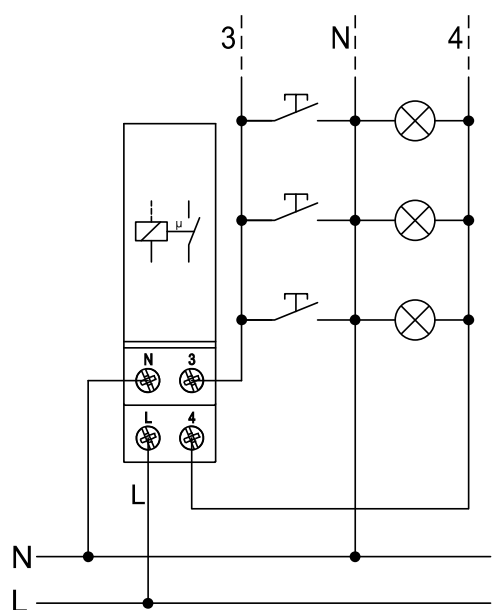
Features

- Controls stairway lighting.
- Timing range 30 s~20 min.
- Different operating modes: ON, Auto, OFF.
- DIN rail mountable.
- Possibility of 3 wire and 4 wire connection.

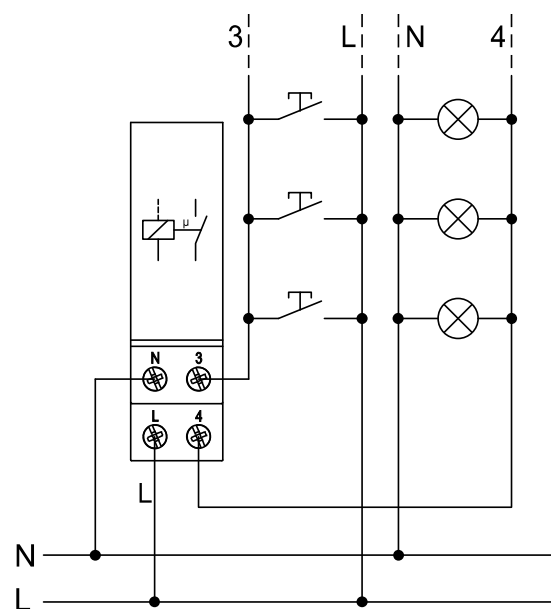


Wiring Diagrams Single Load 3 Wire Connection

Dimension (in mm)



4 Wire Connection



Time Switch

Staircase Time Switch

Description	Cat. No.
Staircase Time Switch	DHTMNX5016

ALL FUNCTIONS AT A GLANCE

Parameters	Astronomical + Digital Time switch	Digital weekly time switch	
No. of modules	2	2	
No. of channels	1	1	
Program	Astronomical, daily, weekly, annually	Weekly, daily	
Manual mode	✓	✓	
Automatic	✓	✓	
Holiday	✓	✓	
Su-Wi changeover	✓	✓	
Data Readout	LCD display with backlight	LCD display	
Mounting type	Din Rail	Din Rail	
Power Reserve	3 years	3 years	
PermON/OFF	✓	✓	
Setting	1 min	1 min	
No. of programs	100	52	
			

	Multifunction time switch	Staircase Time switch	Twilight time switch
	2	1	2
	2	-	-
	Astronomical, daily, weekly, annually	Staircase	Adjustable lux sensitivity
	✓	✓	-
	✓	✓	-
	✓	-	-
	✓	-	-
	LCD display with backlight	LED indicator	LED indicator
	Din Rail	Din Rail	Din Rail
	10 years	-	-
	✓	✓	-
	1 min	30 s-20 min	2~100 lux adjustable
	80	-	-
			



◆ MODULAR CONTACTORS



Nowadays there is a growing trend of automation processes in building wiring and installation. Thus there is a need for compact and energy efficient load controlling devices which can be integrated in the existing building infrastructure.

Havells has designed a wide range of Modular Contactors for centralized control and remote switching of electric devices used in buildings such as hotels, hospitals, shopping centers, offices, public buildings, sport centers, domestic applications etc. They are used for remotely controlling electric circuits for lighting, HVAC, pumps and other building automation systems. Modular Contactors are the latest offering in Havells Euro II range of control and protection devices. Available in 16 A-63 A rating, single pole or multi-pole, automatic and manual versions and having various contact configurations, the range offers a complete package for meeting diverse application needs of modern times.



Safety Terminals: They guide the cable towards the cage terminal and avoid improper cable termination.



- Easy Symmetrical DIN Rail Mounting.
- 2-stage DIN clip simplifies extraction from DIN Rail.



Finger Touch Protection: IP 20 Terminals

◆ FEATURES & BENEFITS



Homogenous with the entire Havells Modular products.

Retro Fittable Auxiliary: Simple, Clip-ON, Toolfree attachment with contactor



Operating Mode Selection: Manual contactors have four position selector on front face to choose between: - Automatic operating mode / Temporary "ON" mode / Permanent "ON" mode / Shutdown mode



Contact Status Indicator: Quick identification of operating status by mechanical indicator- RED when ON



Reduced Noise: Leads to better comfort in building segment applications



Best in class features with quality design

Principle of operation

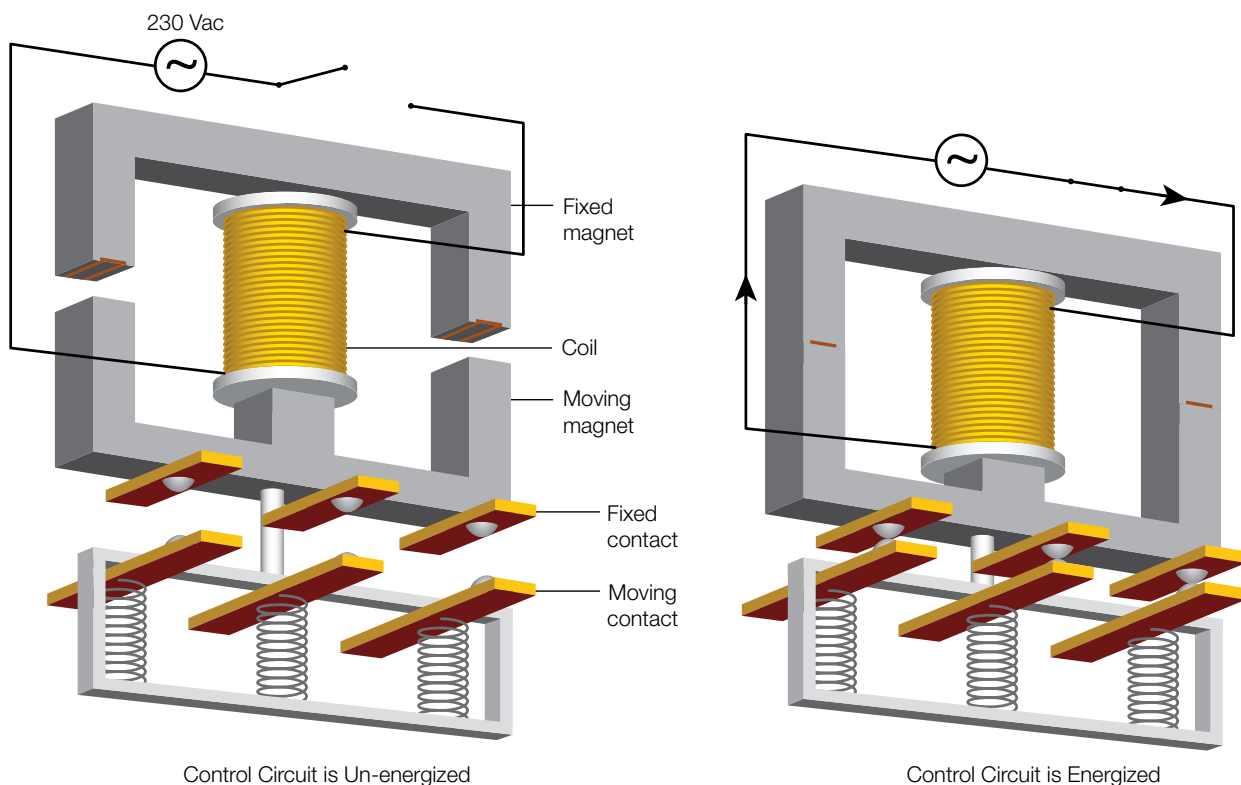
Contactors are electromechanically actuated switches comprising of main circuit and control circuit. They are used to control single or multi-phase high power loads in main circuit, via a very low powered control circuit.

A contactor's **control circuit** basically comprises of electromagnet and coil assembly. There are two E-shaped electromagnets - Fixed Core & Moving Core, and a coil is wound on their central limbs. The **main circuit** basically consists of the contact assembly i.e. fixed contacts and moving contacts. Contactor may be single-pole or multi-pole. Its contacts may be a combination of normally open (NO) and normally closed (NC) type, depending on their natural status when control circuit is un-energized. The **interlinking** between moving core and moving contacts helps in opening or closing of power contacts.

Figure shows, in a simplified manner, the working principle of a three pole contactor with NO type main contacts.

When an energy supply is connected to the coil connections, it draws current, and produces a magnetic field. An upward electromagnetic force acts on the moving magnet, which moves towards the fixed magnet in order to reduce the overall reluctance of flux path. As the moving core's movement is linked to moving contacts, they too come in complete contact with the fixed contacts. This closes the main/power circuit and provides output to the connected load. By interruption of the coil control circuit the movable magnet core and thus also the contact assembly returns to their starting position. Contact spring returns the contacts to their normal state.

Modular contactors belong to the class of air-break switches. If coil power is removed, an arc is created as the contacts open. It is extinguished by separating the contacts by a sufficient distance. Air-break contactors are economic and have lesser maintenance costs in comparison to other classes of contactors (e.g. oil immersed, vacuum etc.).



Working principle of contactor (explained w.r.t. NO contacts)

Advantage 'Modular'

Modular DIN rail components are devices designed to be used with a standardized mounting rail having dimensions 35 mm x 7.5 mm (EN 50022). Such components are designed for a high degree of safety and finger protection. They are designed using the concept of modular width, and are either a fraction of, or multiples of, a single "module", which is standardized at 18 mm. Their compact construction saves space and increases customer benefits in building segment applications.

Havells modular contactors are the latest addition to our family of din-rail modular devices. In comparison to industrial contactors, they occupy a significantly reduced space. Modular contactors are suited for installation in a variety of day-to-day enclosures - distribution panels, switchboards, distribution boxes, consumer units etc.



Utilization categories

Contactors are a common electromechanical switching device used in industrial, commercial and residential applications. Utilization category plays an important role in their correct selection. Each category refers to different applications according to the switching conditions delivered by contactor (voltage, current, power factor, in-rush current, switching frequency, etc.)

Utilization categories of contactors as defined in IEC 60947-4-1	
Category	Typical applications
AC-1	Non-inductive or slightly inductive loads, resistance furnaces
AC-2	Slip-ring motors: starting, switching off
AC-3	Squirrel-cage motors: starting, switching off motors during running
AC-4	Squirrel-cage motors: starting, plugging, inching
AC-5a	Switching of electric discharge lamp controls (ballast)
AC-5b	Switching of incandescent lamps
AC-6a	Switching of transformers
AC-6b	Switching of capacitor banks
AC-7a	Slightly inductive loads in household appliances and similar applications
AC-7b	Motor-loads for household applications
AC-8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases
AC-8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases
DC-1	Non-inductive or slightly inductive loads, resistance furnaces
DC-3	Shunt-motors: starting, plugging, inching. Dynamic breaking of d.c. motors
DC-5	Series-motors: starting, plugging, inching. Dynamic breaking of d.c. motors
DC-6	Switching of incandescent lamps

- Plugging means stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.
- Inching (jogging) means energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.
- Both AC-3 and AC-7a category may be used for occasional inching (jogging) or plugging for limited time periods such as machine set-up; during such limited time periods, the number of such operations should not exceed five per minute or more than ten in a 10 min period.

Modular contactors are compliant to IEC 61095. (This standard IEC 61095 applies to electromechanical air break contactors for household and similar purposes provided with main contacts intended to be connected to circuits the rated voltage of which does not exceed 440 Vac (between phases) and with rated operational currents less than or equal to 63 A for utilization category AC-7a and 32 A for utilization categories AC-7b and AC-7c, and rated conditional short-circuit current less than or equal to 6 kA).

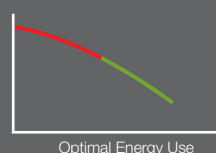
The modular contactor's utilization category **AC-7a is comparable to AC-1**, but the slightly inductive loads find their use in household-like conditions. Their utilization category **AC-7b is comparable to AC-3**, but the motor loads find their use in household-like conditions.



Building Automation in focus...

As users are becoming more conscious about energy saving and efficiency, electrical installations in modern buildings are being adapted to meet these requirements.

Modular contactors are a step in this direction as they can be easily integrated in building automation systems. Using contactors with multiple-function timers, push-buttons, switches, other centralized management systems etc. can save precious time, resources and energy.



Making & Breaking Capacities

Switching devices must always be selected based on the loads to be controlled, which differ in regards to making and breaking currents.

Categories	Making and breaking conditions						
	I_c/I_e	U_r/U_e	Cos φ	On-time (s)	Off-time (s)	Number of operating cycles	Reference standard
AC-1	1.5	1.05	0.8	0.05 ⁽⁷⁾	(1)	50	IEC 60947-4-1
AC-2	4.0 ⁽⁴⁾	1.05	0.65 ⁽⁴⁾	0.05 ⁽⁷⁾		50	IEC 60947-4-1
AC-3	8.0	1.05	"0.45 (I _e ≤100 A) 0.35 (I _e >100 A)"	0.05 ⁽⁷⁾		50	IEC 60947-4-1
AC-4	10	1.05		0.05 ⁽⁷⁾		50	IEC 60947-4-1
AC-5a	3	1.05	0.45	0.05 ⁽⁷⁾		50	IEC 60947-4-1
AC-5b	1.5 ⁽²⁾	1.05	(2)	0.05 ⁽⁷⁾	60	50	IEC 60947-4-1
AC-6a	(3)						
AC-6b	1.5 ⁽⁶⁾	1.05		(6)	(6)	50	IEC 60947-4-1
AC-7a	1.5	1.05	0.8	0.05 ⁽⁷⁾	(1)	50	IEC 61095
AC-7b	8.0	1.05	0.45	0.05 ⁽⁷⁾		50	IEC 61095
AC-8a	6.0	1.05	"0.45 (I _e ≤100 A) 0.35 (I _e >100 A)"	0.05 ⁽⁷⁾	(1)	50	IEC 60947-4-1
AC-8b	6.0	1.05		0.05 ⁽⁷⁾		50	IEC 60947-4-1

Conventional Operations

Conventional Operational Performance covers the load test, which shows the circuit behavior under normal use. The contactor must be able to switch on and switch off under agreed conventional conditions and an agreed number of cycles without failure of the device.

Categories	Making and breaking conditions						
	I_c/I_e	U_r/U_e	Cos φ	On-time (s)	Off-time (s)	Number of operating cycles	Reference standard
AC-1	1.0	1.05	0.8	0.05 ⁽⁷⁾	(1)	6000 ⁽⁵⁾	IEC 60947-4-1
AC-2	2.0	1.05	0.65	0.05 ⁽⁷⁾		6000 ⁽⁵⁾	IEC 60947-4-1
AC-3	2.0	1.05	0.45 (I _e ≤100 A) 0.35 (I _e >100 A)	0.05 ⁽⁷⁾		6000 ⁽⁵⁾	IEC 60947-4-1
AC-4	6.0	1.05				6000 ⁽⁵⁾	IEC 60947-4-1
AC-5a	2.0	1.05	0.45	0.05 ⁽⁷⁾		6000 ⁽⁵⁾	IEC 60947-4-1
AC-5b	1.0 ⁽²⁾	1.05	(2)	0.05 ⁽⁷⁾	60	6000 ⁽⁵⁾	IEC 60947-4-1
AC-6a	(3)						
AC-6b	1 ⁽⁶⁾	1.05		(6)	(6)	6000	IEC 60947-4-1
AC-7a	1.0	1.05	0.8	0.05 ⁽⁷⁾	(1)	30000	IEC 61095
AC-7b	6.0 (making) 1.0 (breaking)	1.0 (making) 0.17 (breaking)	0.45	0.05 ⁽⁷⁾		30000	IEC 61095
AC-8a	1.0	1.05	0.8	0.05 ⁽⁷⁾	(1)	30000	IEC 60947-4-1
AC-8b	6.0	1.05	"0.45 (I _e ≤100 A) 0.35 (I _e >100 A)"	1	9	5900	IEC 60947-4-1
				10	<200	100	IEC 60947-4-1

(1) Off time : 10 s (I_c≤ 100 A), 20 s (100 < I_c≤ 200), 30 s (200 < I_c≤ 300), 40 s (300 < I_c≤ 400)...[Table 8 : IEC 60947-4-1]

(2) Use incandescent load during test

(3) Test with a transformer or derive the rating from the AC-3 values according to Table 9 (IEC 60947-4-1)

(4) The values shown are for stator contactors. For rotor contactors, test with I_c/I_e = 4 and power factor 0.95

(5) For manually operated switching devices, the number of operating cycles shall be 1000 on-load, followed by 5000 off-load

(6) The load shall consist of commercially available capacitor combinations. Refer IEC 60947-4-1 for details.

(7) The time may be less than 50ms, provided that contacts are allowed to become properly seated before reopening.

I_c : current made and broken, expressed in r.m.s. symmetrical values, but it is understood that the actual peak value in the making operation may assume a higher value than the symmetrical peak value.

I_e : rated operational current.

U_r : power frequency recovery voltage.

U_e : rated operational voltage.

Cos φ : power factor of the test circuit.

Applications

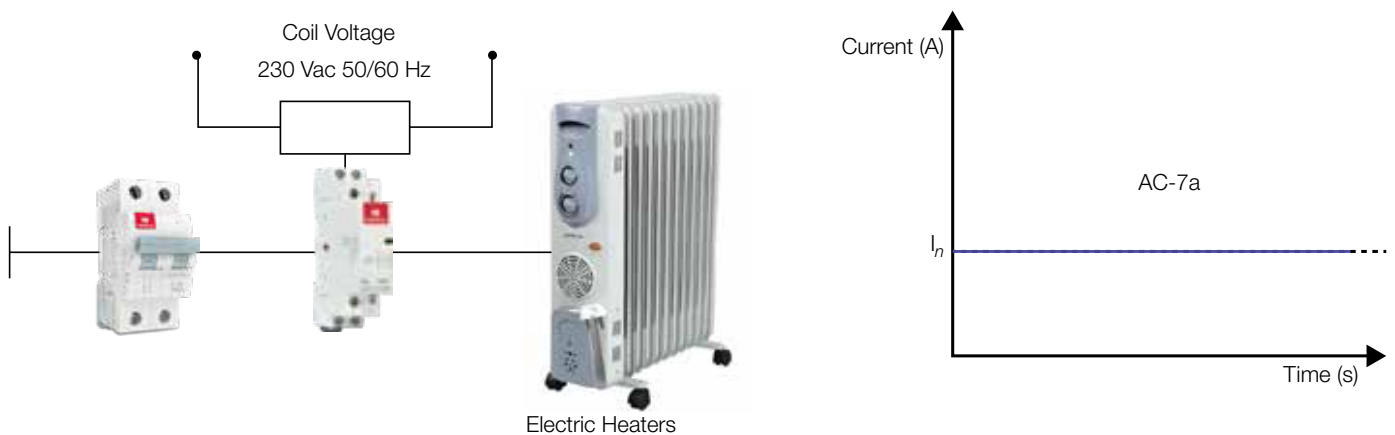
Modular contactors act as an interface between the order giver (e.g. centralized technical management, power utility signal, load-shedding device, push-button, programmable time switch...) and the power circuit for final circuits.

Some typical examples are:

- o Power control of final circuits for housing and the tertiary sector:
 - Lighting (luminous signs, shop windows, safety lighting etc.)
 - Heating, heat pumps, ovens
 - Hot water for domestic use
 - Small utility motors (pumps, fans, barriers, garage doors, roller blinds, mechanical ventilation systems etc.)
 - Air conditioning
- o Energy distribution and control:
 - Load shedding and restoration
 - Source changeover, etc.

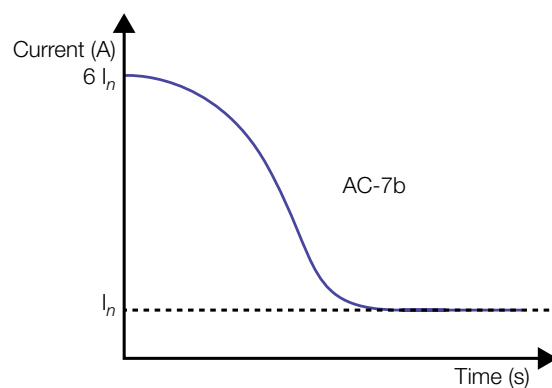
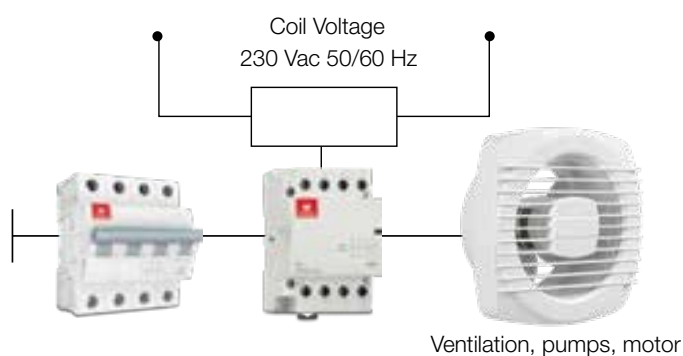
Resistive/ Slightly inductive loads

Loads such as electric heating, water heaters etc. have starting current virtually the same as operating current. Such loads come under utilization category AC-7A and can be controlled by modular contactors.



Motor Loads

Motor starting causes high inrush currents that can reach 6 to 8 times the operating current in a time range up to 10 s. Such motor loads used in household like conditions come under utilization category AC-7B and can be controlled by modular contactors. Examples are – ventilation, pumps etc.



Mixed loads

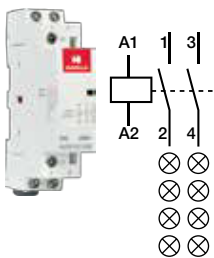
More and more buildings use automatic systems for energy control. For eg., hotel rooms have to be powerless if nobody is inside and the power has to be switched on after entry of people.

Mixed loads include a variety of different inrush currents. The switching of such mixed loads, typically required for apartments, hotels, shops, ships etc entails that multiple requirements for modular contactors are met. As all loads are centrally controlled in the switch cabinet, the switching devices should be of the same design which is offered by modular contactors. Further, modular contactors also offer the possibility of easy integration into the existing power supply system of a house, because their control circuit is rated for 230 V. Some applications are load shedding circuits and access control with key-cards.

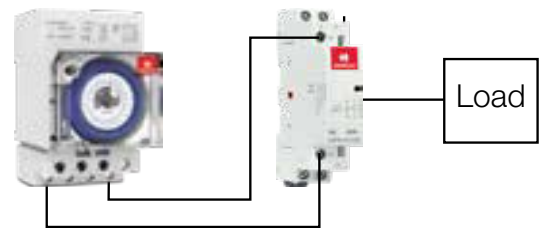


Lamp loads

Conference rooms, shopping centers and official buildings use a lot of rows of lighting load, which can be controlled by multi-pole contactors to save costs. Lamp loads cause capacitive inrush current peaks that can be a multiple of the operating current. Therefore the right selection of contactor rating is important. Lamp table helps to make selection and planning easier.



Lighting control via contactors



Automatic control via contactor & Time switch

Automated control with time switches

Modular contactors act as soldiers of time switch when they are applied to follow orders from time switches to control multiple circuits (or channels) of much heavier current appliances. The range of 16 A to 63 A allows for the reliable control of many different load types (i.e. motors, lighting, or pumps) and levels of loading without affecting the operation or the life expectancy of the Time Switch.

Used for an array of electrical applications in residential/commercial setups, Havells family of Time Switches is a fantastic energy saver. When paired with Modular Contactors, the Time Switches operate with utmost precision.



Automatic garden sprinkling system



◆ AUTOMATIC MODULAR CONTACTOR

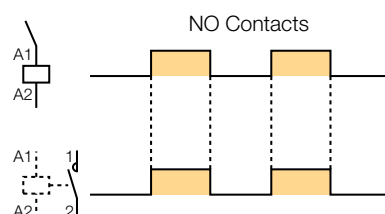
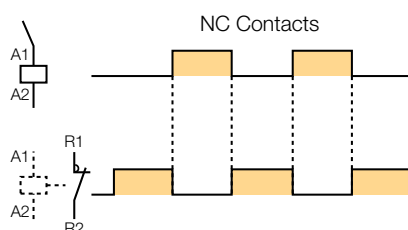


In automatic contactors the switching operation depends solely on the availability of coil supply. When coil supply is provided sufficient electromagnetic force is generated for closing the NO main contacts or opening the NC main contacts. In the absence of coil supply, the contacts revert to their original position.

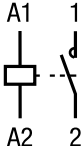
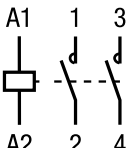
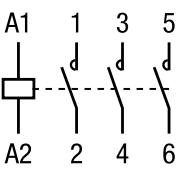
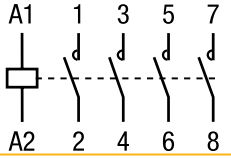
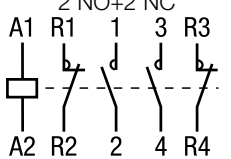
Technical Specifications

Product			Automatic Contactors			
Rating In			16 A	25 A	40 A	63 A
Main contacts						
Standard			IEC/EN 61095	IEC/EN 61095	IEC/EN 61095	IEC/EN 61095
Rated operational voltage Ue			Single phase-250 V~, Three phase-400 V~	Single phase-250 V~, Three phase-400 V~	Single phase-250 V~, Three phase-400 V~	Single phase-250 V~, Three phase-400 V~
Rated operational current Ie	AC-7a		16 A	25 A	40 A	63 A
	AC-7b		6 A	8.5 A	15 A	20 A
Electrical endurance			100,000	100,000	100,000	100,000
Switching operations frequency (per day)			100	100	100	100
Rated breaking & making capacity (AC-7b)			48 A	68 A	120 A	160 A
Conditional Short Circuit Current			3 kA	3 kA	3 kA	3 kA
Type of Protection Device			MCB or gG fuse of adequate rating			
Rated duty			Continuous duty			
Control circuit						
Rated Control circuit voltage Uc			230 V~	230 V~	230 V~	230 V~
Rated frequency			50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Control circuit voltage limits			0.2...0.75 Uc at ≤50 °C drop-out, 0.85...1.1 Uc at ≤50 °C operational			
Coil Heat Dissipation (W)	SP, DP		1.2 W	1.2 W	1.6 W	1.6 W
	TP, FP		-	1.6 W	2.1 W	2.1 W
Environment						
Operating temperature			-5 °C...+60 °C	-5 °C...+60 °C	-5 °C...+60 °C	-5 °C...+60 °C
Storage temperature			-40 °C...+70 °C	-40 °C...+70 °C	-40 °C...+70 °C	-40 °C...+70 °C
Pollution Degree			2	2	2	2
Degree of Protection			IP 20	IP 20	IP 20	IP 20
Insulation						
Rated insulation voltage			500 V~	500 V~	500 V~	500 V~
Rated impulse withstand voltage			4 kV	4 kV	4 kV	4 kV
Dielectric Strength			2.5 kV	2.5 kV	2.5 kV	2.5 kV
Terminals						
Tightening Torque (N·m)	Control		0.8	0.8	0.8	0.8
	Power Contacts		0.8	0.8	3.5	3.5
Terminal Capacity	Control		2 mm² x 2.5 mm² (Flexible), 2 mm² x 1.5 mm² (Rigid)			
	Power Contacts	Flexible	4 mm²	4 mm²	16 mm²	16 mm²
		Rigid	6 mm²	6 mm²	25 mm²	25 mm²

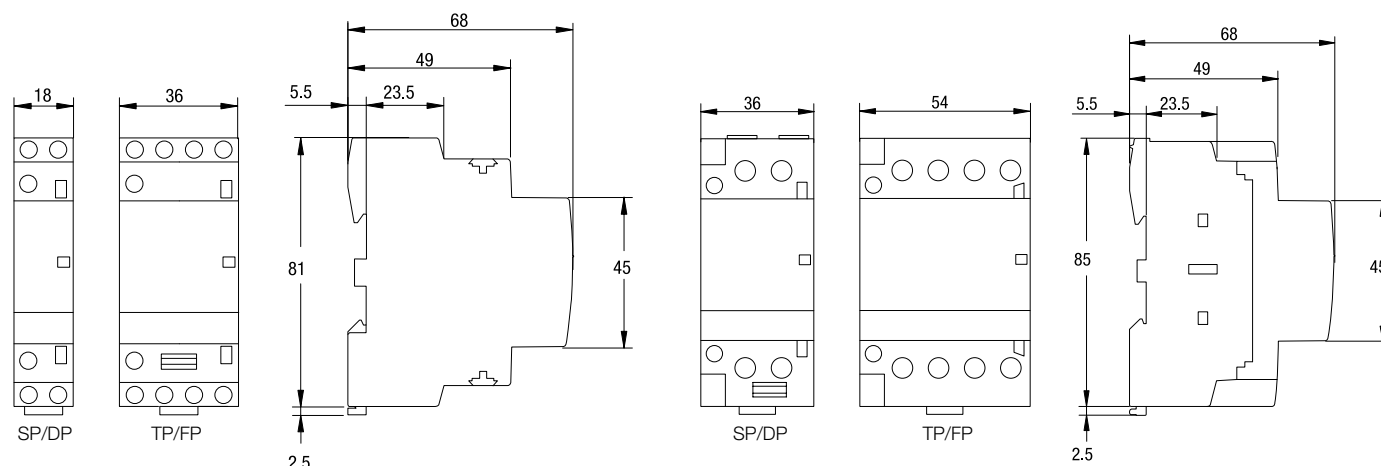
Operation



Ordering Details

Poles	Rating (A) AC-7a	Rating (A) AC-7b	No. of Contacts	Width in Terms of Modular Size (18 mm)	Product Code
1P	25	8.5	1 NO 	1	DHPRG025110M
2P	16	6	2 NO 	1	DHPRF016120M
	25	8.5		1	DHPRF025120M
	40	15		2	DHPRF040220M
	63	20		2	DHPRF063220M
3P	25	8.5	3 NO 	2	DHPRA025230M
	40	15		3	DHPRA040330M
	63	20		3	DHPRA063330M
4P	25	8.5	4 NO 	2	DHPRC025240M
	40	15		3	DHPRC040340M
	63	20		3	DHPRC063340M
4P	63	20	2 NO+2 NC 	3	DHPRC063322M

Dimensions (mm)



Automatic Modular Contactor 16 A/25 A

Automatic Modular Contactor 40 A/63 A



◆ AUTOMATIC MODULAR
CONTACTOR WITH
MANUAL OVERRIDE



Automatic Contactors with manual override knob have a manual over-ride switch to select between three function modes and 4 operating positions.

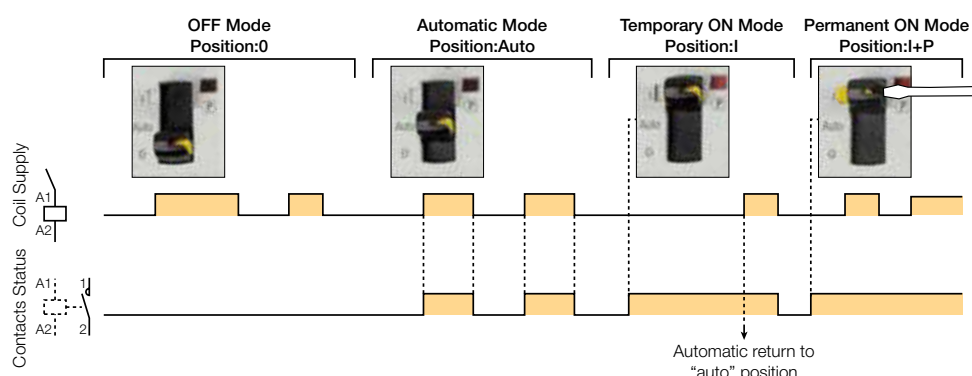
- **Automatic Mode:** It is the normal operating mode i.e. Contactor is operational (ON) when Coil voltage is applied and vice versa.
- **ON Mode :**
 - Temporary "ON" position: When manual knob is not locked at ON position – the main contacts remain ON as long as coil supply is absent. When coil supply becomes available, the contactor automatically reverts to automatic mode.
 - Permanent "ON" position: Here, the contactor is operational (ON) irrespective of the availability of coil supply.
- **OFF Mode:** Here, the contactor is shutdown irrespective of the availability of coil supply.

Manual override option provides customers with the following features:

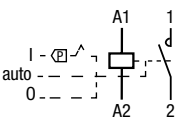
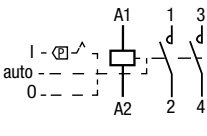
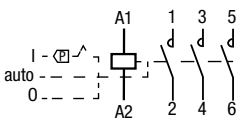
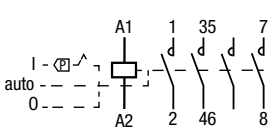
- ⊙ Functional test prior to start/commissioning
- ⊙ High degree of safety and availability in case of automation system failure
- ⊙ Testing or repairs can be carried out safely, reliably and quickly without interrupting other automatic functions.
- ⊙ Force ON and Force OFF feature allows user to run high energy load during low tariff periods only, thereby over-ruling the normal operation of contactor at all times.

Technical Specifications

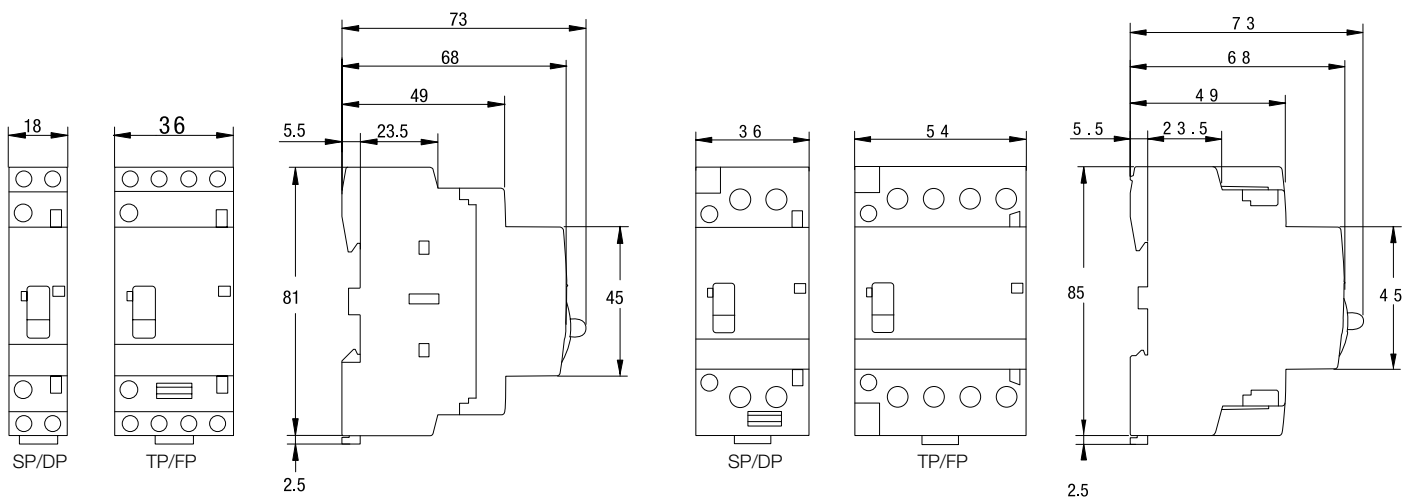
Product			Automatic Contactors with Manual Override			
Rating In (A)			16	25	40	63
Main contacts						
Standard			IEC/EN 61095	IEC/EN 61095	IEC/EN 61095	IEC/EN 61095
Rated operational voltage Ue (Vac)			Single phase-250, Three phase-400	Single phase-250, Three phase-400	Single phase-250, Three phase-400	Single phase-250, Three phase-400
Rated operational current Ie (A)	AC-7a		16	25	40	63
	AC-7b		6	8.5	15	20
Electrical endurance			100,000	100,000	100,000	100,000
Switching operations frequency (per day)			100	100	100	100
Rated breaking & making capacity (A) (AC-7b)			48	68	120	160
Conditional Short Circuit Current (kA)			3	3	3	3
Type of Protection Device			MCB or gG fuse of adequate rating			
Rated duty			Continuous duty			
Control circuit						
Rated Control circuit voltage Uc (Vac)			230	230	230	230
Rated frequency (Hz)			50/60	50/60	50/60	50/60
Control circuit voltage limits			0.2...0.75 Uc at ≤50 °C drop-out, 0.85...1.1 Uc at ≤50 °C operational			
Coil Heat Dissipation (W)	SP, DP		1.2	1.2	1.6	1.6
	TP, FP		-	1.6	2.1	2.1
Environment						
Operating temperature			-5...+60	-5...+60	-5...+60	-5...+60
Storage temperature			-40...+70	-40...+70	-40...+70	-40...+70
Pollution Degree			2	2	2	2
Degree of Protection			IP-20	IP-20	IP-20	IP-20
Insulation						
Rated insulation voltage (Vac)			500	500	500	500
Rated impulse withstand voltage (kV)			4	4	4	4
Dielectric Strength (kV)			2.5	2.5	2.5	2.5
Terminals						
Tightening Torque (N-m)	Control		0.8	0.8	0.8	0.8
	Power Contacts		0.8	0.8	3.5	3.5
Terminal Capacity (mm²)	Control		2x2.5 (Flexible), 2x1.5 (Rigid)			
	Power Contacts	Flexible	4	4	16	16
		Rigid	6	6	25	25



Ordering Details

Poles	Rating (A) AC-7a	Rating (A) AC-7b	No. of Contacts	Width in Terms of Modular Size (18 mm)	Product Code
1P	25	8.5	1 NO 	1	DHPMG025110M
2P	16	6	2 NO 	1	DHPMF016120M
	25	8.5		1	DHPMF025120M
	40	15		2	DHPMF040220M
	63	20		2	DHPMF063220M
3P	25	8.5	3 NO 	2	DHPMA025230M
	40	15		3	DHPMA040330M
	63	20		3	DHPMA063330M
4P	25	8.5	4 NO 	2	DHPMC025240M
	40	15		3	DHPMC040340M
	63	20		3	DHPMC063340M

Dimensions (mm)



Automatic + Manual Modular Contactor 16 A/25 A

Automatic + Manual Modular Contactor 40 A/63 A

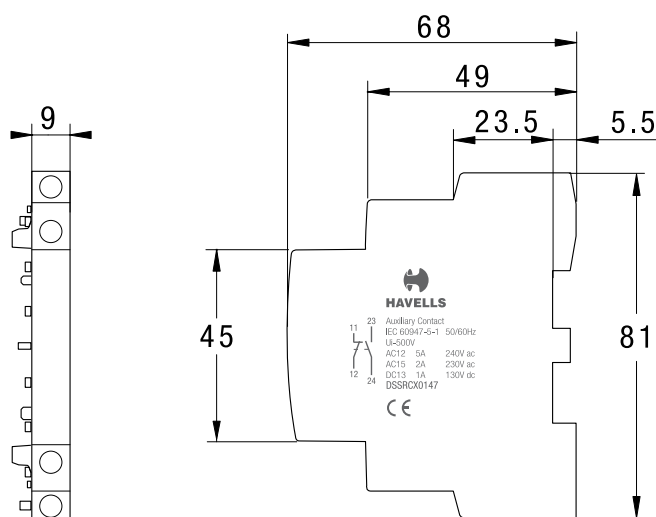
Auxiliary Contact

This Auxiliary allows indication of the “OPEN” or “CLOSED” position of the contactor power contacts. Auxiliary changeover contacts i.e. 1 NO/1 NC version is available which can be fitted on the right side of the device without needing any tools.

Technical Specification

Type	Indication
Standard Compliance	IEC 60947-5-1
Contacts Configuration	1 NO+1 NC
Mounting	On the right side of the contactor
Control Voltage	AC-12-240 V, AC-15-230 V, DC-13-130 V
Operating Frequency	50/60 Hz
Contacts (Breaking capacities)	5 A at 240 Vac, COS $\Phi = 1$, 2 A at 230 V, COS $\Phi = 1$, 1 A at 130 Vdc
Operating Temperature	-5° to 50 °C
Storage Temperature	-40° to 70 °C
Insulation Voltage	500 V
Terminal Capacity	2.5 mm ²
Product Code	DSSRCX0147

Dimensions (mm)



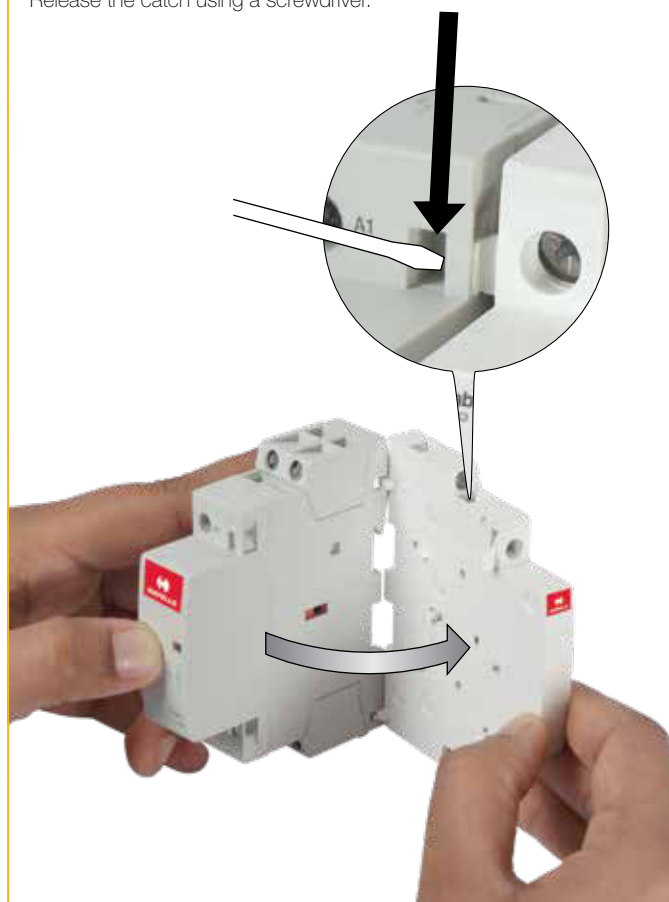
Attachment

Fasten the auxiliary contact by slightly pressing it in place.



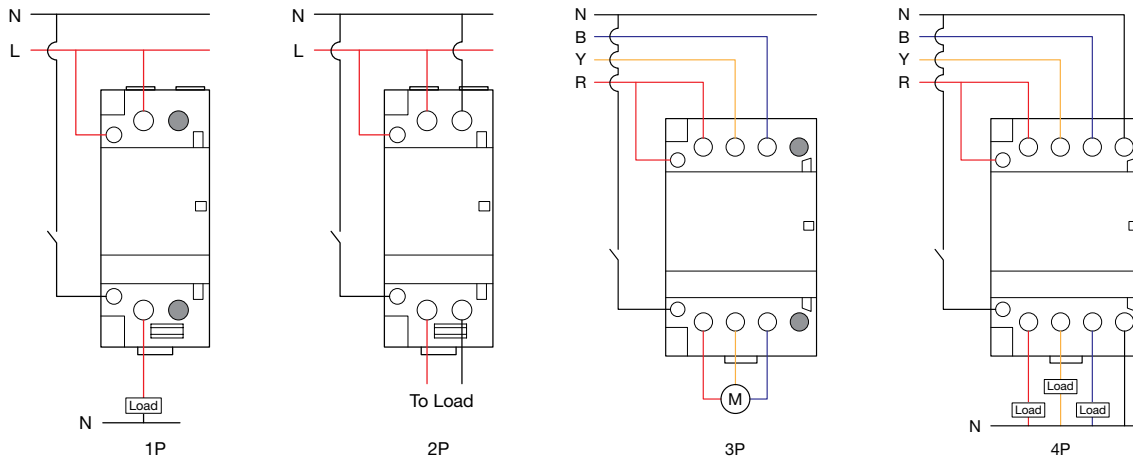
Removal

Release the catch using a screwdriver.

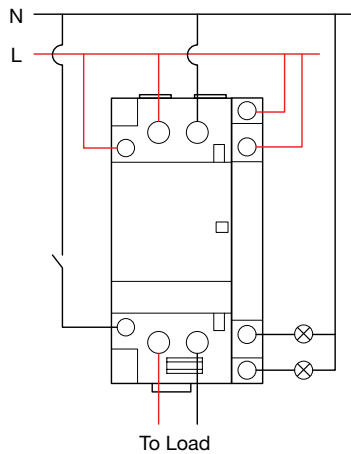


Circuit Diagram

Modular Contactors



Contactor with auxiliary contact



Example

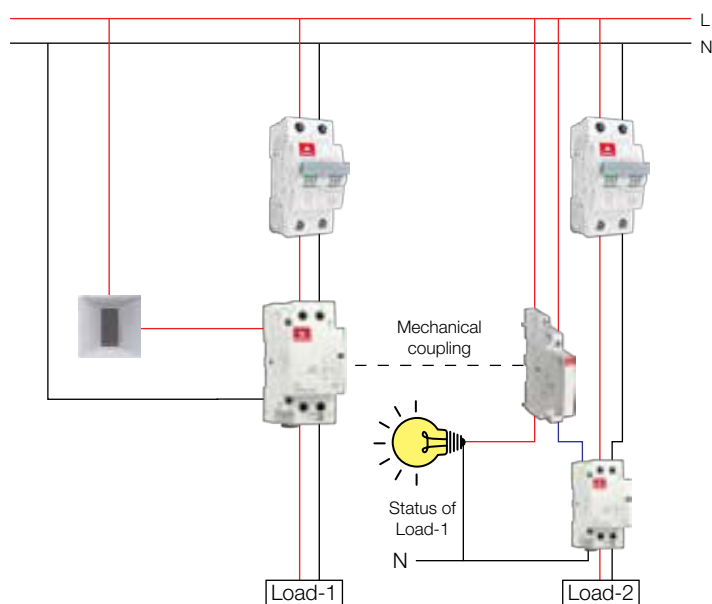


Figure shows the application of modular contactor with auxiliary contact: 1 NO+1 NC contact of auxiliary can be used for remote monitoring of contactor's status and control of alternate loads.

Modular Contactors Choice Table

Heating Application: Contactors rating to be chosen according to the power to be controlled and the number of operations a day.

Number of Operations/day	Maximum power for a given rating (kW)			
250 V Rated Voltage				
	16 A	25 A	40 A	63 A
25	3.4	5.4	8.6	14
50	3.4	5.4	8.6	14
75	2.9	4.6	7.3	12
100	2.7	4	6	9.5
400 V Rated Voltage				
25	10.5	16	26	41
50	10.5	16	26	41
75	8.9	14	22	35
100	6.7	11	17	26

Small Motor Application: Contactor rating to be chosen according to the power to be controlled.

Load and Rated Voltage	Maximum power for a given rating (kW)			
	16 A	25 A	40 A	63 A
250 V Asynchronous single-phase motor	0.95	1.4	2.5	4
400 V Asynchronous three-phase motor	2.7	4	7.5	15
250 V Universal motor	0.6	0.9	1.4	2.2

Lighting Application

- Modern Lighting system generate a high inrush current. Therefore, It is recommended to use the following choice table to calculate maximum lamp load that can be connected per current path on 230 V, 50 Hz Circuits.
- The table below shows the permissible number of lamps for each contactor considering the type, power and configuration of a given lamp.
- In case a 4 pole-contactor is used (3 Ph+N), the below mentioned quantity of lamps need to be multiplied by 1.73 to obtain maximum number of lamps for the contactor. The obtained quantity has to be divided by 3 to evaluate maximum lamps per pole.

Type of lamp	Lamp Load and Power Factor Correction capacitance	Permissible number of Lamp fittings for a single phase 230 V, 50 Hz Circuit and Acceptable Power per circuit.			
		16 A	25 A	40 A	63 A
Compact Fluorescent lamps(CFLs)					
CFL with external electronic ballast		1120 W-1400 W	1750 W-2190 W	3640 W-4300 W	5250 W
	5 W	210	330	670	1025
	7 W	150	222	478	750
	9 W	122	194	383	583
	11 W	104	163	327	477
	18 W	66	105	213	291
	26 W	50	76	153	202
CFL with integrated electronic ballast		800 W-900 W	1150 W-1300 W	2400 W-2675 W	3940 W-4000 W
	5 W	160	230	470	710
	7 W	114	164	335	514
	9 W	94	133	266	411
	11 W	78	109	222	340
	18 W	48	69	138	213
	26 W	34	55	100	151

Incandescent lamps					
Tungsten halogen lamps 230 V		1600 W-2050 W	2300 W-2900 W	4600 W-5200 W	6900 W-7500 W
	40 W	38	57	115	172
	60 W	30	45	85	125
	75 W	25	38	70	100
	100 W	19	28	50	73
	150 W	12	18	35	50
	200 W	10	14	26	37
		2100 W	3000 W	6000 W	8000 W
	300 W	7	10	18	25
	500 W	4	6	10	15
	1000 W	2	3	6	8
Halogen ELV(12 OR 24 V) with electronic transformer		1350 W-1730 W	1800 W-2250 W	3650 W-4250 W	5500 W-6000 W
	20 W	67	97	196	297
	25 W	27	42	82	123
	75 W	22	30	57	84
	100 W	17	24	45	64.8
Halogen ELV(12 OR 24 V) with Ferromagnetic Transforemer		300 W-600 W	450 W-900 W	850 W-1950 W	1250 W-2850 W
	20 W	5	23	42	63
	25 W	10	15	27	42
	75 W	8	12	23	35
	100 W	6	8	18	27
Fluorescent Tubes					
Single tube without parallel compensation		350 W-870 W	490 W-1295 W	1130 W-2500 W	1500 W-3800 W
	15 W	22	30	70	100
	18 W	22	30	70	100
	20 W	22	30	70	100
	36 W	20	28	60	90
	40 W	20	28	60	90
	58 W	13	17	35	56
	65 W	13	17	35	56
	80 W	10	15	30	48
	115 W	7	10	20	32
Single tube with parallel compensation		200 W-800 W	325 W-1290 W	650 W-2500 W	970 W-3550 W
	15 W, 5 µF	15	20	40	60
	18 W, 5 µF	15	20	40	60
	20 W, 5 µF	15	20	40	60
	36 W, 5 µF	15	20	40	60
	40 W, 5 µF	15	20	40	60
	58 W, 7 µF	10	15	30	43
	65 W, 7 µF	10	15	30	43
	80 W, 7 µF	10	15	30	43
	115 W, 7 µF	5	7	14	20
Single tube with electronic ballast		1300 W-1400 W	2000 W-2200 W	4000 W-4400 W	6000 W-6600 W
	18	74	111	222	333
	36	38	58	117	176
	58	25	37	74	111

Double tube with electronic ballast		1300 W-1400 W	2000 W-2200 W	4000 W-4400 W	6000 W-6600 W
	2x18	29	59	120	180
	2x36	22	32	64	97
	2x58	13	20	41	62

LEDs

Double tube with electronic ballast LED 230 V without driver, Not dimmable		120 W-520 W	170 W-760 W	300 W-1360 W	500 W-1880 W
		24	34	61	100
	7 W	22	32	57	94
	9 W	22	32	57	94
	12 W	22	32	57	94
	18 W	21	30	54	77
	22 W	20	28	51	67
	30 W	16	23	42	53
	40 W	13	19	34	47
LED 230V integrated driver,Dimmable		215 W-800 W	320 W-1200 W	575 W-2080 W	1440 W-2100 W
	5 W	46	64	115	180
	7 W	46	64	115	180
	9 W	4	5	10	176
	12 W	44	61	110	176
	18 W	34	48	87	145
	22 W	30	42	76	119
	30 W	25	35	64	64
	40 W	20	29	52	82

Discharge lamps

High pressure Sodium lamp /Metal Iodide lamps with ferromagnetic ballast		600 W	850 W-1200 W	1450 W-2000 W	2250 W-3200 W
	35 W	16	24	42	64
	70 W	8	12	20	32
	150 W	4	7	13	18
	250 W	2	4	8	11
	400 W	1	3	5	8
	1000 W	0	1	2	3
High pressure Sodium lamp /Metal Iodide lamps, ferromagnetic ballast with parallel compensation.		450 W-1000 W	650 W-2000 W	1100 W-4000 W	1750 W-6000 W
	35 W, 6 mF	12	18	31	50
	70 W, 12 µF	6	9	16	25
	150 W, 20 µF	4	6	10	15
	250 W, 32 µF	3	4	7	10
	400 W, 45 µF	2	3	5	7
	1000 W, 60 µF	1	2	3	5
High pressure Sodium lamp /Metal Iodide lamps with electronic ballast		830 W-1400 W	1350 W-2200 W	2400 W-4000 W	3600 W-6000 W
	35 W	23	38	68	102
	70 W	17	29	51	76
	150 W	8	14	26	40

High pressure Mercury Vapour lamp with Ferromagnetic Ballast		750 W-1000 W	1000 W-1600 W	1700 W-2800 W	2650 W-4200 W
	50 W	15	20	34	53
	80 W	10	15	27	40
	125 W	8	10	20	28
	250 W	4	6	10	15
	400 W	2	4	6	10
	700 W	1	2	4	6
High pressure Mercury Vapour lamp with Ferromagnetic Ballast and parallel compensation.		500 W-1400 W	750 W-1600 W	1400 W-3500 W	2150 W-5000 W
	50 W, 7 μ F	10	15	28	43
	80 W, 8 μ F	9	13	25	38
	125 W, 10 μ F	9	10	20	30
	250 W, 18 μ F	4	6	11	17
	400 W, 40 μ F	3	4	8	12
	700 W, 60 μ F	2	2	5	7
Low pressure Sodium Vapour lamp		270 W-360 W	320 W-720 W	500 W-1100 W	850 W-1800 W
	35 W	5	9	14	24
	55 W	5	9	14	24
	90 W	3	6	9	19
	135 W	2	4	6	10
	180 W	2	4	6	10
Low pressure Sodium Vapour lamp with parallel compensation		100 W-180 W	175 W-360 W	350 W-720 W	550 W-1100 W
	35 W, 20 μ F	3	5	10	15
	55 W, 20 μ F	3	5	10	15
	90 W, 25 μ F	2	4	8	11
	135 W, 40 μ F	1	2	5	7
	180 W, 45 μ F	1	2	4	6

The given information is entirely indicative, Considerable variations may occur depending on the electrical installation and equipments used. It is recommended that the implementation or configuration of the circuits must be done by experienced professionals with the expertise to determine the characteristics of the electrical installation (General characteristics of installations, In rush Current duration and value, Load etc). The manufacturer accepts no liability for the use made of this information.

INDICATORS LIGHTS

Havells Indicator Light is a new addition to the product range and can be used in both building and industrial installations. Indicator lights are designed for signaling the incoming supply.

Applications

- Distribution Box • Three Phase Tier DB • Kiosks • Load Line DB
- Meter Boxes • Testing Panels • Switch Boards • MIMIC Panels
- Control panels

Features

- Modular Design enables Indicator Lamp replacement with lens of different varieties Very simple installation and easy to replace
- Easy mounting on DIN rail 35 mm x 7.5 mm long life & durable

Color

Red, Amber, Blue, Green & Clear

Execution

Single Pole (1P)

Specification

IS/IEC 60947-5-1



Technical Specification		
Standard Conformity	IS/IEC 60947-5-1	IS/IEC 60947-5-1
Contacts	Rated Operation Voltage	240 V~
	Rating Electrical Power	1.2 W
	Frequency	50 Hz
	Type of Lamp Socket	E - 10 Thread
	Terminal Capacity	10 mm ²
Light Indication	Color	
	Light	Permanent
	Source	Neon Lamp
Other Data	Mounting on DIN Rail	35 mm x 7.5 mm
	Degree of Protection	IP 20
	Ambient Temperature	-5 °C to 55 °C

Indicator Light



Indicator Light

(In accordance with IS/IEC 60947-5-1) 240 V~, 50 Hz

Colour	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
Red	12 N	DHMCYSPX000
Amber	12 N	DHMCXSPX000



Indicator Light

(In accordance with IS/IEC 60947-5-1) 240 V~, 50 Hz

Colour	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
Blue	12 N	DHMCVSPX000
Green	12 N	DHMCZSPX000
Clear	12 N	DHMCWSPX000

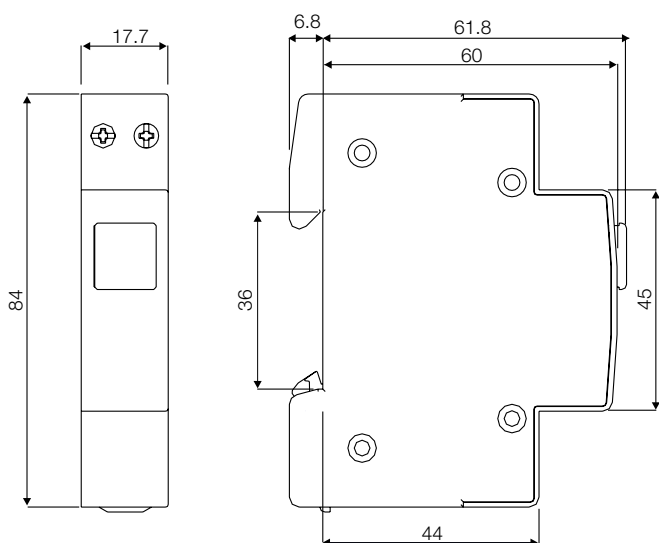
Indicator Light (Colour cap)

Indicator Light - Spares



Colour	Std. / Master Packing (No. of Unit/s)	TP Cat. No.
Red	1 N	DCELDMCL001
Amber	1 N	DCELDMCL001
Blue	1 N	DCELDMCL001
Green	1 N	DCELDMCL001
Clear	1 N	DCELDMCL001

Dimensions (in mm)



Easy To Replace Spares



- The whole module
- Color Cap
- Old Lamp



◆ Photovoltaic
Systems in Focus



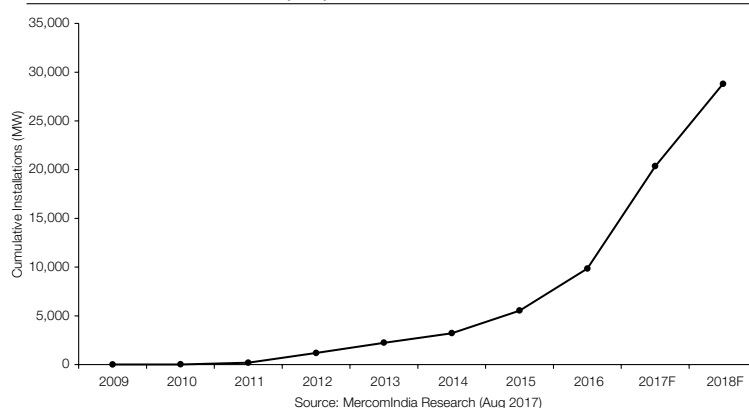
Solar energy is growing at a fast pace in India. And it will continue to do so in coming years across all its different applications - be it residential, commercial, or power plants.

Driving this growth is the ever-improving performance of photovoltaic (PV) systems which now guarantee economic soundness as well as profitability. Further it is a prime source of clean energy that helps reduce carbon footprint and build environmental sustainability. Assembled in solar modules and arrays, PV cells are silent, combustion-free, and emit no pollution. Absence of moving parts means they require little maintenance over their long life spans. Another attractive feature of PV systems is their versatility and convenience. They can be used in standalone applications and installed in places that are difficult and uneconomical to supply with traditional power lines. They can be installed virtually anywhere; on the ground, on flat or pitched roofs or attached to the sides of buildings.

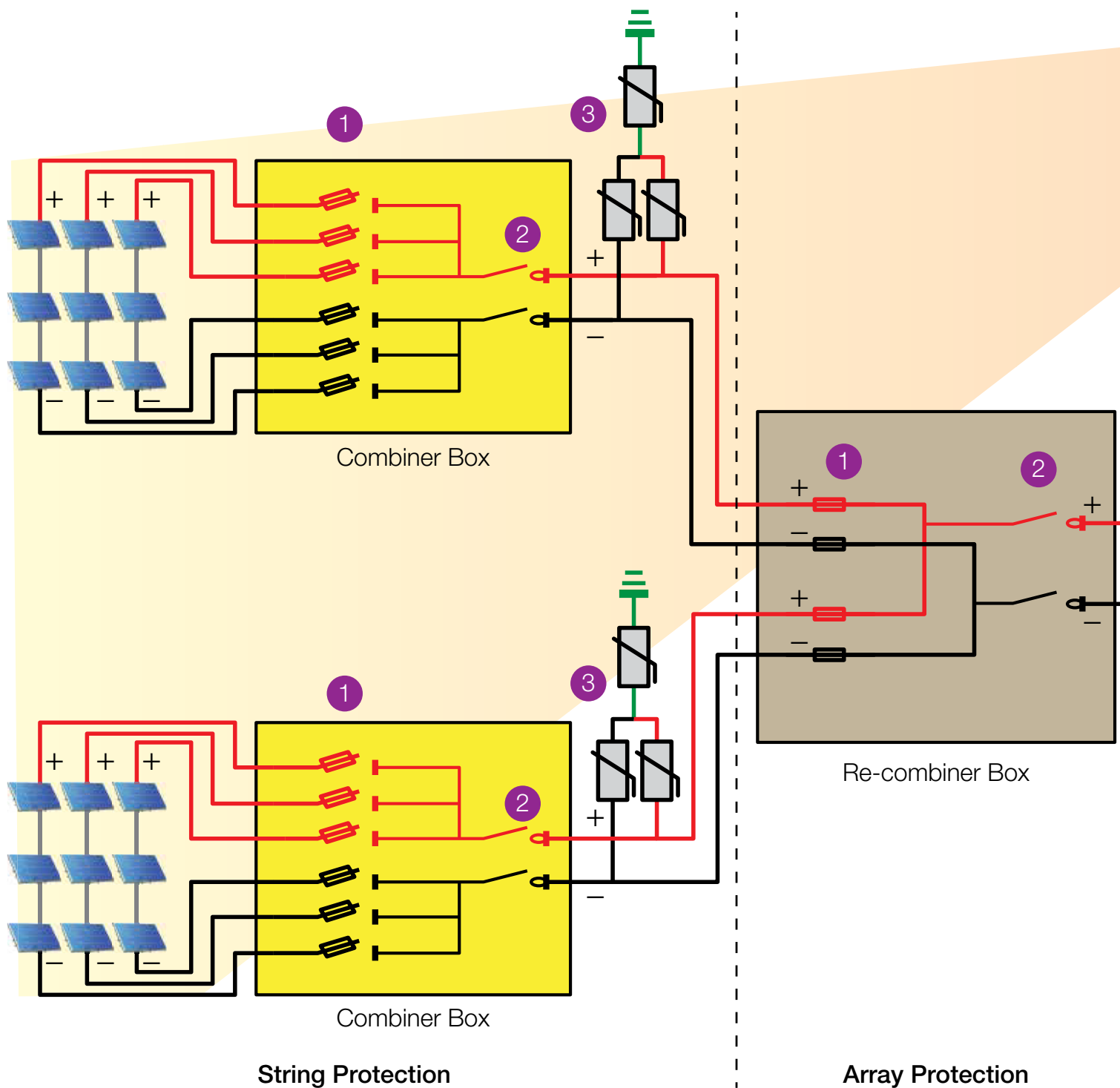
The Indian government has also taken aggressive, long term stance for the promotion of PV electricity generation through a number of regional and national incentives and rebate plans.

However, for it to be considered a good investment, a photovoltaic system must be able to function efficiently for at least 20 years in all weather conditions and under blazing sun. This has challenged the system designers, manufacturers and standard organizations due to special conditions associated with PV system. These requirements have also been considered in the development of international protection standards for PV installations, which Havells, a leading name in electrical industry, has used to develop PV specific switch-gear devices.

India Solar Demand Forecast (MW)



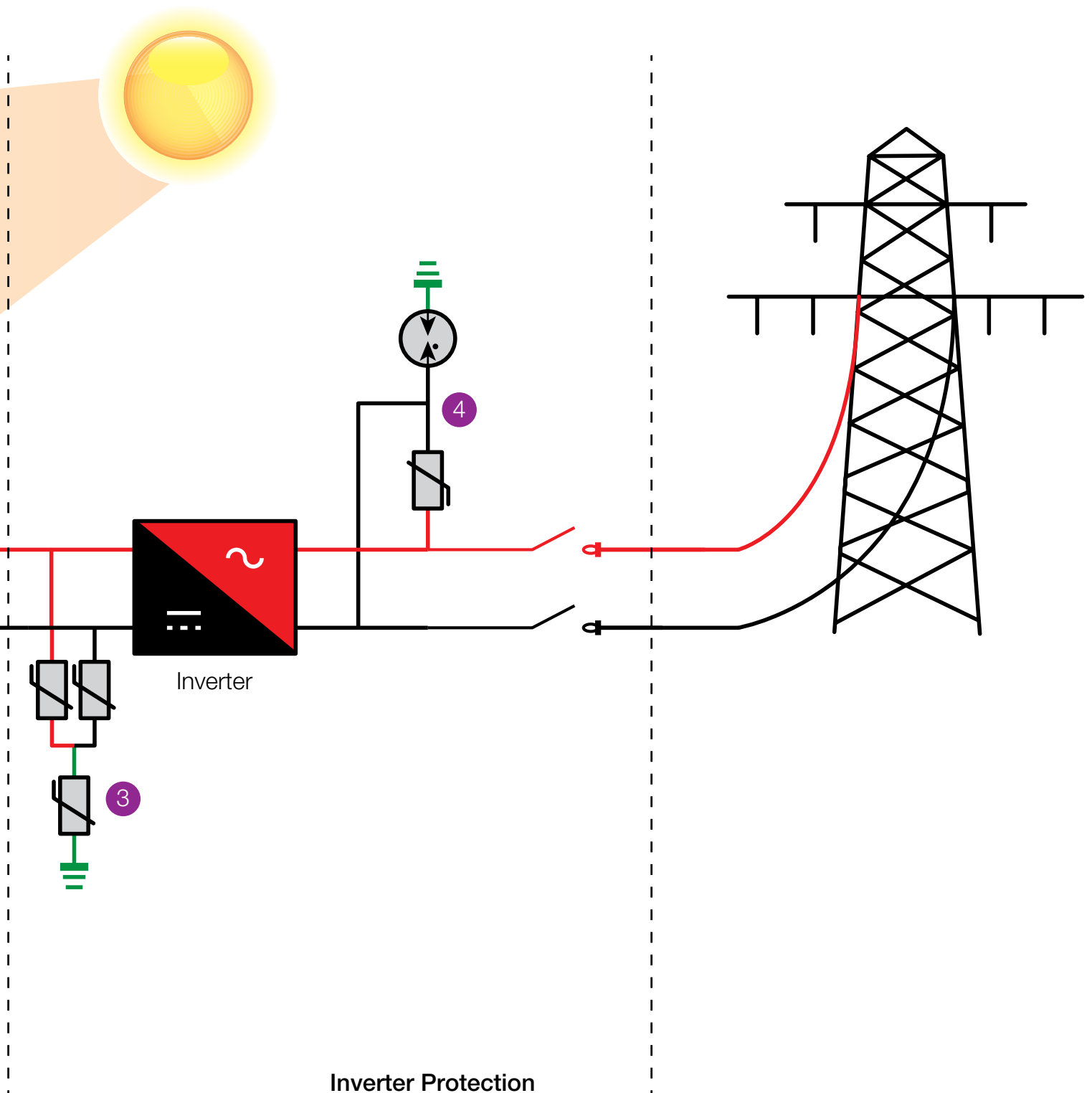
Photovoltaic Powered Distribution Network



Photovoltaic Fuse Disconnecter & Fuse Link



Photovoltaic Switch Disconnecter
(coming soon)



Surge Protection Device - DC Side



Surge Protection Device - AC Side



◆ Photovoltaic Fuse Link & Fuse Disconnecter

Havells gPV fuse range is dedicated to the protection of photovoltaic modules, strings or arrays and their connecting cables from reverse over-current and short-circuits and help minimize safety hazards. The PV fuse-link and fuse-disconnector will isolate the faulted PV string so the balance of the PV system can continue to generate electricity.

Today PV systems are growing in size, so have the corresponding voltage requirements. This increase in system voltage has typically been intended to minimize power loss associated with long conductor runs. Havells Photovoltaic devices are TUV tested to safely interrupt faulted circuits upto the demanding voltage level of 1000 Vdc and 40 kA short circuit faults.

Benefits

- Protects the modules and their connecting cables in the event of reverse currents
- Safely trips in case of fault current and reduce the risk of fire due to DC electric arcs
- Safely isolate the system when the fuse disconnecter is open

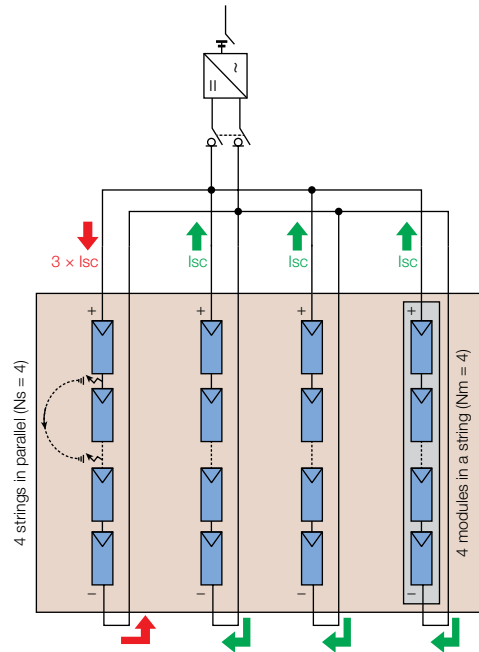


Over-Current Faults in PV System

Unlike with other power sources, short-circuiting of the load would not result in dangerous over-currents in a PV system. Over-currents may, however, result from short-circuit faults in modules, junction boxes and module wiring or from earth faults in array wiring. Though PV modules are current-limited sources, they can be subjected to reverse over-currents supplied by either multiple parallel PV strings or from external sources (e.g. batteries) or both.

Figure shows a short-circuit fault in a PV module which causes reverse current to flow in that string. This occurs as the open-circuit voltage of faulted string is significantly lower than the open voltage of other parallel strings connected to the same inverter. The current flows from the healthy strings to the faulty one instead of flowing to the inverter and supplying power to the downstream load.

The effects of reverse currents may range from permanent damage of PV modules and reduced efficiency to broken conductors resulting in dangerous temperature rises, electric arcing and fire. PV module withstand capability is therefore tested in accordance with IEC 61730-2 standard and the PV module manufacturers provide the maximum reverse current value ($I_{mod_reverse}$). PV modules are tested at a value equal to: $135\% \times I_{mod_reverse}$ for 2 hours: the module has to withstand this condition. It may also be specified in module specification sheet as the maximum series fuse rating.

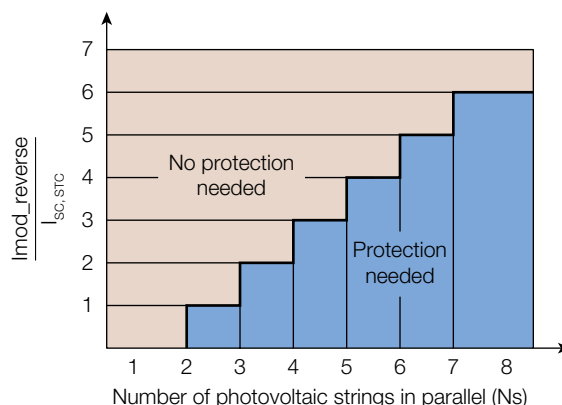


$$\text{Reverse current in the faulty string} = \text{Total current of the remaining strings} = (N_s - 1) \times I_{sc}$$

- There is no risk of reverse current when there is only one string.
- When there are two strings with same number of PV modules connected in parallel, the reverse current will be always lower than the maximum permissible reverse current.

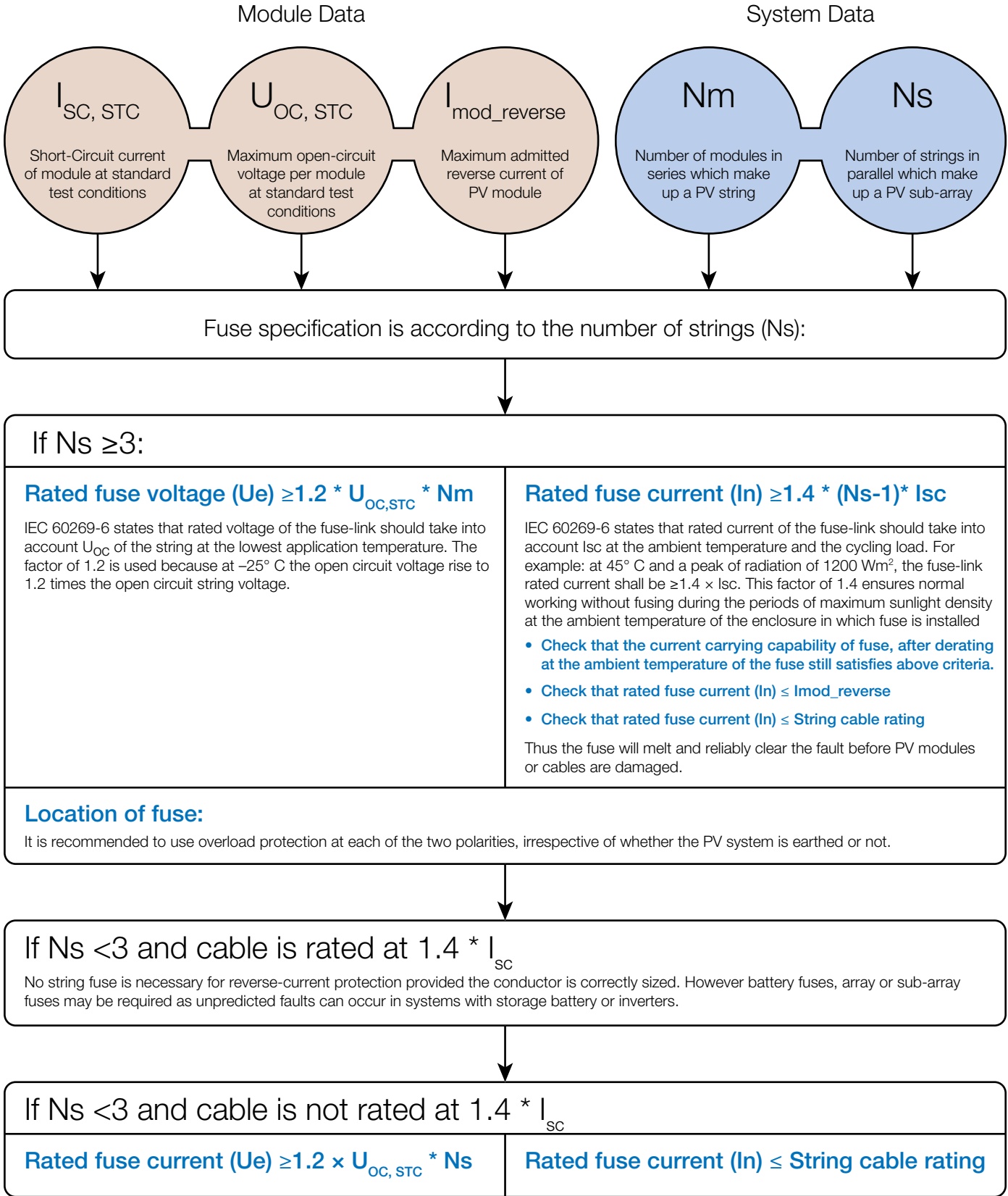
In both these cases there is no need for reverse current protection.

$$\text{Maximum number of strings that can be connected in parallel without string fuse protection} = 1 + \frac{I_{mod_reverse}}{I_{sc, STC}}$$



Following section seeks to provide a thumb rule for selection of fuse rating.

Fuse Rating Selection



Note: The same calculation has to be applied for selecting gPV fuses at the recombination level or at the input of the inverter.

Photovoltaic Fuse Link

Havells offers PV cylindrical fuses of size 10.3 mm x 38 mm and rated current from 2A-30 A, a special space-saving solution for protection of photovoltaic strings.

Applications

- PV string/array level protection
- In-line PV module protection
- Inverters
- Combiner/ Re-combiner boxes
- Battery charge controllers

Features

- High Breaking Capacity: for faults upto 40 kA
- High reliability: No downgrading of fuse characteristics over time.
- The energy released whilst eliminating the fault (fuse blowing) is contained within the cartridge (no degassing).
- Product dedicated to PV installations: Operating ranges adjusted for small over-currents specific to PV installations.
- Durable construction for enhanced system longevity
- Temperature cycle withstand capability

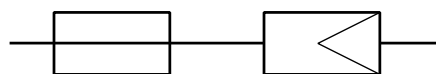
Standard Compliance

- IEC 60269-6:2010
- TUV Tested and approved
- CE marked

IEC 60269-6: Special operational class of gPV Fuses

Unlike typical AC systems, protection of PV strings poses unusual challenges due to high DC rated voltages, low load and low fault currents with the exception of capacitor discharge from the inverter or batteries which have a high peak and rate of rise. Normally the fault currents are only fractionally higher than system currents and the elimination of such low level overloads is a very challenging task for the fuse. Also current output varies rapidly depending on the irradiance incident on the modules during the day time and shading by cloud cover. PV fuses should not age in such situations in order to ensure high plant availability throughout the service life of the PV system. They must also be able to withstand high temperature fluctuations without damage. All this led to the development of gPV fuse-link ranges dedicated for photovoltaic string, sub array and array protection under such onerous conditions.

IEC 60269-6 Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems, standardizes the performance and dimensions of fuse-links specifically designed to protect these new applications. IEC stipulates a minimum rated breaking capacity of 10 kA. Havells fuse-links are tested to qualify IEC 60269-6 and also meet high breaking capacity of 40 kA for effective protection.



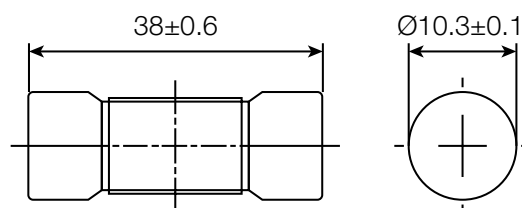
Commonly used symbol for PV fuses - it is a combination of PV string & fuse symbol.



Technical Specification

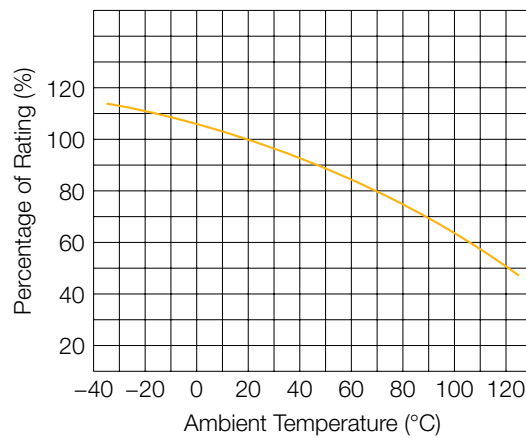
Rated Voltage	1000 Vdc
Rated Current (In)	2 A, 3 A, 4 A, 5 A, 6 A, 8 A, 10 A, 12 A, 15 A, 20 A, 25 A, 30 A
Standard	IEC 60269-6 : 2010
Max. Interrupting Rating	40 kA
Dimensions	ø10.3 mm x 38 mm
Class of operation	gPV (Photovoltaic fuses)
Power Dissipation	≤4.5 W at 0.7 In, ≤6.5 W at In

Dimensions (mm)



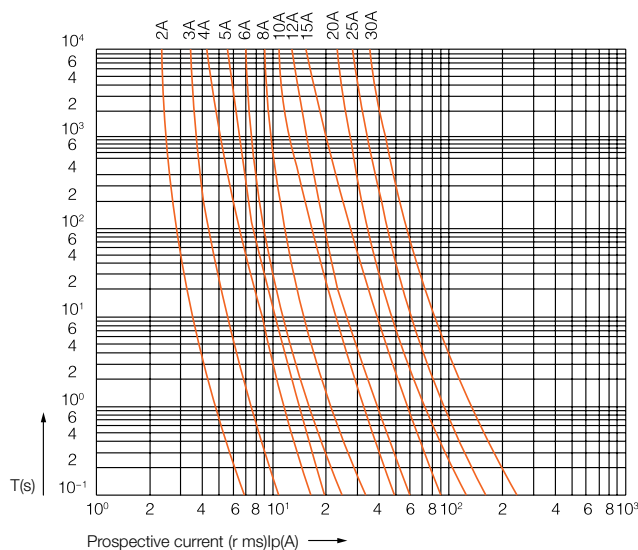
Ambient Temperature Compensation

PV module's output changes with the module temperature and also the amount of sun it is exposed to. The exposure is dependent on irradiance level, incline as well as shading effect from trees, buildings or clouds. Fuse links being thermal devices, they are influenced by ambient temperature. The current capability of the PV fuse links should be derated according to the curve shown:



Time-Current Characteristics

Conventional Non-fusing current (I_{nf})	$1.13 * I_n$	Test current at which the fuse must not trip for one hour
Conventional fusing current (I_f)	$1.45 * I_n$	Test current at which the fuse must trip within one hour



Ordering Details

S. No.	Rated Current (A)	Ordering Code	Std. / Master Packing (No. of Unit/s)
1	2	DHHRHP0002	10 N
2	3	DHHRHP0003	10 N
3	4	DHHRHP0004	10 N
4	5	DHHRHP0005	10 N
5	6	DHHRHP0006	10 N
6	8	DHHRHP0008	10 N
7	10	DHHRHP0010	10 N
8	12	DHHRHP0012	10 N
9	15	DHHRHP0015	10 N
10	20	DHHRHP0020	10 N
11	25	DHHRHP0025	10 N
12	30	DHHRHP0030	10 N

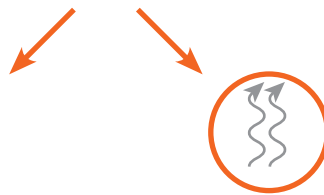
Photovoltaic Fuse-Disconnecter

Havells offers Photovoltaic Fuse Disconnecter for safe disconnection and protection of solar systems, from small installations to large PV farms. It is not designed for load break but is ideal for isolating photovoltaic module strings for maintenance. It has been designed for up to 1000 V direct current voltage with DC-PV0 utilization category. It is suitable to house cylindrical gPV 10.3 mm x 38 mm fuse up to 30 A.

Standard Conformity

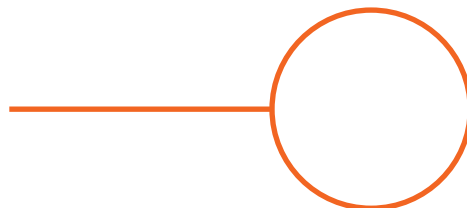
- IEC 60947-3:2008, Amd. 1:2012, Amd. 2:2015 in conjunction with IEC 60947-1:2007, Amd. 1:2010, Amd. 2:2014
- TUV Tested and Certified
- CE Marked

High Short-Circuit withstand rating – 40 kA



Venting grooves allow **better heat dissipation** which reduces operating temperature inside fuse-holders and ensures durability and reliability of the device over time.

No fuse pullers or tools required for fuse removal.



Local **fuse tripping signal** is available via an indicator light which turns ON when fuse is blown (open circuit).



All plastic parts are made of material **resistant to extremely high temperatures**. Glow wire 960 °C for insulating material that is retaining current carrying parts and 650 °C otherwise.



Safety terminals guide the cable towards cage terminal, ensuring proper error-free connections.



Bi-stable din-clip for easy mounting on a 35 mm Din rail & convenient removal.



Complete protection against touch according to IP 20.

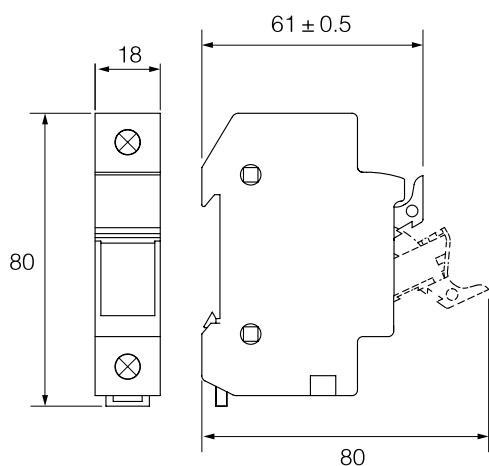


Convenient opening.

Technical Specification

Reference standard	IEC 60947-3:2008, AMD1:2012, AMD2:2015
Rated operational voltage Ue	1000 Vdc
Rated insulation voltage Ui	1000 Vdc
Rated impulse withstand voltage Uimp	8 kV
Rated operational current Ie	30 A
Utilization Category	DC-PV0
Suitable for Isolation	Yes
Load break disconnect	No
Fuse rating	≤30 A
Rated conditional short-circuit current	40 kA
Conventional free air thermal current Ith	30 A
Kind of protective device	gPV fuse-link, ø10.3*38 mm
Blown fuse indicator operating voltage	50-1000 Vdc
Rated power acceptance	≤6.5 W
Degree of protection	IP 20
Working Temperature	-5 °C to +40 °C
Pollution degree	3
Altitude above sea	≤2000 m
Mounting	35 mm DIN Rail
Tightening torque	2 Nm
Terminal Capacity	1 Sq. mm - 16 Sq. mm

Dimensions (mm)



Ordering Details

Rating	Poles	Blown fuse indicator	Product Code	Std. / Master Packing (No. of Unit/s)
30 A	1 P	No	DHFCSN301K	10 N
30 A	1 P	Yes	DHFDSN301K	10 N



◆ SURGE PROTECTION DEVICES

Photovoltaic systems are often located in isolated and exposed locations and generally have a large surface area. Thus the threat of lightning is quite common. The risk is multiple: direct effect (lightning strike on the panels) and indirect (surge on cells, solar chargers, inverters), or on other lines (data communication). Lightning surges and switching operations or power line faults in the upstream power supply system must also be taken into account.

The most noticeable effects from discharges are catastrophic damage with visible carbonization of system components. Less noticeable are the effects on the electrical system caused by the long term exposure to repeated high transient voltages. These transients may cause premature failure of modules and inverters, resulting in substantial repair and/or replacement costs, as well as lost generation revenue. While solar systems will always remain in highly exposed environments, protection against over-voltage surges can help ensure a long operational life.

SPDs installed at key locations will protect major components such as inverters, arrays, equipment in combiner boxes, measurement and control equipment, instrumentation systems, and communications systems from being affected by lightning induced current surges. These devices have an added benefit of protecting against utility generated transients. **Surge protection should be applied to both the AC and DC sides of the inverter**, as well as on applicable control and communication circuits.

Features:

- Visual as well as Remote end-of-life indicators.
- Cartridge's connection with base is secure & foolproof. Cartridge's mechanically loaded for correct fitment with base.
- Simple, Professional Installation of Arrester Modules
- High Terminal Capacity - 35 mm² for Ease of Installation.
- Bi-stable Snap-pusher for Easy Installation and Extraction from DIN-rail.
- TUV Tested and approved. CE compliant.

Range

DC SPD's

Type 1+2

Type 2

AC SPD's

Type 1+2

Type 2

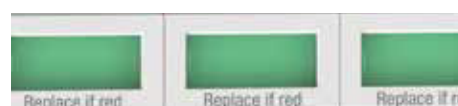
Dateline SPD

6 V, 12 V, 24 V, 48 V



Remote Signaling Contact

- Option to remotely monitor the status of the surge protector; get a signal when cartridge has reached end of life.
- Simplified cabling thanks to a single terminal for monitoring all poles.



- Satisfactory operation
- Cartridge must be replaced

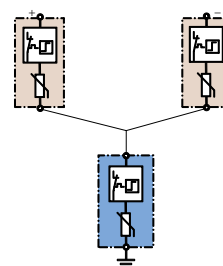
End of Life Indicator

Local Indication on Cartridge: Green shows satisfactory operation and Red indicates that Cartridge must be replaced.



Pluggable Cartridges

- Faulty cartridges can be replaced without changing the entire SPD.
- All cartridges are marked with characteristics for ease of maintenance.



Y-configuration for better protection

PV SPDs have a series connection of two MOVs between all potentials. Even in extreme cases, when one of the varistor fails, the flow of current can reliably continue through the second without being interrupted, thus ensuring maximum safety.

Surge Protection in Photovoltaic Installations

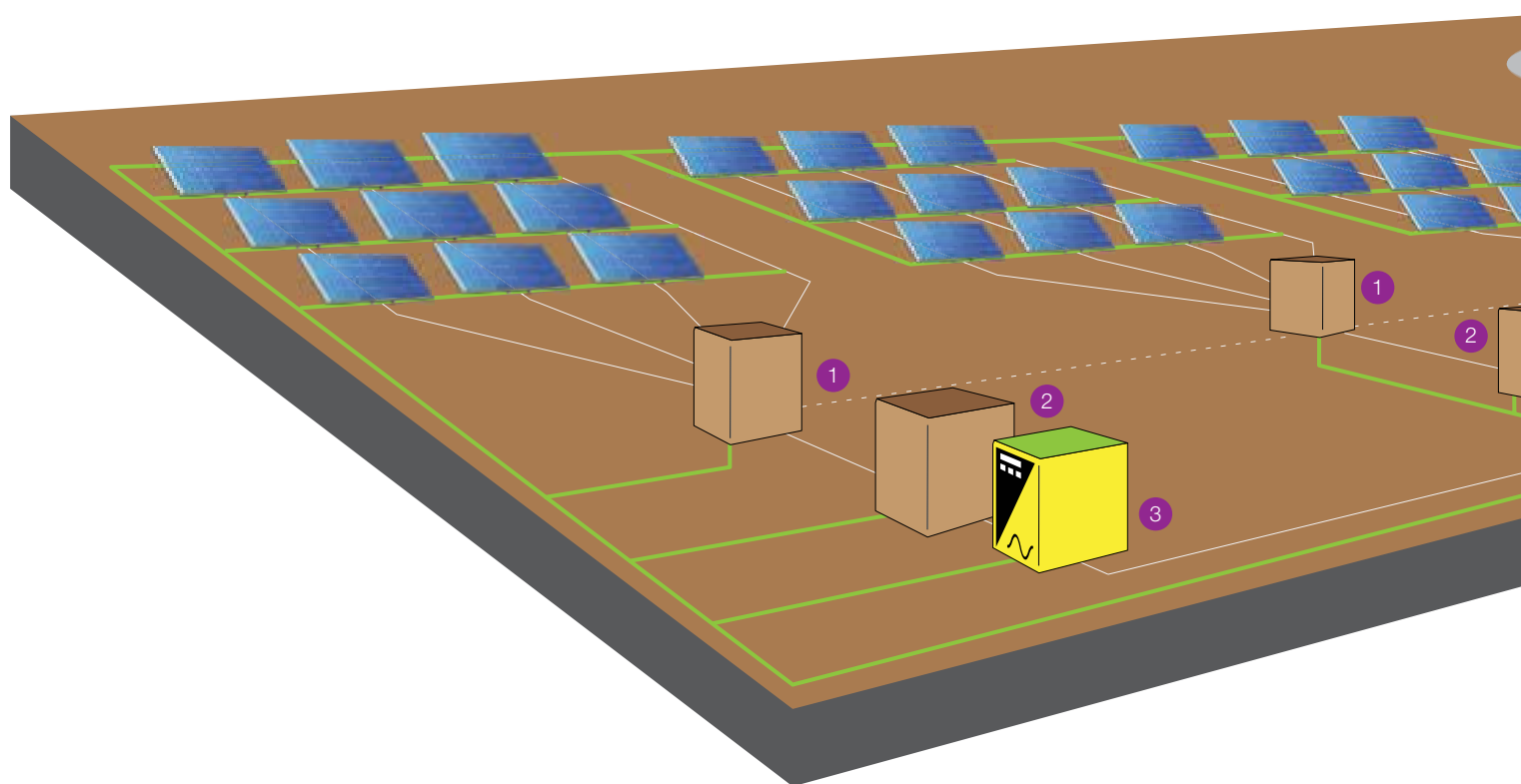
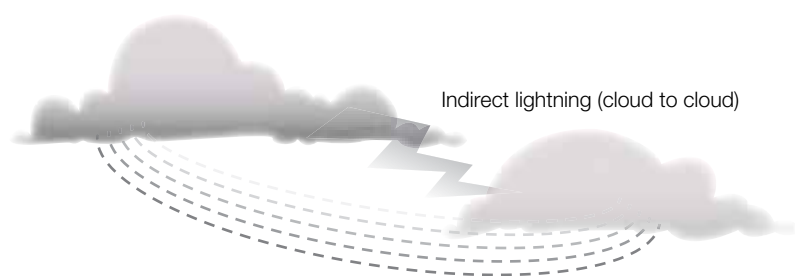
The appropriate SPD selection to protect PV installation verity is dependent on whether the PV array is protected by an external Lightning protection system (LPS), and if so, whether the minimum separation distance (IEC 62305-3) between the LPS and the metallic parts of the PV array has been kept.

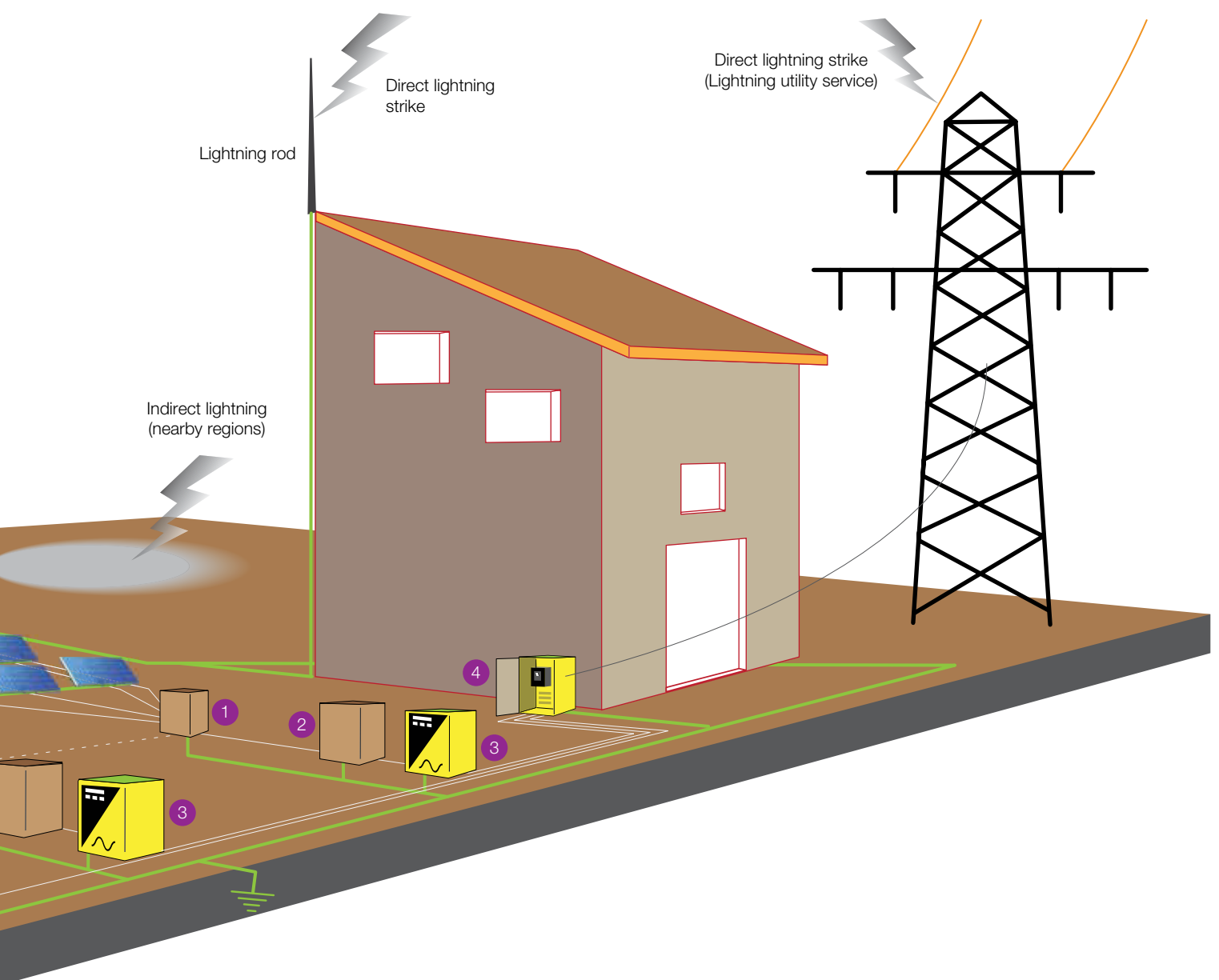
	DC Side		AC Side	
Location	1 Field Combiner Box	2 Re-combiner Box (DC side of inverter)	3 AC Box (AC side of inverter)	4 Main LV switch board (Delivery point)
Protection function	SPD protects panels and strings from atmospheric surges	SPD protects inverter from atmospheric surges	SPD protects inverter from atmospheric surges and grid-generated surges	SPD protects the AC side of electrical installation from atmospheric surges and grid-generated surges
SPD Requirement	Required if LDC < 10 m	Always required	Required if LAC < 10 m	Always required
Type of SPD	Use Type 1+2 SPD if separation distance according to IEC 62305 is not observed. Else use Type 2 SPD.		Type 2 SPD	Type 1+2 SPD if there is risk of direct lightning strike on the system (e.g. installations with lightning rods/ mains overhead line). Else use Type 2 SPD.

LDC = Distance between solar panels and inverter

LAC = Distance between inverter and mains LV Switch-board

Note: To be efficient, SPD connection cables to the upstream network and between the SPD's earth terminal block and ground bus-bar must be as short as possible.





Type 1+2 Photovoltaic Surge Protection Devices

The Type 1+2 PV SPD range allows the DC side of each PV installation i.e. arrays and inverters, to be effectively protected against over voltages, both due to direct lightning strikes (10/350 μ s discharge current wave) as well as indirect lightning strike and switching surges (8/20 μ s discharge current wave).



Range

Type 1+2 Photovoltaic Surge Protection Devices

Specification

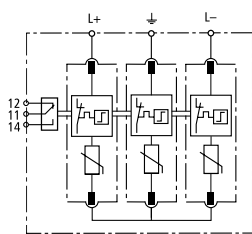
EN 50539-11:2013

Features

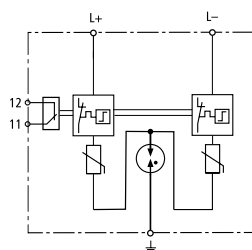
- Tested and Approved by TUV.
- High operating voltages 1200 Vdc.
- High Discharge Current:
Imax 60 kA for 4-module SPD (limp 12.5 kA)
Imax 40 kA for 3-module SPD (limp 6 kA)
- Remote signalling contact allows alarm report of cartridge failure to a supervision station.
- "Y" type circuit for a better protection.
- Both common & differential mode of protection

Technical Specification		
	Type 1+2 (12.5 kA)	Type 1+2 (6 kA)
Standard Compliance	EN 50539-11	EN 50539-11
Type	Type 1+2	Type 1+2
Max Continuous Operating DC Voltage Ucpv	1200 Vdc	1200 Vdc
Lightning Impulse (10/350 microsecond) limp	12.5 kA	6 kA
Nominal Discharge Current (8/20 microsecond) In	20 kA	20 kA
Max Discharge Current (8/20 microsecond) Imax	60 kA	40 kA
Voltage Protection Level Up	<4 kV	<4 kV
Short Circuit Current with Stand Iscpv	1000 A	1000 A
Leakage Current	<100 μ A	<100 μ A
Response Time	<25 ns	<25 ns
Operating State/Fault Indication	Green/No Light	Green/Red
Thermal Disconnecter	Internal	Internal
Fuses	Without	Without
Operating Temperature Range	-40 °C-80 °C	-40 °C-80 °C
Cross-section Area	4-35 Sq. mm	4-35 Sq. mm
For Mounting on	35 mm Din Rail	35 mm Din Rail
Enclosure Material	Thermoplastic UL94-V0	Thermoplastic UL94-V0
Degree of protection	IP 20	IP 20
Mode of Protection	IPE residual current	Icpv

Circuit Diagram:

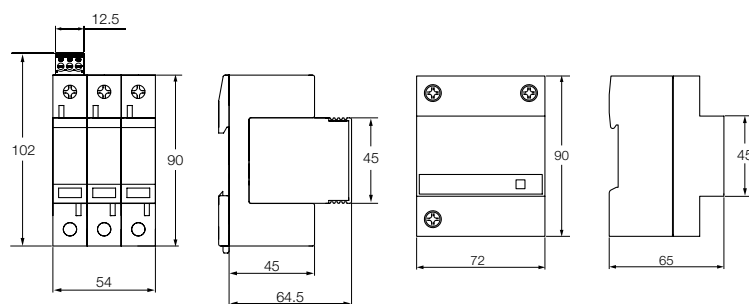


Type 1+2 SPD (6kA)



Type 1+2 SPD (12.5kA)

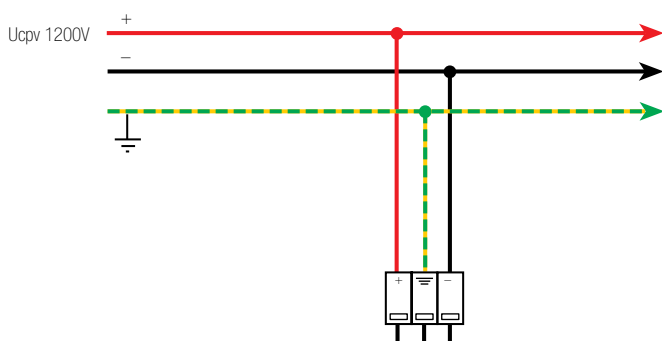
Dimensions:



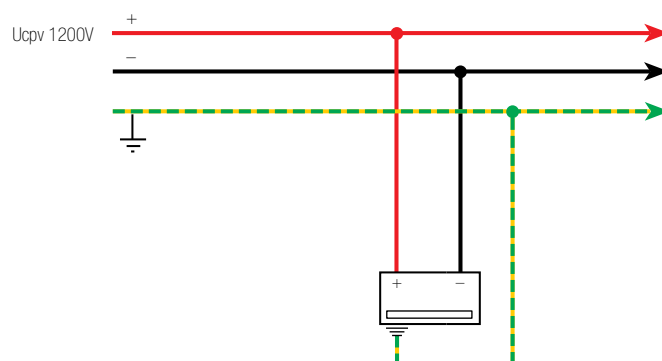
Type 1+2 SPD (6kA)

Type 1+2 SPD (12.5kA)

Connections:



Type 1+2 SPD (6kA)



Type 1+2 SPD (12.5kA)



Type 1+2 Photovoltaic Surge Protection Device (limp 12.5 kA)

Order Code	Ucpv (V)	In (kA)	Iimp (kA)	I _{max} (kA)	Up (kV)	Remote Signaling
DHSDANCC6012H	1200 Vdc	20	12.5	60	4	No
DHSDARCC6012H	1200 Vdc	20	12.5	60	4	Yes



Type 1+2 Photovoltaic Surge Protection Device (limp 6 kA)

Order Code	Ucpv (V)	In (kA)	Iimp (kA)	I _{max} (kA)	Up (kV)	Remote Signaling
DHSDANCB4012H	1200 Vdc	20	6	40	4	No
DHSDARCB4012H	1200 Vdc	20	6	40	4	Yes

Cartridges

Order Code	Pole	Ucpv (V)	In (kA)	Iimp (kA)	I _{max} (kA)	Up (kV)
DSSRCX0154	-	1200 Vdc	20	6	40	4

Type 2 Photovoltaic Surge Protection Devices

The Type 2 PV SPD range allows the DC side of each PV installation to be effectively protected against over voltages due to indirect lightning strikes and switching surges (8/20 μ s discharge current wave).



Range

Type 2 Photovoltaic Surge Protection Devices

Specification

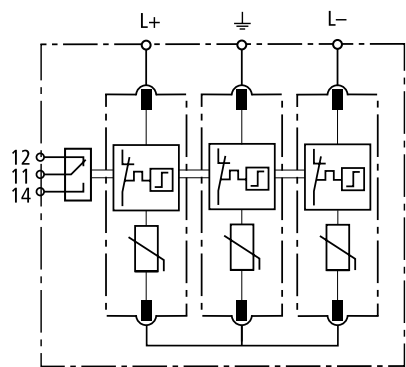
EN 50539-11: 2013

Features

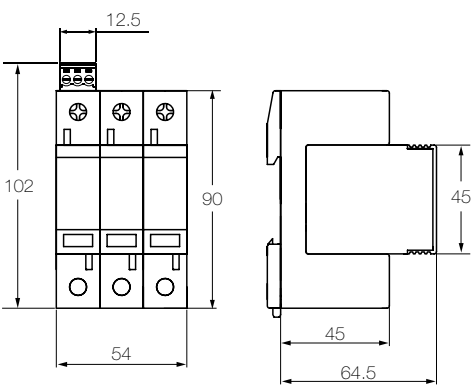
- Tested and Approved by TUV.
- High operating voltages 1200 Vdc
- Remote signalling contact allows alarm report of cartridge failure to a supervision station.
- High Discharge Current:
Maximum discharge current 40 kA.
- Both Common and Differential Mode Protection.
- Remote Monitoring Option.

Technical Specification	
Standard Compliance	EN 50539-11
Type	Type 2
Max Continuous Operating DC Voltage Ucpv	1200 Vdc
Nominal Discharge Current (8/20 microsecond) In	20 kA
Max Discharge Current (8/20 microsecond) Imax	40 kA
Voltage Protection Level Up	<4 kV
Short Circuit Current Withstand Iscp	1000 A
Leakage Current	<100 μ A
Response Time	<25 ns
Operating Temperature Range	-40 °C-80 °C
Humidity	5-95%
Installation	Indoor
Thermal Disconnecter	Internal
Fuses	Without
Operating State/Fault Indication	Green/Red
Cross-section Area	4-35 Sq. mm
For Mounting on	35 mm Din Rail
Enclosure Material	Thermoplastic UL94-V0
Degree of protection	IP 20

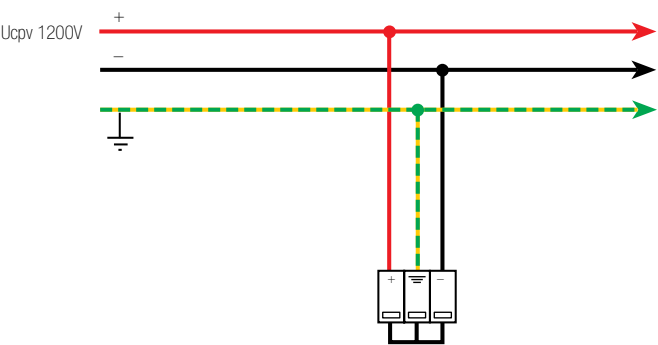
Circuit Diagram:



Dimensions:



Connections:



Type 2 Photovoltaic Surge Protection Device

Order Code	Ucpv (V)	In (kA)	I _{max} (kA)	Up (kV)	Remote Signaling
DHSD2NCN4012H	1200 Vdc	20	40	4	No
DHSD2RCN4012H	1200 Vdc	20	40	4	Yes

Cartridges

Order Code	Pole	Ucpv (V)	In (kA)	I _{max} (kA)	Up (kV)
DSSRCX0155	-	1200 Vdc	20	40	4



◆ INDUSTRIAL PLUG & CONNECTOR

Standard Compliance	IS/IEC 60309-1, 2
Current Rating	16 to 63 A
Pin Configurations	2 P+E, 3 P+E*, 3 P+N+E
Earth Contact Position	6 H, 3 H*
Rated Frequency	50/60 Hz
Rated Voltage	220-250 V~(2P+E), 380-440 V~(3P+E)*, 220/380-240/415 V~(3P+N+E)
Insulation Voltage	690 V
Housing Material	Flame Retardant PA6
Contact Material	Nickel Plated Brass
Glow Wire Test	850 °C for insulated parts necessary to retain current carrying parts, 650 °C for housing
Protection Degree CC	IP 44, IP 67
Operating Temperature	-25 °C to +40 °C

*Refer Page 111 for detailed specification of special plug & connectors for reefer application.

These are heavy-duty industrial plugs and connectors, used to provide power in areas exposed to dust, water or rough use having high demands for safety, reliability and durability.

The plugs and connectors adopt 'preventing incorrect insertion' design and their high grade thermoplastic material ensures flame-retardant properties, good electric insulation, high impact resistance, dustproof, damp-proof and watertight connections. They have an ergonomic design and ample wiring space for comfortable installation. Further, they provide high protection from indirect contact since ground contact is the first to be established and the last to separate.



Safe Unlocking

Unlock with just a tool. Marking indicates the location of locking clip.



Superior Cable Retention

Cable glands seal the cable as well as secure a safe grip, thus protecting against undue loosening.



Fast Assembly

Base and cover can be fixed with quick lock system without using screws, thereby saving time.

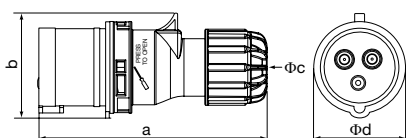


Secure Connections

Nickel plated brass pins and contact tubes for high quality electrical contact as well as convenient insertion and withdrawal

Industrial Plug

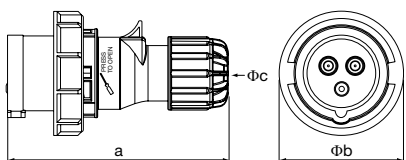
⚠ IP-44



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	120	133	150	155
b	57	75.5	80.5	89.5
c	15	17	22	22
d	53.5	68	72	79.5
Cable Size	1 Sq. mm ~2.5 Sq. mm	1 Sq. mm ~2.5 Sq. mm	2.5 Sq. mm ~6 Sq. mm	2.5 Sq. mm ~6 Sq. mm
Order Code	DHQBA63016	DHQBA65016	DHQBA63032	DHQBA65032
Std. / Master Packing (No. of Unit/s)	4 N	4 N	4 N	4 N

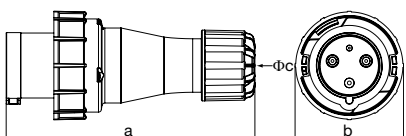
💧 IP-67



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	120	133	150	155
b	71	87	93	99.5
c	15	17	22	22
Cable Size	1 Sq. mm ~2.5 Sq. mm	1 Sq. mm ~2.5 Sq. mm	2.5 Sq. mm ~6 Sq. mm	2.5 Sq. mm ~6 Sq. mm
Order Code	DHQBB63016	DHQBB65016	DHQBB63032	DHQBB65032
Std. / Master Packing (No. of Unit/s)	4 N	4 N	4 N	2 N

💧 IP-67

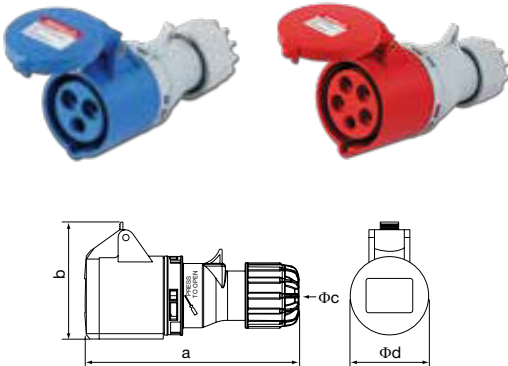


High Rating (63 A)

	63 A	63 A
	2P+E	3P+N+E
Dimensions (mm)		
a	260	260
b	113.5	113.5
c	32	32
Cable Size	6 Sq. mm ~16 Sq. mm	6 Sq. mm ~16 Sq. mm
Order Code	DHQBB63063	DHQBB65063
Std. / Master Packing (No. of Unit/s)	1 N	1 N

Industrial Connector

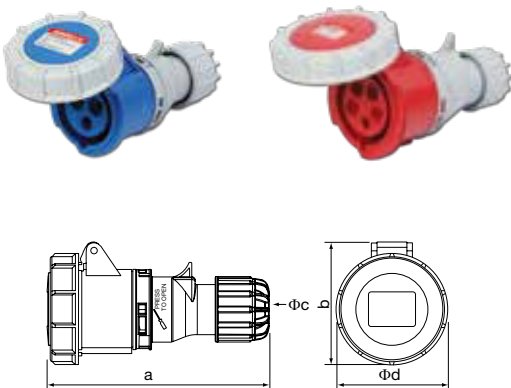
△ IP-44



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	130	142	162	163.5
b	75.6	89.5	94	100
c	15	17	22	22
d	52	62.8	64.6	71
Cable Size	1 Sq. mm ~2.5 Sq. mm	1 Sq. mm ~2.5 Sq. mm	2.5 Sq. mm ~6 Sq. mm	2.5 Sq. mm ~6 Sq. mm
Order Code	DHQDA63016	DHQDA65016	DHQDA63032	DHQDA65032
Std. / Master Packing (No. of Unit/s)	4 N	4 N	4 N	4 N

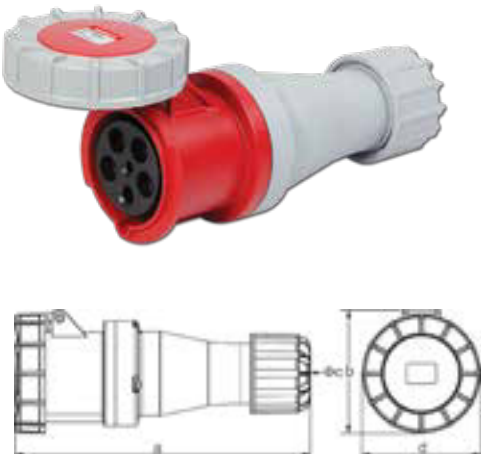
●● IP-67



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	134	146	166	171
b	78.5	93	98	104
c	15	17	22	22
d	71	86.5	93.5	99.5
Cable Size	1 Sq. mm ~2.5 Sq. mm	1 Sq. mm ~2.5 Sq. mm	2.5 Sq. mm ~6 Sq. mm	2.5 Sq. mm ~6 Sq. mm
Order Code	DHQDB63016	DHQDB65016	DHQDB63032	DHQDB65032
Std. / Master Packing (No. of Unit/s)	4 N	4 N	4 N	2 N

●● IP-67



High Rating (63 A)

	63 A
	3P+N+E
Dimensions (mm)	
a	260
b	113.5
c	32
c	111
Cable Size	6 Sq. mm ~16 Sq. mm
Order Code	DHQDB65063
Std. / Master Packing (No. of Unit/s)	1 N



◆ INDUSTRIAL WALL-
MOUNTED SOCKET
& PANEL SOCKET

Standard Compliance	IS/IEC 60309-1, 2
Current Rating	16 A to 63 A
Pin Configurations	2P+E, 3P+E*, 3P+N+E
Earth Contact Position	6 h, 3 h*
Rated Frequency	50/60 Hz
Rated Voltage	220-250 V~(2P+E), 380-440 V~(3P+E)*, 220/380-240/415 V~(3P+N+E)
Insulation Voltage	690 V
Housing Material	Flame Retardant PA6
Contact Material	Nickel Plated Brass
Glow Wire Test	850 °C for insulated parts necessary to retain current carrying parts, 650 °C for housing
Protection Degree CC	IP 44, IP 67
Operating Temperature	-25 °C to +40 °C

*Refer Page 111 for detailed specification of special sockets for reefer application.

Havells provides a comprehensive range of wall-mounted sockets and panel-mounted sockets, used to provide power in areas exposed to dust, water or rough use having high demands for safety, reliability and durability. They adopt 'preventing incorrect insertion' design and their high grade thermoplastic material ensures flame-retardant properties, good electric insulation, high impact resistance, dustproof, damp-proof and watertight connections. Nickel plated contacts provide better corrosion resistance in aggressive environments and at high degrees of air humidity. They have an ergonomic design and ample wiring space for comfortable installation. Further, they provide high protection from indirect contact since ground contact is the first to be established and the last to separate.



Quick Installation

During installation, it is only required to dismantle the cover top of the enclosure.



Hinged Cover

Auto locking of socket flap on plug removal. Reduces potential for accumulation of dust and moisture inside cover.



Ease of Assembly

Separable and sealed type design structure for the enclosure of sockets, which can be disassembled and assembled conveniently, safely and quickly.



Terminal Identification

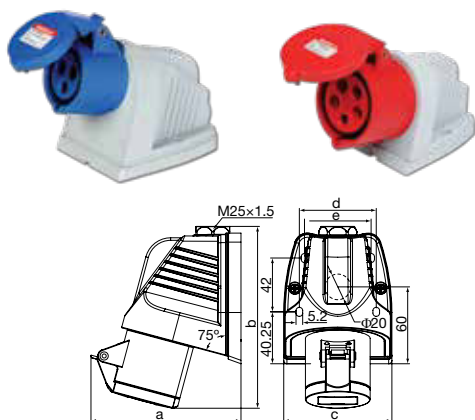
Clear terminal marking for phase, neutral & earth.

Double Secure Wiring

Higher rating has two screws per terminal for fail-safe connections.

Industrial Wall-mounted Socket

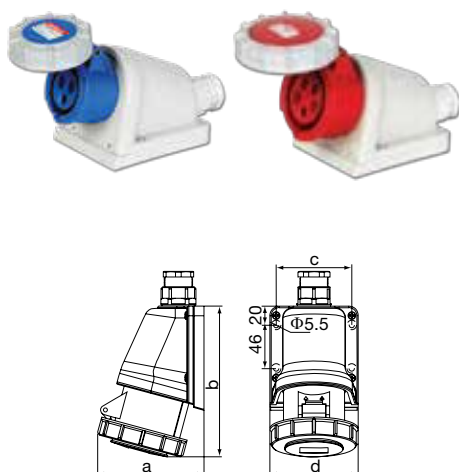
⚠ IP-44



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	117	118.5	120	119
b	142	114.5	156	158
c	84.4	84.4	84.4	84.4
d	60	60	60	60
e	52	52	52	52
Cable Size	1.5 Sq. mm ~4 Sq. mm	1.5 Sq. mm ~4 Sq. mm	2.5 Sq. mm ~10 Sq. mm	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQSA63016	DHQSA65016	DHQSA63032	DHQSA65032
Std. / Master Packing (No. of Unit/s)	2 N	2 N	2 N	2 N

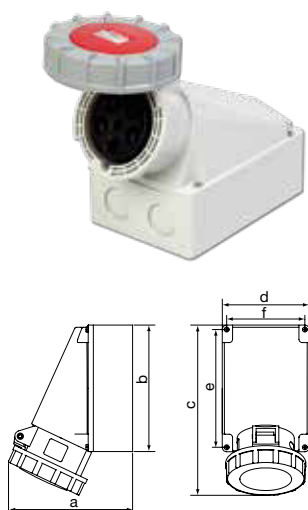
💧💧 IP-67



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	101	107	114	116
b	150	151	162	163
c	80	80	80	80
d	93.5	93.5	93.5	93.5
Cable Size	1.5 Sq. mm ~4 Sq. mm	1.5 Sq. mm ~4 Sq. mm	2.5 Sq. mm ~10 Sq. mm	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQSB63016	DHQSB65016	DHQSB63032	DHQSB65032
Std. / Master Packing (No. of Unit/s)	2 N	2 N	2 N	2 N

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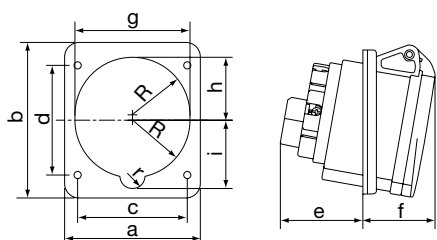


High Rating (63 A)

	63 A
	3P+N+E
Dimensions (mm)	
a	171
b	170
c	230
d	118
e	135
f	105
Cable Size	6 Sq. mm ~25 Sq. mm
Order Code	DHQSB65063
Std. / Master Packing (No. of Unit/s)	1 N

Industrial Panel Socket

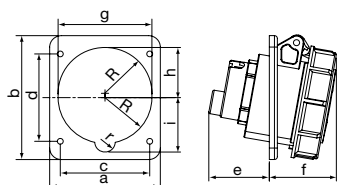
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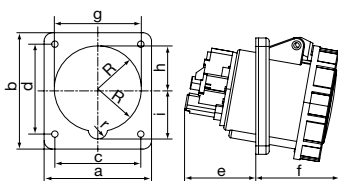
Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	75.5	75.5	75.5	80
b	86.5	86.5	86.5	90
c	61	61	61	65
d	61	61	61	70
e	36	40	55	51
f	37	41	42	45
g	57.5	64	64	70
h		35	35	37.5
i		38	38	40.5
R		32	32	35
r		7	7	7
Cable Size	1.5 Sq. mm ~4 Sq. mm	1.5 Sq. mm ~4 Sq. mm	2.5 Sq. mm ~10 Sq. mm	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQCA63016	DHQCA65016	DHQCA63032	DHQCA65032
Std. / Master Packing (No. of Unit/s)	6 N	4 N	4 N	4 N

◆◆ IP-67



Low Rating (16 A & 32 A)



High Rating (63 A)

Low Rating (16 A & 32 A) and High Rating (63 A)

	16 A		32 A		63 A
	2P+E	3P+N+E	2P+E	3P+N+E	3P+N+E
Dimensions (mm)					
a	75.5	75.5	75.5	80	100
b	86.5	86.5	86.5	90	110
c	61	61	61	65	80
d	61	61	61	70	85
e	41	41.5	52.5	51.5	66.5
f	45	46	49.5	52.5	77.5
g	64	64	64	70	81
h	35	35	35	37.5	42.5
i	38	38	38	40.5	45.5
R	32	32	32	35	9
r	7	7	7	7	40.5
Cable Size	1.5 Sq. mm ~4 Sq. mm	1.5 Sq. mm ~4 Sq. mm	2.5 Sq. mm ~10 Sq. mm	2.5 Sq. mm ~10 Sq. mm	6 Sq. mm ~25 Sq. mm
Order Code	DHQCB63016	DHQCB65016	DHQCB63032	DHQCB65032	DHQCB65063
Std. / Master Packing (No. of Unit/s)	4 N	4 N	4 N	3 N	1 N



◆ INDUSTRIAL INTERLOCKING SOCKET

Standard Compliance	IS/IEC 60309-1, 2, 4
Current Rating	16 A to 63 A
Pin Configurations	2P+E, 3P+E*, 3P+N+E
Earth Contact Position	6 h, 3 h*
Rated Frequency	50/60 Hz
Rated Voltage	220-250 V~(2P+E), 380-440 V~(3P+E)*, 220/380-240/415 V~(3P+N+E)
Insulation Voltage	690 V
Housing Material	Flame Retardant PA6
Contact Material	Nickel Plated Brass
Glow Wire Test	850 °C for insulated parts necessary to retain current carrying parts, 650 °C for housing
Protection Degree CC	IP 44, IP 67
Operating Temperature	-25 °C to +40 °C

*Refer Page 111 for detailed specification of special sockets for reefer application.

These are heavy-duty industrial sockets with additional safety due to mechanical interlocking feature. They are used to provide power in areas exposed to dust, water or rough use having high demands for safety, reliability and durability.

The interlocking sockets also adopt 'preventing incorrect insertion' design and their high grade thermoplastic material ensures flame-retardant properties, good electric insulation, high impact resistance, dustproof, damp proof and watertight connections. Nickel plated contacts provide better corrosion resistance in aggressive environments and at high degrees of air humidity. Further, they provide high protection from indirect contact since ground contact is the first to be established and the last to separate.



Key-Lock Facility

Switch with handle which can be padlocked from outside in position 'O' and 'I'.



Comfortable Installation

Ample wiring space is provided.



Mechanical Interlocking

Switch can be operated only when it is plugged-in properly. The plug can only be pulled out when the switch is 'OFF'. This prevents unintended withdrawal and ensure safe operation.

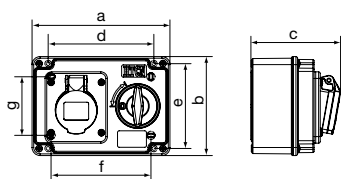


Sockets with MCB/RCCB/RCBO Protection

Provision to install protection devices (upto 4 module width) for overload/short-circuit/leakage fault protection. Transparent window allows user to easily view the status of switching devices.

Industrial Interlocking Socket

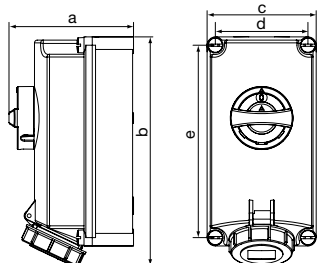
⚠ IP-44



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	167	167	167	167
b	120	120	120	120
c	108	112	118	120.5
d	128	128	128	128
e	102.8	102.8	102.8	102.8
f	121	121	121	121
g	71	71	71	71
Cable Size	1.5 Sq. mm ~4 Sq. mm	1.5 Sq. mm ~4 Sq. mm	2.5 Sq. mm ~10 Sq. mm	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQIA63016	DHQIA65016	DHQIA63032	DHQIA65032
Std. / Master Packing (No. of Unit/s)	1 N	1 N	1 N	1 N

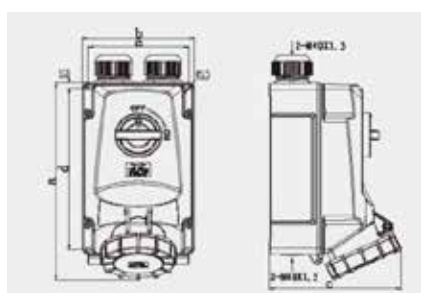
💧 IP-67



Low Rating (16 A & 32 A)

	16 A		32 A	
	2P+E	3P+N+E	2P+E	3P+N+E
Dimensions (mm)				
a	135.8	135.8	142.5	147
b	248	248	256.5	256.5
c	119	119	119	119
d	101	101	101	101
e	208	208	208	208
Cable Size	1.5 Sq. mm ~4 Sq. mm	1.5 Sq. mm ~4 Sq. mm	2.5 Sq. mm ~10 Sq. mm	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQWB63016	DHQWB65016	DHQWB63032	DHQWB65032
Std. / Master Packing (No. of Unit/s)	1 N	1 N	1 N	1 N

💧 IP-67



High Rating (63 A)

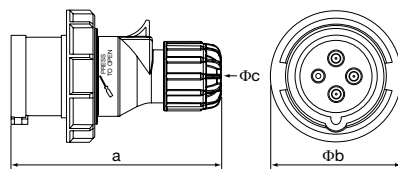
	63 A	
	3P	5P
Dimensions (mm)		
a	300	300
b	163	163
c	191	191
d	245	245
e	146	146
Cable Size	6 Sq. mm ~25 Sq. mm	6 Sq. mm ~25 Sq. mm
Order Code	DHQWB63063	DHQWB65063
Std. / Master Packing (No. of Unit/s)	1 N	1 N

Plug & Socket for Reefer Container

On ships and in harbor terminals, power loss spells disaster. To meet with strict requirement of these applications, Havells has watertight (IP-67) plug & sockets, with earth sleeve in 3 O'clock position, according to IEC/EN 60309-2.

Plug

(32 A, 380 V-440 V~, 3P+E)

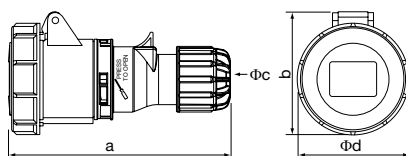


Dimensions (mm)

a	150
b	93
c	22
Cable Size	2.5 Sq. mm ~6 Sq. mm
Order Code	DHQB34032
Std. / Master Packing (No. of Unit/s)	4 N

Connector

(32 A, 380 V-440 V~, 3P+E)

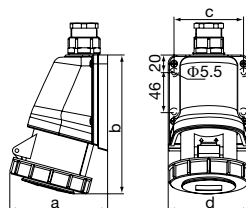


Dimensions (mm)

a	166
b	98
c	22
d	93.5
Cable Size	2.5 Sq. mm ~6 Sq. mm
Order Code	DHQDB34032
Std. / Master Packing (No. of Unit/s)	4 N

Wall Mounted Socket

(32 A, 380 V-440 V~, 3P+E)

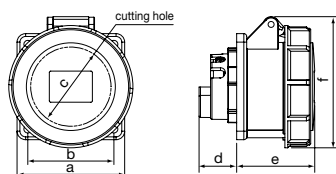


Dimensions (mm)

a	114
b	162
c	80
d	93.5
Cable Size	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQSB34032
Std. / Master Packing (No. of Unit/s)	2 N

Panel Socket

(32 A, 380 V-440 V~, 3P+E)

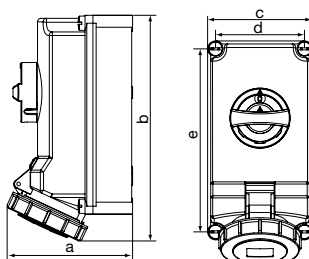


Dimensions (mm)

a	75
b	60
c	57.5
d	29.2
e	64.5
f	97.5
Cable Size	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQCB34032
Std. / Master Packing (No. of Unit/s)	4 N

Inter locking Socket

(32 A, 380 V-440 V~, 3P+E)



Dimensions (mm)

a	142.5
b	256.5
c	119
d	101
e	208
Cable Size	2.5 Sq. mm ~10 Sq. mm
Order Code	DHQWB34032
Std. / Master Packing (No. of Unit/s)	1 N



SOLUTION WITH
INSULATED PLUG &
SOCKET

Industrial plug and socket solutions are an important part of new age manufacturing, hospitality and construction industry. These devices extend a high grade of protection, with flexibility of installation near to the site. Havells industrial plug and socket solutions are designed with an in-depth understanding of Indian subcontinent conditions. The solution is IS 8623 compliant and fulfills the requirement of safe and durable connection in rough environments – whether commercial or industrial. User can conveniently choose and install any of the switchgear devices (MCB/RCCB or Isolator) for protection of downstream equipment. The solution comes with factory-fitted industrial plug and internal wiring kit for easy and quick assembly.

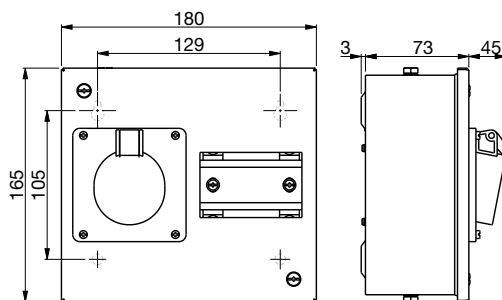
Features :

- Conforms to IS 8623, IS/IEC 60309-1/2.
- IP40 ingress protection. Plugs and sockets are IP 44 compliant.
- Suitable for surface and flush mounting.
- Havells 7T powder coating process ensures excellent aesthetics and long life.



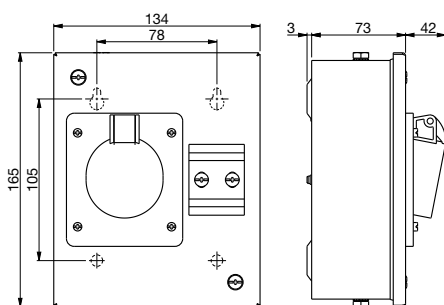
Solution with Insulated Plug & Socket

32 A 3P+N+E



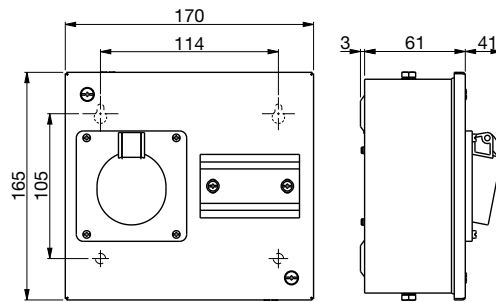
Current : 32 A
Voltage : 415 Vac
Pins : 5 PIN (3P+N+E)
Std. / Master Packing : 1 N
(No. of Unit/s)
Order Code : DHDPBTN032

32 A 2P+E



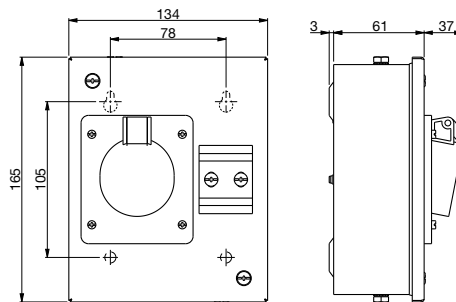
Current : 32 A
Voltage : 240 Vac
Pins : 3 PIN (2P+E)
Std. / Master Packing : 1 N
(No. of Unit/s)
Order Code : DHDPBDP032

16 A 3P+N+E



Current	: 16 A
Voltage	: 415 Vac
Pins	: 5 PIN (3P+N+E)
Std. / Master Packing	
(No. of Unit/s)	: 1 N
Order Code	: DHDPBTN016

16 A 2P+E



Current	: 16 A
Voltage	: 240 Vac
Pins	: 3 PIN (2P+E)
Std. / Master Packing	
(No. of Unit/s)	: 1 N
Order Code	: DHDPBDP016

Note: MCB/RCCB/Isolator are not a part of standard solution and have to be ordered separately.



◆ METALICA
DISTRIBUTION
BOARDS



Metalica series of Distribution Boards is yet another testimony to the advanced Havells research which focuses on user-centered design especially in its aesthetics & engineering qualities, and pivots on the concepts of variety, performance and simplicity of use. The series has been designed to meet the aesthetic requirements of the modern interiors which demand that a distribution board should blend perfectly with other decorative elements of the room, be it the living room of a house or a corporate office or a showroom.

The unique design and 'ease of use' of Metalica Distribution Boards truly set them apart. The premium metallic finish, specially designed curved surface on the front cover and 'Pull To Open' type magnetic door handle reflect that even the smallest of detail has been perfected to ensure superior user experience. The provision for split neutral to provide for two different types of power supply is again a testimony to our extensive research and customer understanding.

Havells Metalica Distribution Boards have been designed using the latest available technology and comply with the following standards: IEC 61439 - 3.



Magnetic door lock with easy to open door handle



Scratch resistant glossy surface



Provided with transparent Cement Guard to protect your DB from construction spill over



Remove link to use split neutral provision

- Use 1st neutral link for mains supply
- Use 2nd neutral link for stand by supply

SPN Metalica DB

**Range**

SPN – 4, 6, 8, 12 & 16 Ways

Color

Silverish Grey, Sparkling White & Sparkling Gold

Specification

IEC 61439-3, IS 13032 & IS 8623

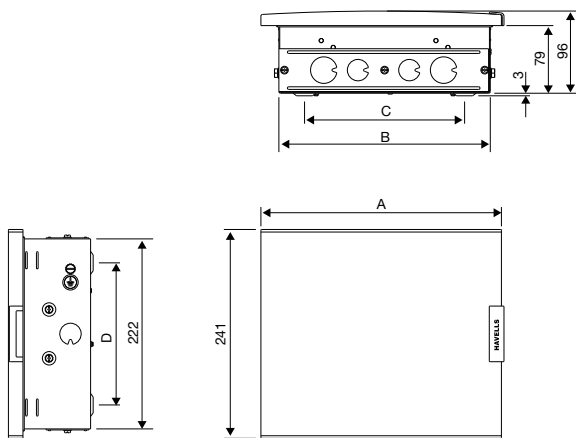
Features

- Magnetic door lock with easy to open door handle
- Scratch resistant glossy surface
- Remove link to use split neutral provision
 - Use 1st neutral link for mains supply
 - Use 2nd neutral link for stand by supply
- Provided with transparent Cement Guard to protect your DB from construction spill over
- IP 42

Dimensions (in mm)

No. of Ways	A	B	C	D	Top		Bottom		Side	Sheet Thickness
					Ø25	Ø31	Ø25	Ø31		
4	209	175	125	172	3	-	3	-	1	1
6	245	211	151	166	3	-	3	-	1	1
8	281	247	187	166	2	2	2	2	1	1
12	353	319	269	176	4	2	4	2	1	1
16	425	391	341	172	4	2	4	2	1	1

Knockout Holes (Ø25 & Ø31)

**SPN Metalica DB**

No. of Ways	O/G	Sparkling White Cat. No.	Sparkling Gold Cat. No.	Silverish Grey Cat. No.
4	4	DHDNSHODAW04	DHDNSHODGW04	DHDNSHODDW04
6	6	DHDNSHODAW06	DHDNSHODGW06	DHDNSHODDW06
8	8	DHDNSHODAW08	DHDNSHODGW08	DHDNSHODDW08
12	12	DHDNSHODAW12	DHDNSHODGW12	DHDNSHODDW12
16	16	DHDNSHODAW16	DHDNSHODGW16	DHDNSHODDW16

TPN Metalica DB



Range

TPN – 4, 6, 8 & 12 Ways

Color

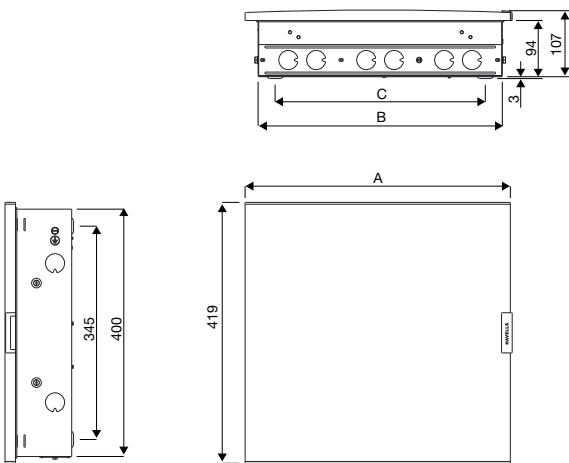
Silverish Grey, Sparkling White & Sparkling Gold

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Magnetic door lock with easy to open door handle
- Scratch resistant glossy surface
- Remove link to use split neutral provision
 - Use 1st neutral link for mains supply
 - Use 2nd neutral link for stand by supply
- Provided with transparent Cement Guard to protect your DB from construction spill over
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
				Ø31	Ø31		
4	285	251	196	4	4	2	1
6	357	323	268	6	6	2	1
8	429	395	340	6	6	2	1
12	568	534	479	8	8	2	1

Knockout Holes (Ø31)

TPN Metalica DB

No. of Ways	I/C+O/G	Sparkling White Cat. No.	Sparkling Gold Cat. No.	Silverish Grey Cat. No.
4	4+12	DHDNTHODAW04	DHDNTHODGW04	DHDNTHODDW04
6	8+18	DHDNTHODAW06	DHDNTHODGW06	DHDNTHODDW06
8	8+24	DHDNTHODAW08	DHDNTHODGW08	DHDNTHODDW08
12	8+36	DHDNTHODAW12	DHDNTHODGW12	DHDNTHODDW12



◆ QVE PLUS DISTRIBUTION BOARDS

AFTER ALL, A PROTECTOR NEEDS TO BE TOUGH.

Introducing QVE Plus Distribution Boards

Features

- Robust core with smooth curve semantic
- Innovative textured finish with optimized play of matte and gloss
- Multiple premium colour finishes



SPN QVE PLUS DB

**Range**

SPN – 4, 6, 8, 12 & 16 Ways

Color

Super White & Mineral Grey

Specification

IEC 61439-3, IS 13032 & IS 8623

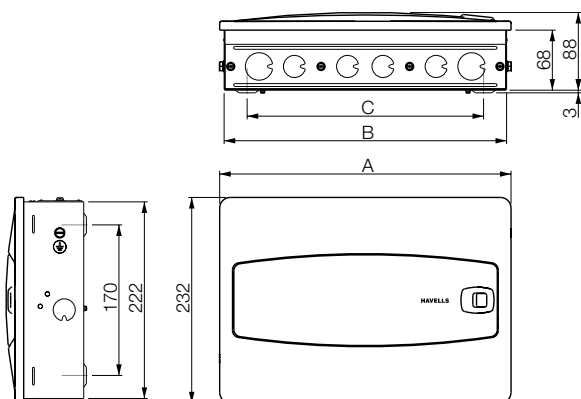
Features

- Robust core with smooth curve semantic
- Innovative textured finish with optimized play of matte and gloss
- Raised neutral link for easy wiring
- Suitable for surface & flush mounting
- Detachable din bar with end stoppers for easy assembly of breakers
- Level marks for providing indication for fitment in wall
- Supplied with neutral & earth link, top & bottom detachable plates
- Supplied with masking sheet to protect components from cement during plastering
- IP 42

Dimensions (in mm)

No. of Ways	A	B	C	Knockout Holes				
				Top		Bottom		Side
				Ø25	Ø31	Ø25	Ø31	
4	186	175	123	-	2	-	2	1
6	222	211	159	3	-	3	-	1
8	258	247	195	2	2	2	2	1
12	330	319	267	4	2	4	2	1
16	402	391	339	4	2	4	2	1

Knockout Holes (Ø25 & Ø31)

**SPN QVE PLUS DB**

No. of Ways	O/G	Super White Cat. No.	Mineral Grey Cat. No.
4	4	DHDMSHODOW04	DHDMSHODDW04
6	6	DHDMSHODOW06	DHDMSHODDW06
8	8	DHDMSHODOW08	DHDMSHODDW08
12	12	DHDMSHODOW12	DHDMSHODDW12
16	16	DHDMSHODOW16	DHDMSHODDW16

TPN QVE PLUS DB



Range

TPN – 4, 6, 8 & 12 Ways

Color

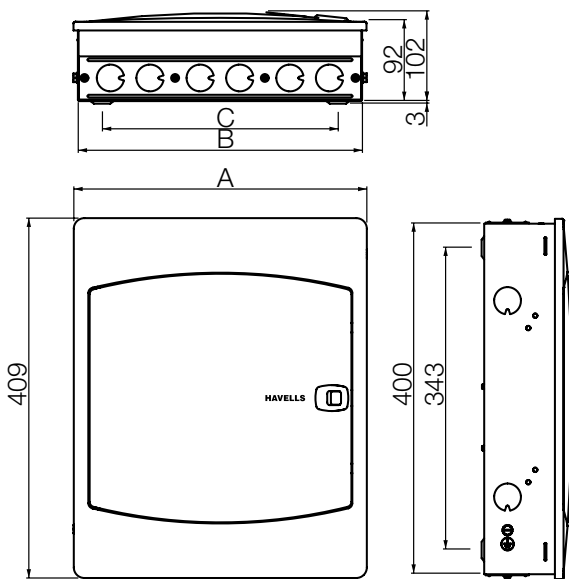
Super White & Mineral Grey

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Robust core with smooth curve semantic
- Innovative textured finish with optimized play of matte and gloss
- Raised neutral link for easy wiring
- Suitable for surface & flush mounting
- Detachable din bar with end stoppers for easy assembly of breakers
- Level marks for providing indication for fitment in wall
- Supplied with neutral & earth link, top & bottom detachable plates
- Supplied with masking sheet to protect components from cement during plastering
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Knockout Holes		
				Top	Bottom	Side
				Ø31	Ø31	Ø31
4	261	251	196	4	4	2
6	333	323	268	6	6	2
8	405	395	340	6	6	2
12	549	539	484	8	8	2

Knockout Holes (Ø31)

TPN QVE PLUS DB

No. of Ways	I/C+O/G	Super White Cat. No.	Mineral Grey Cat. No.
4	4+12	DHDMTHODOW04	DHDMTHODDW04
6	8+18	DHDMTHODOW06	DHDMTHODDW06
8	8+24	DHDMTHODOW08	DHDMTHODDW08
12	8+36	DHDMTHODOW12	DHDMTHODDW12



◆ DISTRIBUTION BOARDS WITH LOCK

Havells research focuses on user-centered design especially engineering qualities, and pivots on the concepts of variety, performance and simplicity of use. The DB series with key lock feature has been designed to meet the demand of a secure distribution board placed at a location accessible to strangers .The user can access full control Of DB operation to secure it from any misuse or theft of components . The DB styled to meet the modern day aesthetics is yet another state of art product from the leader in customer driven innovation .

Range

- Distribution Board With Metal Key Lock (SPN)
- Distribution Board With Metal Key Lock (TPN)



SPN Metal Key Lock DB



Range

SPN – 8 & 12 Ways

Color

Regal Grey

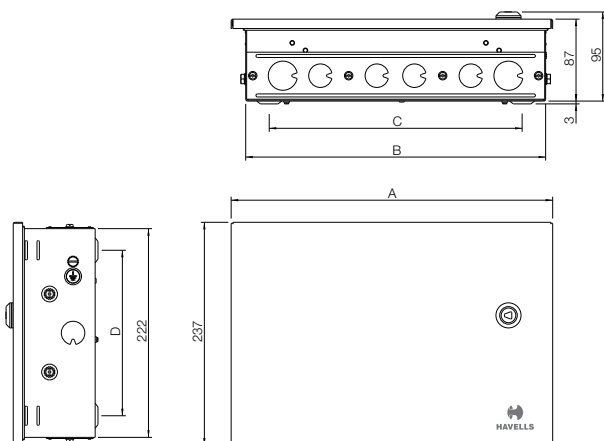
Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Metal key lock
- Remove link to use split neutral provision
 - Use 1st neutral link for mains supply
 - Use 2nd neutral link for stand by supply
- Provided with transparent Cement Guard to protect your DB from construction spill over
- IP 42

Dimensions (in mm)



No. of Ways	A	B	C	D	Knockout Holes				
					Top		Bottom		Side
					Ø25	Ø31	Ø25	Ø31	
8	270	247	197	166	2	2	2	2	1
12	342	319	269	176	4	2	4	2	1

No. of Ways	SAP Code	Description
8	DHDMSHODCW08	SPN 8W DD DB WITH LOCK
12	DHDMSHODCW12	SPN 12W DD DB WITH LOCK

TPN Metal Key Lock DB



Range

TPN – 4, 6 & 8 Ways

Color

Regal Grey

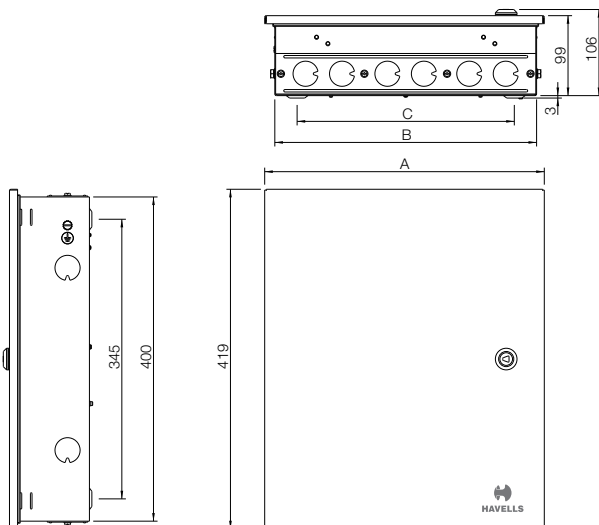
Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Metal key lock
- Remove link to use split neutral provision
 - Use 1st neutral link for mains supply
 - Use 2nd neutral link for stand by supply
- Provided with transparent Cement Guard to protect your DB from construction spill over
- IP 42

Dimensions (in mm)



No. of Ways	A	B	C	Knockout Holes		
				Top	Bottom	Side
				Ø25	Ø31	
4	270	251	196	4	4	2
6	345	323	268	6	6	2
8	417	395	340	6	6	2

No. of Ways	SAP Code	Description
4	DHDMTHODCW04	TPN 4W DD DB WITH LOCK
6	DHDMTHODCW06	TPN 6W DD DB WITH LOCK
8	DHDMTHODCW08	TPN 8W DD DB WITH LOCK



◆ PHASE SELECTOR DISTRIBUTION BOARDS

The power instability in developing countries creates the need for phase selection to back up the utility supply. In such systems, in case of phase outage, the load can be shifted to healthy phase, to maintain continuity of supply. Havells offers Phase Selector Distribution Board and retrofittable Phase Selector Units to serve this purpose. They are available in two versions – manual and automatic.

Range:

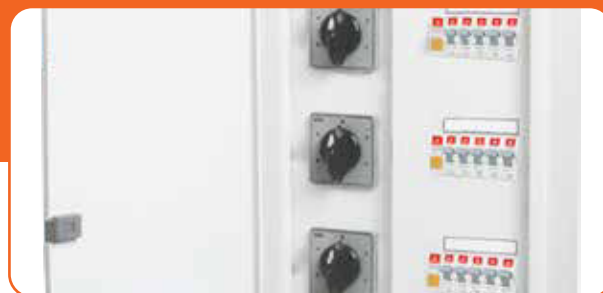
- Manual Phase Selector DB (Horizontal - 4 Quadrant)
- Manual Phase Selector DB (Vertical)
- Automatic Phase Selector DB
- Phase Selector Enclosure (Vertical)
- Automatic Phase Selector Unit

Specification

IEC 61439-3, IS 13032 & IS 8623



Automatic changeover to healthy phase in case of phase outage/ over-voltage/ under-voltage. Operational status indication through LEDs



Manual phase selector DB which allows shifting to healthy phase using phase selector switches



Easy Retro-fit Solutions - Provision to change your existing TPN DB to automatic/manual phase selector DB in a simple, economical and easy to use manner.

Automatic Phase Selector DB

The power instability in developing countries creates the need for phase selection to back up the utility supply. Today there is a growing need of automation in distribution system as the rate of power outage and low voltage output becomes predominantly high.

Automatic Phase Selector DBs offers several advantages over manual phase selector DBs. Most of the residential and commercial applications are dependent on power supply and if the process of changeover is manual, a considerable time is wasted, and it may also cause hindrance in important activities. Moreover manual changing is not possible every time as identifying the phase of power interruption is difficult.

In addition to above, this DB introduces an automatic solution to overcome problems of not just phase outage but also power fluctuations (over-voltage/ under-voltage) by selecting the next most healthy phase available.

It maintains a constant output power supply irrespective of the available input supply by continuously monitoring each phase, automatically switching between them and returning to the priority phase as necessary.

Working of Automatic Phase Selector DB:

Phase Priority Selection:

The phase priority selection is manually carried out by the user through a priority selector switch present on the front facia of Automatic Phase selector. The user can select the desired priority sequence according to its own choice i.e. RYB, YBR or BRY.

Phase loss Protection:

- In case of phase failure (if RYB priority sequence is selected), the Automatic switching equipment will first check the R phase. If the R phase is present and its phase voltage is in the required range, then the load will run on the R phase only, which will be indicated by the R phase LED blinking at the rate of 1 second.
- But if the R phase goes off i.e. fails (the LED will stop glowing), then the Automatic switching equipment will check the voltage in the Y phase. If the Automatic switching equipment finds Y phase as the healthiest phase, then it will do the necessary switching to the Y phase within 3 seconds (and Y phase LED will start blinking at the rate of 1 second).
- If it does not find Y phase healthy, it will repeat the above procedure with the B phase.

Restoration of highest priority phase:

- In the event of restoration of highest priority phase (say R phase), the entire load will be automatically transferred to that phase within 3 seconds.

Under-voltage protection:

- If the voltage level of the supplying phase falls below the undervoltage limit of 150 V (factory sealed), then the Automatic switching equipment shifts the entire load to the next healthiest phase according to its priority. The under voltage condition on a particular phase is indicated by the LED of the respective phase blinking at the rate of 3 seconds.
- The fault LED will also glow indicating the system under fault.

Over-voltage Protection:

- The overvoltage limit is factory sealed or fixed at 300 V. So if the voltage of the supplying phase goes above 300 V, then the Automatic switching equipment will shift the entire load to the next available healthiest phase according to the priority set by the user. The over voltage condition on a particular phase is indicated by the LED of the respective phase blinking at the rate of 0.5 second.
- The fault LED will also glow indicating the system under fault.



Range

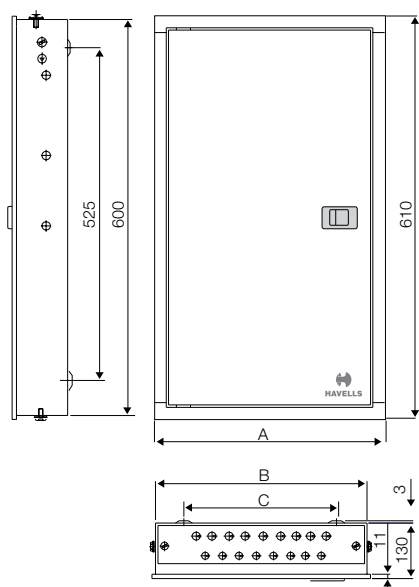
Automatic Phase Selector

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Phase loss Protection
- Under voltage & overvoltage protection
- Manual phase priority selection
- Operational status indication through LEDs
- Incomer with prewired TPN MCB 63 A
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top		Bottom		Side Ø31	Sheet Thickness
				Ø25	Ø20	Ø25	Ø20		
4	261	251	211	5	4	5	4	3	1.2
6	261	251	211	5	4	5	4	3	1.2

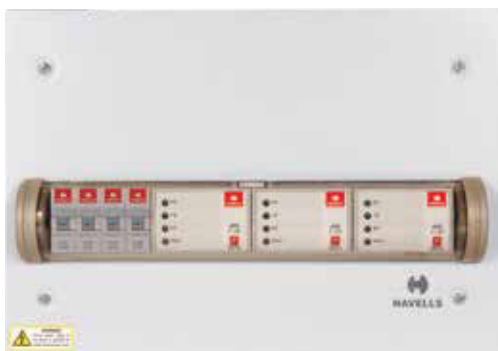
Knockout Holes (Ø20, Ø25 & Ø31)

Automatic Phase Selector DB

Incomer Rating	Rating APS	Ways	I/C + O/G	Cat. No.	Description
63 A TPN MCB	32 A	4	8+12	DHDANVDRZ04032	Auto Ph-Sel DB 4 W D/D 32 A
63 A TPN MCB	32 A	6	8+18	DHDANVDRZ06032	Auto Ph-Sel DB 6 W D/D 32 A

Automatic Phase Selector Unit

These are retrofittable add-ons to existing TPN DBs to convert them into automatic phase selector DBs in a simple, easy to use and reliable manner.



Range

Automatic Phase Selector Unit

Specification

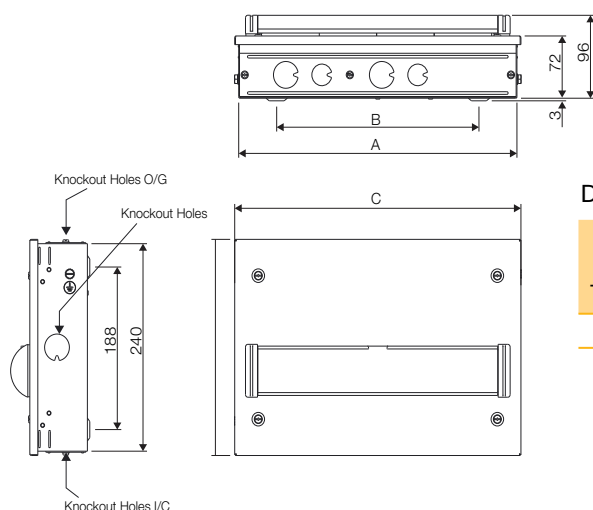
IEC 61439-3, IS 13032 & IS 8623

Features

- Can be easily connected with your existing DB
- Automatic Phase selection
- Phase loss Protection
- Under voltage & overvoltage protection
- Manual phase priority selection
- Operational status indication through LEDs
- It comes with prewired TPN MCB of 63 A
- IP 40

Technical Specification	
Incomer MCB	TPN 63 A
Standard Conformity	IEC 60947-6-1
No. of poles	3 P+N
Rated voltage (Ue)	415 Vac
Operating voltage range	200 Vac to 415 Vac
Rated frequency	50 Hz
Time delay for phase changeover	3 s
Utilization category	AC31A
Indication	Individual phase (R, Y, B), load, fault, type of fault (i.e. Undervoltage or overvoltage)
Ambient temp	-5 °C to +55 °C
Electrical life	6000 operations
Rated impulse withstand voltage (Uimp)	2.5 kV
Conditional short circuit breaking capacity	3 kA
Mounting	DIN rail mounting
Terminal capacity	10 mm ²
Phase Priority selection	Manual (RYB, YBR, BRY)
Undervoltage Protection (L-N)	150 V (factory sealed)
Overvoltage Protection (L-N)	300 V (factory sealed)

Note: The switching capacity of the individual unit (APS) is 32 A. But the total load carrying capacity of APS on any single phase is 63 A (as incomer MCB is of 63 A).



Dimensions (in mm)

Incomer Rating TPN MCB	APS Rating	A	B	C	Top (O/G)		Bottom (I/C)		Side Ø31	Sheet Thickness
					Ø25	Ø31	Ø25	Ø31		
63 A	32 A	348	253	358	2	2	2	2	1	1

Automatic Phase Selector Unit

Rating	Cat. No.
32 A	DHDAMHSCZ00032

Manual Phase Selector DB

Havells offers TPN DBs with inbuilt phase selector switches to easily and manually shift the load to healthy phase in case of phase outage. These are recommended for residential and commercial applications for phase selection to back-up power in situations of utility phase outage.

Phase Selector DB (Horizontal - 4 Quadrant)



Range

Phase Selector (Horizontal - 4 Quadrant) - 4, 6 & 8 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

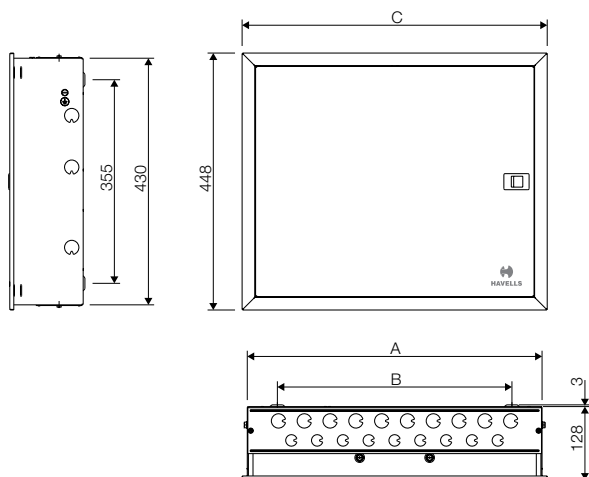
Features

- With inbuilt 3 nos. of 40 A/63 A phase selector switches and 3 nos. piano switches
- Suitable for Flush mounting and Surface mounting
- With 100 A copper busbar for each phase
- With neutral bar, earth bar and cable ties for cable management
- Fully insulated busbar and neutral bar
- Provision for 8 W incomer, indicator light R, Y, B (FP MCB/ Isolator/RCCB)
- Supplied with wire set
- IP 42

Dimensions (in mm)

No. of Ways	A	B	C	D	E	Top		Bottom		Side Each Side	Sheet Thickness
						Ø20	Ø25	Ø20	Ø25		
4	478	373	496	430	355	8	9	8	9	3	1
6	514	409	532	430	355	9	10	9	10	3	1
8	550	445	568	430	355	10	11	10	11	3	1

Knockout Holes (Ø20 & Ø25)



Phase Selector (Horizontal - 4 Quadrant) (with rotary switches, duly wired)

No. of Ways	Rating	Regal Grey Cat. No. (DD)	I/C
4	40 A	DHDSCHDRZ04040	Eight way
4	63 A	DHDSCHDRZ04063	Eight way
6	40 A	DHDSCHDRZ06040	Eight way
6	63 A	DHDSCHDRZ06063	Eight way
8	40 A	DHDSCHDRZ08040	Eight way
8	63 A	DHDSCHDRZ08063	Eight way

Phase Selector DB (Vertical)



Range

Phase Selector (Vertical) – 4, 6 & 8 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

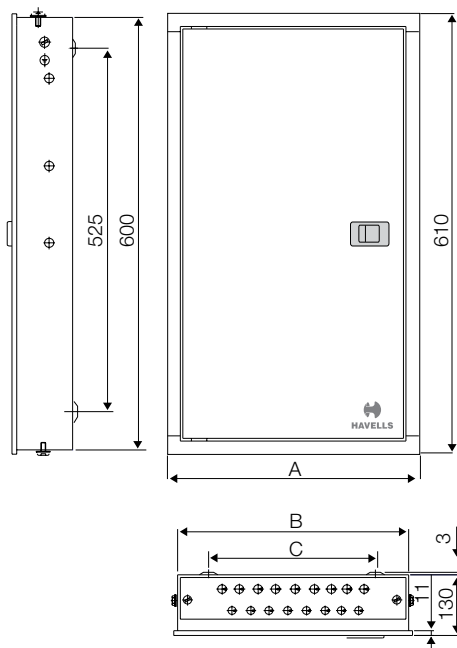
Features

- With inbuilt 3 nos. of 63 A phase selector switches and 3 nos. piano switches
- Suitable for Flush mounting and Surface mounting
- With 100 A copper busbar for each phase
- With neutral bar, earth bar and cable ties for cable management
- Fully insulated busbar and neutral bar
- Provision for 8 Ways incomer, indicator light R, Y, B (FP MCB/ Isolator/RCCB)
- Supplied with wire set
- IP 42

Dimensions (in mm)

No. of Ways	A	B	C	Top		Bottom		Side	Sheet Thickness
				Ø25	Ø20	Ø25	Ø20		
4	333	323	248	9	8	9	8	3	1.2
4	333	323	248	9	8	9	8	3	1.2
6	405	395	320	9	8	9	8	3	1.2
6	405	395	320	9	8	9	8	3	1.2
8	405	395	320	9	8	9	8	3	1.2
8	405	395	320	9	8	9	8	3	1.2

Knockout Holes (Ø20 & Ø25)



Phase Selector (Vertical)

(with rotary switches, duly wired & provision for 8 Ways I/C)

No. of Ways	Rating	Regal Grey Cat. No. (DD)	Pearl Ivory Cat. No. (DD)
4	40 A	DHDSNVDRZ04040	DHDSNVDPZ04040
4	63 A	DHDSNVDRZ04063	DHDSNVDPZ04063
6	40 A	DHDSNVDRZ06040	DHDSNVDPZ06040
6	63 A	DHDSNVDRZ06063	DHDSNVDPZ06063
8	40 A	DHDSNVDRZ08040	DHDSNVDPZ08040
8	63 A	DHDSNVDRZ08063	DHDSNVDPZ08063

Phase Selector Enclosure (Vertical)

These are retrofittable add-ons to existing TPN DBs to convert them into manual phase selector DBs in a simple, easy to use and reliable manner.



Range

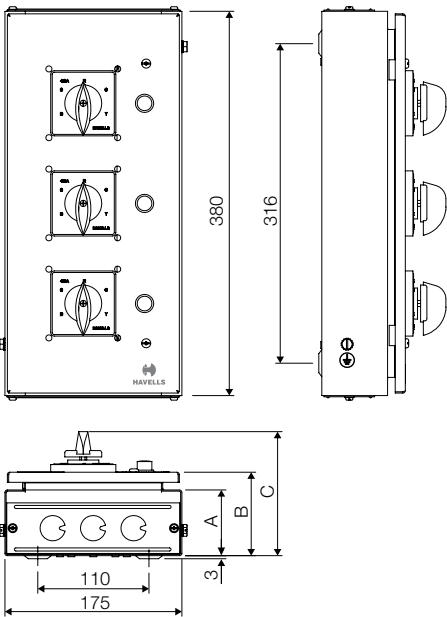
40 A to 63 A

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Compact DBs which occupy minimum space
- TPN DB can be used as a Phase Selector DB after attaching the Phase Selector Enclosure.
- Suitable for surface & flush mounting
- Cost Effective Solution
- Supplied with rotary switches, duly wired
- Suitable for use on 240 V/415 V, 50 Hz supply
- IP 40



Dimensions (in mm)

Rating	A	B	C	Top	Bottom	Sheet Thickness
40 A	65	83	123	3	3	1.2
63 A	91	109	144	3	3	1.2

Knockout Holes (Ø25)

Phase Selector Enclosure (Vertical)
(with rotary switches, duly wired)

Rating	Regal Grey Cat. No. (DD)
40 A	DHDATVFS40
63 A	DHDATVFS63



◆ UTILITY
DISTRIBUTION
BOARDS

Havells offers a wide range of compact, elegant & economical distribution boards with unique features, designed & engineered to provide user safety, convenience and operational / maintenance advantages.

With these inherent strengths, Havells Utility DB Range has been increasingly adopted by leading power consumers in residential, commercial and industrial installations, as a strong, simple and reliable power distribution method.

Range:

- QVE Series SPN/TPN Distribution Boards
- Consumer Units
- MCB Enclosure SPN
- MCB Enclosure (Plastic & Sheet Steel)

Specification

IEC 61439-3, IS 13032 & IS 8623



QVE Series SPN DB

**Range**

SPN – 4, 6, 8, 12 & 16 Ways

Color

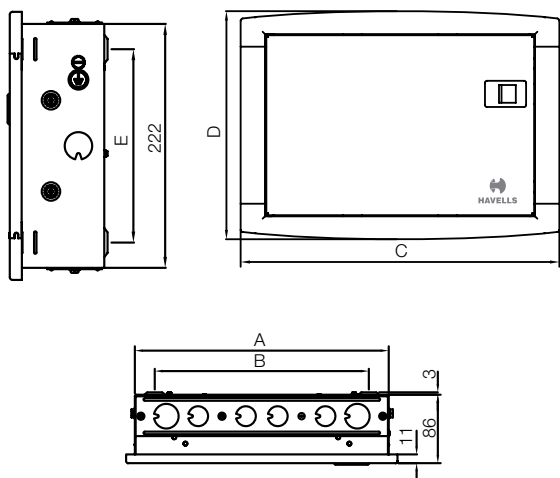
Pearl Ivory & Regal Grey

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Compact DBs which occupy minimum space
- Raised neutral link for easy wiring
- Suitable for surface & flush mounting
- Detachable din bar with end stoppers for easy assembly of breakers
- Supplied with fully shielded bus-bars
- Level marks for providing indication for fitment in wall
- Supplied with neutral & earth link, top & bottom detachable plates
- Supplied with masking sheet to protect components from cement during plastering
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	D	E	Knockout Holes				
						Top		Bottom		Side (Each Side)
						Ø25	Ø31	Ø25	Ø31	
4	175	125	197	256	172	3	-	3	-	1
6	211	151	233	244	166	3	-	3	-	1
8	247	187	269	244	176	2	2	2	2	1
12	319	269	341	244	176	4	2	4	2	1
16	391	341	413	244	176	4	2	4	2	1

Knockout Holes (Ø25 & Ø31)

SPN Distribution Boards

No. of Ways	I/C+O/G	Regal Grey Cat. No. (SD)	Regal Grey Cat. No. (DD)	Pearl Ivory Cat. No. (DD)
4	4	DHDPHOSRW04	DHDPHODRW04	DHDPHODPW04
6	6	DHDPHOSRW06	DHDQSHODRW06	DHDQSHODPW06
8	8	DHDPHOSRW08	DHDPHODRW08	DHDPHODPW08
12	12	DHDPHOSRW12	DHDPHODRW12	DHDPHODPW12
16	16	DHDPHOSRW16	DHDPHODRW16	DHDPHODPW16

QVE Series TPN DB

Suitable for MCB / RCCB / Isolator as Incomer



Range

TPN – 4, 6, 8 & 12 Ways

Color

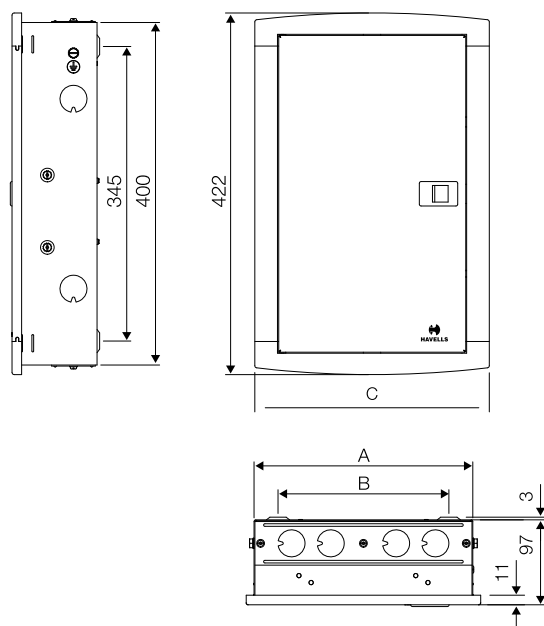
Pearl Ivory & Regal Grey

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Compact DBs which occupy minimum space
- Raised neutral link for easy wiring
- Suitable for surface & flush mounting
- Detachable Din Bar with end stoppers for easy assembly of breakers
- Supplied with fully shielded bus-bars
- Level marks for providing indication for fitment in wall
- Supplied with neutral & earth link, top & bottom detachable plates
- Supplied with masking sheet to protect components from cement during plastering
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	251	196	269	4	4	2	1
*4	323	268	341	6	6	2	1
6	323	268	341	6	6	2	1
8	395	340	413	6	6	2	1
12	534	479	552	8	8	2	1

Knockout Holes (Ø31)

*8 Ways Incomer provision

TPN Distribution Boards (for Single Phase Outgoing) Suitable for MCB / RCCB / Isolator as Incomer

No. of Ways	I/C+O/G	Regal Grey Cat. No. (SD)	Regal Grey Cat. No. (DD)	Pearl Ivory Cat. No. (DD)
4	4+12	DHDQTHCSRW04	DHDNTHCDRW04	DHDNTHCDPW04
6	8+18	DHDQTHCSRW06	DHDNTHCDRW06	DHDNTHCDPW06
8	8+24	DHDQTHCSRW08	DHDNTHCDRW08	DHDNTHCDPW08
12	8+36	DHDQTHCSRW12	DHDNTHCDRW12	DHDNTHCDPW12

QVE Series TPN DB

**Range**

TPN – 4, 6, 8 & 12 Ways

Color

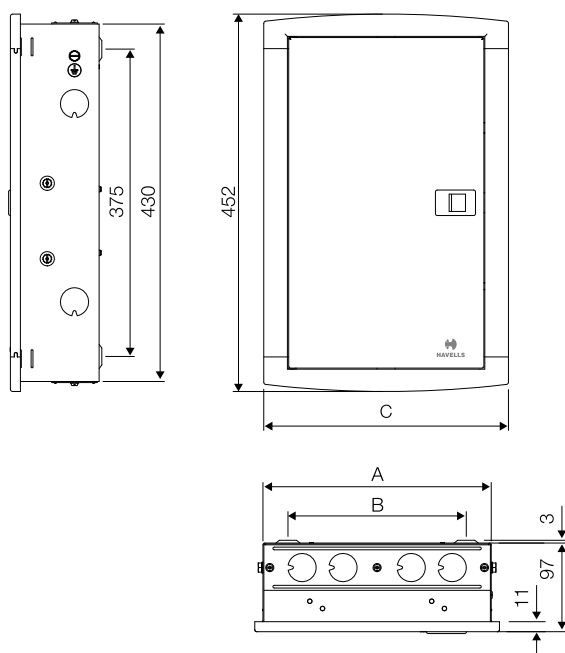
Pearl Ivory & Regal Grey

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Compact DBs which occupy minimum space
- Raised neutral link for easy wiring
- Suitable for surface & flush mounting
- Detachable Din Bar with end stoppers for easy assembly of breakers
- Supplied with fully shielded bus-bars
- Level marks for providing indication for fitment in wall
- Supplied with neutral & earth link, top & bottom detachable plates
- Supplied with masking sheet to protect components from cement during plastering
- IP 42

**Dimensions (in mm)**

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	251	196	269	4	4	2	1
*4	323	268	341	6	6	2	1
6	323	268	341	6	6	2	1
8	395	340	413	6	6	2	1
12	534	479	552	8	8	2	1

Knockout Holes (Ø31)

*8 Ways Incomer provision

TPN Distribution Boards (for Single Phase Outgoing)

No. of Ways	I/C+O/G	Regal Grey Cat. No. (SD)	Regal Grey Cat. No. (DD)	Pearl Ivory Cat. No. (DD)
4	4+12	DHDPTHOSRW04	DHDPTHODRW04	DHDPTHODPW04
6	8+18	DHDPTHOSRW06	DHDPTHODRW06	DHDPTHODPW06
8	8+24	DHDPTHOSRW08	DHDPTHODRW08	DHDPTHODPW08
12	8+36	DHDPTHOSRW12	DHDPTHODRW12	DHDPTHODPW12

Consumer Units

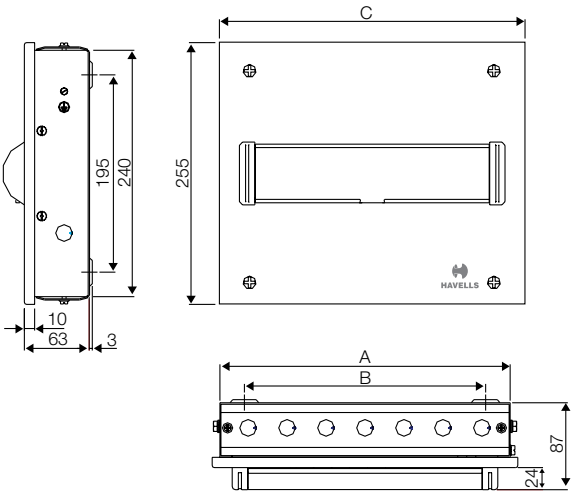


Range
SPN – 4, 8, 12 & 16 Ways

Color
Regal Grey

Specification
IEC 61439-3, IS 13032 & IS 8623

- Features**
- Compact DBs which occupy minimum space
 - Raised neutral link for easy wiring
 - Suitable for surface & flush mounting
 - DIN-bar
 - Supplied with fully shielded bus-bars
 - Supplied with neutral & earth link, top & bottom detachable plates
 - IP 40



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	139	89	154	3	3	1	1
8	211	161	226	5	5	1	1
12	283	233	298	7	7	1	1
16	355	305	370	9	9	1	1

Knockout Holes (Ø25)

Single Door with Acrylic Window
Sheet Steel, Phosphatized, Powder Painted MCB DBs with Bus Bar, Neutral Link, Earth Bar and Din Rail
(In accordance with IS 13032, IS 8623, IEC/BS EN 60439-3)

No. of Ways	Regal Grey Cat. No.
4	DHDMSHOSRA04
8	DHDMSHOSRA08
12	DHDMSHOSRA12
16	DHDMSHOSRA16

MCB Single Door Consumer

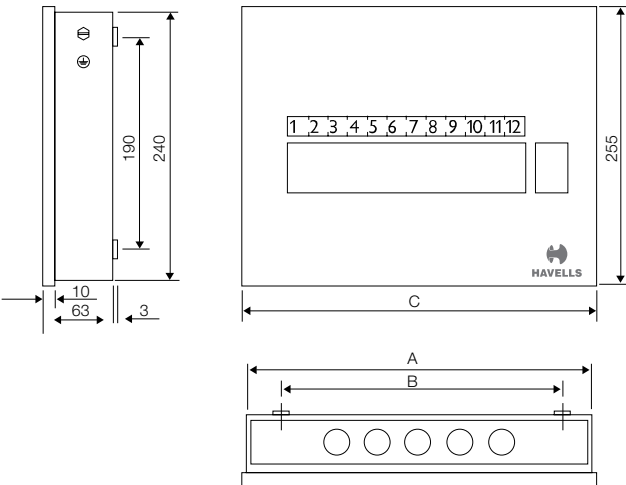


Range
SPN – 2+4, 2+8 & 2+12 Ways

Color
Regal Grey

Specification
IEC 61439-3, IS 13032 & IS 8623

- Features
- Compact DBs which occupy minimum space
 - Raised neutral link for easy wiring
 - Suitable for surface & flush mounting
 - Supplied with fully shielded bus-bars
 - Level marks for providing indication for fitment in wall
 - Supplied with neutral & earth link, top & bottom detachable plates
 - IP 40



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Sheet Thickness
2 + 4	211	161	226	5	5	1
2 + 8	283	233	298	7	7	1
2 + 12	355	305	370	9	9	1

Knockout Holes (Ø25)

Single Door Consumer unit without Isolator

No. of Ways	Regal Grey Cat. No.
2+4	DHDCSHOSRW04
2+8	DHDCSHOSRW08
2+12	DHDCSHOSRW12

MCB Enclosure (Plastic & Sheet Steel)



MCB Plastic Enclosure



MCB Sheet Steel Enclosure

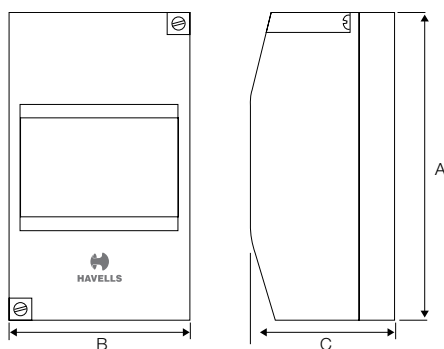
Range
2 Pole & 4 Pole

Color
Regal Grey

Specification
IS 13032 & IS 8623

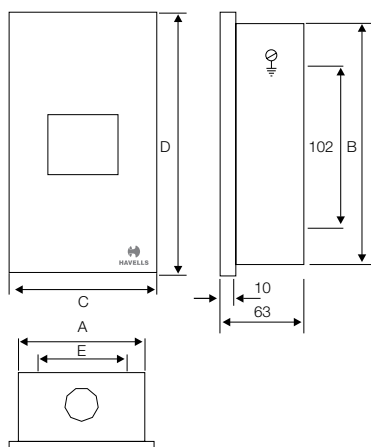
Features

- Suitable for surface
- Enclosures for independent cutoff / connection of the electrical appliances



Dimensions (in mm)

No. of Ways	A	B	C
2	140	45	65
4	140	81	65



Dimensions (in mm)

No. of Ways	A	B	C	D	E	Top	Bottom	Sheet Thickness
2	60	160	70	170	30	1	1	1
4	98	180	108	190	62	2	2	1

Knockout Holes (Ø25)

MCB Plastic Enclosure (Cutout)

No. of Poles	Cat. No.
2	DHDEPDP
4	DHDEPFP

MCB Sheet Steel Enclosure (Cutout)

Sheet Steel, Phosphatized, Powder Painted MCB DBs with Bus Bar, Neutral Link, Earth Bar and Din Rail

No. of Poles	Cat. No.
2	DHDESDP
4	DHDESFP



◆ DESIGNER
DISTRIBUTION
BOARDS

Havells offers Designer Distribution Boards – blending aesthetics and functionality in a perfect combination which is compact, elegant, economical and easy to use. The range has been designed with unique features ensuring user safety, convenience, easy handling, and quick, simple installation.

Range:

- DBOXx SPN/TPN Distribution Boards
- Translucent Distribution Boards
- Transparent Distribution Boards

Specification

IEC 61439-3, IS 13032 & IS 8623



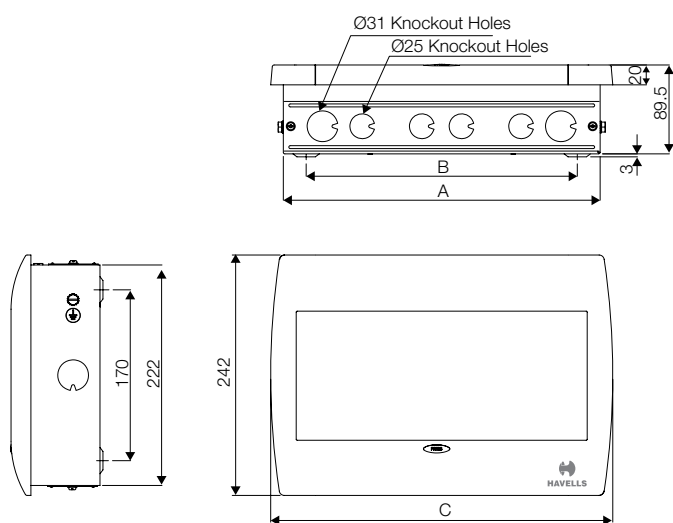
DBOXx Range



Mist White



Coin Grey



Dimensions SPN (in mm)

No. of Ways	A	B	C	Top		Bottom		Side	Sheet Thickness
				Ø25	Ø31	Ø25	Ø31		
8	247	195	272	2	2	2	2	1	0.8
12	319	267	344	4	2	4	2	1	0.8
16	391	339	415	4	2	4	2	1	0.8

Knockout Holes (Ø25 & Ø31)

DBOXx SPN

The New Style statement for your DBs

No. of Ways	I/C+O/G	Mist White SPN Cat. No.	Coin Grey SPN Cat. No.
8	8	DHDNSHCDDW08	DHDNSHCDDW08
12	12	DHDNSHCDDW12	DHDNSHCDDW12
16	16	DHDNSHCDDW16	DHDNSHCDDW16

Range

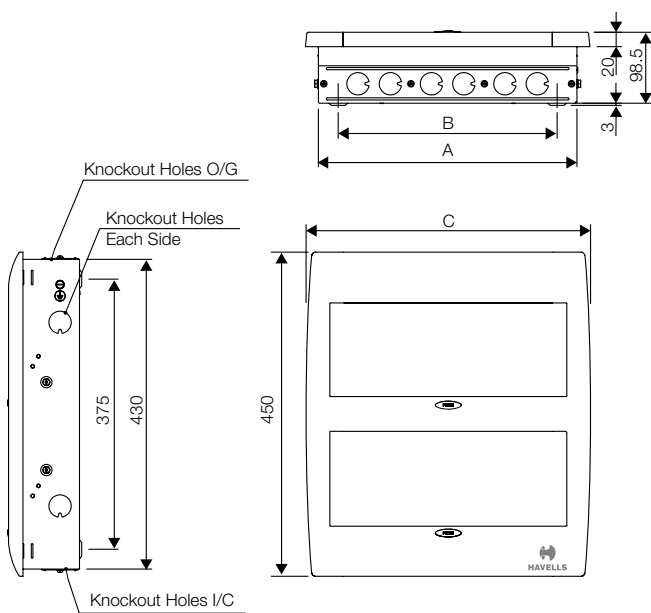
DBOXx – (SPN) 8, 12 & 16 Ways
DBOXx – (TPN) 4, 6, 8 & 12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- These are most elegantly designed DBs, to suit the decor of homes
- Raised neutral link for easy wiring
- Spring loaded outer cover swings open by just pressing the lock as in case of DBOXx
- Supplied with masking sheets to protect components from cement during plastering
- Supplied with neutral & earth link, top & bottom detachable plates
- IP 42



Dimensions TPN (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4 / 6	359	304	395	6	6	2	1
8	395	340	431	6	6	2	1
12	539	484	575	8	8	2	1

Knockout Holes (Ø31)

DBOXx TPN

The New Style statement for your DBs

No. of Ways	I/C+O/G	Mist White TPN Cat. No.	Coin Grey TPN Cat. No.
4/6	8 + 18	DHDNTHCDOW06	DHDNTHCDDW06
8	8 + 24	DHDNTHCDOW08	DHDNTHCDDW08
12	8 + 36	DHDNTHCDOW12	DHDNTHCDDW12



◆ SPECIAL
APPLICATION
DISTRIBUTION
BOARDS

Havells offers a wide range of special application distribution boards, engineered with deep thought and precision to meet the specific needs of different applications. These DBs seamlessly blend aesthetics, functionality and safety, guaranteeing easy installation, operational and maintenance advantages to discerning clientele.

Range:

- 7 Segment Distribution Boards
- TPN Vertical Distribution Boards
- TPN Vertical Loadline Distribution Boards
- SPN/TPN (IP 54)
- SPN/TPN Prewired Distribution Boards
- TPN Prewired (with Cable End Box)
- Per Phase Isolation (PPI) Vertical - 4 Tier
- Per Phase Isolation (PPI) - QVE Series

Specification

IEC 61439-3, IS 13032 & IS 8623



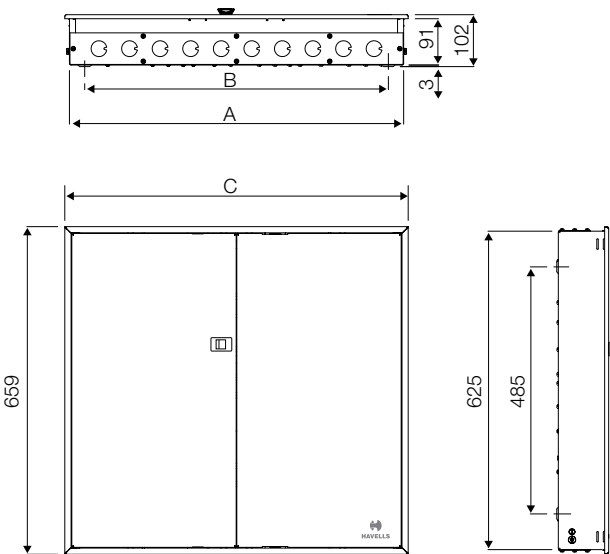
7 Segment



Range
7 Segment DB - 4, 6, 8 & 12 Ways

Specification
IEC 61439-3, IS 13032 & IS 8623

- Features
- DBs with separate compartments to fully segregate & isolate incomer and outgoing devises in each phase, which also facilitates easy and quick maintenance
 - Suitable for Flush mounting and Surface mounting
 - With 100 A copper busbar for each phase
 - With seperate neutral bar, earth bar
 - Fully insulated busbar
 - Main Incomer FP Isolator & FP Changeover, DP RCCB as subincomer and SP MCBs as outgoing
 - Supplied with wire set
 - IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Sheet Thickness
4	440	380	474	7	7	1.2
6	548	488	582	8	8	1.2
8	656	596	690	10	10	1.6
12	872	812	906	13	13	1.6

Knockout Holes (Ø31)

7 Segment

No. of Ways	Regal Grey Cat. No. (DD).
4	DHDMTHDDR04
6	DHDMTHDDR06
8	DHDMTHDDR08
12	DHDMTHDDR12

TPN Vertical



Range

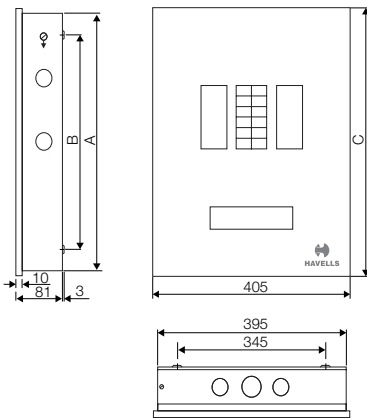
TPN Vertical DB - 4, 8 & 12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

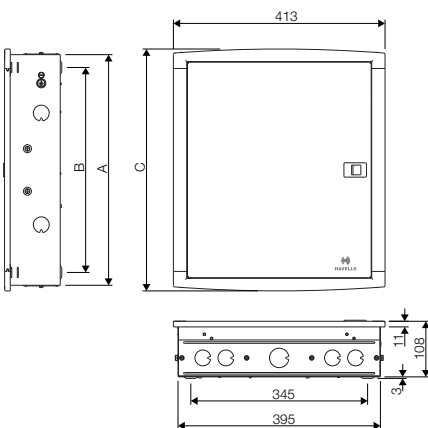
- Suitable for Flush mounting and Surface mounting
- With 125 A copper busbar flat type
- With neutral & earth bars
- Pan assembly for ease of installation
- With provision for FP Isolator/RCCB as incomer and SP / TP MCBs as outgoing
- IP 40 (for Single Door)
- IP 42 (for Double Door)



Dimensions (in mm) Single Door

No. of Ways	A	B	C	Top	Bottom Ø31	Bottom Ø38	Side	Sheet Thickness
4	450	400	460	5	2	1	2	1.0
8	558	508	568	5	2	1	2	1.0
12	666	616	676	5	2	1	2	1.0

Knockout Holes (Ø31 & Ø38)



Dimensions (in mm) Double Door

No. of Ways	A	B	C	Top	Bottom Ø31	Bottom Ø38	Side	Sheet Thickness
4	450	400	472	5	2	1	2	1.0
8	558	508	580	5	2	1	2	1.0
12	666	616	688	5	2	1	2	1.0

Knockout Holes (Ø31 & Ø38)

TPN Vertical

No. of Ways	I/C+O/G	Single Door	Double Door
4	8+12	DHDMTVOSRW04	DHDPTVODRW04
8	8+24	DHDMTVOSRW08	DHDPTVODRW08
12	8+36	DHDMTVOSRW12	DHDPTVODRW12

TPN Vertical Loadline



Range

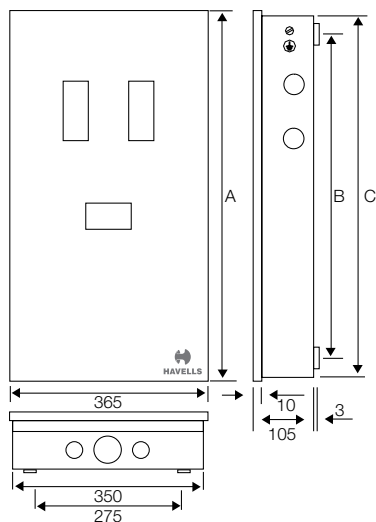
Loadline DB - (TPN SD/DD) - 4, 8 & 12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Suitable for Flush mounting and Surface mounting
- With 160 A & 250 A copper busbar
- With neutral bars & earth bars
- With provision for TP/FP 160 MCCB as incomer and SP / TP MCBs as outgoing
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom Ø31	Bottom Ø38	Side	Sheet Thickness
4	685	595	670	7	4	1	2	1.2
8	793	703	778	7	4	1	2	1.2
12	901	811	886	7	4	1	2	1.2

Knockout Holes (Ø31 & Ø38)

TPN Vertical Loadline

Loadline DBs are fitted with Bus Bars, Neutral Links, Blanking Plates (without MCCB) (Suitable for TP/FP)

No. of Ways	Cat. No.	Description
SINGLE DOOR		SUITABLE FOR TP/FP 'G FRAME' MCCB
4	DHDLVSRWGOFO04	DB LL 4 W SD VERT W/O MCCB
8	DHDLVSRWGOFO08	DB LL 8 W SD VERT W/O MCCB
12	DHDLVSRWGOFO12	DB LL 12 W SD VERT W/O MCCB
DOUBLE DOOR		SUITABLE FOR TP/FP 'G FRAME' MCCB
4	DHDLVDRWGOFO04	DB LL 4 W DD VERT W/O MCCB
8	DHDLVDRWGOFO08	DB LL 8 W DD VERT W/O MCCB
12	DHDLVDRWGOFO12	DB LL 12 W DD VERT W/O MCCB
DOUBLE DOOR		SUITABLE FOR TP/FP 'A FRAME' MCCB
4	DHDLVDRWAOF004	DB LL 4 W DD VERT W/O MCCB
8	DHDLVDRWAOF008	DB LL 8 W DD VERT W/O MCCB
12	DHDLVDRWAOF012	DB LL 12 W DD VERT W/O MCCB

Note: (i) MCCBs & Accessories Should Be Selected And Purchased Separately
(ii) For Any Other Configuration Contact Us
(iii) For Appropriate MCCB Price, Please see Havells IP Price List

SPN (IP 54)



Range

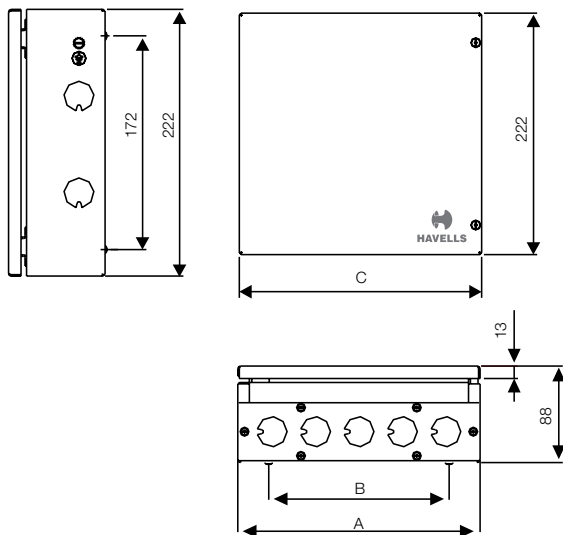
IP - 54 (SPN DD) - 4, 8 & 12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Suitable for Flush mounting and Surface mounting
- With 100 A copper busbar
- With neutral bars & earth bar
- Fully insulated busbar
- IP 54



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	175	125	175	3	3	1	1.6
8	247	197	247	5	5	1	1.6
12	319	269	319	7	7	1	1.6

Knockout Holes (Ø31)

SPN (IP 54)

No. of Ways	Description	Horizontal Cat. No.
4	SPN DB DD 04W	DHDMSHODRW040002
8	SPN DB DD 08W	DHDMSHODRW080002
12	SPN DB DD 12W	DHDMSHODRW120002

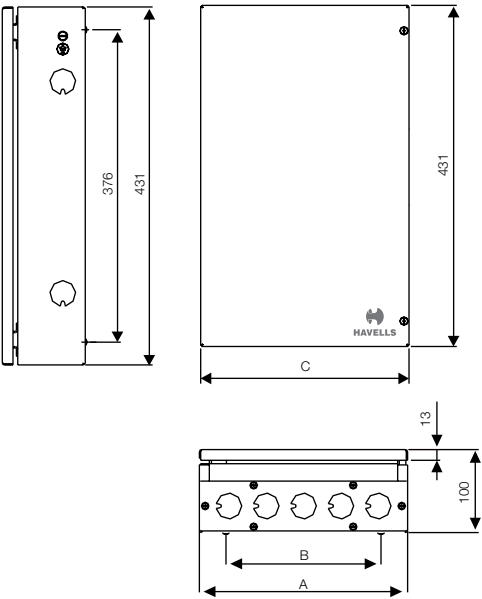
TPN (IP 54)



Range
IP 54 (TPN DD) - 4, 8 & 12 Ways

Specification
IEC 61439-3, IS 13032 & IS 8623

- Features
- Suitable for Flush mounting and Surface mounting
 - With 100 A copper busbar
 - With neutral bars & earth bar
 - Fully insulated busbar
 - IP 54



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	251	196	251	5	5	2	1.6
8	395	340	395	8	8	2	1.6
12	534	479	534	11	11	2	1.6

Knockout Holes (Ø31)

TPN (IP 54)

No. of Ways	Description	Horizontal Cat. No.	Vertical Cat. No.
4	TPN DB DD 04 Ways	DHDMTHODRW040002	DHDMTVODR040002
8	TPN DB DD 08 Ways	DHDMTHODRW080002	DHDMTVODR080002
12	TPN DB DD 12 Ways	DHDMTHODRW120002	DHDMTVODR120002

SPN Prewired



Range

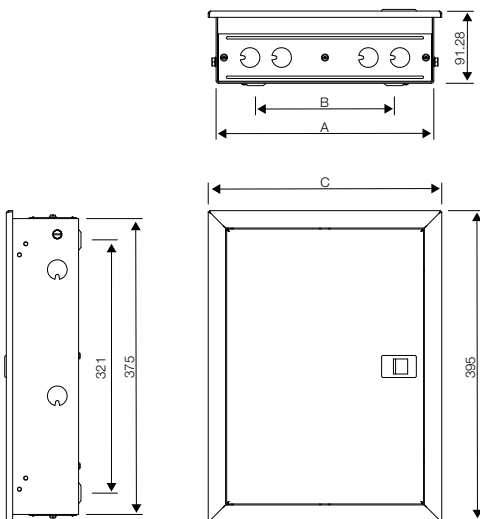
SPN DD – 6, 8, 10, 12 & 16 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Phase/Neutral terminal block for termination of incoming and outgoing wires
- Colored flame retardant Polyamide terminal blocks and FRLS wiring for easy identification, Phases & Neutral
- A detachable cassette is provided for safe removal of MCB/RCCB from DB without loosening the internal cable connection of Phase & Neutral Circuit
- DBs are provided with integral loose wire box in SPN for accommodating extra bunch of wires
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
6	276	176	296	4	4	2	1.6
8	312	212	332	4	4	2	1.6
10	348	248	368	4	4	2	1.6
12	384	284	404	6	6	2	1.6
16	456	356	476	8	8	2	1.6

Knockout Holes (Ø25)

SPN Prewired (with cable end box)

No. of Ways	IC/OG	DD Cat. No.
6	2+6	DHDSHMLRW06
8	2+8	DHDSHMLRW08
10	2+10	DHDSHMLRW10
12	2+12	DHDSHMLRW12
16	2+16	DHDSHMLRW16

TPN Prewired



Range

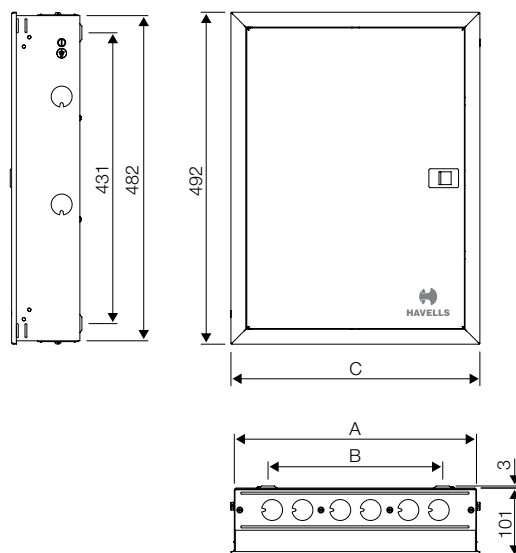
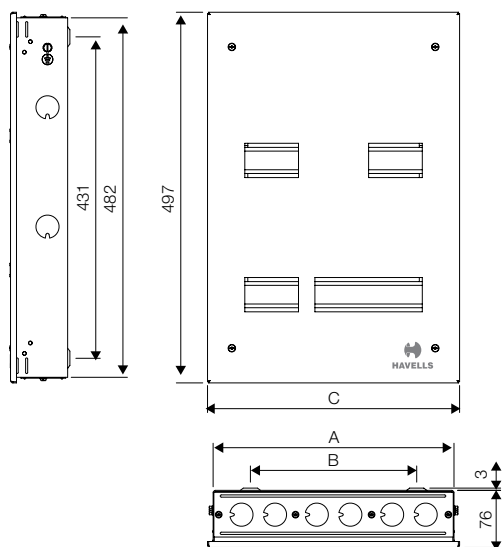
TPN SD – 4, 6, 8 & 12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Phase/Neutral terminal block for termination of incoming and outgoing wires
- Colored flame retardant Polyamide terminal blocks and FRLS wiring for easy identification of R, Y & B Phases & Neutral
- A detachable cassette is provided for safe removal of MCB/RCCB from DB without loosening the internal cable connection of Phase & Neutral Circuit
- IP 42



Single Door Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	323	223	338	6	6	2	1.6
6	359	259	374	6	6	2	1.6
8	423	323	438	6	6	2	1.6
12	567	467	582	8	8	2	1.6

Knockout Holes (Ø25)

TPN Prewired
(without cable end box)

No. of Ways	IC/OG	DD Cat. No.
4	8+12	DHDMTHMKDRA04
6	8+18	DHDMTHMKDRA06
8	8+24	DHDMTHMKDRA08
12	8+36	DHDMTHMKDRA12

Double Door Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	323	223	333	6	6	2	1.6
6	359	259	369	6	6	2	1.6
8	423	323	433	6	6	2	1.6
12	567	467	577	8	8	2	1.6

Knockout Holes (Ø31)

TPN Prewired (with Cable End Box)



Range

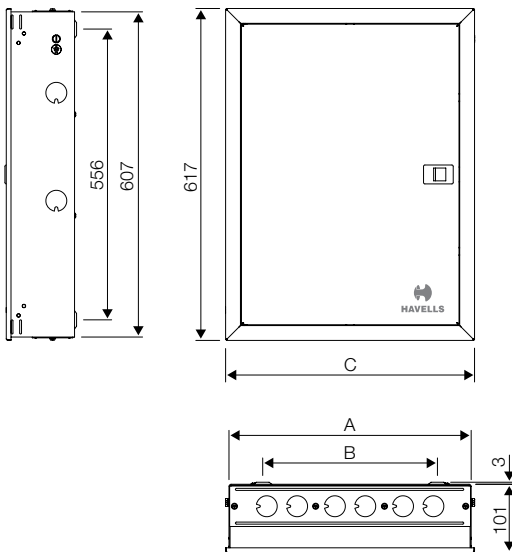
TPN DD – 4, 6, 8 & 12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- Phase/Neutral terminal block for termination of incoming and outgoing wires
- Colored flame retardant Polyamide terminal blocks and FRLS wiring for easy identification of R, Y & B Phases & Neutral
- A detachable cassette is provided for safe removal of MCB/RCCB from DB without loosening the internal cable connection of Phase & Neutral Circuit
- DBs are provided with integral loose wire box in TPN for accommodating extra bunch of wires
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
4	323	223	333	6	6	2	1.6
6	359	259	369	6	6	2	1.6
8	423	323	433	6	6	2	1.6
12	567	467	577	8	8	2	1.6

Knockout Holes (Ø31)

TPN Prewired (with cable end box)

No. of Ways	IC/OG	DD Cat. No.
4	8+12	DHDMTHMLXW04
6	8+18	DHDMTHMLXW06
8	8+24	DHDMTHMLXW08
12	8+36	DHDMTHMLXW12

Per Phase Isolation (PPI) Vertical - 4 Tier

PPI DBs provide earth leakage protection in each phase. In case of leakage fault in one particular phase, only that phase gets isolated while the other two phases do not have power outage.



Range

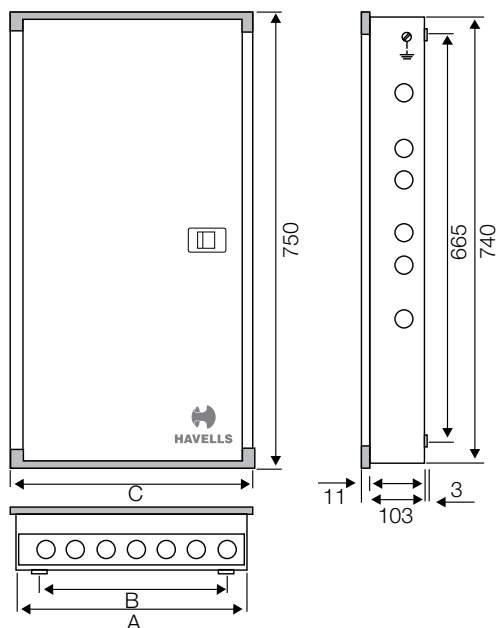
PPI Vertical DB - 4 Tier - 2+8 & 2+12 Ways

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- DBs with phase segregation and separation between incomer and outgoing
- Suitable for Flush mounting and Surface mounting
- With 100 A copper busbar for each phase
- With neutral bar, earth bar and cable ties for cable management
- Fully insulated busbar
- With per phase neutral & earth bar
- Supplied with wire set
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
2 + 8	323	248	338	7	7	6	1.2
2 + 12	395	320	405	7	7	6	1.2

Knockout Holes (Ø31)

Per Phase Isolation (PPI) Vertical - 4 Tier

No. of Ways	I/C + O/G	Regal Grey Cat. No. (DD).
2+8	8+6+24	DHDPTVPDRW08
2+12	8+6+36	DHDPTVPDRW12

Per Phase Isolation (PPI) - QVE Series

PPI DBs provide earth leakage protection in each phase. In case of leakage fault in one particular phase, only that phase gets isolated while the other two phases do not have power outage.



Range

TPN – 4, 6 & 8 Ways

Color

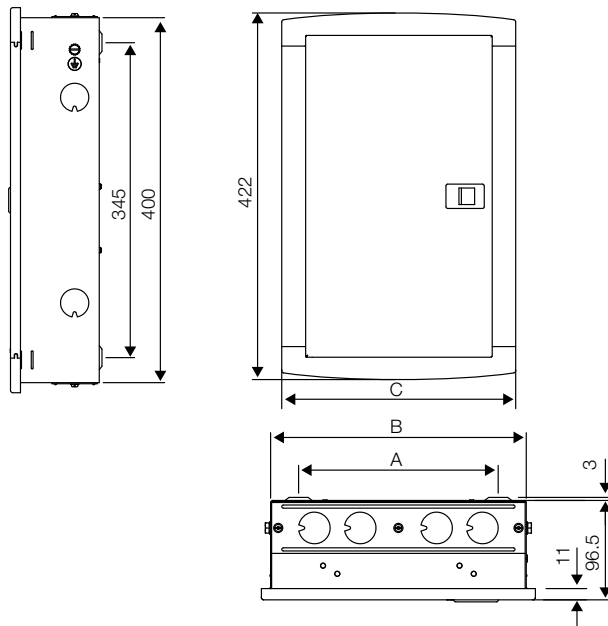
Pearl Ivory & Regal Grey

Specification

IEC 61439-3, IS 13032 & IS 8623

Features

- DBs with phase segregation and separation between incomer and outgoings
- Suitable for Flush mounting and Surface mounting
- With 100 A copper busbar for each phase
- With neutral bar, earth bar and cable ties for cable management
- Fully insulated busbar
- Suitable for MCB/RCCB/Isolator as Incomer
- With per phase neutral & earth bar
- Supplied with wire set
- IP 42



Dimensions (in mm)

No. of Ways	A	B	C	Top	Bottom	Side	Sheet Thickness
2+4	323	268	341	6	6	2	1
2+6	395	340	413	8	8	2	1
2+8	534	479	552	11	11	2	1

Knockout Holes (Ø31)

Per Phase Isolation (PPI) - QVE Series

No. of Ways	I/C + O/G	Regal Grey Cat. No. (DD)
2+4	4+6+12	DHDPTHDPDRW04
2+6	4+6+18	DHDPTHDPDRW06
2+8	4+6+24	DHDPTHDPDRW08

Cable End Box

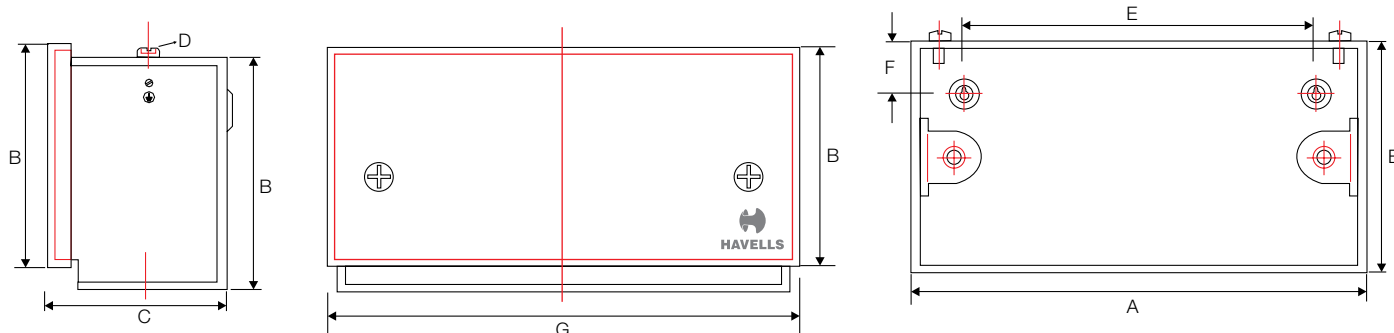
No. of Ways	Item	Cat No.	
		Single Door	Double Dor
4	SPN	DHDASHOS04	DHDASHOD04
8	SPN	DHDASHOS08	DHDASHOD08
12	SPN	DHDASHOS12	DHDASHOD12
16	SPN	DHDASHOS16	DHDASHOD16
4	TPN - Horizontal	DHDATHOS04	DHDATHOD04
6	TPN - Horizontal	DHDATHOS06	DHDATHOD06
8	TPN - Horizontal	DHDATHOS08	DHDATHOD08
12	TPN - Horizontal	DHDATHOS12	DHDATHOD12
4/8/12	TPN - Vertical	DHDATVOS04	DHDATVOD04
4/8/12	Loadline	DHDATVLS04	DHDATVLD04
2+8	PPI	DHDATVTS10	DHDATVTD10
2+12	PPI	DHDATVTS14	DHDATVTD14



A. Single Door DB

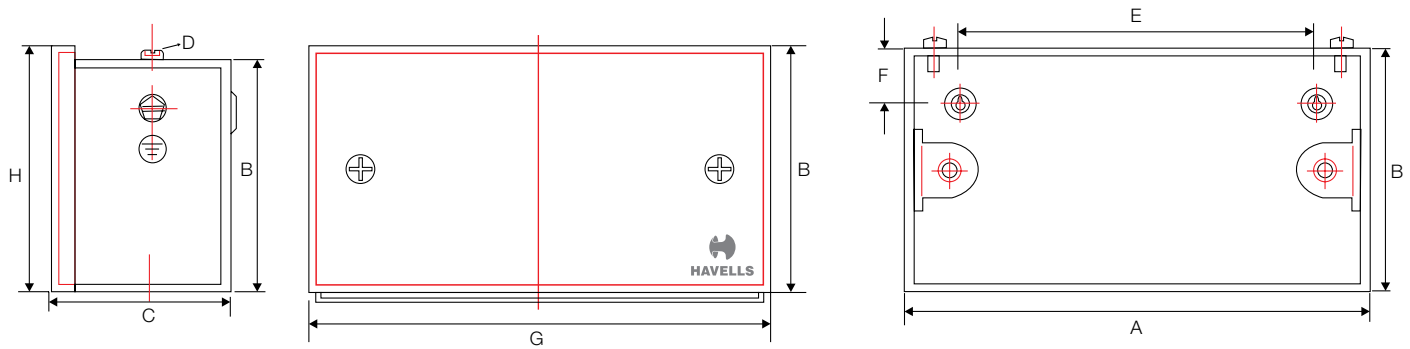
No. of Ways	Item	Dimensions (in mm)							T (Sheet Thickness)	Cat. No.
		A	B	C	D	E	F	G		
4	SPN	139	100	61	3	89	25	154	1.0	DHDASHOS04
8		211	100	61	5	161	25	226	1.0	DHDASHOS08
12		283	100	61	7	233	25	298	1.0	DHDASHOS12
16		355	100	61	9	305	25	370	1.2	DHDASHOS16
4	TPN	323	125	66	4	268	37.5	338	1.2	DHDATHOS04
6		359	125	66	6	304	37.5	374	1.2	DHDATHOS06
8		395	125	66	6	340	37.5	410	1.2	DHDATHOS08
12		539	125	66	8	484	37.5	554	1.2	DHDATHOS12
4/8/12	Vertical	350	125	87	7	275	37.5	365	1.2	DHDATVOS04
4/8/12	Loadline	350	125	102	7	275	37.5	365	1.2	DHDATVLS04
2 + 8	PPI	323	125	78	6	248	37.5	338	1.2	DHDATVTS10
2 + 12		395	125	78	7	320	37.5	410	1.2	DHDATVTS14
10	Tier	323	125	78	6	248	37.5	338	1.2	DHDATVTS10
14		395	125	78	7	320	37.5	410	1.2	DHDATVTS14

Dimensions (in mm)



B. Double Door DB

No. of Ways	Item	Dimensions (in mm)								T (Sheet Thickness)	Cat. No.
		A	B	C	D	E	F	G	H		
4	SPN	175	100	74	3	125	25	190	107.5	1.0	DHDASHOD04
8		247	100	74	4	197	25	262	107.5	1.0	DHDASHOD08
12		319	100	74	6	269	25	334	107.5	1.0	DHDASHOD12
16		391	100	74	6	341	25	406	107.5	1.2	DHDASHOD16
4	TPN	251	125	85	4	196	37.5	266	132.5	1.2	DHDATHOD04
6		323	125	85	6	268	37.5	338	132.5	1.2	DHDATHOD06
8		395	125	85	6	340	37.5	410	132.5	1.2	DHDATHOD08
12		534	125	85	8	479	37.5	549	132.5	1.2	DHDATHOD12
4/8/12	Vertical	395	125	98	8	320	37.5	405	130	1.2	DHDATVOD04
4/8/12	Loadline	350	125	130	7	275	37.5	380	130	1.2	DHDATVLD04
2 + 8	PPI	323	125	89	6	248	37.5	333	130	1.2	DHDATVTD10
2 + 12		395	125	89	7	320	37.5	405	130	1.2	DHDATVTD14
10	Tier	323	125	89	6	248	37.5	333	130	1.2	DHDATVTD10
14		395	125	89	7	320	37.5	405	130	1.2	DHDATVTD14



Comb Bus Bar

No. of Ways Three Phase	Capacity of 17.8 mm module	Features	Cat No.
2	6	TP I/C & TP O/G	DSCCPADB022
3	9	TP I/C & TP O/G	DSCCPADB023
4	12	TP I/C & TP O/G	DSCCPADB024
5	15	TP I/C & TP O/G	DSCCPADB025
10 SP*	10	SP O/G	DSCCPADB026
14 SP*	14	SP O/G	DSCCPADB027

*For Tire DBs



Plug & Sockets

Description	Cat. No.
20 A DP PLUG ASSEMBLY	DSSPLX0035
20 A DP SOCKET ASSEMBLY	DSSPLX0036
30 A TP PLUG ASSEMBLY	DSSPLX0037
30 A TP SOCKET ASSEMBLY	DSSPLX0038



Rotary Switch

Description	Cat. No.
40 A PHASE-SEL. SWITCH	DSCCPAMCX010
63 A PHASE-SEL. SWITCH	DSCCPAMCX009



Cat. No.	Description	Where used in List
DSCPGMDBX099	P-Channel SPN 12 W Flat Grey	DHDSNVDRZ04040 DHDSNVDRZ04063 DHDPTVPDRW08
DSCPGMDBX100	P-Channel SPN 16 W Flat Grey	DHDPTVODRW04 DHDPTVODRW08 DHDPTVODRW12 HDSNVDRZ06040 DHDSNVDRZ06063 DHDSNVDRZ08040 DHDSNVDRZ08063 DHDPTVPDRW12
DSCPGMDBX105	P-Channel SPN 12 W Flat Ivory	DHDSNVDPZ04040 DHDSNVDPZ04063
DSCPGMDBX106	P-Channel SPN 16 W Flat Ivory	DHDSNVDPZ06040 DHDSNVDPZ06063 DHDSNVDPZ08040 DHDSNVDPZ08063
DSCPGMDBX126	P-Channel SPN 4 W Curve Grey	DHDPSSHODRW04
DSCPGMDBX127	P-Channel SPN 8 W Curve Grey	DHDPSSHODRW08 DHDPTHODRW04
DSCPGMDBX128	P-Channel SPN 12 W Curve Grey	DHDPSSHODRW12 DHDPTHODRW06
DSCPGMDBX129	P-Channel SPN 16 W Curve Grey	DHDPSSHODRW16 DHDPTHODRW08
DSCPGMDBX131	P-Channel TPN 12 W Curve Grey	DHDPTHODRW12
DSCPGMDBX132	P-Channel SPN 4 W Curve Ivory	DHDPSSHODPW04
DSCPGMDBX133	P-Channel SPN 8 W Curve Ivory	DHDPSSHODPW08 DHDPTHODPW04
DSCPGMDBX134	P-Channel SPN 12 W Curve Ivory	DHDPSSHODPW12 DHDPTHODPW06
DSCPGMDBX135	P-Channel SPN 16 W Curve Ivory	DHDPSSHODPW16 DHDPTHODPW08
DSCPGMDBX137	P-Channel TPN 12 W Curve Ivory	DHDPTHODPW12



Miscellaneous

Description	Cat. No.
N/L BASE	DSCPGMDBX019
Dummy(Blanking)Plate 18mm	DSCPGMDBX001
KNOB SNAP TYPE GREY	DSCPGMDBX045
KNOB SNAP TYPE PI	DSCPGMDBX046
GREEN INDICATOR SWITCH SMALL	DSCCPAMCX005



Blanking Plate

No. of Ways	Length	Cat No.
1P	18 mm	DSCPGMDBX001

Single Phase Bus Bar

No. of Ways	Cat No.
4	DSCCUPDBP028
6	DSCCUPDBP032
8	DSCCUPDBP029
12	DSCCUPDBP030
16	DSCCUPDBP031



Spare Din Rails

No. of Ways	Length of DIN Rail	Cat No.
4	104 mm	CFEFDBX320
6	140 mm	CFEFDBX459
8	176 mm	CFEFDBX321
12	248 mm	CFEFDBX322
16	320 mm	CFEFDBX323



Spare Neutral Links

No. of Ways	Cat No.
2 P&S	DSCBRCDXB002
4 SPN	DSCBRCDXB011
6 SPN	DSCBRCDXB090
8 SPN	DSCBRCDXB012
12 SPN	DSCBRCDXB013
16 SPN	DSCBRCDXB014
4 TPN	DSCBRCDXB013
6 TPN	DSCBRCDXB015
8 TPN	DSCBRCDXB016
12 TPN	DSCBRCDXB017



Spare Earth Links

No. of Ways	Cat No.
4 SPN	DSCBRCDXB006
6 SPN	DSCBRCDXB093
8 SPN	DSCBRCDXB007
12 SPN	DSCBRCDXB003
16 SPN	DSCBRCDXB004
4 TPN	DSCBRCDXB003
6 TPN	DSCBRCDXB005
8 TPN	DSCBRCDXB009
12 TPN	DSCBRCDXB008



Ingress Protection

The IP (Ingress Protection) rating given to an enclosure states the degree of protection it offers by means of two digits. A summary of these is shown below, for a more detailed definition, see IEC 60529 2000, BS EN 60529 1992.

First Digit

Protection against solid foreign objects and access to hazardous parts: The first digit covers protection against penetration by solid objects, which includes hands and tools such as screwdrivers. At the lowest of seven levels, 0, no protection is offered, either of the equipment itself from damage by intrusion or of a person contacting live or moving parts. At the highest, there shall be no entry of dust.

0. No Protection



1. Protected against solid objects up to 50 mm
e.g. accidental touch by hands



2. Protected against solid objects up to 12 mm
e.g. fingers



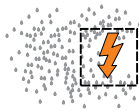
3. Protected against solid objects over 2.5 mm
e.g. tools and wires



4. Protected against solid objects over 1 mm
e.g. tools, wires and small wires



5. Protected against dust -limited ingress,
no harmful deposits



6. Totally protected against dust.



Second Digit

Protection against ingress of water: The second digit covers the degree of protection against the entry of water, on a progressive scale. For example, number 1 indicates that dripping water shall have no harmful effect, and number 6, that water projected in powerful jets against the enclosure from any direction shall have no harmful effects.

0. No Protection



1. Protected against vertically falling
drops of water eg. condensation



2. Protected against direct sprays of
water up to 15° from the vertical



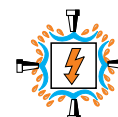
3. Protected against sprays of water
up to 60° from the vertical



4. Protected against water splashed
from all directions -limited ingress
permitted



5. Protected against low pressure jets
of water from all directions -limited
ingress permitted



6. Protected against strong jets of
water e.g. for use on ship decks
-limited ingress permitted



The letter X can be used in place of the first or second digit to indicate that tests have either not been made or are not applicable.

Category Of Duty

The category of duty defines the basic type of circuit and switching capability of the device, and selection should be made accordingly.

Utilisation Category Typical Applications

AC 20/DC 20 Connecting and disconnecting under no-load. Assumes all switching operations are carried out by other capable devices before this device is operated.

AC 21/DC 21 Switching of resistive loads including moderate overloads. Suitable for purely resistive type loads devices can switch 150% of its rated current under fault conditions

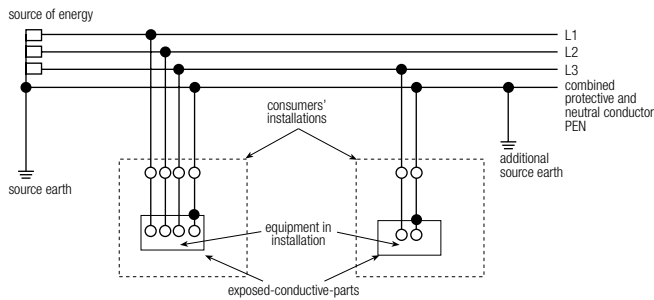
AC 22/DC 22 Switching of mixed resistive / inductive loads, including moderate overloads. Suitable for mixed resistive / inductive loads. Devices can switch 300% of its rated current under fault conditions.

AC 23/DC 23 Switching of highly inductive loads. Devices complying with AC 23/DC 23 are provided mainly as back-up to other means of switching, e.g. contacts. In the event of failure of functional devices, an AC 23/DC 23 type device can safely interrupt a stalled motor current. Where devices are the only means of controlling individual motors, they should comply with the requirements of appendix A of the standard. (IEC 60947-3)

Earthing System

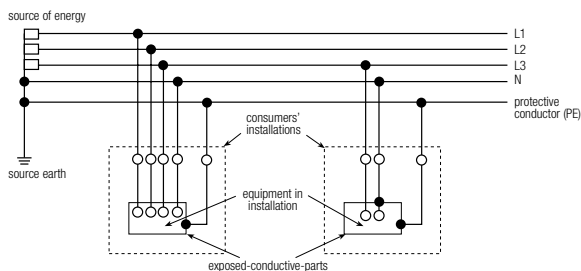
TN-C system

In this grid system, the neutral point of the transformer supplying the energy is directly grounded. The neutral conductor and protective conductor are routed to the consumer system in one conductor (PEN). A three-phase power supply consists of four conductors: L1, L2, L3, and PEN.



TN-S system

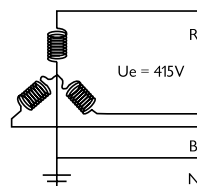
In this grid system, one point – usually the neutral point – of the transformer supplying the energy is usually directly grounded. The neutral conductor (N) and protective conductor (PE) are routed to the consumer system in separate conductors. A three-phase power supply consists of five conductors: L1, L2, L3, N, and PE.



Important Definitions

1. U_e = Rated Operational Voltage

The normal line-to-line voltage (3 Phase) or line to neutral voltage (1 Phase) of the system should not exceed (U_e)



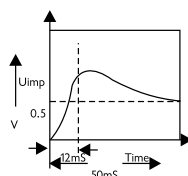
2. U_i = Rated Insulation Voltage

The voltage on which the dielectric properties have conventionally been based using tests at high voltage and mains frequency.

$U_i = 660 \text{ V}$
Tested @
2500 Vac 50 Hz

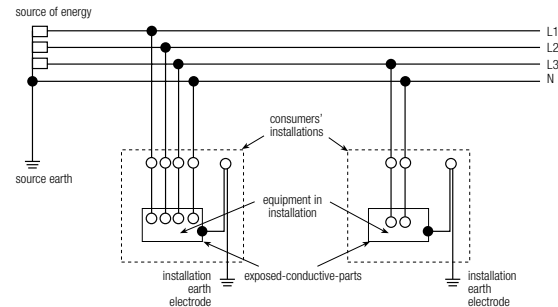
3. U_{imp} = Rated impulse withstand voltage

The voltage on which clearance distances are based. The value of transient peak voltage the circuit breaker can withstand from switching surges or lightning strikes imposed on the supply. e.g. $U_{imp} = 8 \text{ kV}$, Tested @ 8 kV peak with 1.2/50 ms impulse wave



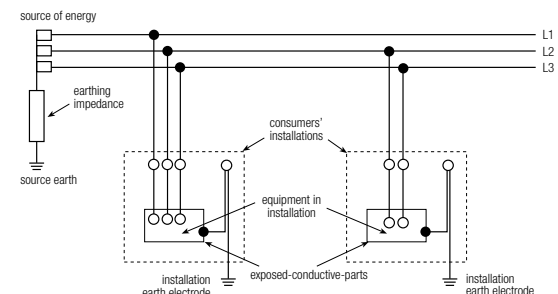
TT system

In this grid system, the grounded point of the transformer is routed to the system solely as a neutral conductor. The parts of the electrical system are connected to a local grounding system that is separated from the grounded point of the transformer. The neutral conductor and the local protective conductor are routed to the consumer system in separate conductors. A three-phase power supply consists of five conductors: L1, L2, L3, N, and local PE.



IT system

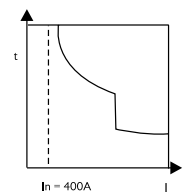
In this grid system, the neutral point of the transformer supplying the energy is not grounded, or only grounded via a high impedance. The parts of the electrical system are connected to a local grounding system that is separated from the grounded point of the transformer. If a neutral conductor is also routed from the neutral point of the transformer supplying the energy, this is routed separately from the local protective conductor. A three-phase power supply consists of four or five conductors: L1, L2, L3, if appropriate, N, and local PE.



4. I_n = Rated Current

The current which the circuit breaker will carry continuously under specified conditions and on which the time / current characteristics are based.

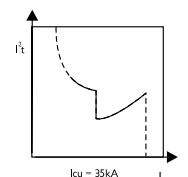
Unless otherwise stated (I_n) is based on a reference ambient temperature of 30 °Centigrade.



5. I_{cu} -Rated Ultimate Short Circuit Breaking Capacity in kA

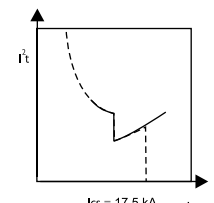
The calculated prospective fault current at the incoming terminals of the circuit breaker should not exceed (I_{cu}).

Exception: Using back-up protection as specified by the manufacturer.



6. I_{cs} -Rated Service Short Circuit Breaking Capacity in kA

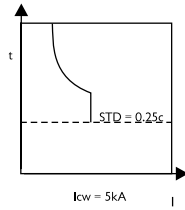
The maximum level of fault current operation after which further service is assured without loss of performance.



7. Icw-Rated Short-time Withstand Current

Circuit breakers of utilisation category 'B' have a short-time delay allowing time-graded selectivity between circuit breakers in series.

(I_{cw}) is the current the circuit breaker will withstand for the maximum short-time delay time. Preferred times are 0.05, 0.1, 0.25, 0.5 and 1.0 second.



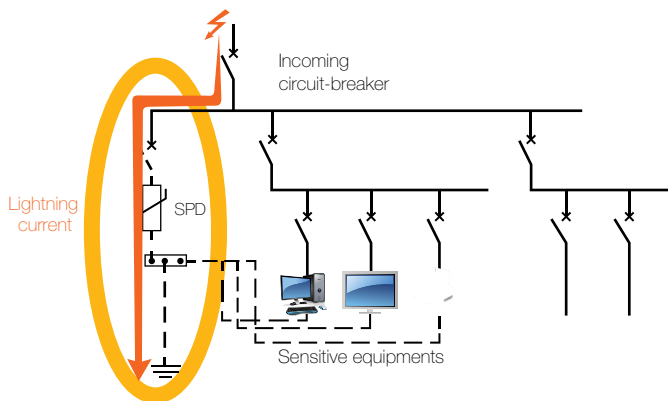
Terminology Related to SPD

General Operations of SPD

The Surge Protection Devices (SPD) is a device used to limit transitory overvoltage surges and to divert impulse currents away. They contain at least one non-linear component (such as varistor and/or GDT).

They are installed in parallel to the load:

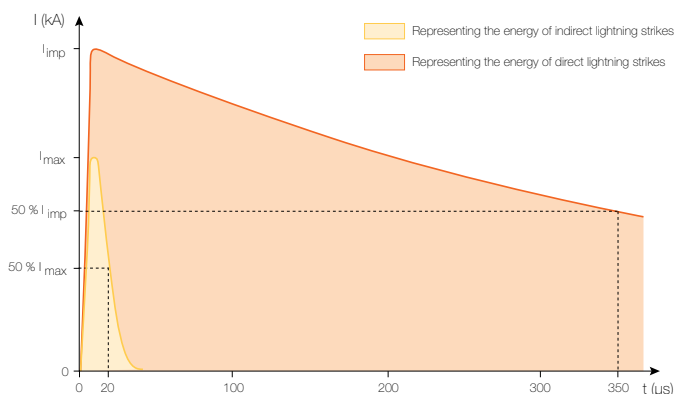
- during normal operation (in absence of surges), SPD shall have no influence on the system to which it is applied. SPD acts as an open circuit and maintains insulation between the line and earth.
- when surge occurs, the SPD lowers its impedance in some nanoseconds and diverts the surge current. SPD behaves as a closed circuit, the surge voltage is short circuited. The overvoltage is limited to an admissible value for the electrical equipment located downstream.
- after surge occurrence, the SPD recovers its high impedance and behaves as an open circuit.



Discharge Current Waveform

Wave 8/20: Current impulse with a 8 μ s rising edge (from 10-90% of maximum value) and a time to decrease to half value of 20 μ s. It is used to represent indirect lightning strike. They are used to test Type-2 SPD.

Wave 10/350: Current impulse with a 10 μ s rising edge (from 10-90% of maximum value) and a time to decrease to half value of 350 μ s. It is used to represent direct lightning strike. They are used to test Type-1 SPD



Maximum Continuous Operating Voltage (U_c/U_{cpv})- The maximum continuous operating voltage U_c is the maximum r.m.s/ dc voltage which may be applied continuously to the SPD. It has to take into account the network nominal voltage U_n plus the possible tolerances.

Nominal discharge current (I_n)- This is the discharge current with 8/20 μ s waveform that the Class 2 SPD is able to divert (towards earth) at least 15 consecutive times, without deteriorating.

The higher it is, the longer the life of the SPD will be.

Impulse current (I_{imp})- The impulse current (I_{imp}), used in Class I test is the maximum impulse 10/350 μ s current a surge protector can withstand without destruction. This test simulates the effect, of a direct lightning strike on an installation.

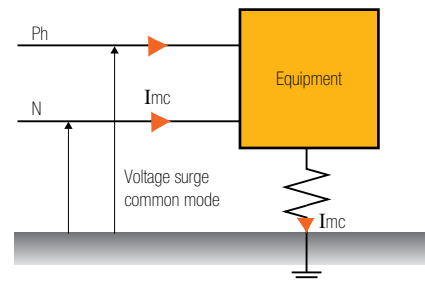
Maximum Discharge current (I_{max})- The maximum discharge current (I_{max}), applicable to Type 2 SPD, is the maximum impulse current 8/20 μ s a surge protector can withstand without destruction.

The higher the I_{max} is, for the same I_n, the safer the SPD is working, far away from its performance limits.

Protection Level (U_p)- The residual voltage that is measured across the terminal of the SPD when I_n is applied. Surge protection needs to be selected such that their voltage protection level (U_p) is lower than the impulse withstand capability of the equipment to be protected.

Follow-through current (I_f)- Current supplied by the electrical supply grid, which flows through the SPD following an impulse current.

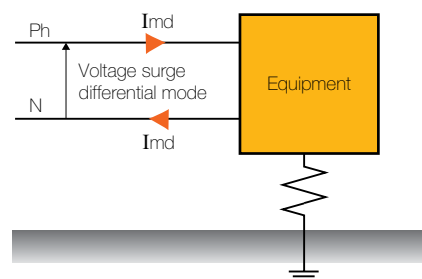
Follow current interrupting rating (I_{fi})- It is a parameter for spark-gaps and gas discharge tubes and does not concern varistors. I_{fi} is the rms-value of



the follow current, which can be interrupted by the SPD under U_c.

Common mode surge: Common mode voltage surges occur between the live parts and the earth: phase/earth or neutral/earth. They are especially dangerous for devices whose frame is earthed due to the risk of dielectric breakdown.

Differential mode surge: Differential mode voltage surges circulate between live conductors: Phase to phase or phase to neutral. They are especially dangerous for electronic equipment, sensitive computer equipment, etc.



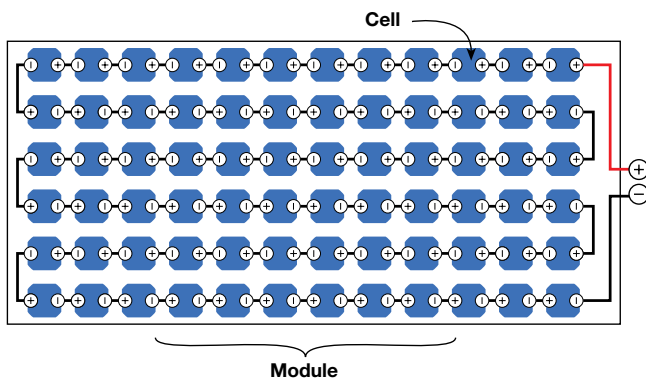
PV System Architecture

A **photovoltaic cell** is the basic building block that converts solar radiation into electricity. The most common type of cell is made from silicon doped with minute quantities of boron, phosphorous, gallium, arsenic, or other materials. Each cell develops about 0.5 Vdc to 0.7 Vdc voltage and a current of 30 mA/cm². The maximum amperage of the cell is proportional to its surface area, and depends on the intensity of the light.

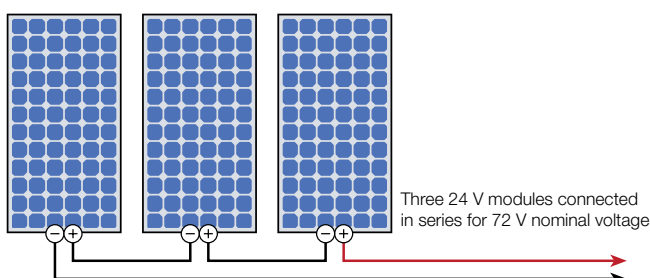


A **PV module** is a grouping of cells. For example, modules with 36 cells are quite common, producing 18 to 22 volt for a 12-volt nominal output. PV module is the smallest completely environmentally protected assembly of interconnected PV cells

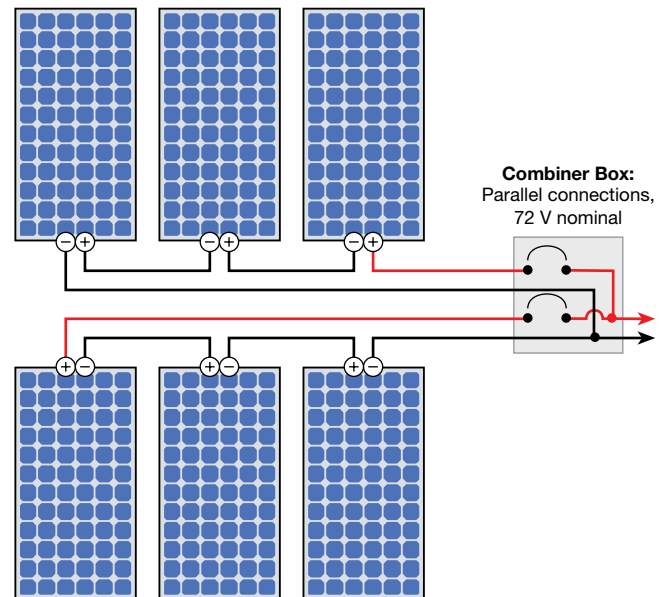
Several modules mechanically and electrically connected form a **PV panel**, that is a common structure which can be anchored to the ground or to a building



A **PV string** is a grouping of modules wired in series. A series string can then be used on its own or paralleled with other series strings, either to charge batteries or feed the utility grid.

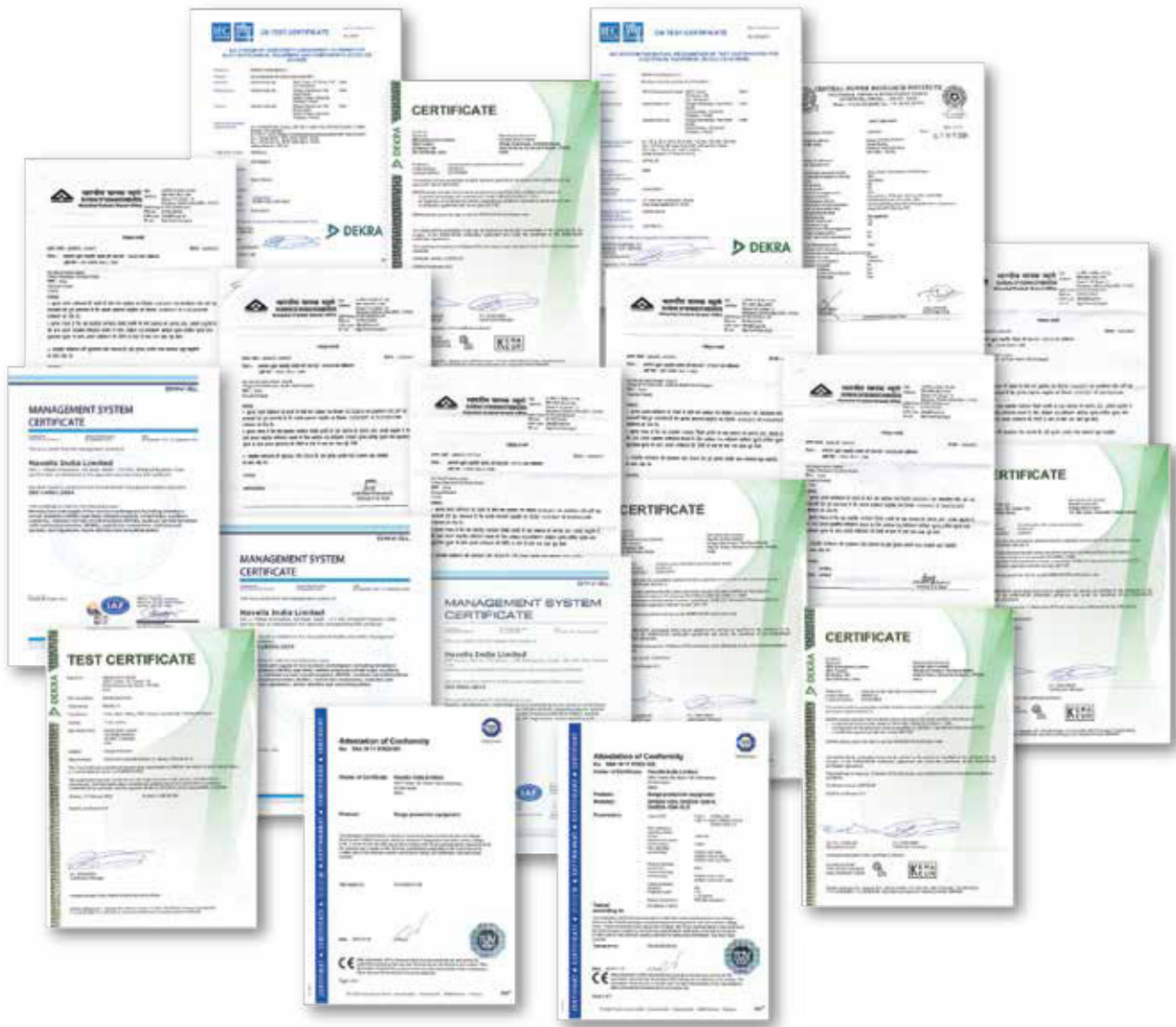


A **PV array** is a group of strings connected in parallel to generate higher current and consequently higher power.



The electricity generated by the solar system is then fed into a power inverter (PV inverter) that converts and regulates the DC source into usable AC power. The AC power can then be used locally for specific remote equipment, back-up power in residential and commercial places or fed directly back into the power grid and used as environmentally clean energy.

Certifications



Manufacturing plants compliant to ISO 9001:2015 ; ISO 14001:2004 ; OHSAS 18001:2007

Accredited by national / international bodies – BIS, CPRI, DEKRA, INTERTEK, TUV, UL

IS/IEC 60898-1 / EN 60898-1
 IS 12640-1 : 2000 / IEC 61008-1 / EN 61008-1
 IS 12640-2 : 2001 / IEC 61009-1 / EN 61009-1
 IS/IEC 60947-3 / IEC 60947-3
 IEC 61643-11 / EN 50539-11

...and in the process of attaining other International certifications

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