

Motor Protection Circuit Breaker



COSMIC
STAR

Catalogue 2011

QRG
GROUP



HAVELLS
INDUSTRIAL



Faridabad: Industrial Switchgear Plant



Sahibabad: Industrial Switchgear Plant



Noida: Capacitor Plant



Baddi: Domestic Switchgear Plant



Neemrana: Motor Plant



Alwar: Cable Plant



Haridwar: Fan Plant



Baddi: Modular Switches & EWA Plant



Neemrana: CFL Plant

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INTRODUCTION

Havells presents the versatile MB2 series motor protection circuit breakers specifically designed for control and protection of motors, conforming to IS / IEC 60947-2 & IS / IEC 60947-4-1 standards.

Motor Circuit Breakers are advanced three pole thermal-magnetic circuit breakers offering excellent short circuit protection by magnetic non adjustable tripping elements under 3ms, this results in rapid build up of an arc voltage which limits the current of the short circuit to a very low level.

In fact, this current limiting capability of MB2 motor breakers provides high short circuit breaking capacity upto 100 kA. The thermal elements coupled with automatic ambient temperature compensation over a range of -20 °C to +60 °C provide close / accurate overload protection qualifying it as a trip class 10 device.

The breaker comes with a wide range of add-on accessories to meet variety of application needs in motor circuits and system automation.

Operation

Motor Circuit Breakers control is manual and local when it is used on its own. However when it is used in conjunction with a contactor, the control is automatic and remote.

The ON / OFF actuation is by push button. Switching ON is controlled manually by operating the start button marked 'I' and switching OFF by operating the stop button marked 'O' or automatically by the thermal magnetic protection elements or by a voltage trip add on accessory namely: Shunt trip / Under Voltage Trip (UVT).

Protection

Motor protection is provided by the thermal-magnetic protection elements incorporated in the motor circuit-breaker.

The magnetic elements (short-circuit protection) have a non-adjustable tripping threshold, fixed at 13 times the maximum setting current of the thermal trips.

The thermal elements (overload protection) include automatic compensation for ambient temperature variations.

The rated operational current of the motor is displayed by means of a graduated / calibrated knob. All live parts are protected against direct finger contact from the front panel. Personal protection is also provided.

The undervoltage trip allows the circuit-breaker to de-energize in the event of an undervoltage condition. The user is therefore protected against sudden starting of the machine when normal voltage is restored, since the Start button 'I' has to be pressed to restart the motor.

The shunt trip provides remote tripping of the circuit-breaker. These circuit breakers are suitable for isolation. The start button can be padlocked in stop position in open execution unit.

Connection

The MPCBs are designed for connection by screw clamp terminals.

Mounting

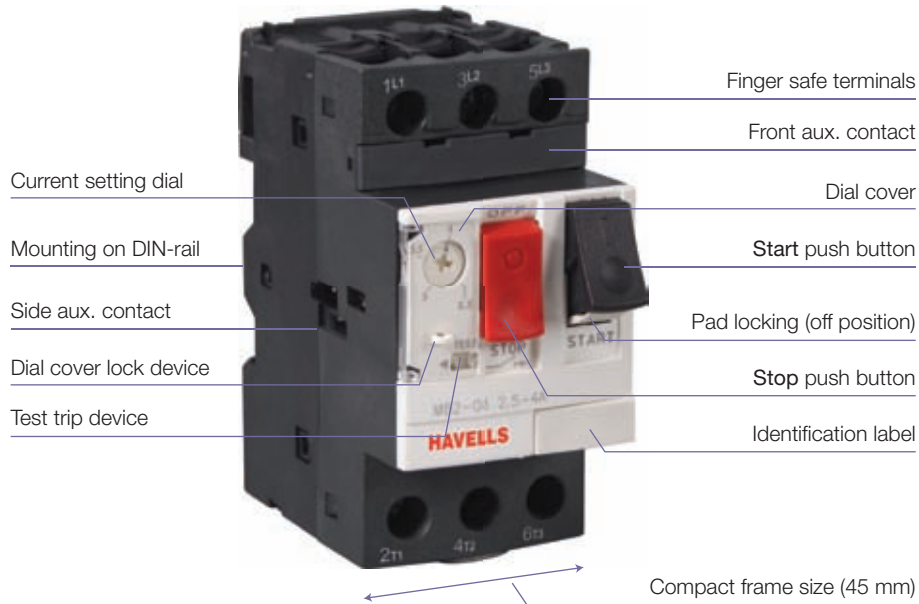
These motor circuit-breakers can be mounted by screw fixing or clip on mounting on symmetrical, asymmetrical or combination Din-rail.

FEATURES

HAVELLS MB2 series motor protection circuit breaker effectively combines control & protection lending greater efficiency & flexibility through various functions, accessories & compact design

- Compact size & space saving
- Close overload & short circuit protection
- High breaking capacity
- Sensitive to single phasing
- Visual fault indication
- Simple & easy installation
- Wide range of accessories
- Available in open execution / in plastic enclosure

PARTS IDENTIFICATION



TECHNICAL INFORMATION

Parameters	Type	MB-2
Standard conformity		IS / IEC 60947-2 & IS / IEC 60947-4-1
Utilization category		A (Circuit breaker) / AC-3 (Motor duty)
Rated thermal current range (Ith)	A	0.16-32
Rated operational voltage	V	690
Rated insulation voltage	V	690
Rated operational frequency	Hz	50 / 60
Rated impulse with stand voltage	kV	6
Breaking capacity (Icu)		
upto 4kW / 5.5-9kW / 15kW	kA	100 / 15 / 10
Breaking capacity (Ics % of Icu)		
upto 4kW / 5.5-7.5kW / 9kW / 11kW	%	100 / 50 / 40 / 50
Power dissipated per pole	W	2.5
Mechanical life (C.O.)	No.of ops.	0.1 million
Duty class (Max. operating rate)	C.O. / hr	25
Rated duty		Continuous
Degree of protection open / enclosed		IP-20 / IP-65
Shock resistance		30 gn-11ms
Vibration resistance		5 gn
Ambient temperature range	°C	-20 to +60
Max. operating altitude	m	2000
Suitable for isolation		Yes
Phase failure sensitivity		Yes
Operating position		90° on either side off normal vertical mounting plane
Terminal capacity		
Solid cable (Max.)	Sq. mm	2 x 6
Flexible cable (Max.)	Sq. mm	2 x 6
Tightening torque	N.m.	1.7
Weight	Kg.	0.260
Dimension	mm	44.5 x 89 x 67.2


TECHNICAL INFORMATION

Add on Accessory	Type	Aux. Contact		Fault Signalling Contact
		Side mounted	Front mounted	Side mounted
Contact configuration		(1NO + 1NC) / 2NO	(1NO + 1NC) / 2NO	1NO / 1NC
Rated insulation voltage (U _i)	V	690	690	690
Rated thermal current (I _{th})	A	6	2.5	2.5
Utilisation Category		AC 15	AC 15	AC 14
Rated operation voltage (U _e)	V	110 / 240 / 415	110 / 240	110 / 240
Rated current	A	4.5 / 3.3 / 2.2	1 / 0.5	0.5 / 0.3
Mechanical life (Close - open)	Ops.	1,00,000	1,00,000	1,000
Number of cables / Conductor		2	2	2
Cable size (max.)	Sq. mm	2.5	2.5	2.5

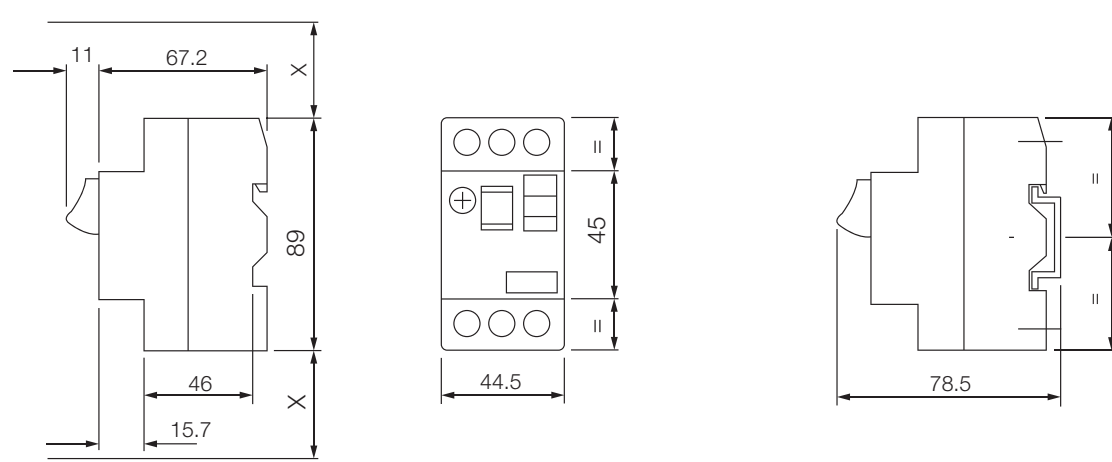

TECHNICAL INFORMATION

Add on Accessory	Type	Under Voltage Trip (UVT)	Shunt Trip (ST)
		Side mounted	Side mounted
Rated insulation voltage (U _i)	V	690	690
Operation current	V	0.85 - 1.1 U _n	0.7 - 1.1 U _n
Drop out voltage	V	0.7 - 0.35 U _n	0.75 - 0.2 U _n
Power consumption (inrush)	VA	12	14
Power consumption	W	8	10.5
Power consumption (sealed)	VA	3.5	5
Power consumption	W	1.1	1.6
Operating time	ms	10 - 15	10 - 15
Number of cables / Conductor		1 / 2	1 / 2
Cable size (Max.)	Sq. mm.	2.5	2.5
Tightening torque	Nm	1.4	1.4
Mechanical life (Close - open)	Ops.	1,00,000	1,00,000

MOTOR KW RATING & CURRENT SETTING RANGE						
3-phase motor rating AC-3 duty 415 V , 50Hz				Thermal Current Setting range	Magnetic tripping current	Type
kW	HP	Icu (kA)	Ics (%)	A	A	
0.02	-	100	100	0.1 - 0.16	1.5	MB2 - 01
0.06	-	100	100	0.16 - 0.25	2.4	MB2 - 02
0.09	-	100	100	0.25 - 0.40	5	MB2 - 03
0.12 0.18	- -	100	100	0.40 - 0.63	8	MB2 - 04
0.25	0.33	100	100	0.63 - 1	13	MB2 - 05
0.37 0.55	0.5 0.75	100	100	1 - 1.6	22.5	MB2 - 06
0.75	1	100	100	1.6 - 2.5	33.5	MB2 - 07
1.1 1.5	1.5 2.01	100	100	2.5 - 4	51	MB2 - 08
2.2	3	100	100	4 - 6.3	78	MB2 - 10
3 4	4.02 5.3	100	100	6 - 10	138	MB2 - 14
5.5	7.5	15	50	9 - 14	170	MB2 - 16
7.5	10	15	50	13 - 18	223	MB2 - 20
9	12.5	15	40	17 - 23	327	MB2 - 21
11	17.5	15	40	20 - 25	327	MB2 - 22
15	20	10	50	24 - 32	416	MB2 - 32



DIMENSION (in mm)

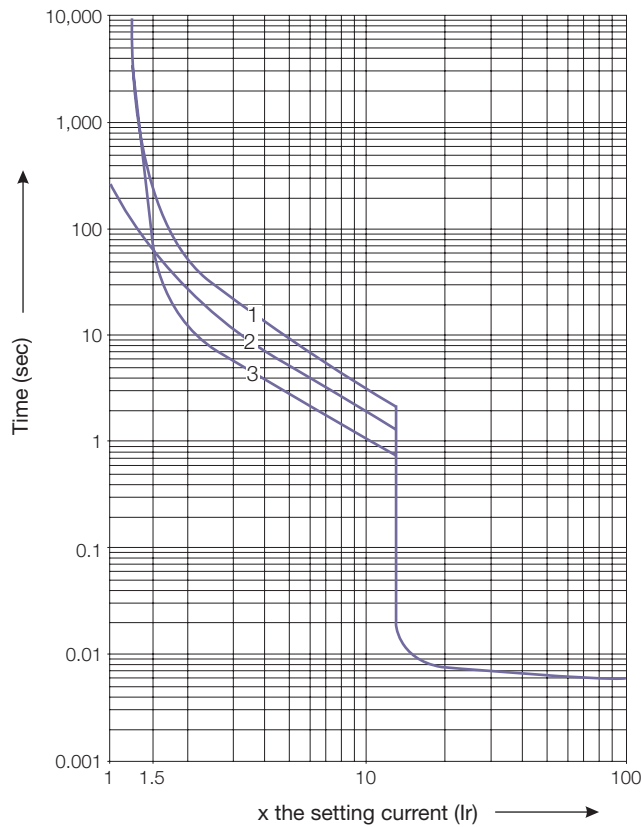


X - Electrical clearance = 40 mm

Standard screw mounting

Mounting on (35 x 7.5) Din rail

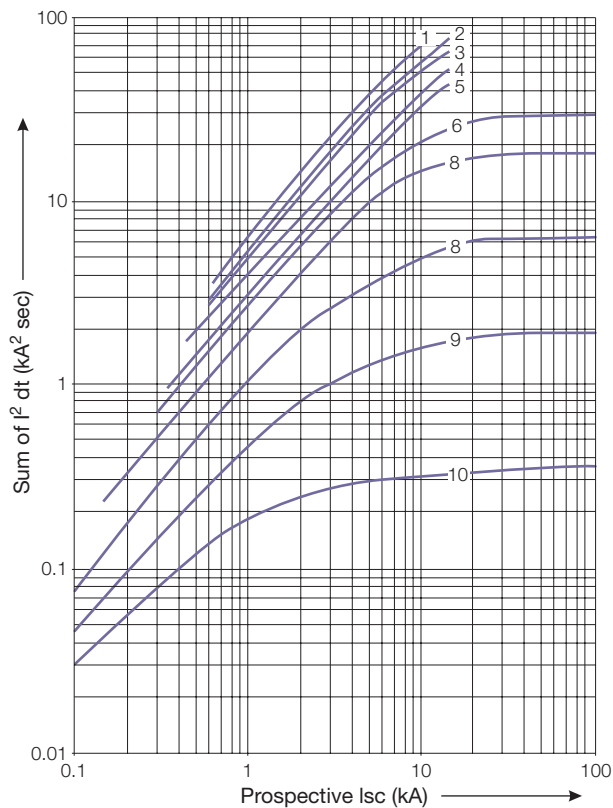
TIME - CURRENT CHARACTERISTICS



- 1) 3 poles from cold state
- 2) 2 poles from cold state
- 3) 3 poles from hot state

LET THROUGH ENERGY (I²T) CHARACTERISTICS

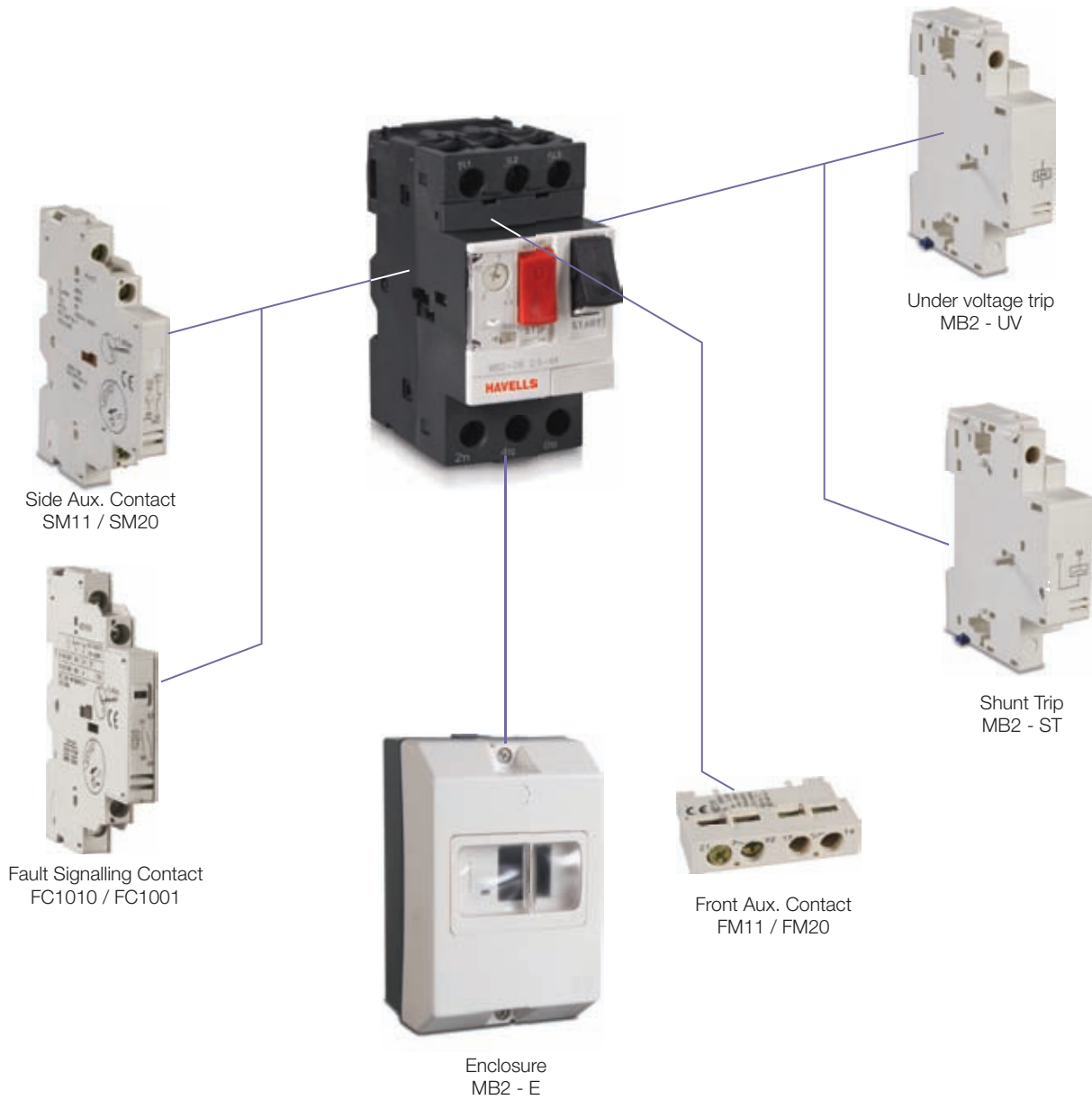
Thermal limit on short circuit (in magnetic operating zone)



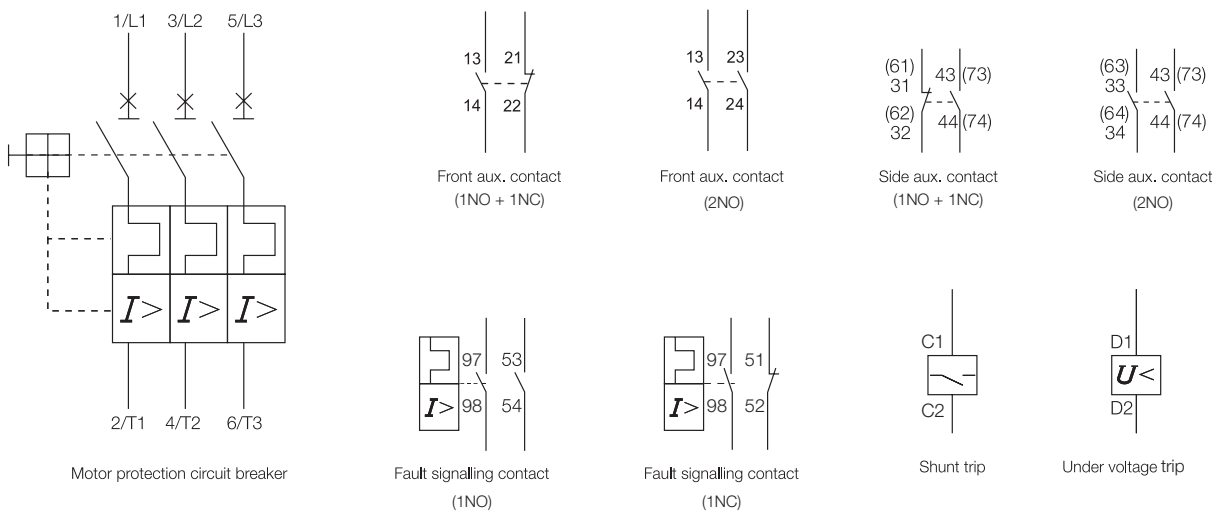
- (1) 24 - 32 A
- (2) 20 - 25 A
- (3) 17 - 23 A
- (4) 13 - 18 A
- (5) 9 - 14 A
- (6) 6 - 10 A
- (7) 4 - 6.3 A
- (8) 2.5 - 4 A
- (9) 1.6 - 2.5 A
- (10) 1 - 1.6 A

Sum of I² dt = f (prospective I_{sc}) at 1.05 U_e = 435 V

ADD ON ACCESSORIES



CIRCUIT DIAGRAMS



ORDERING INFORMATION



Relay Range	Type	Cat. No.
0.1-0.16	MB2 - 01	IHPMPBA0A0
0.16-0.25	MB2 - 02	IHPMPBB0B0
0.25-0.4	MB2 - 03	IHPMPBC0C0
0.4-0.63	MB2 - 04	IHPMPBD0D0
0.63 - 1	MB2 - 05	IHPMPBE0E0
1-1.6	MB2 - 06	IHPMPBF0F0
1.6-2.5	MB2 - 07	IHPMPBG0G0
2.5 - 4	MB2 - 08	IHPMPBH0H0
4 - 6.3	MB2 - 10	IHPMPBJ0J0
6 - 10	MB2- 14	IHPMPBK0K0
9 - 14	MB2 - 16	IHPMPBL0L0
13 - 18	MB2- 20	IHPMPBM0M0
17 - 23	MB2 - 21	IHPMPBN0N0
20 - 25	MB2 - 22	IHPMPBQ0Q0
24 - 32	MB2 - 32	IHPMPBPOPO

Note: MB2 - 22 provide on request

ADD ON ACCESSORIES



Accessory	Type	Cat. No.
Side aux. contact (1NO+1NC)	MB2 - SM11	ISPMASM011
Side aux. contact (2 NO)	MB2 - SM20	ISPMASM020
Front aux. contact (1NO+1NC)	MB2 - FM11	ISPMAFM011
Front aux. contact (2NO)	MB2 - FM20	ISPMAFM020
Fault signalling contact (1NO)	MB2 - FC1010	ISPF010
Fault signalling contact (1NC)	MB2 - FC1001	ISPF001
Shunt trip 110 V 220 V 380 V / 415 V	MB2 - ST1 MB2 - ST2 MB2 - ST3	ISPST110 ISPST220 ISPST415
Under voltage trip 110 V 220 V 380 V / 415 V	MB2 - UV1 MB2 - UV2 MB2 - UV3	ISPUV110 ISPUV220 ISPUV415
MPCB Enclosure (IP 65)	MB2 - E	IHPMB2 E0

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ACB



MCCB



Digital MCCB



MCCB Panel Board



Euroload Change Over Switch



Submersible & Motor Starter



Switch Disconnecter Fuse



Load Changeover Switch



Camlock fuse holder



HRC Fuse



Motor



Low Voltage Capacitor



Although every effort has been made to ensure accuracy in the compilation of the technical detail within this publication. Specifications and performance data are constantly changing. Current details should therefore be checked with Havells Group.

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