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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.

Range

6A to 40A - 'B' Curve 0.5A to 63A - 'C' Curve 0.5A to 63A - 'D' Curve 0.5A to 63A 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 8828 / IEC 60898 / EN 60898

Features

- Precise hammer action
- 15 Plates Arc Chute for effective arc quenching
- Longer electrical life
- Wide range
- Value for money
- Low power consumption, thus cost effective & Energy saving

Accessories - Auxiliary Switch

- Shunt Trip

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 with stand.

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 15 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 INFORMATION

Standard Conformity		IS 8828 / IEC 60898-1 / EN 60898-1			
Type / Series		B C D			
Rated Current (In)	А	6-40	0.5 - 63*	0.5 - 63*	
Rated Voltage (Ue)	V~	240/415	240/415	240/415	
Rated Frequency (f)	Hz		50		
No. of Poles (Execution)			1P, 1P+N, 2P, 3P, 3P+N, 4P		
Rated Short Circuit Breaking Capacity	kA	10 10 0.5 - 32A - 10 40A - 63A - 4.5			
Magnetic Release Setting		(3-5)In	(5-10)ln	(10-20)ln	
Rated Insulation Voltage (Ui)	V		660		
Rated Impulse Voltage (Uimp)	kV		4		
Electrical / Mechanical Endurance (no. of opera <32A >32A Ambient Working Temperature	ations) (°C)	20000 10000 -5°C to 55°C			
Terminal Capacity (max)	sq.mm		25		
Vibration	g		3		
Shock		40mm free fall			
Protection Class		IP-20			
Installation Position		Vertical / Horizontal			
Mounting		Clip on DIN Rail (35mm x 7.5mm)			
Case & Cover		Moulded, flame-retardant thermoplastic material.			

*	Current	Ratinas	_
	0.011.01.10	1 10/01/01/01	

0.5, 1, 2, 3, 4, 5, 6, 8, 10, 13, 16, 20, 25, 32, 40, 50, 63

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

CHARACTERISTICS CURVES



Thermal Tripping Ma			Magr	netic Trippir	ng	
As per IS:8828:96	No tripping current	Tripping current	Time limits	Hold current	Trip current	Time limits
	I ₁	$ _2$	t	$ _4$	I ₅	t
B Curve	1.13 x I _N		≥1h	3xl _N		<u>≥</u> 0.1s
		$1.45 \times l_{_{\rm N}}$	<1h		$5 \times l_{_{\rm N}}$	<0.1s
C Curve	1.13 x I _N		<u>≥</u> 1h	5xl _N		<u>></u> 0.1s
		$1.45 \times l_{_{\rm N}}$	<1h		$10 \times I_N$	<0.1s
D Curve	1.13 x I _N		<u>≥</u> 1h	10xl_{N}		<u>></u> 0.1s
		1.45 x l _N	<1h		$20 \times I_N$	<0.1s
l ₃ = 2.55 x l _N	1 s < t < 60s for I_N < 32A 1 s < t < 120s for I_N > 32A					

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) In

'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) In

'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) In

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 = Contact opening time (i.e., creation of arc)
- t₁ = Current / Voltage peak (i.e., current limitation)
- t₂ = Time to total extinction of arc (i.e., complete shutdown of fault current)

HAMMER TRIP MECHANISM



Current Limiting design in itself may not fulfill 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



K2 =0.78 (from graph 2) I_n / pole = 0.89 x 0.78 x 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 400Hz can be supplied on request.

These can be used on different frequencies in supply from $16\frac{2}{3}$ - 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	100Hz	200Hz	400Hz	
Multiplication Factor	1.1	1.2	1.5	1.5

LET THROUGH ENERGY I2T



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MAXIMUM BACKUP PROTECTION

At site, no. of MCBs are used for outgoing connection. To protect the MCBs under short circuit (higher 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	25
2	35
4	50
6	80
10-63	100

COLD RESISTANCE & POWER LOSS DETAILS

The power loss value declared are at rated current.

Rated Current	Cold Resistance	Power Loss per Pole
I _N (A)	R _i (m)	P _v (W)
1	1178.00	1.3
2	281.00	1.5
4	92.00	2.2
6	16.55	0.7
10	11.68	1.4
13	10.10	1.7
16	8.00	2.2
20	5.25	2.5
25	3.78	3.1
32	2.57	3.4
40	1.94	3.9
63	1.40	7.3

Remarks:- Tolerance ±5%

MINIATURE CIRCUIT BREAKER

HAVELLS

DC APPLICATION

MCBs for DC application are specially designed to meet tough arc guenching 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) _n
for 'C' curve AC MCB, magnetic range	=	(5-10)I _n
for DC MCB, magnetic range	=	1.4(5-10) _r

= (4-7)|_

=(7-14)|





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 :

<u>Vb</u> Rb lsc =

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 : \overline{R}

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 accross each pole. This can be achieved by wiring poles in series.

MCBs have been successfully tested on DC and can be used under the following conditions :

L/R	15ms max
Voltage	12-130V
Short Circuit Breaking Capacity	1 kA
Magnetic Release Setting	4-7 In

ACCESSORIES

AUXILIARY CONTACT



Attachment used for Signalling, Indication, Annunciation and Interlocking.

Standard Conformity		:	IS 13947-1, IEC 60947-1
Rated Current (In)	А	:	6
Rated Voltage (Ue)	V ac	:	240
Contact Configuration		:	1 NO + 1 NC / 2 NO + 2 NC
Utilization Category		:	AC 11
Electrical Endurance (No. of operation	ons)	:	10000
Terminal Capacity (Max)	mm ²	:	10
Protection Class		:	IP - 20 as per IEC-60529 / IS-2147
Mounting		:	Left side of MCB
			(Factory assembled)

SHUNT TRIP





Attachment used for remote tripping.

Standard Conformity		:	IS 13947-3, IEC 60947-3
Coil Consumption	VA	:	6
Rated Voltage (ac) (Ue)	V	:	240
(dc) (Ue)	V	:	48, 24, 12
Frequency	Hz	:	50
Operating Voltage Range		:	70% - 110% of rated voltage
Electrical Endurance (No. of ops)		:	10000
Terminal Capacity (Max)	mm ²	:	25
Protection Class		:	IP-20 as per IS-2147
			& IEC 60529 / IS-2147
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 short time rated and it trips the breaker instantaneously. (i.e., continuous duty not required)

DISCRIMINATION DATA

MCB Downstrear	n		MCB	Upstrea	m C Cu	rves					•										
C curve		10A	1	13	3A	16	5A		20A		25	A		32A		40	A		50A		63A
0.5 to 5A		5C)	6	65	1	80		100		12	5		160		20	00		250		315
6A				6	65	ł	80		100		12	5		160		20)0		250		315
10A									100		12	5		160		20)0		250		315
13A											12	5		160		20)0		250		315
16A														160		20)0		250		315
20A																20)0		250		315
25A																			250		315
32A																					315
40A																					
50A																					
MCB Downstrear	n		MCB	Upstrea	m B Cu	rves					•										
B curve		6A	١	10A		13A		16A	A	20	AC	2	25A		32A		40A	٨	50A	١	63A
0.5 to 5A				30		39		48	3		60		75		96		120)	150)	189
6A				30		39		48	3		60		75		96		120)	150)	189
10A								48	3		60		75		96		120)	150)	189
13A											60		75		96		120)	150)	189
16A													75		96		120)	150)	189
20A															96		120)	150)	189
25A																	120)	150)	189
32A																					189
40A																					
50A																					
MCB Downstrear	n 164	M Up: 204	CCBs stream 254	324	40A	50A	634	80A	1004	1254	1604	200	2504	3204	400A	500A	630A	8004	1000A	12504	1600A
0.5 to 6A	1100	1200	1/00	1700	2000	2500	3/00	4800	5800	6700	т	т	т	т	т	т	т	т	т	Т	т
104	-	1100	1200	1400	1700	2100	2500	3000	3500	4300	T	T	T	т	T	т Т	T	т	T	T	Т
164	-	-	-	1300	1600	1900	2100	2400	2700	3200	8300		т Т	т Т	т Т	 Т	т Т	т	т Т	т	Т
204	-	-	-	-	1600	1900	2100	2400	2700	2500	8300	т Т	т Т	т Т	т Т	 Т	т Т	т	т Т	T	т
25A	-	-	-	-	-	1700	1800	2000	2200	2500	5400	. 8700	T	T	T	T	T	T	T	T	T
32A	-	-	-	-	-	-	1800	2000	2200	2500	5400	8700	T	T	T	T	T	Т	T	T	Т
40A	-	-	-	-	-	-	-	1500	1700	2000	4300	7000	T	T	T	T	T	T	T	T	T
50A	-	-	-	-	-	-	-	-	1300	1500	3600	5900	9000	T	Т	T	T	T	T	T	T
63A	-	-	-	-	-	-	-	-	-	1100	2800	5200	8200	T	T	T	T	T	T	T	Т
00.1																			-		

Prospective Fault Levels to which selectivity is achieved ($\mathsf{T}=\mathsf{Total}$ Selectivity)

Discrimination with Fuses

HRC Fuse Upstream Type Gg

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

SELECTION

For Household Applications

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

Rating of MCBs for specified no. of fittings ("B" Series MCBs)

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

"B" series MCB is used for all Lighting Applications

Selection of MCB for Motor Protection

		1 Phase : Sta	230V DOL Irting	3 Phase 4 Start	00V DOL ing	3 Phase 400V Assisted Starting Star Delta			
S. No.	kW	HP	Full Load	MCB	Full Load	MCB	Full Load		
			Current	Selection	Current	Selection	Current	MCB 8	Selection
				С		С		С	D
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 :

Incomer Current Rating, For Single Phase :

Total Load in Watts

Incomer Current Rating, For Three Phase :

Total Load in Watts √3X240V "C" series MCB is used for all Motor Applications

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

SINGLE POLE (1P)



Current	'B' Curve	'C' Curve	'D' Curve	'DC' MCB.*
Rating (A) Cat No.	Cat No.	Cat No.	Cat No.
0.5		DHMCCSPF0x5	DHMCDSPF0x5	DHMCESPF0x50013
1		DHMCCSPF001	DHMCDSPF001	DHMCESPF0010013
2		DHMCCSPF002	DHMCDSPF002	DHMCESPF0020013
3		DHMCCSPF003	DHMCDSPF003	DHMCESPF0030013
4		DHMCCSPF004	DHMCDSPF004	DHMCESPF0040013
5		DHMCCSPF005	DHMCDSPF005	DHMCESPF0050013
6	DHMCBSPF006	DHMCCSPF006	DHMCDSPF006	DHMCESPF0060013
10	DHMCBSPF010	DHMCCSPF010	DHMCDSPF010	DHMCESPF0100013
16	DHMCBSPF016	DHMCCSPF016	DHMCDSPF016	DHMCESPF0160013
20	DHMCBSPF020	DHMCCSPF020	DHMCDSPF020	DHMCESPF0200013
32	DHMCBSPF032	DHMCCSPF032	DHMCDSPF032	DHMCESPF0320013
35				DHMCESPF0350013
40	DHMCBSPF040	DHMCCSPF040	DHMCDSPF040	DHMCESPF0400013
50		DHMCCSPF050	DHMCDSPF050	DHMCESPF0500013
63		DHMCCSPF063	DHMCDSPF063	DHMCESPF0630013

SINGLE POLE & NEUTRAL (1P+N)



Current	'C' Curve	
Rating (A)	Cat No.	
0.5	DHMCCSNF0x5	
1	DHMCCSNF001	
2	DHMCCSNF002	
3	DHMCCSNF003	
4	DHMCCSNF004	
5	DHMCCSNF005	
6	DHMCCSNF006	
10	DHMCCSNF010	
16	DHMCCSNF016	
20	DHMCCSNF020	
32	DHMCCSNF032	
40	DHMCCSNF040	
50	DHMCCSNF050	
63	DHMCCSNF063	

DOUBLE POLE (2P)



Current	'C' Curve	'D' Curve	'DC' MCB.*
Rating (A)	Cat No.	Cat No.	Cat No.
0.5	DHMCCDPF0x5	DHMCDDPF0x5	DHMCEDPF0x50013
1	DHMCCDPF001	DHMCDDPF001	DHMCRDPF0010013
2	DHMCCDPF002	DHMCDDPF002	DHMCRDPF0020013
3	DHMCCDPF003	DHMCDDPF003	DHMCRDPF0030013
4	DHMCCDPF004	DHMCDDPF004	DHMCRDPF0040013
5	DHMCCDPF005	DHMCDDPF005	DHMCRDPF0050013
6	DHMCCDPF006	DHMCDDPF006	DHMCRDPF0060013
10	DHMCCDPF010	DHMCDDPF010	DHMCRDPF0100013
16	DHMCCDPF016	DHMCDDPF016	DHMCRDPF0160013
20	DHMCCDPF020	DHMCDDPF020	DHMCRDPF0200013
32	DHMCCDPF032	DHMCDDPF032	DHMCRDPF0320013
35			DHMCRDPF0350013
40	DHMCCDPF040	DHMCDDPF040	DHMCRDPF0400013
50	DHMCCDPF050	DHMCDDPF050	DHMCRDPF0500013
63	DHMCCDPF063	DHMCDDPF063	DHMCRDPF0630013

*MCB suitable for DC application.

MINIATURE CIRCUIT BREAKER

THREE POLE (3P)



Current	'B' Curve	'C' Curve	'D' Curve	'DC' MCB.*
Rating (A)	Cat No.	Cat No.	Cat No.	Cat No.
0.5		DHMCCTPF0x5	DHMCDTPF0x5	DHMCDTPF0x5
1		DHMCCTPF001	DHMCDTPF001	DHMCDTPF001
2		DHMCCTPF002	DHMCDTPF002	DHMCDTPF002
3		DHMCCTPF003	DHMCDTPF003	DHMCDTPF003
4		DHMCCTPF004	DHMCDTPF004	DHMCDTPF004
5		DHMCCTPF005	DHMCDTPF005	DHMCDTPF005
6		DHMCCTPF006	DHMCDTPF006	DHMCDTPF006
10		DHMCCTPF010	DHMCDTPF010	DHMCDTPF010
16		DHMCCTPF016	DHMCDTPF016	DHMCDTPF016
20		DHMCCTPF020	DHMCDTPF020	DHMCDTPF020
32		DHMCCTPF032	DHMCDTPF032	DHMCDTPF032
35				
40		DHMCCTPF040	DHMCDTPF040	DHMCDTPF040
50		DHMCCTPF050	DHMCDTPF050	DHMCDTPF050
63		DHMCCTPF063	DHMCDTPF063	DHMCDTPF063

THREE POLE - N (3P+N)



'C' Curve	'D' Curve	
Cat No.	Cat No.	
DHMCCTNF0x5	DHMCDFPF0x5	
DHMCCTNF001	DHMCDFPF001	
DHMCCTNF002	DHMCDFPF002	
DHMCCTNF003	DHMCDFPF003	
DHMCCTNF004	DHMCDFPF004	
DHMCCTNF005	DHMCDFPF005	
DHMCCTNF006	DHMCDFPF006	
DHMCCTNF010	DHMCDFPF010	
DHMCCTNF016	DHMCDFPF016	
DHMCCTNF020	DHMCDFPF020	
DHMCCTNF032	DHMCDFPF032	
DHMCCTNF040	DHMCDFPF040	
DHMCCTNF050	DHMCDFPF050	
DHMCCTNF063	DHMCDFPF063	
	C Curve Cat No. DHMCCTNF0x5 DHMCCTNF001 DHMCCTNF002 DHMCCTNF003 DHMCCTNF004 DHMCCTNF005 DHMCCTNF006 DHMCCTNF010 DHMCCTNF016 DHMCCTNF032 DHMCCTNF032 DHMCCTNF032 DHMCCTNF040 DHMCCTNF050	Cr Curve D' Curve Cat No. Cat No. DHMCCTNF0x5 DHMCDFPF0x5 DHMCCTNF001 DHMCDFPF002 DHMCCTNF002 DHMCDFPF003 DHMCCTNF003 DHMCDFPF003 DHMCCTNF004 DHMCDFPF004 DHMCCTNF005 DHMCDFPF005 DHMCCTNF006 DHMCDFPF006 DHMCCTNF007 DHMCDFPF010 DHMCCTNF010 DHMCDFPF016 DHMCCTNF010 DHMCDFPF016 DHMCCTNF020 DHMCDFPF032 DHMCCTNF032 DHMCDFPF032 DHMCCTNF040 DHMCDFPF040 DHMCCTNF050 DHMCDFPF050 DHMCCTNF050 DHMCDFPF050 DHMCCTNF050 DHMCDFPF050

FOUR POLE (4P)



Current	'C' Curve	'D' Curve	
Rating (A)	Cat No.	Cat No.	
0.5	DHMCCFPF0x5	DHMCDFPF0x5	
1	DHMCCFPF001	DHMCDFPF001	
2	DHMCCFPF002	DHMCDFPF002	
3	DHMCCFPF003	DHMCDFPF003	
4	DHMCCFPF004	DHMCDFPF004	
5	DHMCCFPF005	DHMCDFPF005	
6	DHMCCFPF006	DHMCDFPF006	
10	DHMCCFPF010	DHMCDFPF010	
16	DHMCCFPF016	DHMCDFPF016	
20	DHMCCFPF020	DHMCDFPF020	
32	DHMCCFPF032	DHMCDFPF032	
35			
40	DHMCCFPF040	DHMCDFPF040	
50	DHMCCFPF050	DHMCDFPF050	
63	DHMCCTPF063	DHMCDTPF063	

RAILWAY MCB



Current	'DC' application	
Rating (A)	Cat. No.	
0.5	DHMCRSPF0X50013	
1	DHMCRSPF0010013	
2	DHMCRSPF0020013	
3	DHMCRSPF0030013	
4	DHMCRSPF0040013	
5	DHMCRSPF0050013	
6	DHMCRSPF0060013	
10	DHMCRSPF0100013	
16	DHMCRSPF0160013	
20	DHMCRSPF0200013	
32	DHMCRSPF0320013	
35	DHMCRSPF0350013	
40	DHMCRSPF0400013	
50	DHMCRSPF0500013	

DHMCRSPF0600013

DIMENSIONS (in mm)



60

ACCESSORIES

SHUNT TRIP



Description	Cat. No.
12 VDC	MCDST012
24 VDC	MCDST024
48 VDC	MCDST048
240 VAC	MCDST240

AUXILIARY CONTACT



Contact Configuration	Current	Cat. No.
1NO + 1NC	6A	MCBAC116
2NO + 2NC	6A	MCBAC226

INDICATOR 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.



INDICATOR LIGHTS

Volts	Colour	Cat. No.
240 V	Red	DHMCYSPX000
240 V	Amber	DHMCXSPX000
240 V	Blue	DHMCVSPX000
240 V	Green	DHMCZSPX000
240 V	Clear	DHMCWSPX000

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 35.5 X 7.5 mm.
- Long life & durable
- Available in five different colours : Red, Amber, Blue, Green, Clear

INDICATOR LIGHTS - SPARES

Colour	Lens Cat. No.	Neon Bulb Cat. No.
Red	DCPTMMCX043	DCELDMCL001
Amber	DCPTMMCX051	DCELDMCL001
Blue	DCPTMMCX049	DCELDMCL001
Green	DCPTMMCX050	DCELDMCL001
Clear	DCPTMMCX052	DCELDMCL001

TECHNICAL INFORMATION

Specification	IS 13947 (Part 5)	
	IEC 60947-5-1	
Contacts	Rated Operation Voltage	240 V ac
	Rating Electrical Power	1.2 Watt
	Frequency	50 Hz
	Type of Lamp Socket	E - 10 Thread
	Terminal Capacity	10 mm ²
Light Indication	Colour	
	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 to 55° C

EASY TO REPLACE SPARES



- The whole module
- Colour Cap
- Old Lamp

DIMENSIONS (in mm)







Miniature Circuit Breaker (80 - 125)

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.

Range 80A to 125A - 'C' Curve

Execution Single Pole (1P) Three Pole (3P) Three Pole & Neutral (3P+N)

Specification IS 8828-1996 / IEC 60898 - 2002

Features

- Uniform 10 kA breaking capacity for the entire range
- Control lever colour unambiguously indicates the rated current In of the device
 - In (A) Colour
 - 80 (Silver)
 - 100 (Red)
 - 125 (Yellow)
- Position indicating device optically the operating status of the device Indicator colour device status (Red) ON (Green) OFF
- Test button for verification of the tipping mechanism function

TECHNICAL INFORMATION

Standard Conformity		IS 8828 / IEC 60898-1
Type/Series		С
Rated Current (In)	A	80A - 125A*
Rated Voltage (ac) (Ue)	V	240/415
Rated Frequency (f)	Hz	50-60 Hz
Nos. of Poles (Execution)		1P, 3P, 3P+N**
Rated Short Circuit Breaking Capacity	kA	10
Magnetic Release Setting		(5-10)ln
Rated Insulation Voltage (Ui)	kV	4
Electrical Endurance (No. of operations)	10000	10000
Ambient Working Temperature	(°C)	**-5°C to + 55°C
Terminal Capacity (Max)	mm ²	50
Tightening Torque	Nm	3.5
Vibration	g	3
Shock		40mm fall
Protection Class		IP-20
Installation Position		Vertical / Horizontal
Mounting		Clip on DIN Rail (35mm x 7.5mm)
Case & Cover		Moulded, flame retardant thermoplastic material.

Current Ratings - 80A, 100A, 125A

'D' Curve MCBs are available on request

** 1P Single Pole 3P Three Pole 3P+N Three Pole Neutral

*

MINIATURE CIRCUIT BREAKER (80-125A MCB)

SINGLE POLE (1P)



Current Rating (A)	'C' Curve Rating (A)	
80	DHMCCSPF080	
100	DHMCCSPF100	
125	DHMCCSPF125	

THREE POLE (3P)



Current Rating (A)	'C' Curve Rating (A)	
80	DHMCCTPF080	
100	DHMCCTPF100	
125	DHMCCTPF125	

THREE POLE NEUTRAL (3P+N)



Current Rating (A)	'C' Curve Rating (A)	
80	DHMCCTNF080	
100	DHMCCTNF100	
125	DHMCCTNF125	

TECHNICAL INFORMATION

AUXILIARY CONTACTS



SHUNT TRIP



Attachment used for Auxilliary Circuits Contact Sequence Cat. No. : IEC 62019 11 (1NO + 1NC) MOBAC116 Standard Conformity 21 (2NO + 1NC) MOBAC216 Contact Sequence : 11,21* Rated Current (In) A 6 Rated Voltage 240 Vac : Voltage Category : AC 11 : 4 Impulse Voltage kV Electrical Endurance : 10000 operations Terminal Capacity

Rigid	mm ²	:	max 4
Flexible	mm ²	:	max 2.5
Protection Class		:	IP-20 as per IS-2147 / IEC-60529
Mounting	t	:	on Right side of MCB
* 11 = 1NO + 1NC			

21 = 2NO + 1 NC

Attachment used for Rer	note Tripping	Voltage	Cat. No.		
Standard conformity	: IS: 13947 - 1: 93	24 ac	MOAST024		
Rated Current (In) A	: 80 - 125	48 ac	MOAST048		
Rated Voltage	:	110 ac	MOAST110		
ac	: 24, 48, 110, 230, 400	230 ac	MOAST230		
dc	: 24, 48, 110, 220, 440	400 ac	MOAST400		
Frequency Hz	: 50	24 dc	MODST024		
Operating Voltage	: 70% - 110% of rated voltage	48 dc	MODST048		
Impulse Voltage kV	: 4	110 dc	MODST110		
Electrical endurance	: 10000 operations	220 dc	MODST220		
Terminal Capacity	mm ²	:	max 2.5 440 dc		
Protoction Class	· ID 20 as par IS 2147 / IEC 605	20			
	. II -20 as per 10-2 147 / IEO-00028				
Mounting	: To be coupled on Left side of MCB				

UNDER VOLTAGE RELEASE



Attachment used for Tripping Circuit

Breaker at voltage drop I	between 75% and 45% Un.	Voltage	Cat. No.			
Standard conformity	: IS 13947 - 1: 93	24 ac	MOAUV024			
Rated Current (In) A	: 80 - 125	48 ac	MOAUV048			
Rated Voltage ac	: 24, 48, 110, 230, 400	110 ac	MOAUV110			
Frequency Hz	: 50	230 ac	MOAUV230			
Operating Voltage	: 70% - 110% of rated voltage	400 ac	MOAUV400			
Impulse Voltage kV	: 4	4				
Electrical Endurance	10000 operations					
Terminal Capacity mm ²	max 2.5					
Protection Class	: IP-20 as per IS 2147 / IEC 6052	IP-20 as per IS 2147 / IEC 60529				
Mounting	To be coupled on left side of MCB					

MINIATURE CIRCUIT BREAKER (80-125A MCB)

HAVELLS

ACCESSORIES INSTALLATION

AUXILIARY CONTACTS

Installation (hereinafter only the block) to a circuit breaker or tumbler switch (hereinafter only the device)



- 1. Switch on both the block and the device.
- Insert metallic shaft from the right onto the device in such a control lever and the plastic shaft into the block switching system hole.
- Slide the block from the right onto the device in such a way that one shaft interconnects control levers and the other interconnects the switching systems.
- 4. Press the block to the device and click the side fixing latches of the block in the device recess.
- 5. Check correct function by switching.

SHUNT TRIP & UNDER VOLTAGE RELEASE

Installation (hereinafter only the block) to a circuit breaker or tumbler switch (hereinafter only the device)



Switch on both the block and the device.

1.

2.

- Insert metallic shaft from the right onto the device in such a control lever and the plastic shaft into the block switching system hole.
- Slide the block from the right onto the device in such a way that one shaft interconnects control levers and the other interconnects the switching systems.
- 4. Press the block to the device and click the side fixing latches of the block in the device recess.
- 5. Check correct function by switching.

TRIPPING CHARACTERISTICS

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





Mini MCB

Havells Mini MCB is a single composite device, which provides, protection against overload and short circuit faults. It is designed with unique mounting concept, for use in domestic & commercial distribution systems, at the most downstream circuit (switchboards / DESB), ensuring even higher degree of protection for discriminating applications.

In normal operation, this new Mini MCB is safe to use & there is no threat to user and environment.

Range 6A, 10A, 16A, 20A, 25A, 32A

Execution Single Pole (1P)

Specification IS 8828-1996

Features

- Protection against overload & short circuit in switch board itself
- Suitable for both DESB and switch board
- Positive contact indication
- Short circuit breaking capacity, 3kA
- Performance & Safety
- Reliability & Continuity of service

CONSTRUCTION

Havells Mini MCB is a single composite device, which provides, protection against overload and short circuit faults. It is designed with unique mounting concept, for use in domestic & commercial distribution systems, at the most downstream circuit (switchboards / DESB), ensuring even higher degree of protection for discriminating applications.

In normal use, this new Mini MCB is safe to use and without danger to user as well as to environment.

TECHNICAL SPECIFICATION

Specification Reference	:	IS : 8828 : 1996
Rated Current In	:	6A, 10A, 16A, 20A, 25A, 32A .
Rated Voltage Un	:	240 V ac
Tripping Curve		С
Rated Insulation voltage	:	500 V ac
Rated Frequency	:	50 Hz
No. of Poles		Single Pole
Rated Short Circuit Capacity Icn	:	3kA
Method of Mounting	:	Switch Board Type
Degree of Protection	:	IP 20
Terminals Capacity		
Line Terminals		6 mm ²
Load Terminals		6 mm ²
Dimensions L x W x D(in mm)	:	56.25 x 47 x 17.7
Net Weight (in Kg)		0.085 (approx)
Ambient Temperature	:	- 5°C to + 55°C

MINI MCB



Current Rating (A)	Cat No. 'C' Curve	
6A	DHMNCSPA006	
10A	DHMNCSPA010	
16A	DHMNCSPA016	
20A	DHMNCSPA020	
25A	DHMNCSPA025	
32A	DHMNCSPA032	



TRIPPING CURVES



DIMENSIONS (in mm)



INSTALLATION INSTRUCTIONS



Seperate the front plate from Mini MCB by pulling off



Screw mount Mini MCB front plate on the Switchboard



Hold the Mini MCB in such a position that knob shows OFF position



Connect the outgoing phase wire on upper terminal & tight it



Connect the outgoing phase wire on upper terminal & tight it



Push fit the Mini MCB on to the front plate



Mini MCB is successfully installed





Isolator

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

Range 40A - 63A, 80A - 125A

Execution

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

Specification IS 13947-3 / IEC 60947 - 3

Features

- Low Watt Loss
- Longer Electrical Life
- Wide Range
- Value for Money
- Low power consumption, thus cost effective & energy saving

TECHNICAL INFORMATION

Standard Conformity		IS 13947-3 & IEC 60947-3
Rated Current (In)	A	40A - 63A, 80 - 125A
Rated Voltage (ac) (Ue)	V	240/415
Rated Frequency (f)	Hz	50
Nos. of Poles (Execution)		1P, 2P, 3P, 4P
Utilization Category		AC 22A
Rated Insulation Voltage (Ui)	V	660
Rated Impulse Voltage (Uimp)	kV	4
Electrical / Mechanical Endurance	Nos	10000
(No. of operations)		
Ambient Temperature	°C	-5 to +55
Terminal Capacity (Max)	sq.mm	25
Vibration	g	5
Shock		40mm free fall
Protection Class		IP-20
Installation Position		Vertical / Horizontal
Mounting		Clip on DIN Rail (35mm x 7.5mm)
Case & Cover		Moulded, flame retardant thermoplastic material.

DIMENSIONS (in mm)

SINGLE POLE (1P)



DOUBLE POLE (2P)





Current Rating (A)	Cat. No.
40	DHMIOSPX040
63	DHMIOSPX063

Current Rating (A)	Cat. No.
40	DHMIODPX040
63	DHMIODPX063
80	DHMIOSPX080
100	DHMIOSPX100
125	DHMIOSPX125

ISOLATORS

HAVELLS

THREE POLE (3P)



Current Rating (A)	Cat. No.
40	DHMIOTPX040
63	DHMIOTPX063
80	DHMIODPX080
100	DHMIODPX100
125	DHMIODPX125

FOUR POLE (4P)



Current Rating (A)	Cat. No.
40	DHMIOFPX040
63	DHMIOFPX063
80	DHMIOTPX080
100	DHMIOTPX100
125	DHMIOTPX125

ISOLATOR FOUR POLE (2 MODULE)



Current Rating (A)	Cat. No. Double Pole One Module	Cat. No. Four Pole Two Module
25	DHMIHDPX025	DHMIHFPX025
40	DHMIHDPX040	DHMIHFPX040

	А		В					С	D	E	F
		SP	SPN	DP	TP	TPN	FP				
Isolators	72.7			35.6	53.4		71.2	60.0	43.5	45.0	87.5



Changeover Switch

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.

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

Range 25A & 40A

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

Specification IS 13947-3 / IEC 60947 - 3

Features

- Compact construction
- Double break contacts
- Silver Cadmium Oxide contact tips
- Shrouded terminals
- Front operation with three stable positions I-O-II
- Centre position OFF
- Easy snap on DIN Rail mounting
- Can be mounted with other products viz. MCB, ELCB, Isolator in Distribution Board

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 conacts 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 INFORMATION

Standard Conformity		:	IS 13947-3 / IEC 60947-3
No. of Poles (Execution)		:	2 Pole, 4 Pole
Rated Current (In)	А	:	25, 40
Rated Voltage (Ue)	V	:	240 ac / 415 ac
Rated Frequency	Hz	:	50
Rated Insulation Voltage	V	:	660
Dielectric Strength	kV	:	2.5
Rated Impulse Voltage	kV	:	4
Utilization Category		:	AC 21A
Ambient Temp.	°C	:	-5 to +55
Mechanical Life		:	10000 operations
Electrical Life		:	10000 operations
Mounting		:	Clip on DIN Rail (35mm x 7.5) mm
Mounting Position		:	Vertical / Horizontal
Terminal Capacity	mm ²	:	10
Weight Double Pole	gms	:	134
Four Pole	gms	:	268



CONNECTION DIAGRAMS / TERMINAL MARKING

TWO POLE



- "II" Incoming terminals (standby supply) 4 & 8 Outgoing terminals (to load) - 1 & 5
- Outgoing terminals (to load)
 Mid position of knob is 'OFF' position

FOUR POLE



DOUBLE POLE



Rating Amp	Cat. No.
25	DHMIHDPX025
40	DHMIHDPX040

FOUR POLE



Rating Amp	Cat. No.
25	DHMIHFPX025
40	DHMIHFPX040

60 44

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DIMENSIONS (in mm)



4 Pole





36 84




Residual Current Circuit Breaker (RCCB) 16A - 63A

The flow of current through electrical facilities always involves risks. Poorly insulated equipment, faulty wires and incorrect use of an electrical device cause currents to flow through the wrong path (i.e. through the insulation) to the earth. This current is called 'Leakage Current'.

Earth leakage is an electrical hazard and is responsible for electrical shocks and fire risk. Earth leakage and its associated hazard can be prevented by Residual Current Circuit Breaker (RCCB), also popularly known as Earth Leakage Circuit Breaker (ELCB).

Range

16A - 63A

Sensitivity 30mA, 100mA, 300mA, 500mA

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

Specification IEC 61008-1/IS 12640 - 1:2000 / EN 61008-1

Features

- Simple and Robust operating mechanism.
- Rotary handle with ON/OFF indication
- Dual termination for Bus Bar as well as cable connection
- Advance neutral
- Test button for regular inspection
- Positive contact indication

PROTECTION

AGAINST ELECTROCUTION

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.

Electrocution is a passage of current through human body, which is dangerous. The flow of current through human body effects vital functions.

- 1. Breathing
- 2. Heartbeat

A correctly chosen RCCB can detect small currents flowing to earth and reduces the risk of electrocution. Effect of electric current through human body has been well researched and following chart summarizes the results:

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



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 = 50V
- In damp surroundings, voltage limit = 25V

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 30mA, the maximum permissible earth fault loop impedance is calculated as follows: Zs (max) = $50 / \ln = 50/0.03 = 1,666$

Rated Tripping Current	Maximum permissible earth
of the RCD	fault loop impedance in
10mA	5,000
30mA	1,666
100mA	500
300mA	166

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 amp.

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.

TECHNICAL INFORMATION





TWO POLE

FOUR POLE

Standard Conformity		IS 12640-1: IEC 61008-1	IS 12640-1: IEC 61008-1
Rated Current (In)	А	16, 25, 32, 40, 63	25, 40, 63
Sensitivity († n)	mA	30, 100, 300, 500	30, 100, 300, 500
Rated Voltage (Un)	Vac	240	415
Rated Insulation Voltage (Ui)	V	660	660
Rated Frequency	Hz	50	50
Short circuit Withstand Capacity	kA	6	6
Residual Making Breaking Capacity	A	500 A or 10 In wherever is greater	500 A or 10 In wherever is greater
Ambient Temperature	°C	-25°C to + 55°C	-25°C to + 55°C
Shock Resistance		40 mm free fall	40 mm free fall
Vibration Resistance	g	3	3
Electrical /Mechanical operations		10000	10000
Mounting		Din Rail (35 x 7.5) mm	Din Rail (35 x 7.5) mm
Degree of Protection		IP 20	IP 20
Terminal Capacity (max)	mm ²	25	25
*500 mA is available on request			

WORKING PRINCIPLE



The RCCB works on the current balance principle. The supply conductors, i.e. the phases and the neutral, are passed through a torroid 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.

SELECTION

30 mA

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



- 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 if ventricular fabriliation increased upto 5% (curve C_2) upto 50% (curve C_3) and above 50% beyond curve C3. It increases with magnitude and time, and pathophysiological effects such as cardiac arrest, breathing arrest and heavy burns may occur.

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

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

100 mA

A 100mA ELCB 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 ELCB. This could occur if additional resistances to that of human body are included in the earth path.

The 100mA RCCB protects against leakage currents and indirect contact with earth loop impedance upto 500 Ohms.

300 / 500mA

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

ACTUATION TIME CHARACTERISTICS



WIRING DIAGRAM

For Single Phase - 2 Wire For Three Phase - 3 Wire For Three Phase - 4 Wire connections connections connections Load Load Load 0 0 666 \diamond 0000 1N 135N 135N RΦ RĻ RФ Т ŻΝ ØN ¹⊘ 0 00 Line Line l ine

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.

RESIDUAL CURRENT CIRCUIT BREAKER

DOUBLE POLE 'AC' TYPE



0		
	Sensitivity	Cat No.
Rating (A)	mA	
16	30	DHRMCTDE030016
16	100	DHRMCTDE100016
16	300	DHRMCTDE300016
25	30	DHRMCTDE030025
25	100	DHRMCTDE100025
25	300	DHRMCTDE300025
32	30	DHRMCTDE030032
32	100	DHRMCTDE100032
32	300	DHRMCTDE300032
40	30	DHRMCTDE030040
40	100	DHRMCTDE100040
40	300	DHRMCTDE300040
63	30	DHRMCTDE030063
63	100	DHRMCTDE100063
63	300	DHRMCTDE300063

FOUR POLE 'AC' TYPE



Current Rating (A)	Sensitivity mA	Cat No.
25	30	DHRMCRFE030025
25	100	DHRMCRFE100025
25	300	DHRMCRFE300025
40	30	DHRMCRFE030040
40	100	DHRMCRFE100040
40	300	DHRMCRFE300040
63	30	DHRMCRFE030063
63	100	DHRMCRFE100063
63	300	DHRMCRFE300063

DIMENSIONS (in mm)

2 POLE



45.0

4 POLE





DOUBLE POLE 'A' TYPE



Current Rating (A)	Sensitivity mA	Cat No.
16	30	DHRMAMDF030016
16	100	DHRMAMDF100016
16	300	DHRMAMDF300016
25	30	DHRMAMDF030025
25	100	DHRMAMDF100025
25	300	DHRMAMDF300025
32	30	DHRMAMDF030032
32	100	DHRMAMDF100032
32	300	DHRMAMDF300032
40	30	DHRMAMDF030040
40	100	DHRMAMDF100040
40	300	DHRMAMDF300040
63	30	DHRMAMDF030063
63	100	DHRMAMDF100063
63	300	DHRMAMDF300063

FOUR POLE 'A' TYPE



Current Rating (A)	Sensitivity mA	Cat No.
16	30	DHRMAMFF030016
16	100	DHRMAMFF100016
16	300	DHRMAMFF300016
25	30	DHRMAMFF030025
25	100	DHRMAMFF100025
25	300	DHRMAMFF300025
32	30	DHRMAMFF030032
32	100	DHRMAMFF100032
32	300	DHRMAMFF300032
40	30	DHRMAMFF030040
40	100	DHRMAMFF100040
40	300	DHRMAMFF300040
63	30	DHRMAMFF030063
63	100	DHRMAMFF100063
63	300	DHRMAMFF300063





Residual Current Circuit Breaker (RCCB) 80A - 125A

The flow of current through electrical facilities always involves risks. Poorly insulated equipment, faulty wires and incorrect use of an electrical device cause currents to flow through the wrong path (i.e. through the insulation) to the earth. This current is called 'Leakage Current'.

Earth leakage is an electrical hazard and is responsible for electrical shocks and fire risk. Earth leakage and its associated hazard can be prevented by residual current circuit breaker (RCCB), also popularly known as Earth Leakage Circuit Breaker (ELCB).

Range 80A, 100A & 125A

Sensitivity 30mA, 100mA, 300mA, 500mA

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

Specification IEC 12640-1 / IEC 61008-1 / EN 61008-1

Features

- Short circuit breaking with stand capacity 10kA
- Different knob position to indicate whether it is switched by a fault or manually switched OFF (mid trip)
- Test button for regular inspection
- Contact position indication

TECHNICAL SPECIFICATION



DOUBLE POLE

FOUR POLE

Specification Reference		IEC 61008-1 & IS 12640-1: 2000	IEC 61008-1 & IS 12640-1: 2000
Rated current (In)	А	80, 100, 125	80, 100 , 125
Sensitivity (I ∆ n)	mA	30, 100, 300	30, 100 ,300, 500*
Rated Voltage (Ue)	V	240 V~	415V~
Rated Insulation voltage (Ui)	V	660	660
Rated Frequency	Hz	50	50
Trip Time		lx I <u>A</u> n<300ms, 5l <u>A</u> n<40ms	
Short circuit withstand Capacity	kA	10	10
Residual Making Breaking capacity	А	10 ln	10 ln
Ambient Working Temperature	°C	-25°C to + 55°C	-25°C to + 55°C
Shock Resistance		40mm free fall	40mm free fall
Vibration Resistance	g	5	5
Electrical Endurance	operations	>2000	>2000
Mechanical Endurance	operations	>3000	>3000
Mounting		Din Rail (35 x7.5 mm)	Din Rail (35 x7.5 mm)
Degree of protection		IP 20	IP 20
Terminals Capacity (Max)	mm ²	50	50

*500mA on request

RESIDUAL CURRENT CIRCUIT BREAKER (80A - 125A RCCB)

HAVELLS

DOUBLE POLE



Current	Sensitivity	Cat No.
Rating (A)	mA	
80	30	DHRMCMDF030080
80	100	DHRMCMDF100080
80	300	DHRMCMDF300080
100	30	DHRMCMDF030100
100	100	DHRMCMDF100100
100	300	DHRMCMDF300100
125	30	DHRMCMDF030125
125	100	DHRMCMDF100125
125	300	DHRMCMDF300125

FOUR POLE



Current	Sensitivity	Cat No.
Rating (A)	mA	
80	30	DHRMCMF F030080
80	100	DHRMCMFF100080
80	300	DHRMCMFF300080
100	30	DHRMCMFF030100
100	100	DHRMCMFF100100
100	300	DHRMCMFF300100
125	30	DHRMCMFF030125
125	100	DHRMCMFF100125
125	300	DHRMCMFF300125











Residual Current Circuit Breaker with Overload and Short Circuit Protection

Havells New RCBO is a single composite device which provides protection against over currents and earth leakage faults 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 to user as well as to environment.

Range

6A, 10A, 16A, 20A, 25A, 32A & 40A

Sensitivity 30mA, 100mA, 300mA

Execution Single Pole with neutral (SPN) Triple Pole with neutral (TPN)

Specification IS:12640 Part2, IEC 61009-1, BSEN:61009-1

Features

- Pulsating dc protection Type A
- Discrimination using time delay Type S RCBO
- Controlled response VD RCBO (Electronic)
- Protection in case of loss of supply neutral
- Enhanced immunity to nuisance tripping

RESIDUAL CURRENT CIRCUIT BREAKER WITH OVER LOAD & SHORT CIRCUIT PROTECTION

CONSTRUCTION

Havells new RCBO is a single composite device which provides protection against over currents and earth leakage faults 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 desensitised. 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 chasis & distribution boards.

Reliability & continuity of service

- Enhanced discrimination with Havells MCBs
- Back up to 10 kA with BS & DIN fuses
- 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<300mS for fault currents of IDn and < 40ms for fault currents > 5IDn.
- S Type- having a trip time of 150 500mS for IDn, and 40 130mS for >5IDn.

(IDn 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 ad downstream RCBOs. For example, when two RCBOs are connected in series the first RCBO will often be an S type.

RESIDUAL CURRENT CIRCUIT BREAKER WITH OVER LOAD & SHORT CIRCUIT PROTECTION





TECHNICAL INFORMATION

Specification		SPN (2M)	TPN (4M)
Specification Reference		IS 12640 (Part 2) & IEC 61009	IS 12640 (Part 2) & IEC 61009
Rated Current	ln	6A, 10A, 16A, 20A,25A, 32A, 40A	6A, 10A, 16A, 20A,25A, 32A, 40A
Rated Residual Operating Current	lan	30, 100, 300mA.	30, 100, 300mA.
Instantaneous Tripping Current		'C 'curve	'C 'curve
Rated Voltage	Un Vac	240V~	415V~
Rated Insulation Voltage	Un Vac	660V	660V
Rated Frequency		50Hz	50Hz
No. of Pole		1P+N	3P+N
Rated Short Circuit Capacity	lcn	10kA	10kA
Rated Residual Making Breaking Capacity	lam	500A	500A
Operating Characteristics in case of			
Residual Currents		'A' type	'A' type
Method of Mounting		Panel Board Type (DIN Rail)	Panel Board Type (DIN Rail)
Degree of Protection		IP 20	IP 20
Terminals for External Conductors			
Net Weight (in Kg)		0.420	0.420
Ambient Working Temperature		-5°C to + 55°C	-5°C to + 55°C
Mechanical Endurance (No. of Operations)		4000	4000
Electrical Endurance (No. of Operations)		4000	4000
Trip Time (milli Second)		<40	<40
Shock Resistance		40mm free fall	40mm free fall
Vibration Resistance			3g

TIME CURRENT CHARACTERISTICS C CURVE



RESIDUAL CURRENT TRIPPING CHARACTERISTICS (GENERAL TYPE)



SP&N (1P+N)



RESIDUAL CURRENT CIRCUIT BREAKER WITH OVER LOAD & SHORT CIRCUIT PROTECTION

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

DIMENSIONS (in mm) SP&N (1P+N)



RESIDUAL CURRENT CIRCUIT BREAKER WITH OVER LOAD & SHORT CIRCUIT PROTECTION

HAVELLS

TP&N (3P+N)



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

DIMENSIONS (in mm) TP&N (3P+N)







Electrical energy has brought along with it a lot of conveniences, beyond imagination. It's consumption has increased manifold be it in domestic, commercial or industrial applications, there by creating a need for scientific & effective method of distribution.

The purpose of electrical wiring is to systematically distribute current. In the process the system mainly adopts methods to protect installation and human life from electrical hazards such as short circuit, overload and earth leakage.

The electrical wiring is carried out to distribute current from a single source of supply to various circuits, such an arrangement is made inside an enclosure called Distribution Board.

The Distribution Board is not merely an enclosure but a comprehensive system in itself, comprising of copper bus bars, brass neutral links, earth links to facilitate effective distribution of current. It incorporates safety devices such as MCBs, ELCBs and Isolators, which serves to protect the installation.

A wide range of compact, elegant & economical DBs with unique features, designed & engineered to provide user safety, convenience and operational / maintenance advantages are offered.

Range

Single Phase & Three Phase Distribution Boards

Specification

IS 13032 /IS 8623

Features

- Aesthetically superior DBs to suit the style of vour home décor
- Choice of multiple incomer MCB, Isolator, MCB + RCCB, Changeover + RCCB, Isolator + RCCB + TPN RCBO
- When Per Phase Isolation DBs are in use, only that phase where the earth leakage exist gets isolated. This feature avoids the total outage and allows the other two healthy phases to remain ON.
- Complete range of DBs with detachable gland plates at the top and bottom with knockouts on the sides of DB to increase the flexibility of cables / conduit entry from all directions
- Ready to use DBs that are supplied with Neutral Links, Earth Links, Bus Bar and inter connecting wires / links
- Top two foundation holes of key type and bottom two of Round type for mounting or hanging the DB
- Knockouts at appropriate positions make the DBs suitable for wider applications, minimizing sharp bends of cables
- Earth Bar for better and firm earthing and for facilitating individual earthing for each outgoing terminal
- TPN (Vertical design) DBs have a provision of mounting 20A SP and 20A TP / 30A TP sockets on the sides of DB as additional provision
- Bus Bar Rating 100 / 200A
- Gaskets to ensure weather-proof conditions
- Masking sheet to protect the DB during construction.

DISTRIBUTION BOARD

HAVELLS

RANGE

S No.	Туре	Configuration	Inc	comer	Outgoing		Application
А	SPN	SPN DB &	Poles -	- DP MCB	Single Door 4, 8, 12, 16	Double Door 4, 8, 12, 16	Simple and economical distribution
		Consumer DB	2	DP Changeover DP RCCB	4, 0, 12	4, 0, 12	RCCB Combination provides more safety
В	TPN	Horizontal	4	FP MCB FP Isolator FP RCCB TPN RCBO	4, 6	4, 6	Three phase & Neutral incoming. The outgoing can be only single phase
			8	FP MCB + FP RCCB, FP Isolator + FP RCCB, FP Isolator + TPN RCBO FP C/O + TPN RCBO	4, 6, 8, 12	4, 6, 8, 12	
		Vertical	8	FP MCB +FP RCCB, FP Isolator +FP RCCB, FP Isolator + TPN RCBO FP C/O + TPN RCBO	4, 8, 12	4, 8, 12	More Versatile Three phase & Neutral incoming The outgoing can be single as well as multi-phase
С	Special Phase Application DBs	PPI (Vertical)	8	FP MCB + FP RCCB FP Isolator + FP RCCB FP Isolator + TPN RCBO FP C/O + TPN RCBO	2 + 8, 2 + 12	2 + 8, 2 + 12	Special arrangement to prevent Isolation of entire outage as only the phase where fault exist, gets isolated. Most flexible distribution
		PPI (Horizontal)	4 4 8	FP MCB + FP RCCB FP Isolator + FP RCCB FP Isolator + TPN RCBO FP C/O + TPN RCBO	2+4 2+6 2+8		Aesthetic four quardrant design with phase seggregation facility as in PPI vertical DB
		Phase Selector (Vertical)	8	FP MCB + FP RCCB FP Isolator + FP RCCB FP Isolator + TPN RCBO FP C/O + TPN RCBO	4, 6, 8	4, 6, 8	TPN incoming, special provision for immediate selection of phase in case of failure of any one or two phases
		Phase Selector Horizontal	8	FP MCB + FP RCCB FP Isolator + FP RCCB FP Isolator + TPN RCBO FP C/O + TPN RCBO		4, 6 , 8	Aesthetically superior Four Quardrant design with phase selection facility as in Phase Selector Vertical.

DISTRIBUTION BOARD

HAVELLS

RANGE

S No.	Туре	Configuration	Incomer		Outgoing		Application
			Poles	Device	Single Door	Double Door	
D	Special Purpose DBs	Load Line	3	Suitable for TP MCCB 'G' frame 80A, 100A, 125A with 10KA or 16KA Breaking Capacity	4, 8, 12	4, 8, 12	TPN vertical distribution boards most reliable for fault level higher than 10 kA.
		7 Segment	8	FP MCB + FP RCCB FP Isolator + FP RCCB FP Isolator + TPN RCBO FP C/O + TPN RCBO	2+4 2+6 2+8 2+12	2+4 2+6 2+8 2+12	Suitable for high-rise buildings as a single point distribution in the form of Per Phase Isolation facility too.
		IP 54 DBs	4	FP MCB + FP RCCB FP Isolator + FP RCCB FP Isolator + TPN RCBO FP C/O + TPN RCBO		4 8, 12	Dust proof & Vermin proof distribution board meeting IP-54 Ingress Protection norms as per IEC 60529 : 2000.
		SPN Prewired DBs	2	DP/SPN MCB DP Isolator, DP RCCB SPN RCBO		6, 8, 10, 12, 16	Ready to use distribution boards pre-fitted with MCBs and duly wired.
E	Designer DB	TeakWood DB Translucent DB Transparent DB	SPN : 2	DP/SPN MCB	DP Isolator, DP RCCB SPN RCBO		Aesthetically Superior Designer Distribution Board to match the décor of your home.
	MOD	Diastia Factoriumo	TPN : 4	FP Isolator/RCCB/ MCB	FP RCCB TPN RCBO		FP MCB,
	Enclosures	Plastic Enclosures Sheet Steel Enclosures Plug & Socket			SP, DP, TP, FP SP, DP, TP, FP SPN, DP, TPN		Protection of Air Conditioners, Motors. Independent cut-off / connection

MCB DISTRIBUTION BOARDS

SPN DB

SINGLE DOOR DB - IP-40 PROTECTION



No,. of Ways	Capacity of 17.8mm module Incomer + Outgoing	Sheet Thickness (m.m)	Cat No.
4	4	1.0	DHDMSHOSRW04
8	8	1.0	DHDMSHOSRW08
12	12	1.0	DHDMSHOSRW12
16	16	1.2	DHDMSHOSRW16

- As per IS 13032, 8623 (Part 3) universal mounting with copper Bus Bar, Neutral link, Earth link, Earthing studs.
 - Both side detachable gland plates with knockouts.
 - Masking sheet in Double Door DBs





No. of	C	Dimension	S			
Ways	А	В	С		Knocka	out Holes (Ø25) —
				Тор	Bottom	Side (Each Side)
4	139	89	154	3	3	1
8	211	161	226	5	5	1
12	283	233	298	7	7	1
16	355	305	370	9	9	1

DISTRIBUTION BOARD

HAVELLS

SPN SD COMPAC



DIMENSIONS (IN MM)



DOUBLE DOOR IP-42



No. of	Capacity of	Sheet		Cat No.		
Ways	17.8 mm module	Thic	kness	Regal Gray	Pearl Ivory	
	Incomer + Outgoing	Box	Cover			
4	4	1.0	1.2	DHDNSHODRW04	DHDNSHODPW04	
8	8	1.0	1.2	DHDNSHODRW08	DHDNSHODPW08	
12	12	1.0	1.2	DHDNSHODRW12	DHDNSHODPW12	
16	16	1.2	1.2	DHDNSHODRW16	DHDNSHODPW16	



No. of	C	Dimensions					
Ways	А	В	С	Knockout Holes (Ø25)			
				Top Bottom Side (Each Side)			
4	179	129	197	3 3 1			
8	251	201	269	5 5 1			
12	323	273	341	7 7 1			
16	395	345	413	9 9 1			

No. of	Capacity of 17.8 mm	Sheet thicknes		Cat. No.
Ways	module incomer + outgoing	Box	Cover	
04	4	1.0	1.0	DHDMSHCSRW04
06	6	1.0	1.0	DHDMSHCSRW06
08	8	1.0	1.0	DHDMSHCSRW08
12	12	1.0	1.0	DHDMSHCSRW12
16	16	1.2	1.2	DHDMSHCSRW16

No. of	D	imensior	าร	k	(nockout Hole	es (φ25)
Ways	А	В	С	Тор	Bottom	Side (Each Side)
04	139	89	149	3	3	1
06	175	125	185	4	4	1
08	211	161	221	5	5	1
12	283	233	293	7	7	1
16	355	305	365	9	9	1

SINGLE DOOR CONSUMER DB - IP-40 PROTECTION



No. of	Capacity of	Cat No.	Cat No.
Ways	17.8 mm module	with Isolator	without Isolator
	Incomer + Outgoing	(63A Double Pole)	
4	2 + 4	DHDCSHFSRW040001	DHDCSHOSRW04
8	2 + 8	DHDCSHFSRW080001	DHDCSHOSRW08
12	2 + 12	DHDCSHFSRW120001	DHDCSHOSRW12

DIMENSIONS (in mm)



No. of	E	Dimension	IS		
Ways	А	В	С	Knocka	out Holes (Ø25)
				Тор	Bottom Side
2+4	211	161	226	5	5
2+8	283	233	298	7	7
2+12	355	305	370	9	9

SPN DB WITH ACRYLIC WINDOW



No. of	No. of Capacity of		heet	Cat No.
Ways	17.8 mm module	Thic	kness	
	Incomer + Outgoing	Box	Cover	
04	4	1.0	1.0	DHDMSHOSRA04
08	8	1.0	1.0	DHDMSHOSRA08
12	12	1.0	1.0	DHDMSHOSRA12
16	16	1.2	1.2	DHDMSHOSRA16

No. of	٢	Dimensions				
Ways	А	В	С	Knockout Holes (Ø25)		
				Top Bottom Side (Each Side)		
04	139	89	154	3 3 1		
08	211	161	226	5 5 1		
12	283	233	298	7 7 1		
16	355	305	370	9 9 1		



SPN DD



No. of	Capacity of	Cat N	lo.
Ways	17.8 mm module	Regal Gray	Pearl Ivory
	Incomer + Outgoing		
04	4	DHDPSHODRW04	DHDPSHODPW04
08	8	DHDPSHODRW08	DHDPSHODPW08
12	12	DHDPSHODRW12	DHDPSHODPW12
16	16	DHDPSHODRW16	DHDPSHODPW16



No. of	C	Dimensions							
Ways	А	В	С	Knockout Holes (Ø25)					
				Top Bottom Side (Each Side)					
04	175	125	197	3 3 1					
08	247	197	269	5 5 1					
12	319	269	341	7 7 1					
16	391	341	413	9 9 1					



TPN HORIZONTAL DB



- As per IS 13032 & 8623 (Part 3) universal mounting with copper Bus Bar, Neutral link, Earth link, Earthing studs and inter-connecting wires.
- Both side detachable gland plates with knockouts
- With provision of FP Isolator / MCB / RCCB as incomer and SP outgoing.
- Masking sheet in Double Door DBs

SINGLE DOOR





Cat. No	No. of	Capacity of		D	imensio	ons	Incomer Sheet				
	Ways	17.8 mm module	А	В	С	D		Thickness		Knockout Holes (Ø31)	
		Incomer + Outgoing							Тор	Bottom	Side (Each Side)
DHDMTHOSF	RW04 4	8 + 12	270	195	285	72	4 +4	1.2	5	5	2
DHDMTHOSF	RW06 6	8 +18	336	261	351	72	4 + 4	1.2	6	6	2
DHDMTHOSF	RW08 8	8 + 24	414	339	429	144	4 + 4	1.2	8	8	2
DHDMTHOSF	RW12 12	8 + 36	558	483	573	144	4 + 4	1.2	11	11	2

DISTRIBUTION BOARD

TPN SD COMPAC



No. of	Capacity of 17.8 mm	Sheet	Thicknes	Cat. No.
Ways	module incomer + outgoing	Box	Cover	
04	8 + 12	1.2	1.2	DHDMTHCSRW04
06	8 + 18	1.2	1.2	DHDMTHCSRW06
08	8 + 24	1.2	1.2	DHDMTHCSRW08
12	8 + 36	1.2	1.2	DHDMTHCSRW12

DIMENSIONS (in mm)



No. of	C)imensior	าร	Kn	Knockout Holes (ø31)					
Way	А	В	С	Тор	Bottom	Side (Each Side)				
04	270	195	280	5	4	2				
06	336	261	346	6	4	2				
08	414	339	424	8	4	2				
12	558	483	568	11	4	2				

B. DOUBLE DOOR DB - IP 42 PROTECTION





No. of Ways	Capacity of 17.8 mm module	Cat No.					
	Incomer + Outgoing	Regal Grey	Pearl Ivory				
4	4 + 12	DHDNTHODRW04	DHDNTHODPW04				
6	4 + 18	DHDNTHODRW06	DHDNTHODPW06				
4	8 + 12	DHDNPHODRW04	DHDNPHODPW04				
6	8 + 18	DHDNPHODRW06	DHDNPHODPW06				
8	8 + 24	DHDNTHODRW08	DHDNTHODPW08				
12	8 + 36	DHDNTHODRW12	DHDNTHODPW12				

No. of	C	imension	IS	
Ways	А	В	С	Knockout Holes (Ø31)
				Top Bottom Side (Each Side)
4	251	176	269	5 5 2
6	323	248	341	6 6 2
8	395	320	413	8 8 2
12	534	459	552	11 11 2

HAVELLS

TPN VERTICAL DB

A. SINGLE DOOR - IP 40 PROTECTION



DIMENSIONS (in mm)



Cat. No	No. of	Capacity of	Dimensions Knockout Holes					oles	Sheet	
	Ways	17.8 mm module	A B C (Ø31)		(Ø31)	(Ø38)	(Ø31)	Thickness		
_		Incomer + Outgoing				Тор	Bottom	Bottom	Side (Each Side)	
DHDMTVOSRW04	4	8 + 12	465	375	450	7	2	1	2	1.2
DHDMTVOSRW08	8	8 + 24	565	475	550	7	2	1	2	1.2
DHDMTVOSRW12	12	8 + 36	673	583	658	7	2	1	2	1.2

B. DOUBLE DOOR - IP 42 PROTECTION



No. of	Capacity of	Cat No.	
Ways	17.8 mm module		
	Incomer + Outgoing		
4	8 + 12	DHDPTVODRW04	
8	8 + 24	DHDPTVODRW08	
12	8 + 36	DHDPTVODRW12	



No. of	Di	mensio	ns		Kno	Knockout Holes				
Ways	А	В	С	(Ø31)	(Ø31)	(Ø38)	(Ø31)			
				Тор	Bottom	Bottom	Side (Each Side)			
4	450	375	460	7	2	1	2			
8	550	475	560	7	2	1	2			
12	658	583	668	7	2	1	2			

TPN PER PHASE ISOLATION DB (VERTICAL)



- As per IS 13032 & 8623 (Part-3) Universal mounting, with copper Bus Bar, Neutral link, Earth link, Earthlink, Earthlink
- Both side detachable gland plates with knockouts
- With provision of FP Isolator / MCB as main incomer, 2 Pole ELCB in each phase, and SP outgoing.

SINGLE DOOR DB - IP 40 PROTECTION





Cat. No	No. of	Capacity of	Dimensions				Sheet		
	Ways	17.8 mm module	А	В	С	Knockout Holes (Ø31)			Thickness
		Incomer + Outgoing				Тор	Bottom	Side (Each Side)	
DHDPTVPSRW08	2+8	8 + (6 + 24)	323	248	338	7	7	6	1.2
DHDPTVPSRW12	2 + 12	8 + (6 + 36)	395	320	410	7	7	6	1.2

B. DOUBLE DOOR DB - IP 42 PROTECTION



No. of Ways	Capacity of 17.8 mm module Incomer + Outgoing	Sheet Thickness	Cat No.
2 + 8	8 + (6 + 24)	1.2	DHDPTVPDRW08
2 + 12	8 + (6 + 36)	1.2	DHDPTVPDRW08



DIMENSIONS (in mm)

No. of	Di	mensic	ons		Knockout	Holes (Ø31)
Ways	А	В	С			
				Тор	Bottom	Side (Each Side)
2 + 8	323	248	333	7	7	6
2 + 12	395	320	405	7	7	6

TPN PPI HORIZONTAL DB



No. of	Capacity of	S	heet	Cat No.
Ways	17.8 mm module	Thic	kness	
	Incomer + Outgoing	Box	Cover	
04	4 + (6+12)	1.2	1.2	DHDPTHPDRW04
06	8 + (6+18)	1.2	1.2	DHDPTHPDRW06
08	8 + (6+24)	1.2	1.2	DHDPTHPDRW08

TPN PPI HORIZONTAL DIMENSIONS (in mm)



No. of	Dimensions			Knockout Holes			
Ways	А	В	С	(Ø31)			
				Top Bottom Side (Each	Side)		
04	323	268	333	6 6 2			
06	395	340	405	8 8 2			

DISTRIBUTION BOARD

HAVELLS

TPN PPI HORIZONTAL DIMENSIONS (in mm)



No. of		Dimensions	3		Knockout H	oles
Ways	А	В	С		(Ø31)	
				Тор	Bottom	Side (Each Side)
08	557	482	587	11	11	2

PHASE SELECTOR VERTICAL DB (SINGLE DOOR)







								Kno	ockout	Holes	
No. of	Capacity of	Rating	А	В	С	To	op	Bott	om E	ach Sic	de Sheet
Ways 1	7.8 mm modul	е				Ø25	Ø20	Ø25	Ø20	Ø20	Thikness
Ind	coming+outgoi	ng									
4	8+12	40A	338	323	248	9	8	9	8	3	1.2
4	8+12	63A	338	323	248	9	8	9	8	3	1.2
6	8+18	40A	410	395	320	9	8	9	8	3	1.2
6	8+18	63A	410	395	320	9	8	9	8	3	1.2
8	8+24	40A	410	395	320	9	8	9	8	3	1.2
8	8+24	63A	410	395	320	9	8	9	8	3	1.2

PHASE SELECTOR VERTICAL DB (DOUBLE DOOR)



No. of	Rating	Cat. No.	Cat. No.
Ways		Single Door	Double Door
4	40A	DHDSMVSRZ04040	DHDSNVDRZ04040
4	63 A	DHDSMVSRZ04063	DHDSNVDRZ04063
6	40 A	DHDSMVSRZ06040	DHDSNVDRZ06040
6	63 A	DHDSMVSRZ06063	DHDSNVDRZ06063
8	40 A	DHDSMVSRZ08040	DHDSNVDRZ08040
8	63 A	DHDSMVSRZ08063	DHDSNVDRZ08063

DIMENSIONS (in mm)



								Kno	ockout	Holes	
No. of	Capacity of	Rating	А	В	С	To	р	Bott	om_E	ach Sic	le Sheet
Ways 1	7.8 mm modul	е				Ø25	Ø20	Ø25	Ø20	Ø20	Thikness
Inc	coming+outgoi	ng									
4	8+12	40A	333	323	248	9	8	9	8	3	1.2
4	8+12	63A	333	323	248	9	8	9	8	3	1.2
6	8+18	40A	405	395	320	9	8	9	8	3	1.2
6	8+18	63A	405	395	320	9	8	9	8	3	1.2
8	8+24	40A	405	395	320	9	8	9	8	3	1.2
8	8+24	63A	405	395	320	9	8	9	8	3	1.2

PHASE SELECTOR DB (VERTICAL) (Without Rotary Switches & Wires)

No. o	f Regal Grey	Regal Grey	
Ways	Cat. No. (SD) Vertical	Cat. No. (DD) Vertical	
4	DHDSMVSRB04000	DHDSNVDRB04000	
6	DHDSMVSRB06000	DHDSNVDRB06000	
8	DHDSMVSRB06000	DHDSNVDRB08000	

PHASE SELECTOR DB (HORIZONTAL - 4 QUADRANT DESIGN) (With Rotary Switches & Wires)

No. of	Rating	Regal Grey	
Ways		Cat. No. (DD) Vertical	
4	40A	DHDSCHDRZ04040	With six way incomer slot
4	63A	DHDSCHDRZ04063	With six way incomer slot
6	40A	DHDSCHDRZ06040	With eight way incomer slot
6	63A	DHDSCHDRZ06063	With eight way incomer slot
8	40A	DHDSCHDRZ08040	With eight way incomer slot
8	63A	DHDSCHDRZ08063	With eight way incomer slot



PHASE SELECTOR DB (Without Rotary Switches & Wires)

No. of	Regal Grey		
Ways	Cat. No. (DD)		
4	DHDSCHDRZ04000		
6	DHDSCHDRZ06000		
8	DHDSCHDRZ08000		

SPECIAL PURPOSE DISTRIBUTION BOARDS

LOADLINE DB



As per IS 13032 & 8623 (Part - 3) Universal mounting, with copper Bus Bar, Neutral link, Earth link, Earthing studs and inter-connecting wires. Both side detachable gland plates with knockouts

• TP MCCB (G frame) as incomer and SP / DP /TP MCB as outgoing

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• Higher breaking capacity MCCBs or any other configuration are available on requirement.

SINGLE DOOR





No. of Cat. No. Ways Rating (A)			
4	DHDLVSRWGOTO04		
8	DHDLVSRWGOTO08		
12	DHDLVSRWGOTO12		

No. of Ways	Capacity of	Di	mensic	ons		Kn	ockout Holes	
Module	17.8 mm	А	В	С	(Ø31)	(Ø38)	(Ø31)
Outgoing					Тор	Bottom	Bottom Side (E. Side	
4	12	685	595	670	7	4	1	2
8	24	793	703	778	7	4	1	2
12	36	901	811	886	7	4	1	2

DISTRIBUTION BOARD

DOUBLE DOOR

No. of Ways

Module

Outgoing

4

8

12



Capacity of

17.8 mm

12

24

36

Dimensions

В

595

703

811

А

700

808

916

С

670

778

886

(Ø31)

Top Bottom

4

4

4

7

7

7

Knockout Holes

(Ø38)

1

1

1

Bottom Side (E. Side)

(Ø31)

2

2

2

No. of	Cat. No.
Ways	Rating (A)
4	DHDLVDRWGOT004
8	DHDLVDRWGOT008
12	DHDLVDRWGOTO12

DIMENSIONS (in mm)



SEVEN COMPARTMENT DB



No. of Capacity of 17.8mm Ways module incomeing + Outgoing Single Door Double Door Cat No. Cat No. 4 8+(6+12) DHDMTHDSRW04 DHDMTHDDRW04 DHDMTHDSRW06 DHDMTHDDRW06 6 8+(6+18) 8 8+(6+24) DHDMTHDSRW08 DHDMTHDDRW08 12 8+(6+36) DHDMTHDSRW12 DHDMTHDDRW12

DOUBLE DOOR DIMENSIONS - (in mm)

No. of				Ø31	
Ways	А	В	С	Knockout Holes	Sheet
					Thickness
4W	456	320	494	8	1.2
6W	562	428	602	8	1.2
8W	672	536	710	8	1.6
12W	888	752	926	12	1.6



SINGLE DOOR DIMENSIONS (in mm)



No. of				Ø25	
Ways	А	В	С	Knockout Holes	Sheet
					Thickness
4W	450	320	430	7	1.6
6W	558	428	538	9	1.6
8W	666	536	646	10	1.6
12W	882	752	862	12	1.6

SP&N PREWIRED DB



No. of	Capacity of	Sheet		DB fitted with
Ways	17.8 mm module	Thickness		
	Incomer+Outgoing	Box	Cover	
2+6/2+8	2+6/2+8	1.6	1.6	B series SP MCBs 6-32A as outgoing
2+10/2+12	2+10/2+12	1.6	1.6	B series SP MCBs 6-32A as outgoing
2+16	2+16	1.6	1.6	B series SP MCBs 6-32A as outgoing

DIMENSIONS (in mm)



Dimensions Knockout Holes No. of Ways В С Тор Bottom Side (Each Side) А Ø25 Ø31 2+6/2+8 276 5 5 2 196 296 2+10/2+12 348 268 368 7 7 2 9 9 2 420 340 440 2+16

TPN HORIZONTAL DOUBLE DOOR - IP54 (NEW)



No. of	Capacity of 17.8 mm	Sheet ⁻	Thicknes	Cat. No.
Ways	Module Incomer + Outgoing	Box	Cover	
04	4 + 12	1.6	1.6	DHDMTHODRW040002
08	8 + 24	1.6	1.6	DHDMTHODRW080002
12	8 + 36	1.6	1.6	DHDMTHODRW120002

DIMENSIONS (in mm)



No. of	Dimensions			K	Knockout Holes (f31)			
Ways	А	В	С	Тор	Bottom	Side (Each Side)		
04	251	196	251	5	5	2		
08	395	340	395	8	8	2		
12	534	479	534	11	11	2		



No. of	Capacity of	Cat	No.
Ways	17.8 mm module		
	Incomer + Outgoing	Regal Grey	Pearl Ivory
04	4 + 12	DHDPTHODRW04	DHDPTHODPW04
06	4 + 18	DHDPTHODRW06	DHDPTHODPW06
08	8 + 24	DHDPTHODRW08	DHDPTHODPW08
12	8 + 36	DHDPTHODRW12	DHDPTHODPW12

DIMENSIONS (in mm)

No. of	C	Dimension	S				
Ways	А	В	С		Knockout I	Holes (Ø31)	
				Тор	Bottom	Side (Each Side)	
04	251	196	269	5	5	2	
06	323	268	341	6	6	2	
08	395	340	413	8	8	2	
12	534	479	552	11	11	2	



VALUE ADD FEATURES

Level Mark Indicating the depth till which box to be inserted in the wall.

Collar to provide structural strength

1000

Detachable Bracket for mounting neutral link, aids in easy wiring

Fixed nut plate design with extra strength

Detachable Din Bar Assembly with Stoppers for easy MCB alignment with inner cover & flexibility in mounting


DESIGNER DISTRIBUTION BOARDS

TEAK WOOD & TRANSPARENT SPN DOUBLE DOOR DB





No. of Capacity of		Sheet		Cat No.		
Ways 17.8 mm module		Thickness		Transparent	Teakwood	
	Incomer + Outgoing	Box	Cover			
4	12	1.0	1.0	DHDPSHODRT04	DHDPSHODKW04	
8	24	1.0	1.0	DHDPSHODRT08	DHDPSHODKW08	
12	36	1.0	1.0	DHDPSHODRT12	DHDPSHODKW12	
16	48	1.2	1.2	DHDPSHODRT16	DHDPSHODKW16	

DIMENSIONS (in mm)



TRANSLUSENT SPN DB



No. of	D	imension	S				
Ways	А	В	С		Knockout Holes (Ø25)		
				Тор	Bottom	Side (Each Side)	
04	179	129	189	3	З	1	
08	251	201	261	5	5	1	
12	323	273	333	7	7	1	
16	395	345	405	9	9	1	

No. of	Capacity of 17.8 mm	Sheet	Cat. No.
Ways	Module Incomer + Outgoing	Thickness Box	
04	4	1.0	DHDPSHODRC04
08	8	1.0	DHDPSHODRC08
12	12	1.0	DHDPSHODRC12
16	16	1.2	DHDPSHODRC16

No. of	Dimensions			Kr	Knockout Holes (ø25)			
Ways	А	В	С	Тор	Bottom	Side (Each Side)		
04	179	128	197	3	3	1		
08	251	200	269	5	3	1		
12	323	272	341	7	3	1		
16	395	344	413	8	3	1		

DIMENSIONS (in mm)



HAVELLS

DISTRIBUTION BOARD

DESIGNER DB TPN DOUBLE DOOR (SIZE EQUAL TO TPN-H DD)



Way of Ways	Transparent	Teakwood
4	DHDNTHODRT04	DHDNTHODKW04
6	DHDNTHODRT06	DHDNTHODKW06
8	DHDNTHODRT08	DHDNTHODKW08



MCB	ENCLOSURES	

А

251

323

395

PLUG & SOCKET

No. of

Ways

4

6

8

• DBs suitable for the protection of appliances like ACs, Motors.

Dimensions

В

196

268

340

С

261

333

405

Тор

5

6

8

Knockout Holes (Ø31) Bottom Side (Each Side)

2

2

2

5

6

8

• SP or TP Plug and Socket DBs



Item	Capacity of	Cat. No.
	17.8mm module	
	incomer + Outgoing	
20A SPN	1	DHDPUSN020
20A DP	2	DHDPUDP020
30A TP	3	DHDPUTN030

DIMENSIONS (in mm)



Item			ŀ	Knockout H	Holes (Ø25)		
	А	В	С	D	Е	Тор	Bottom
20A SP	152	116	167	139	124	2	2
20A DP	152	116	167	139	124	2	2
20A TP	278	230	293	129	114	1	1
30A TP	278	230	293	129	114	1	1

DISTRIBUTION BOARD

HAVELLS

 $\begin{array}{l} \mbox{MCB ENCLOSURE} \mbox{ (For Independent cutoff / connection of the Electrical appliances)} \\ \mbox{A. STEEL SHEET} \end{array}$



No. of Ways	Cat. No.
SP	DHDESSP
DP	DHDESDP
TP	DHDESTP
FP	DHDESFP

DIMENSIONS (in mm)

Item	Dimensions				Knockout Holes (f 25) Capa			Capacity of
	А	В	С	D	Е	Тор	Bottom	17.8 Module
SP	60	160	70	170	30	1	1	1
DP	60	160	70	170	30	1	1	2
TP	98	180	108	190	62	2	2	3
FP	98	180	108	190	62	2	2	4



MCB ENCLOSURE

B. PLASTIC



Item	Cat. No.
SP	DHDEPSP
DP	DHDEPDP
TP	DHDEPTP
FP	DHDEPFP

DIMENSIONS (in mm)



No. of	Capacity for 17.8 Module		Dimensions	3
Ways		А	В	С
SP	1	140	45	65
DP	2	140	45	65
TP	3	140	81	65
FP	4	140	81	65

HAVELLS

DISTRIBUTION BOARD

CABLE END BOX



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

DIMENSIONS (in mm)







A. SINGLE DOOR DB

Cat. No.	ltem	No. of Ways				Dimen	isions			
			А	В	С	D	E	F	G	T (Sheet Thickness)
DHDASHOS04	SPN	4	139	100	63	3	89	25	154	1.0
DHDASHOS08		8	211	100	63	5	161	25	226	1.0
DHDASHOS12		12	283	100	63	7	233	25	298	1.0
DHDASHOS16		16	355	100	63	9	305	25	370	1.2
DHDATHOS04	TPN	4	270	125	78	5	195	37.5	285	1.2
DHDATHOS06		6	336	125	78	6	261	37.5	351	1.2
DHDATHOS08		8	414	125	78	8	339	37.5	429	1.2
DHDATHOS12		12	558	125	78	11	483	37.5	573	1.2
DHDATVOS04	Vertical	4/8/12	350	125	87	7	275	37.5	365	1.2
DHDATVLS04	Loadline	4/8/12	350	125	102	7	275	37.5	365	1.2
DHDATVTS10	PPI	2 + 8	323	125	78	6	248	37.5	338	1.2
DHDATVTS14		2 + 12	395	125	78	7	320	37.5	410	1.2
DHDATVTS10	Tier	10	323	125	78	6	248	37.5	338	1.2
DHDATVTS14		14	395	125	78	7	320	37.5	410	1.2

DISTRIBUTION BOARD

HAVELLS

DIMENSIONS (in mm)







B. DOUBLE DOOR DB

Cat. No.	ltem	Ways				Dimen	sions				
			А	В	С	D	E	F	G	Н	Т
DHDASHOD04	SPN	4	179	100	74	3	129	25	189	105	1.0
DHDASHOD08		8	251	100	74	5	201	25	261	105	1.0
DHDASHOD12		12	323	100	74	7	283	25	333	105	1.0
DHDASHOD16		16	395	100	74	9	345	25	405	105	1.2
DHDATHOD04	TPN	4	251	125	89	5	196	37.5	261	130	1.2
DHDATHOD06		6	323	125	89	6	268	37.5	333	130	1.2
DHDATHOD08		8	395	125	89	8	340	37.5	405	130	1.2
DHDATHOD12		12	558	125	89	11	483	37.5	588	130	1.2
DHDATVOD04	Vertical	4/8/12	395	125	98	7	320	37.5	405	130	1.2
DHDATVLD04	Loadline	4/8/12	350	125	130	7	275	37.5	380	130	1.2
DHDATVTD10	PPI	2 + 8	323	125	89	6	248	37.5	333	130	1.2
DHDATVTD14		2 + 12	395	125	89	7	320	37.5	405	130	1.2
DHDATVTD10	Tier	10	323	125	89	6	248	37.5	333	130	1.2
DHDATVTD14		14	395	125	89	7	320	37.5	405	130	1.2

COMB BUS BAR



No. of Ways	Cat. No.	No. of 17.8 mm Modules	Features
Three Phase			
2	DSCCPADBX022	2 6	TP I/C & TP O/G
3	DSCCPADBX02	3 9	TP I/C & TP O/G
4	DSCCPADBX02	4 12	TP I/C & TP O/G
5	DSCCPADBX02	5 15	TP I/C & TP O/G
10 SP*			
(3 Phase)	DSCCPADBX02	6 10	TP I/C & SP O/G
14 SP*			
(3 Phase)	DSCCPADBX02	7 14	TP I/C & SP O/G

*For Tire DBs



COPPER BUS BAR

No. of Ways	Cat. No.
4	DSCCUPDBP007
6	DSCCUPDBP011
8	DSCCUPDBP008
12	DSCCUPDBP009
16	DSCCUPDBP010

BLANKING PLATE

	1 Pole	18mm	DSCPGMDBX001
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SPARE DIN RAILS

DIN Rail used in	Cat. No.	Length of DIN Rail
SPN 4W	DSCFEFDBX094	80mm
SPN 8W / TPN 6W	DSCFEFDBX082	163mm
TPN 8W	DSCFEFDBX085	200mm
TPN 4W	DSCFEFDBX088	260mm
TPN 12W	DSCEFEDBX089	273mm

SPARE NEUTRAL LINKS FOR ALL MCB BOARDS

No. of Ways	Cat. No.
SPN 4W	DSSDBX0012
SPN 8W	DSSDBX0013
SPN 12W	DSSDBX0014
SPN 16W	DSSDBX0011
TPN 4W	DSSDBX0014
TPN 6W	DSSDBX0016
TPN 8W	DSSDBX0017
TPN 12W	DSSDBX0015

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 defition, 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.

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.



No Protection



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



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



Protected against solid objects over 2.5 mm e.g. tools and wires



Protected against solid objects over 1 mm e.g. tools, wires and small wires







Totally protected against dust.



No Protection

Protected against vertically falling drops of water eg. condensation



Protected against direct sprays of water up to 15° from the vertical



Protected against sprays of water up to 60° from the vertical



Protected against after splashed from all directions -limited ingress permitted

Protected against low pressure jets of water from all directions -limited ingress permitted

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
AC20/DC20	Connecting and disconnecting under no-load. Assumes all switching operations are carried out by other capable devices before this device is operated.
AC21/DC21	Switching of resistive loads including moderate overloads. Suitable for purely resistive type loads devices can switch 150% of its rated current under fault conditions
AC22/DC22	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.
AC23/DC23	Switching of highly inductive loads. Devices complying with AC23/DC23 are provided mainly as back-up to other means of switching. e.g. contacts. In the event of failure of functional devices, an AC23 / DC23 type device can safety 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)



Ue = Rated Operational Voltage The normal line-to-line voltage of the system should not exceed (Ue)

Ui = Rated Insulation Voltage

to replace this value with (Uimp)



Icu Rated Ultimate Short Circuit Breaking Capacity

The calculated prospective fault current at the incoming terminals of the circuit breaker should not exceed (lcu).

Exception: Using back-up protection as specified by the manufacturer.



The maximum level of fault current operation after which further service is assured without loss of performance.

Ics Rated Short-time Withstand Current



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.

(Icw) 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.







Uimp = The voltage on which clearance distances are based.

The voltage on which the dielectric properties

have conventionally been based using tests at

high voltage and mains frequency. It is intended

The value of transient peak voltage the circuit breaker can withstand from switching surges or lighting strikes imposed on the supply. e.g. Uimp = 8kV, Tested @8kV peak with 1.2/50m (ms)S impulse wave

In = 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 slated (In) is based on a reference ambient temperature of 30° centigrade.