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MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

Miniature Circuit Breakers
Residual Current Circuit Breakers
Isolating Switches
DIN Series

Empowering Industries

17 A

Breaking Through The

Introducing the DIN Series...

High-quality, high-performance circuit breakers suitable for household electrical distribution panels

DIN Series

Industry

INDEX

Features

(1) All models fully comply with IEC regulations
(2) Units can be mounted on a standard 35mm IEC rail
(3) Residual current circuit breakers use an original Mitsubishi Electric IC securing reliable earth-leakage protection
(4) High current-limiting performance
(5) Compliance with IP2X protection rating
(6) All models are compatible with reverse connection
(7) DC circuit-compatible model (BH-D10) added to product line-up

Product Line-up

Model type		No of poles (P)	Rating	Instantaneous tripping	Voltage (V)	Short-Circuit capacity (kA)	Compliance standard
MCB	BH-D6	1, 2, 3, 4(3+N)	0.5~63A	TYPE B, C, D	230/400AC	6	IEC60898-1
		1+N	0.5~40A	TYPE B, C	230AC		
	BH-D10	1, 2, 3, 4(3+N)	0.5~63A	TYPE B, C, D	230/400AC	10	IEC60898-1
	BH-D10 (For DC)	1	0.5~63A	TYPE B, C	125DC	10	IEC60898-2
					230/400AC	6	
		2			250DC	10	
					400AC	6	
	BH-DN	1+N	6~20A	TYPE C	230AC	4.5	IEC60898-1
RCCB	BV-D	2(1+N), 4(3+N)	25, 40, 63A	–	230/400AC	–	IEC61008-2-2
RCBO	BV-DN	1+N	6~40A	TYPE C	230AC	4.5	IEC61009-2-2
Isolating Switch	KB-D	1, 2, 3, 4(3+N)	32, 63, 80A	–	230/400AC	–	IEC60947-3

Explanation of Markings (Example Model Type : BH-D6)

Technical Specifications

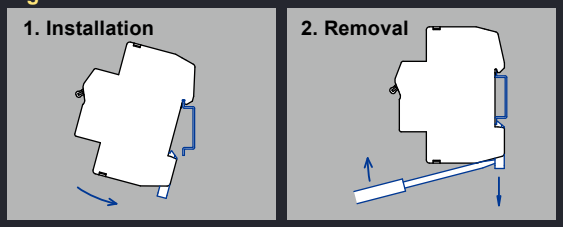
Ambient temperature range	-10 ~ +40℃
Frequency	50/60Hz

Points to Note

1 Installation

Standard IEC35mm rail installation is possible.
Fix by attaching a slip stopper.

Fig-1



2 Connection

At the time of wire connection, fasten the terminal screws with the torque stated in the table below.

Fastening torque

Screw diameter	Fastening torque (N·m)	Model type
M5	1.7~2.5	BH-D6, BH-D10, BV-D, KB-D SHTA400-05DLS, SHTD048-05DLS
M4	1.0~1.5	BH-DN, BV-DN
M3.5	0.8~1.0	AL-05DLS, AX-05DLS, ALAX-05DLS AX2-05DLS

3 Opening, Closing and Tripping Operations

Move the handle up/down to turn power On/Off. Tripping operation refers to automatic opening (breaking) of circuits.

4 Earth-leakage Test

Earth-leakage test steps:

(1) Move the handle to the On position under rated voltage.
(2) Push the yellow test button.
(3) At this time, the RCCB or RCBO must be tripped within the specified time.
(4) The handle will move to the Off position.
(5) The earth-leakage indication changes from white to red.

5 Withstand Voltage Test

(1) Withstand voltage test: The voltage applied to the main circuit during the withstand voltage test is 2,000VAC (effective for 1min). Do not conduct a withstand voltage tests using voltages exceeding 2,000VAC.
(2) Measurement of insulation resistance and withstand voltage test
Please note the following restrictions (① and ② below) that apply when using earth-leakage circuit breakers.

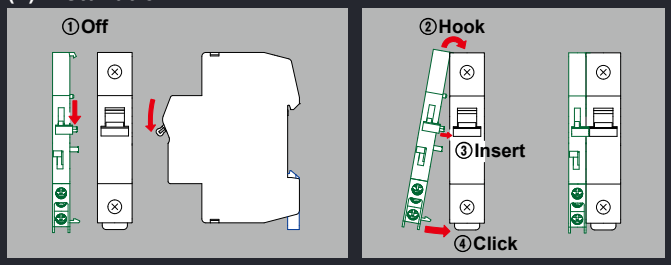
① Measuring insulation resistance:
– Do not use a 1000V insulation resistance tester. Please use a 500V insulation resistance tester.
– The "▲" marks in the table are based on minimum insulation resistance values.

② Testing withstand voltage: The "X" marks in the table below indicate that the test voltage is not to be applied to that model. (If a test voltage is accidently applied to one of these models, do not reuse the product regardless of whether or not they were tripped.)

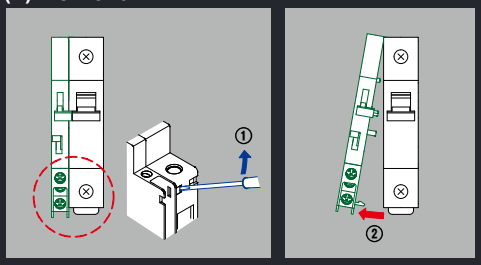
Measuring position / Test				Insulation resistance measurement		Withstand voltage test	
Handle position				ON	OFF	ON	OFF
Between main circuit live part and ground				○	○	○	○
Between different poles	On line side	BV-D 2P BV-DN		▲	○	×	○
		BV-D 4P	Between right pole (terminal symbol 6) and N pole	▲	○	×	○
			Between poles other than above	○	○	○	○
	On load side	BV-D 2P BV-DN		▲	▲	×	×
		BV-D 4P	Between right pole (terminal symbol 6) and N pole	▲	▲	×	×
			Between poles other than above	○	○	○	○
Between terminals on line side and load side				—	○	—	○

6 Installation of Accessories (AX, AL, SHT)

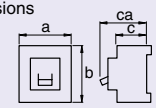
(1) Installation



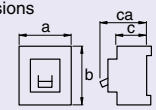
(2) Removal



Specifications

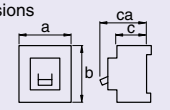
				MCB									
Type				BH-D6					BH-D10				BH-DN
Image													
No. of poles [P]				1	2	3	4(3+N)*1	2(1+N)*1	1	2	3	4(3+N)*1	2 (1+N)*1
Instantaneous tripping				Type B, C, D*2				Type B, C*2	Type B, C, D*2				Type C*2
Rated insulation voltage U_i [V]				440					440				230
Rated current I_n [A] at ambient temperature 30℃				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40	0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				6, 10, 16, 20
Rated short-circuit capacity [kA]	IEC60898-1 GB10963.1 (Icn)	AC	230V	6	–			6	10	–			4.5
			230/400V	6	–			–	10	–			–
			400V	–	6			–	–	10			–
Number of operating cycles		Without current		8,000					10,000				20,000
		With current		8,000					10,000				20,000
Dimensions [mm] 		a		18	36	54	72	36	18	36	54	72	18
		b		87					87				88
		c		44					44				44
		ca		70					70				70
Type of overcurrent release				Thermal-magnetic					Thermal-magnetic				Thermal-magnetic
Mounting				IEC35mm rail					IEC35mm rail				IEC35mm rail
Applicable wire size				1 to 25mm^2					1 to 25mm^2				1 to 10mm^2
Mass [kg]				0.15	0.3	0.45	0.55	0.25	0.15	0.3	0.45	0.55	0.12
Accessories (optional)	Alarm switch (AL)			○					○				–
	Auxiliary switch (AX)			○					○				–
	Shunt trip (SHT)			○					○				–
Terminal connection				Solderless					Solderless				Solderless
Based on standard				IEC60898-1					IEC60898-1				IEC60898-1
CE marking				EN60898-1 : Self-declaration					EN60898-1 : Self-declaration				EN60898-1 : Self-declaration
CCC				GB10963.1					GB10963.1				GB10963.1

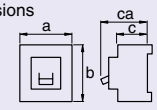
*1: N pole is a switched neutral pole (without overcurrent release device).
*2: Type B: (3 In <, ≦ 5 In), Type C: (5 In <, ≦ 10 In), Type D: (10 In <, ≦ 20 In)

				For DC	
Type				BH-D10	
Image					
No. of poles [P]				1	2
Instantaneous tripping				Type B, C*3	
Rated insulation voltage U_i [V]				250	
Rated current I_n [A] at ambient temperature 30℃				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63	
Rated short-circuit capacity [kA]	IEC60898-2 GB10963.2 (Icn)	DC	125V	10	–
			250V	–	10
		AC	230/400V	6	–
			400V	–	6
Number of operating cycles		Without current		8,000	
		With current		4,000	
Dimensions [mm] 		a		18	36
		b		87	
		c		44	
		ca		70	
Type of overcurrent release				Thermal-magnetic	
Mounting				IEC35mm rail	
Applicable wire size				1 to 25mm^2	
Mass [kg]				0.15	0.3
Accessories (optional)	Alarm switch (AL)			○	
	Auxiliary switch (AX)			○	
	Shunt trip (SHT)			○	
Terminal connection				Solderless	
Based on standard				IEC60898-2	
CE marking				EN60898-2 : Self-declaration	
CCC				GB10963.2	

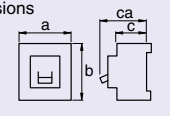
*3: Type B: (4 In <, ≦ 7 In), Type C: (7 In <, ≦ 15 In) for DC
Type B: (3 In <, ≦ 5 In), Type C: (5 In <, ≦ 10 In) for AC

Specifications

		RCCB	
Type		BV-D	
Image			
No. of poles [P]		2(1+N)*1	4(3+N)*1 *3
Rated current [A] at ambient temperature 30℃		25, 40, 63	
Rated voltage [VAC]		230	230/400
Rated current sensitivity IΔn [mA]		30, 300	
Max. operating time at 5IΔn [s]		0.04	
Pulsating current sensitivity		Type AC	
Rated conditional short-circuit current [kA]		6	
Dimensions [mm] 	a	36	72
	b	85	
	c	44	
	ca	70	
Mass [kg]		0.2	0.35
Rated making and breaking capacity Im [A]		500(In 25,40A), 630(In63A)	
Rated conditional short-circuit current Inc [kA]		6	
Rated residual making and breaking capacity IΔm [A]		500(In 25,40A), 630(In63A)	
Rated conditional residual short-circuit current IΔc [kA]		6	
Number of operating cycles	Without current	8,000	
	With current	8,000	
Type of overcurrent release		–	
Mounting		IEC35mm rail	
Applicable wire size		1 to 25mm^2	
Terminal connection		Solderless	
Based on standard		IEC61008-2-2	
CE marking		EN61008-2-2 : Self-declaration	
CCC		GB16916.22	

		RCBO
Type		BV-DN
Image		
No. of poles [P]		2(1+N)*1
Rated current [A] at ambient temperature 30℃		6, 10, 16, 20, 25, 32, 40
Rated voltage [VAC]		230
Rated current sensitivity IΔn [mA]		30, 100, 300
Max. operating time at 5IΔn [s]		0.04
Pulsating current sensitivity		Type AC
Breaking capacity [kA] sym. (IEC 61009)		4.5
Tripping characteristics		Type C*2
Dimensions [mm] 	a	36
	b	88
	c	44
	ca	70
Mass [kg]		0.19
Automatic tripping device		Thermal, magnetic
Number of operating cycles	Without current	20,000
	With current	20,000 (In 6,10,16,20A) 15,000 (In 25A) 10,000 (In 32,40A)
Type of overcurrent release		Thermal-magnetic
Mounting		IEC35mm rail
Applicable wire size		1 to 16mm^2
Terminal connection		Solderless
Based on standard		IEC61009-2-2
CE marking		EN61009-2-2 : Self-declaration
CCC		GB16917.22

*1: N pole is a switched neutral pole (without overcurrent release device).
*2: Type C: (5 In <, ≦ 10 In)
*3: For use to three phase 4-wire type. When using, it be sure to connect the neutral wire to the neutral phase. Not available for use to three phase 3-wire type.

		Isolating switch			
Type		KB-D			
Image					
No. of poles [P]		1	2	3	4(3+N)
Utilization category		AC-22A			
Rated current [A] at ambient temperature 30℃		32, 63, 80			
Rated voltage [VAC]		230	400		
Short time withstand current [A]		20 × In, 1s			
Short-circuit making capacity [A]		20 × In			
Dimensions [mm] 	a	18	36	54	72
	b	87			
	c	44			
	ca	70			
Mass [kg]		0.09	0.18	0.27	0.36
Optional accessories	Insulating barrier	—	1 pc.	2 pcs.	3 pcs.
Number of operating cycles	Without current	20,000			
	With current	3,000			
Mounting		IEC35mm rail			
Applicable wire size		1 to 25mm^2			
Terminal connection		Solderless			
Based on standard		IEC60947-3			
CE marking		EN60947-3 : Self-declaration			
CCC		GB14048.3			

Accessories

Functions of Accessories

Internal accessory	Function
AL Alarm switch	Electrically indicates the trip status of the circuit breaker.
AX Auxiliary switch	Electrically indicates the On/Off status of the circuit breaker.
SHT Shunt trip	Electrically trips the circuit breaker from a remote location. Permissible working voltages are 70 to 110% of the AC rated voltage or 70 to 125% of the DC rated voltage.

Equipping of Accessories

Accessory \ Model name	BH-D6	BH-D10	BH-DN, BV-DN, KB-D, BV-D
AL	○	○	–
AX	○	○	
SHT	○	○	

○: Accessory equipped
–: Accessory not equipped

Specifications

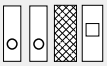
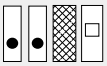
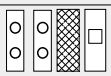
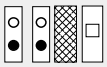
Type		AL	AX	AL+AX	AX+AX
		AL-05DLS	AX-05DLS	ALAX-05DLS	AX2-05DLS
Contact	Configuration	1C	1C	2C	2C
	Contact capacity	400VAC, 2A	230VAC, 5A	120VDC, 0.4A	48VDC, 1.5A 24VDC, 4A
Function	Line	–	–	AX	AX
	Load	AL	AX	AL	AX
Connection		Clamp terminal			
Compliance standard		IEC60947-5-1			

Type	SHT	
	SHTA400-05DLS	SHTD048-05DLS
Cut-off switch	Equipped	
Voltage	110-400VAC	24-48VDC
Input power requirement	110VAC 60VA 230VAC 250VA 400VAC 750VA	24VDC 75VA 48VDC 300VA
Operating time [ms]	<20	
Connection	Solderless terminal	
Compliance standard	IEC60947-2	

* Secure a sufficient input power supply so that the voltage will not drop below the permissible lower working voltage (70% of the lowest rated voltage).
* The operating time denotes the time from when the rated voltage is applied to SHT until the time the main contact of the breaker starts to open.

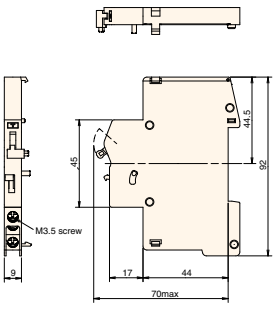
Accessories

Combinations of Accessories

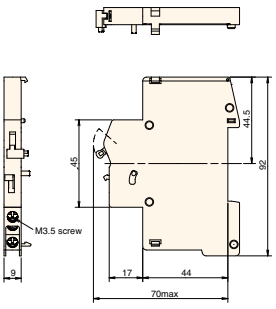
Accessory connection combinations	AL	
	AX	
	2AX	
	ALAX	
	SHT	
	AX+SHT	
	AL+SHT	
	2AX+SHT	
	ALAX+SHT	

Outer Dimensions

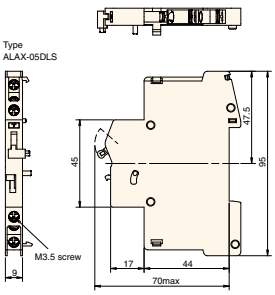
AL-05DLS



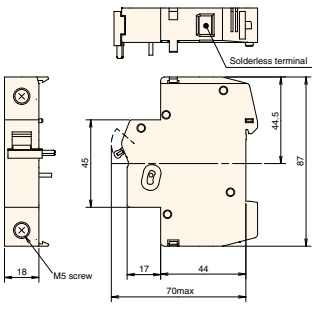
AX-05DLS



ALAX-05DLS
AX2-05DLS

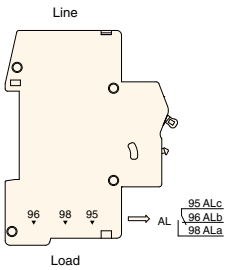


SHTA400-05DLS
SHTD048-05DLS

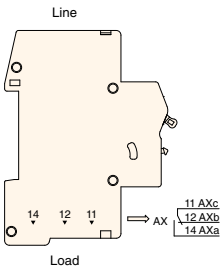


Connection of Line and Load Side

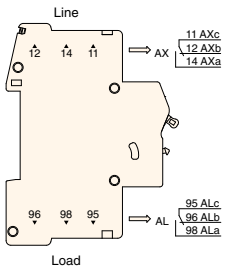
AL-05DLS



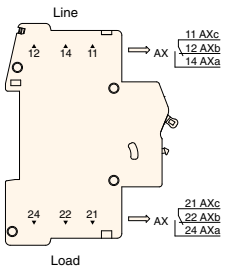
AX-05DLS



ALAX-05DLS



AX2-05DLS



Characteristics and Dimensions

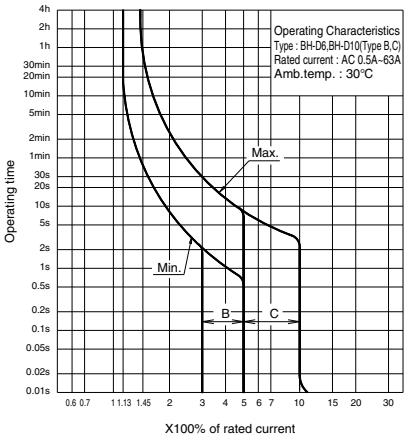
Miniature Circuit Breakers

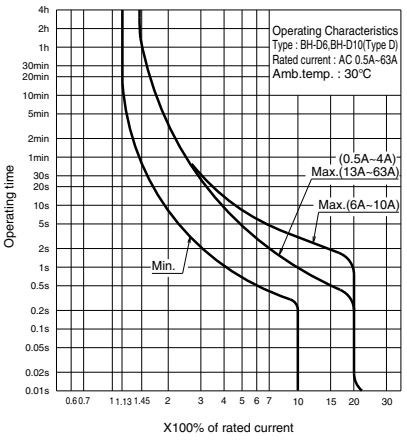
BH-D6 BH-D10

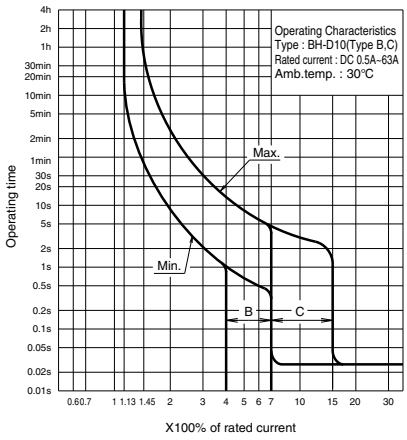
Type				BH-D6					BH-D10				BH-D10 (For DC)	
No. of poles [P]				1	2	3	4(3+N)*1	2(1+N)*1	1	2	3	4(3+N)*1	1	2
Instantaneous tripping				Type B, C, D				Type B, C	Type B, C, D				Type B, C	
Rated insulation voltage U_i [V]				440					440				250	
Rated current I_n [A] at ambient temperature 30℃				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40	0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63	
Rated short-circuit capacity [kA]	IEC60898-1 GB10963.1 (Icn)	AC	230V	6	–			6	10	–			–	–
			230/400V	6	–			–	10	–			–	–
			400V	–	6			–	–	10			–	–
	IEC60898-2 GB10963.2 (Icn)	DC	125V	–					–				10	–
			250V	–					–				–	10
		AC	230/400V	–					–				6	–
			400V	–					–				–	6

*1: N pole is a switched neutral pole (without overcurrent release device).

■Operating Characteristics

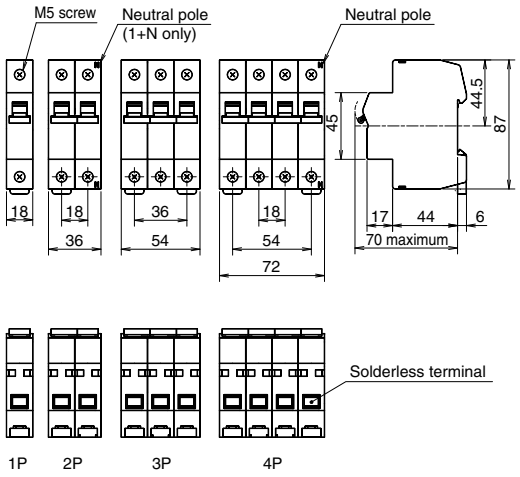




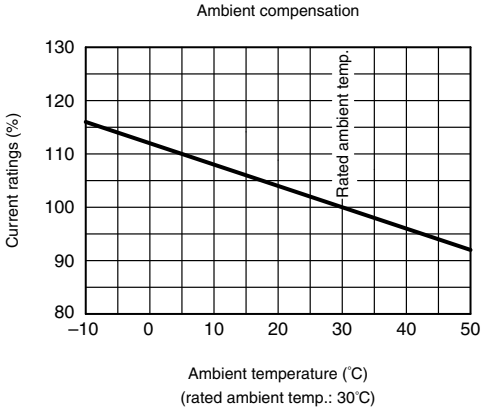


* When using BH-D10 (for DC) in AC circuit, characteristic curve of BH-D10 (Type B, C) for AC is applied.

■Outer Dimensions



■Ambient Compensation Curve



* In case of installing breakers side by side, reduce the passing current to under 80% of the rated current.

Characteristics and Dimensions

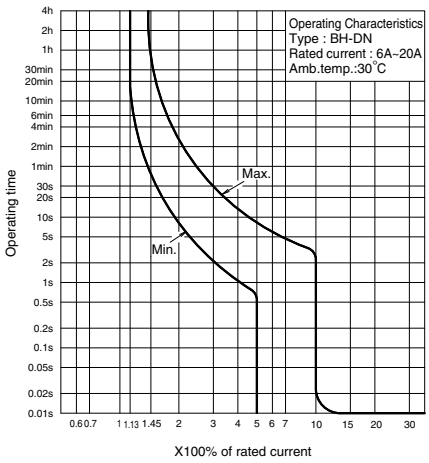
Miniature Circuit Breakers (MCB)

BH-DN

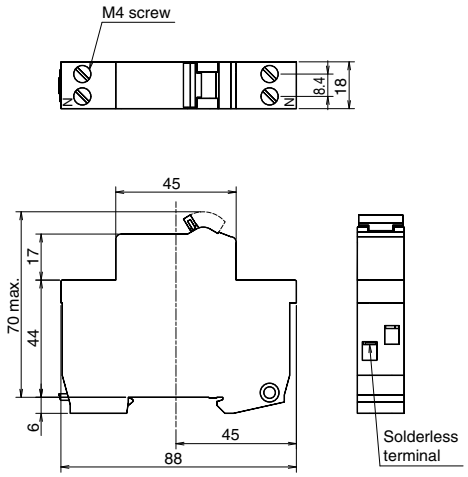
Type				BH-DN
No. of poles [P]				2 (1+N)*1
Instantaneous tripping				Type C
Rated insulation voltage U_i [V]				230
Rated current I_n [A] at ambient temperature 30℃				6, 10, 16, 20
Rated short-circuit capacity [kA]	IEC60898-1 GB10963.1 (Icn)	AC	230V	4.5

*1: N pole is a switched neutral pole (without overcurrent release device).

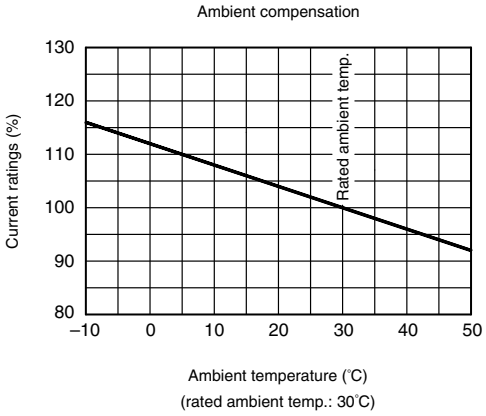
■Operating Characteristics



■Outer Dimensions



■Ambient Compensation Curve



* In case of installing breakers side by side, reduce the passing current to under 80% of the rated current.

Characteristics and Dimensions

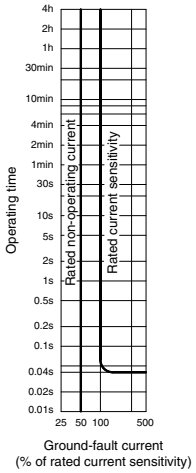
Residual Current Circuit Breakers (RCCB)

BV-D

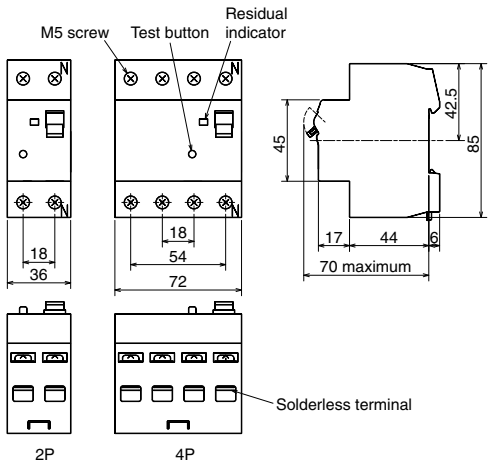
Type	BV-D	
No. of poles [P]	2(1+N)*1	4(3+N)*1 *2
Rated operational voltage Ue [AC V]	230	230/400
Rated current I_n [A] at ambient temperature 30℃	25, 40, 63	
Rated current sensitivity IΔn [mA]	30, 300	
Max. operating time at 5IΔn [s]	0.04	
Pulsating current sensitivity	Type AC	
Residual operation	Dependent on line voltage	
Rated making and breaking capacity Im [A]	500(In 25,40A) 630(In63A)	
Rated conditional short-circuit current Inc [kA]	6	
Rated residual making and breaking capacity IΔm [A]	500(In 25,40A) 630(In63A)	
Rated conditional residual short-circuit current IΔc [kA]	6	

*1: N pole is a switched neutral pole (without overcurrent release device).
*2: For use to three phase 4-wire type. When using, it be sure to connect the neutral wire to the neutral phase. Not available for use to three phase 3-wire type.

■Operating Characteristics



■Outer Dimensions



Characteristics and Dimensions

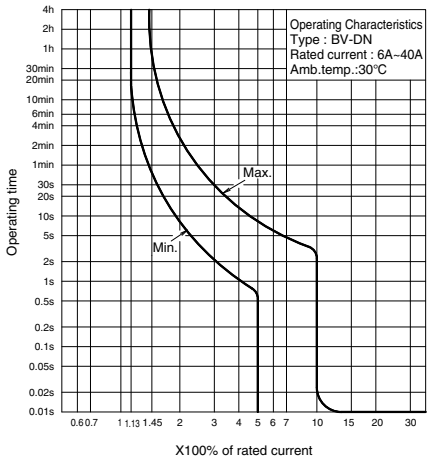
Residual Current Circuit Breakers with Overcurrent Protection (RCBO)

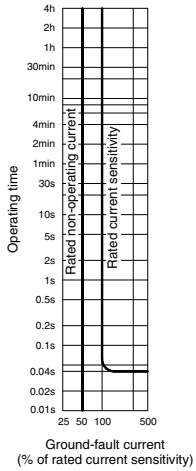
BV-DN

Type				BV-DN
No. of poles [P]				2(1+N)*1
Rated operational voltage Ue [VAC]				230
Rated current I_n [A] at ambient temperature 30℃				6, 10, 16, 20, 25, 32, 40
Instantaneous tripping				Type C
Rated current sensitivity IΔn [mA]				30, 100, 300
Max. operating time at 5IΔn [s]				0.04
Pulsating current sensitivity				Type AC
Residual operation				Dependent on line voltage
Rated short-circuit capacity [kA]	IEC61009-1 GB16917.1 (Icn)	AC	230V	4.5

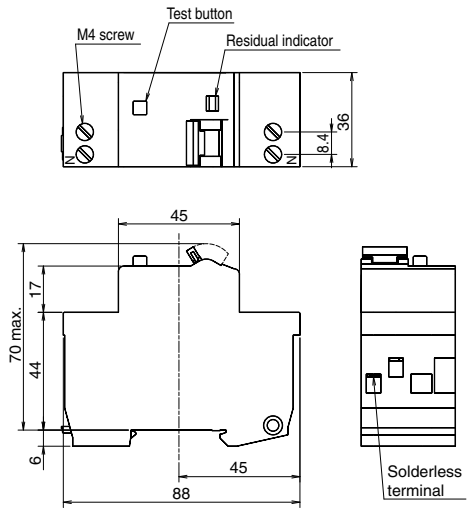
*1: N pole is a switched neutral pole (without overcurrent release device).

■Operating Characteristics

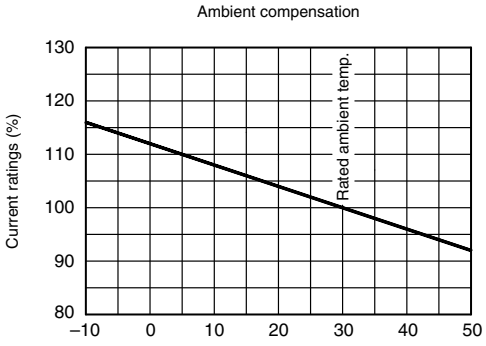




■Outer Dimensions



■Ambient Compensation Curve



* In case of installing breakers side by side, reduce the passing current to under 80% of the rated current.

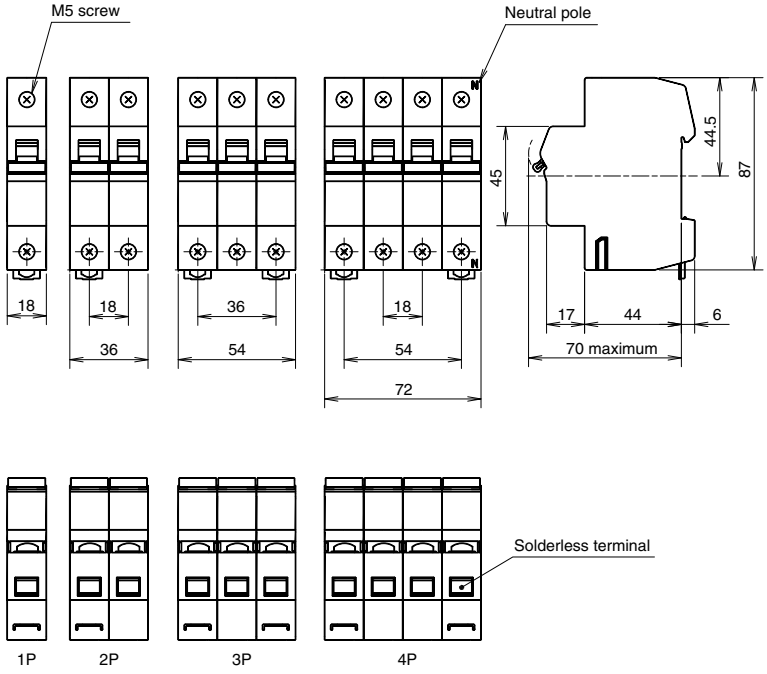
Characteristics and Dimensions

Isolating switches

KB-D

Type	KB-D			
No. of poles [P]	1	2	3	4(3+N)
Utilization category	AC22A class			
Rated insulation voltage U_i [V]	250	440		
Rated voltage Ue [VAC]	230	400		
Rated current I_n [A] at ambient temperature 30℃	32, 63, 80			
Short-time withstand current [A]	20×In , 1s			
Short-time making current [A]	20×In			

■Outer Dimensions



Ordering Information

Please specify items with ☐

Type name	Number of poles	Rated current	Operating characteristics	Rated voltage	Quantity
BH-D6	1P	6A	Type C	DC	12
BH-D6 BH-D10	1P, 2P, 3P, 4P, 1P+N	0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63A	Type B Type C Type D	Specify DC voltage when used in DC circuit	

Type name	Number of poles	Rated current	Operating characteristics	Quantity
BH-DN	1P+N	6A	Type C	12
		6, 10, 16, 20A		

Type name	Number of poles	Rated current	Quantity
KB-D	1P	32A	12
	1P, 2P, 3P, 4P	32, 63, 80A	

Type name	Number of poles	Rated current	Rated sensitivity current	Quantity
BV-D	2P	25A	30mA	6
	2P, 4P	25, 40, 63A	30, 300mA	

Type name	Number of poles	Rated current	Rated sensitivity current	Operating characteristics	Quantity
BV-DN	1P+N	6A	30mA	Type C	6
		6, 10, 16, 20, 25, 32, 40A	30, 100, 300mA		

Information from Fukuyama Works

http://www.MitsubishiElectric.co.jp/haisei/lvs/

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Wiring and connection must be done by the person have a specialized knowledge of electric construction and wiring.

eco Changes

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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