

# Miniature Circuit Breakers Residual Current Circuit Breakers Isolating Switches **DIN Series**



# GLOBAL IMPACT OF MITSUBISHI ELECTRIC



Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

## ***Changes for the Better***

"Changes for the Better" represents the Mitsubishi Electric Group's attitude to "always strive to achieve something better", as we continue to change and grow. Each one of us shares a strong will and passion to continuously aim for change, reinforcing our commitment to creating "an even better tomorrow".

Mitsubishi Electric is involved in many areas including the following:

### **Energy and Electric Systems**

A wide range of power and electrical products from generators to large-scale displays.

### **Electronic Devices**

A wide portfolio of cutting-edge semiconductor devices for systems and products.

### **Home Appliance**

Dependable consumer products like air conditioners and home entertainment systems.

### **Information and Communication Systems**

Commercial and consumer-centric equipment, products and systems.

### **Industrial Automation Systems**

Maximizing productivity and efficiency with cutting-edge automation technology.

Our advances in AI and IoT are adding new value to society in diverse areas from automation to information systems. The creation of game-changing solutions is helping to transform the world, which is why we are honored to be recognized in the 2019 "Forbes Digital 100" as one of world's most influential digital corporations.



# MEMO

# Instructions for Application

## 1 Warranty period and warranty coverage

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi Electric occurs during use of the product within the warranty period, the product shall be repaired at no cost via the sales representative or Mitsubishi Electric Sales office. However, if repairs are required on-site at domestic or overseas locations, expenses to send an engineer will be charged.

### 1. Warranty period

The warranty period of the product shall be for twelve (12) months after the date of purchase or delivery to the designated place.

### 2. Warranty coverage

- (1) The primary failure diagnosis should be performed by users. However, if required by users, Mitsubishi Electric or Mitsubishi Electric Sales office may be able to perform the diagnosis. In that case, for damages caused by any cause found to be the responsibility of Mitsubishi Electric, the diagnosis will be performed at no cost. For details, contact a distributor.
- (2) The coverage shall be limited to ordinary use within the usage state, usage methods, usage environment, and other conditions which follow the instructions and precautions given in the instruction manual, user's manual, and caution labels on the product.
- (3) Even within the warranty period, repair cost shall be charged for the following cases.
  - ① Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by selection of hardware or software design on the user side.
  - ② Failure caused by modifications, etc. to the product by the user without any approvals from Mitsubishi Electric.
  - ③ In case Mitsubishi Electric product is assembled into a user's device, failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
  - ④ Failure that could have been avoided if the maintenance described in the user's manual has been performed.
  - ⑤ Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by natural disasters such as earthquakes, lightning, wind and water damages.
  - ⑥ Failure caused by reasons unpredictable based on scientific technology standards at the time of shipment from Mitsubishi Electric.
  - ⑦ Any other failure found not to be the responsibility of Mitsubishi Electric or that admitted not to be so by the user.In addition, the warranty applies only to the product delivered. It does not apply to the damage that is caused by the failure of the product.

### 3. The period to supply the spare parts after discontinuation of production

Mitsubishi Electric shall supply spare parts for five (5) years after discontinuation of production. After five years, Mitsubishi Electric shall supply spare parts until the spare parts run out of stock.

## 2 Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the warranty period, Mitsubishi Electric shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi Electric.
- (2) Loss in opportunity, lost profits incurred to the user by failures of Mitsubishi Electric product.
- (3) Damages whether foreseeable or not, secondary damages, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric products, caused by exceptional situations.
- (4) Compensation for cost occurring secondarily from replacement work by the user, maintenance of on-site equipment and start-up test run and other operations.

## 3 Product applications


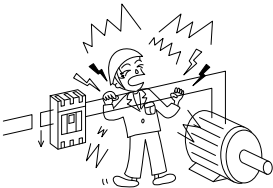
- (1) When using the products listed in this catalogue, the following conditions must be confirmed and obeyed. The product must be used so that a failure that occurs to the product does not lead to a serious accident. When a damage or failure occurs, the external backup function or fail-safe function must be executed systematically.
- (2) The products listed in this catalogue are designed and manufactured as general-purpose products for application to the general industry field. Therefore, the warranty does not apply to the following special uses.

- ① The use that has a significant influence on the public facilities such as nuclear power plants and other power plants of power companies.
- ② The use for railway companies, government offices, etc. that require to build the special quality assurance system.
- ③ The use for aerospace equipment, medical equipment, railway equipment, combustion and fuel equipment, passenger vehicles, manned transportation equipment, recreational equipment, safety equipment, and air conditioner for servers and the cooling facilities that are expected to have a significant influence on life, body, and property.


If the products listed in this catalogue are used for the above mentioned special uses, Mitsubishi Electric does not take any responsibility for the quality, performance, and safety of the product, which includes, but is not limited to, default liability, defect liability, quality assurance liability, tort liability, and product liability. However, in case the special quality (beyond general specifications) is not required and the use is a limited purpose and the backup/fail-safe functions are equipped with the facility, Mitsubishi Electric may determine that the products listed in this catalogue can be guaranteed. For details, consult a distributor or Mitsubishi Electric.

## 4 Safety precautions





- Carefully read the safety precautions prior to use the circuit breaker correctly.
- Important safety instructions are given below. Strictly observe the instructions.
- Be sure to communicate these safety precautions to the end user.

 <b>DANGER</b>	
<ul style="list-style-type: none"> <li>● Do not touch the terminal area. Doing so can cause an electric shock.</li> <li>● The residual current circuit breakers are designed to operate when the difference between leaving current and returning current exceeds the specified value. In the case shown in this figure, residual current is not detected. Therefore, never touch the two bare live parts. The circuit breaker will not operate upon occurrence of an electric shock.</li> </ul>	 <p style="text-align: center;">Residual current circuit breaker</p>


### Instructions for installation

 <b>CAUTION</b>	
<ul style="list-style-type: none"> <li>● The electrical work shall be performed by qualified personnel (electrical workers).</li> <li>● Before performing wiring work, turn off the upstream circuit breaker, and ensure that no current is flowing through the circuit breaker to be wired. Failure to do so may expose you to shock hazard.</li> <li>● When connecting any wire, tighten the terminal screw to the torque specified in the instruction manual. Failure to do so may cause a fire.</li> <li>● When the model comes with insulating barriers as standard accessories, install the insulating barriers without fail.</li> <li>● Do not install the circuit breaker in an abnormal environment with high temperature, high moisture, dust, corrosive gas, vibration or shock. Doing so may cause a fire or make the circuit breaker inoperative.</li> <li>● Protect the circuit breaker so that foreign particles, such as dust, concrete powder and iron powder, and rain water will not enter the circuit breaker. Failure to do so may make the circuit breaker inoperative.</li> </ul>	
[Residual current circuit breaker]	
<ul style="list-style-type: none"> <li>● When using a residual current circuit breaker for use only in 3-phase 4-wire systems, connect the neutral wire to the neutral phase without fail. If they are not connected, the circuit breaker may not operate, thereby resulting in a fire.</li> <li>● Connect the circuit breaker to a power supply appropriate to the rating of its body. Failure to do so may make the circuit breaker inoperative or damage it.</li> </ul>	


### [Explanation of warning symbols]

 <b>DANGER</b>	Incorrect handling of the product will result in a hazardous situation, such as death or serious injury.
 <b>CAUTION</b>	Incorrect handling of the product may result in a hazardous situation according to circumstances.
	This means something is prohibited and should never be performed.
	Ignition or fire may occur under certain circumstances.

### Instructions for use

 <b>CAUTION</b>	
<ul style="list-style-type: none"> <li>● When the circuit breaker automatically breaks a circuit, turn on the handle after removing the cause. Failure to do so may cause an electric shock or a fire.</li> </ul>	
[Residual current circuit breaker]	
<ul style="list-style-type: none"> <li>● Ground the earth terminal of electrical equipment. Failure to do so may cause an electric shock or a fire.</li> <li>● Press the test button to check the operation once a month or so. If the earth leakage circuit breaker is not turned off, it is out of order. Consult an electrician.</li> </ul>	

### Instructions for maintenance

 <b>CAUTION</b>	
<ul style="list-style-type: none"> <li>● The circuit breakers shall be maintained by persons with specialized knowledge.</li> <li>● Before maintaining, turn off the upstream circuit breaker, and ensure that no current is flowing through the circuit breaker to be maintained. Failure to do so may expose you to shock hazard.</li> <li>● Retighten the terminals periodically. Failure to do so may cause a fire.</li> </ul>	

### Instructions for disposal

 <b>CAUTION</b>	
<ul style="list-style-type: none"> <li>● When disposing of the product, treat it as industrial waste.</li> </ul>	

## 5 Change in product specifications

The specifications of the product listed in this catalogue, manuals or technical documents are subject to change without prior notice.

*Breaking Through The*



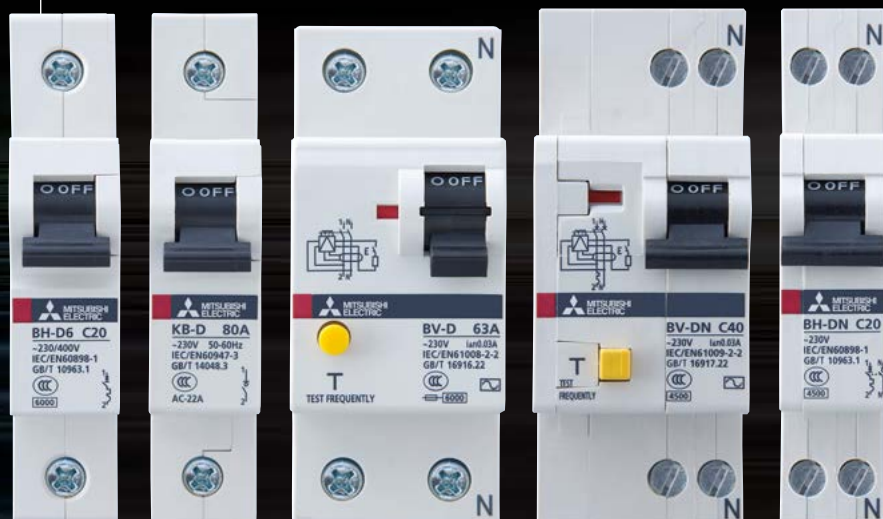
Introducing the DIN Series...

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

DIN Series

## INDEX

- **Features, Product Line-up and Points to Note** ..... 5
  - Features and Product Line-up..... 5
  - Points to Note ..... 6
- **Specifications** ..... 7-8
- **Accessories** ..... 9-10
- **Characteristics and Dimensions** ..... 11
  - Miniature Circuit Breakers (MCB) ..... 11-12
  - Residual Current Circuit Breakers (RCCB) ..... 13
  - Residual Current Circuit Breakers with  
Overcurrent Protection (RCBO) ..... 14
  - Isolating Switches ..... 15
- **Ordering Information** ..... 16



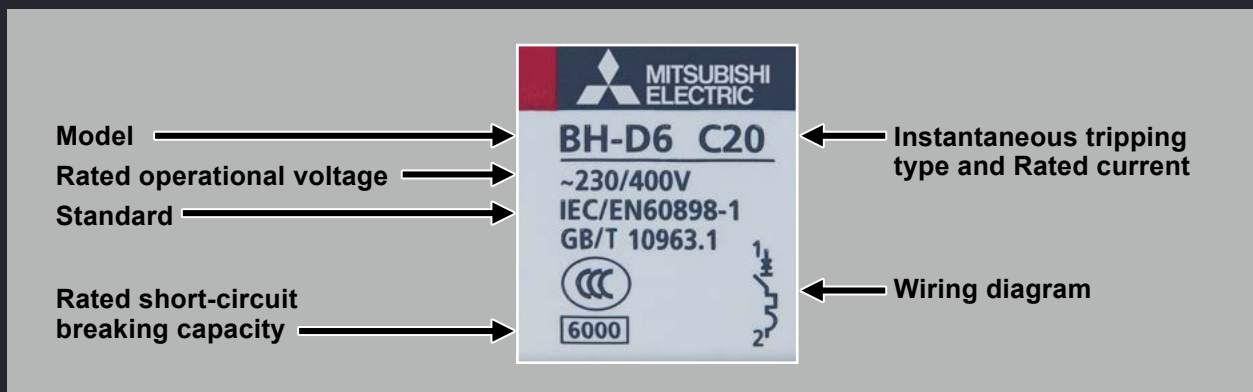
## Features

- (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

## Product Line-up

Model	No. of poles (P)	Rated current	Instantaneous tripping	Rated operational voltage (V)	Rated short-circuit breaking capacity (kA)	Compliance standard	
MCB	BH-D6	1, 2, 3, 4(3+N)	0.5~63A	TYPE B, C, D	230/400AC	6	IEC 60898-1
		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	IEC 60898-1
					125DC	10	
	BH-D10 (For DC)	1	0.5~63A	TYPE B, C	230/400AC	6	IEC 60898-2
250DC					10		
	2			400AC	6		
BH-DN	1+N	6~20A	TYPE C	230AC	4.5	IEC 60898-1	
RCCB	BV-D	2(1+N), 4(3+N)	25, 40, 63A	–	230/400AC	–	IEC 61008-2-2
RCBO	BV-DN	1+N	6~40A	TYPE C	230AC	4.5	IEC 61009-2-2
	BV-DN6		3~40A			6	
Isolating Switch	KB-D	1, 2, 3, 4(3+N)	32, 63, 80A	–	230/400AC	–	IEC 60947-3

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



## Technical Specifications

Model	BH-D6, BH-D10, BH-DN, KB-D	BV-D, BV-DN, BV-DN6
Ambient temperature range	-25 ~ +60°C <sup>*1</sup>	-20 ~ +60°C <sup>*1</sup>
Rated frequency	50/60Hz	

\*1: Note that the 24-hour average value must not exceed 35°C. Working current reduction rate in ambient temperature exceeding 40°C.  
 50°C···0.9 fold  
 60°C···0.7 fold



# DIN Series

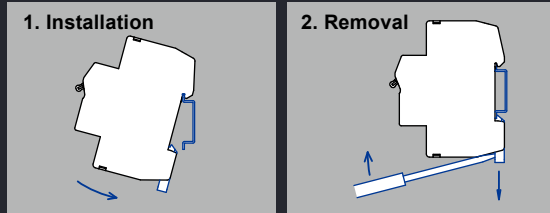


## Points to Note

### 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
M5	2.1±0.4	BH-D6, BH-D10, BV-D, KB-D SHTA400-05DLS, SHTD048-05DLS
M4	1.3±0.2	BH-DN, BV-DN, BV-DN6
M3.5	0.9±0.1	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:

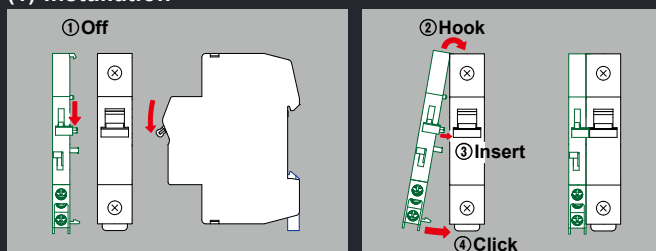
- Do not use a 1000V insulation resistance tester. Please use a 500V insulation resistance tester.
- The “▲” marks in the table are based on minimum insulation resistance values.

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 accidentally applied to one of these models, do not reuse the product regardless of whether or not they were tripped.)

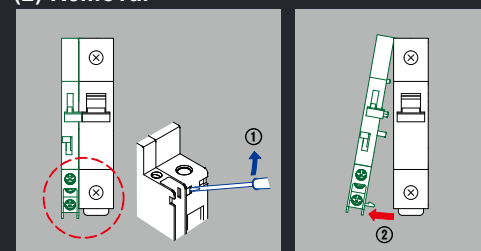
Measuring position		Test	Insulation resistance measurement		Withstand voltage test	
			ON	OFF	ON	OFF
Handle position			○	○	○	○
Between main circuit live part and ground			○	○	○	○
Between different poles	On line side	BV-D 2P BV-DN	▲	○	×	○
		BV-D 4P Between right pole (terminal symbol 6) and N pole Between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




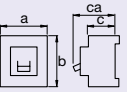
#### (1) Installation




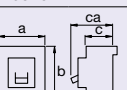
#### (2) Removal



## Specifications

Model		MCB															
		BH-D6				BH-D10				BH-DN							
Image																	
No. of poles [P]		1	2	3	4(3+N) <sup>*1</sup>	2(1+N) <sup>*1</sup>	1	2	3	4(3+N) <sup>*1</sup>	2(1+N) <sup>*1</sup>						
Instantaneous tripping		Type B, C, D <sup>*2</sup>				Type B, C <sup>*2</sup>				Type C <sup>*2</sup>							
Rated insulation voltage $U_i$ [V]		440				440				230							
Rated current $I_n$ [A] at ambient temperature 30°C		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 breaking capacity [kA] ( $I_{cn}$ )	IEC 60898-1 EN 60898-1 GB/T 10963.1 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							
Reverse connection		Available				Available				Available							
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						
Mass [kg]	0.15	0.3	0.45	0.55	0.25	0.15	0.3	0.45	0.55	0.12							
Type of overcurrent release		Thermal-magnetic				Thermal-magnetic				Thermal-magnetic							
Mounting		IEC35mm rail				IEC35mm rail				IEC35mm rail							
Applicable wire size		1 to 25mm <sup>2</sup>				1 to 25mm <sup>2</sup>				1 to 10mm <sup>2</sup>							
Accessories (optional)	Alarm switch (AL)	○				○				-							
	Auxiliary switch (AX)	○				○				-							
	Shunt trip (SHT)	○				○				-							
	Handle lock device (HL)	○				○				-							
Terminal connection		Solderless				Solderless				Solderless							
Based on standard		IEC 60898-1, EN 60898-1, GB/T 10963.1				IEC 60898-1, EN 60898-1, GB/T 10963.1				IEC 60898-1, EN 60898-1, GB/T 10963.1							
CE marking		Self-declaration				Self-declaration				Self-declaration							
UKCA marking		Self-declaration				Self-declaration				Self-declaration							
CCC		Certified				Certified				Certified							
Marine use approval		CCS <sup>*3</sup> , DNV (DNV GL)				CCS <sup>*3</sup> , DNV (DNV GL)				-							


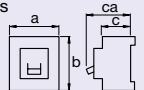
\*1: N pole is a switched neutral pole (without overcurrent release device).  
 \*2: Type B: ( $3 I_n <, \leq 5 I_n$ ), Type C: ( $5 I_n <, \leq 10 I_n$ ), Type D: ( $10 I_n <, \leq 20 I_n$ )  
 \*3: Except for 4 poles breaker

Model		MCB												
		BH-D10 (For DC)												
Image														
No. of poles [P]		1				2								
Instantaneous tripping		Type B, C <sup>*1</sup>												
Rated insulation voltage $U_i$ [V]		440												
Rated current $I_n$ [A] at ambient temperature 30°C		0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63												
Rated short-circuit breaking capacity [kA] ( $I_{cn}$ )	IEC 60898-2 EN 60898-2 GB/T 10963.2 DC	125V	10	-										
		250V	-	10										
		AC	230/400V	6	-									
Number of operating cycles	Without current	8,000												
	With current	4,000												
Reverse connection		Available												
Dimensions [mm]		a	18	36										
		b	87											
		c	44											
		ca	70											
Mass [kg]	0.15	0.3												
Type of overcurrent release		Thermal-magnetic												
Mounting		IEC35mm rail												
Applicable wire size		1 to 25mm <sup>2</sup>												
Accessories (optional)	Alarm switch (AL)	○												
	Auxiliary switch (AX)	○												
	Shunt trip (SHT)	○												
	Handle lock device (HL)	○												
Terminal connection		Solderless												
Based on standard		IEC 60898-2, EN 60898-2, GB/T 10963.2												
CE marking		Self-declaration												
UKCA marking		Self-declaration												
CCC		Certified												
Marine use approval		CCS												

\*1: Type B: ( $4 I_n <, \leq 7 I_n$ ), Type C: ( $7 I_n <, \leq 15 I_n$ ) for DC  
 Type B: ( $3 I_n <, \leq 5 I_n$ ), Type C: ( $5 I_n <, \leq 10 I_n$ ) for AC




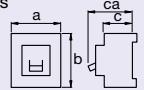
## Specifications


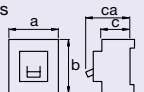
		RCCB	
Model		BV-D	
Image			
No. of poles [P]		$2(1+N)^{*1}$	$4(3+N)^{*1,*3}$
Rated current $I_n$ [A] at ambient temperature 30°C		25, 40, 63	
Rated operational voltage $U_e$ [VAC]		230	230/400
Rated residual operating current $I_{\Delta n}$ [mA]		30, 300	
Max. operating time at 5 $I_{\Delta n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Residual operation		Dependent on line voltage	
Dimensions [mm]		a	36
		b	85
		c	44
		ca	70
Mass [kg]		0.2	0.35
Rated frequency [Hz]		50/60	
Short-circuit protective device		BH-D6	
Rated making and breaking capacity $I_m$ [A]		500 ( $I_n$ 25,40A), 630 ( $I_n$ 63A)	
Rated conditional short-circuit current $I_{nc}$ [kA]		6	
Rated residual making and breaking capacity $I_{\Delta m}$ [A]		500 ( $I_n$ 25,40A), 630 ( $I_n$ 63A)	
Rated conditional residual short-circuit current $I_{\Delta c}$ [kA]		6	
Reverse connection		Available	
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 <sup>2</sup>	
Terminal connection		Solderless	
Based on standard		IEC 61008-1, IEC 61008-2-2, EN 61008-1, GB/T 16916.1, GB/T 16916.22	
CE marking		Self-declaration	
UKCA marking		Self-declaration	
CCC		Certified	

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

\*2: Type C: ( $5 I_n <, \leq 10 I_n$ )

\*3: For use to three phase 4-wire type. When wiring to three phase 4-wire, connect the neutral line to the neutral pole. Not available for use to three phase 3-wire type.

		RCBO	
Model		BV-DN	BV-DN6
Image			
No. of poles [P]		$2(1+N)^{*1}$	
Rated current $I_n$ [A] at ambient temperature 30°C		6, 10, 16, 20, 25, 32, 40	3, 6, 10, 16, 20, 25, 32, 40
Rated operational voltage $U_e$ [VAC]		230	
Rated residual operating current $I_{\Delta n}$ [mA]		30, 100, 300	
Max. operating time at 5 $I_{\Delta n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Residual operation		Dependent on line voltage	
Rated short-circuit breaking capacity [kA] ( $I_{cn}$ )	IEC 61009-1	4.5	6
	EN 61009-1		
	GB/T 16917.1		
	AC	230V	
Tripping characteristics		Type C <sup>*2</sup>	
Dimensions [mm]		a	36
		b	88
		c	44
		ca	70
Mass [kg]		0.19	
Rated frequency [Hz]		50/60	
Rated residual making and breaking capacity $I_{\Delta m}$ [A]		500	
Reverse connection		Available	
Number of operating cycles	Without current	20,000	
	With current	20,000 ( $I_n$ 6,10,16,20A) 15,000 ( $I_n$ 25A) 10,000 ( $I_n$ 32,40A)	
Type of overcurrent release		Thermal-magnetic	
Mounting		IEC35mm rail	
Applicable wire size		1 to 16mm <sup>2</sup>	
Terminal connection		Solderless	
Based on standard		IEC 61009-2-2, IEC 61009-1, EN 61009-1, GB/T 16917.1, GB/T 16917.22	
CE marking		Self-declaration	
UKCA marking		Self-declaration	
CCC		Certified	

		Isolating switch			
Model		KB-D			
Image					
No. of poles [P]		1	2	3	$4(3+N)^{*1}$
Utilization category		AC-22A			
Rated operational current $I_e$ [A] at ambient temperature 30°C		32, 63, 80			
Rated insulation voltage $U_i$ [V]		250		440	
Rated operational voltage $U_e$ [VAC]		230		400	
Rated short-time withstand current $I_{cw}$ [A]		$20 \times I_e, 1s$			
Rated short-circuit making capacity $I_{cm}$ [A]		$20 \times I_e$			
Rated impulse withstand voltage $U_{imp}$ [kV]		6			
Dimensions [mm]		a	18	36	54
		b		87	
		c		44	
		ca		70	
Mass [kg]		0.09	0.18	0.27	0.36
Reverse connection		Available			
Number of operating cycles	Without current	20,000			
	With current	3,000			
Pollution degree		2			
Mounting		IEC35mm rail			
Applicable wire size		1 to 25mm <sup>2</sup>			
Terminal connection		Solderless			
Based on standard		IEC 60947-3, EN 60947-3, GB/T 14048.3			
CE marking		Self-declaration			
UKCA marking		Self-declaration			
CCC		Certified			
Marine use approval		CCS <sup>*2</sup> , DNV (DNV GL)			

\*1: Connect the neutral line to the neutral pole.

\*2: Except for 4 poles breaker.

# Accessories

## Functions of Accessories

Accessory	Function
<b>AL</b> Alarm switch	Electrically indicates the trip status of the circuit breaker.
<b>AX</b> Auxiliary switch	Electrically indicates the On/Off status of the circuit breaker.
<b>SHT</b> 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.
<b>HL</b> Handle lock device	Device for locking the circuit breaker in the OFF position.

## Equipping of Accessories

Accessory \ Model	BH-D6	BH-D10	BH-DN, BV-DN, BV-DN6, KB-D, BV-D
<b>AL</b>	○	○	-
<b>AX</b>	○	○	
<b>SHT</b>	○	○	
<b>HL</b>	○	○	

○: Accessory equipped  
 -: Accessory not equipped

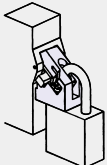
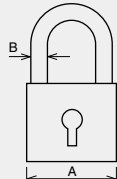
## Specifications

Model		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
Function	Line	-	-	AX	AX
	Load	AL	AX	AL	AX
Connection		Screw terminal			
Compliance standard		IEC60947-5-1			

Model	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.

Model	HL	Reference diagram	Padlock
HLF-05BHD			

Please use on the left pole for 2 pole breaker, on the center pole for 3 pole breaker, on the second pole or third pole from the left for 4 pole breaker. (OFF lock only)  
 This device can be also used as a lock cover that can prohibit operation to ON position readily without any lock. One lot contains 10 pieces.

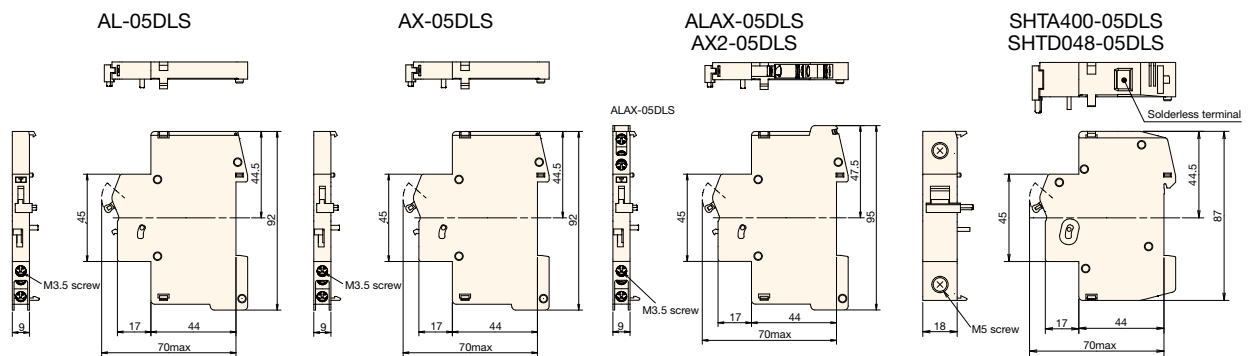
# Accessories

## Combinations of Accessories

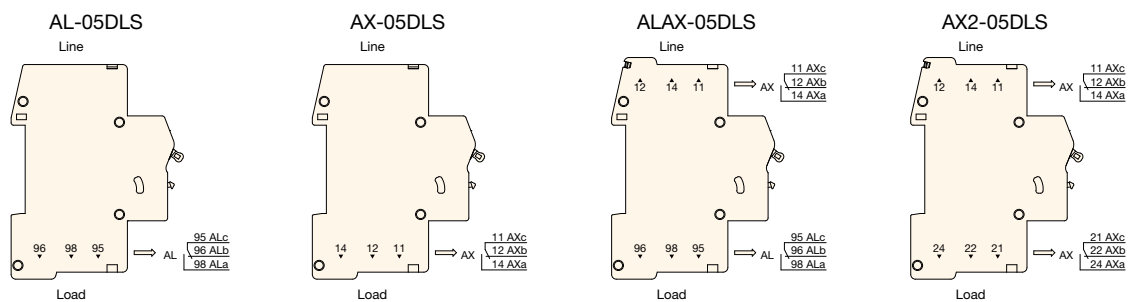
Accessory connection combinations	AL	
	AX	
	2AX	
	ALAX	
	SHT	
	AX+SHT	
	AL+SHT	
	2AX+SHT	
	ALAX+SHT	



## Outline Drawing



## Connection of Line and Load Side



# Characteristics and Dimensions

## Miniature Circuit Breakers

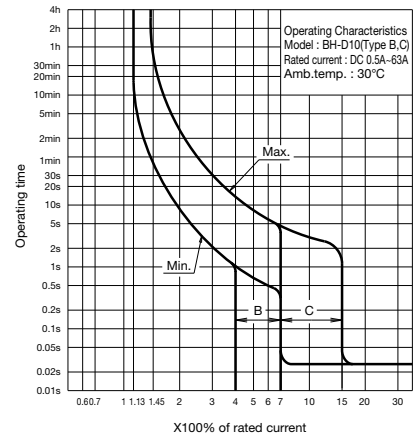
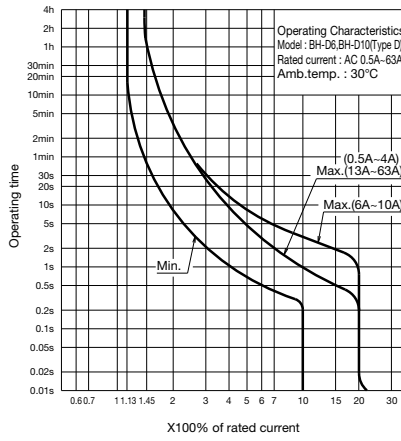
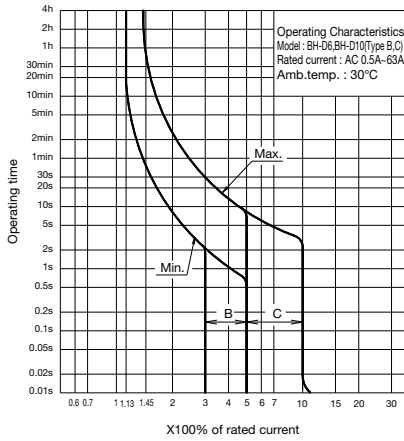
### BH-D6 BH-D10



Model		BH-D6					BH-D10				BH-D10 (For DC)	
No. of poles [P]		1	2	3	4(3+N) <sup>*1</sup>	2(1+N) <sup>*1</sup>	1	2	3	4(3+N) <sup>*1</sup>	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°C		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 breaking capacity [kA]	IEC 60898-1 EN 60898-1 GB/T 10963.1 ( $I_{cn}$ )	AC	230V	6	–	6	10	–	–	–	–	–
			230/400V	6	–	–	10	–	–	–	–	–
		400V	–	–	6	–	–	10	–	–	–	–
	DC	125V	–	–	–	–	–	–	–	10	–	
		250V	–	–	–	–	–	–	–	–	10	
	AC	230/400V	–	–	–	–	–	–	–	6	–	
	400V	–	–	–	–	–	–	–	–	6	–	

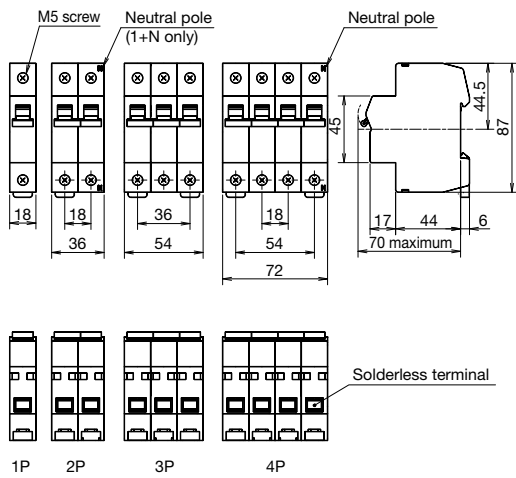
\*1: N pole is a switched neutral pole (without overcurrent release device).

### Operating Characteristics

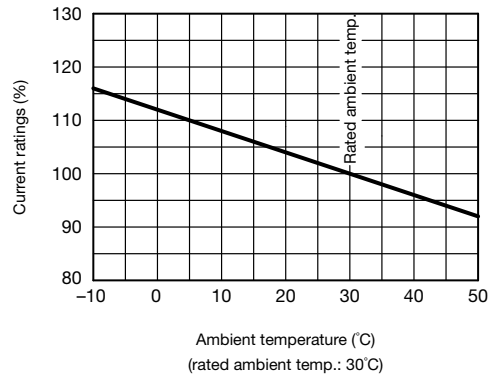


\* When using BH-D10 (for DC) in AC circuit, characteristic curve of BH-D10 (Type B, C) for AC is applied.

### Outline Drawing



### Temperature 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)

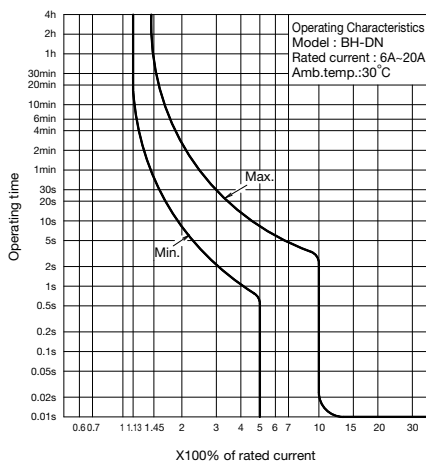
### BH-DN



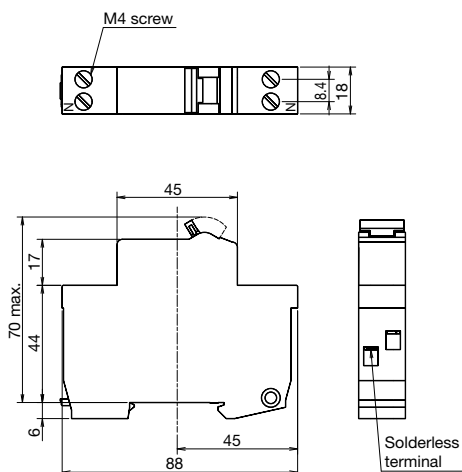
Model		BH-DN		
No. of poles [P]		2 (1+N) <sup>1</sup>		
Instantaneous tripping		Type C		
Rated insulation voltage $U_i$ [V]		230		
Rated current $I_n$ [A] at ambient temperature 30°C		6, 10, 16, 20		
Rated short-circuit breaking capacity [kA]	IEC 60898-1 EN 60898-1 GB/T 10963.1 ( $I_{cn}$ )	AC	230V	4.5

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

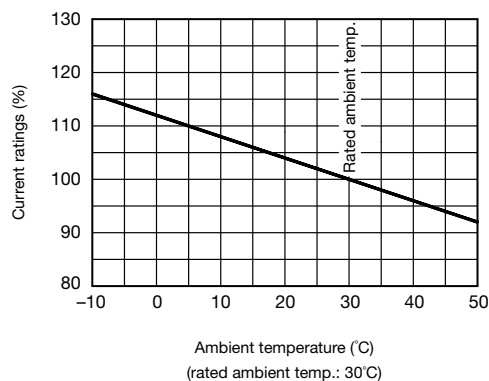
### Operating Characteristics



### Outline Drawing



### Temperature 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

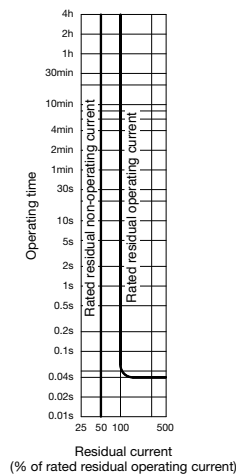


Model	BV-D	
No. of poles [P]	$2(1+N)^{-1}$	$4(3+N)^{-1-2}$
Rated operational voltage $U_e$ [AC V]	230	230/400
Rated current $I_n$ [A] at ambient temperature 30°C	25, 40, 63	
Rated residual operating current $I_{\Delta n}$ [mA]	30, 300	
Max. operating time at 5 $I_{\Delta n}$ [s]	0.04	
Pulsating current sensitivity	Type AC	
Residual operation	Dependent on line voltage	
Rated making and breaking capacity $I_m$ [A]	500 ( $I_n$ 25,40A) 630 ( $I_n$ 63A)	
Rated conditional short-circuit current $I_{nc}$ [kA]	6	
Rated residual making and breaking capacity $I_{\Delta m}$ [A]	500 ( $I_n$ 25,40A) 630 ( $I_n$ 63A)	
Rated conditional residual short-circuit current $I_{\Delta c}$ [kA]	6	

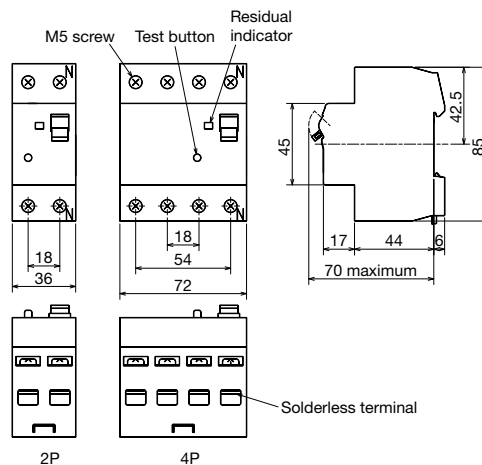
\*1: N pole is a switched neutral pole (without overcurrent release device).

\*2: For use to three phase 4-wire type. When wiring to three phase 4-wire, connect the neutral line to the neutral pole. Not available for use to three phase 3-wire type.

### Operating Characteristics



### Outline Drawing





# Characteristics and Dimensions

## Residual Current Circuit Breakers with Overcurrent Protection (RCBO)

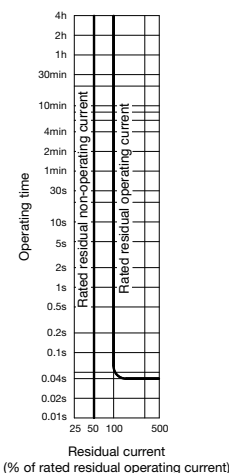
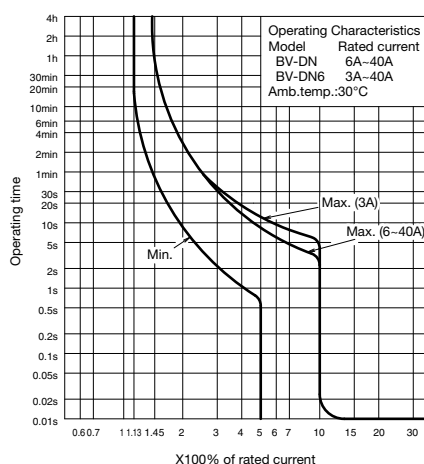
**BV-DN BV-DN6**



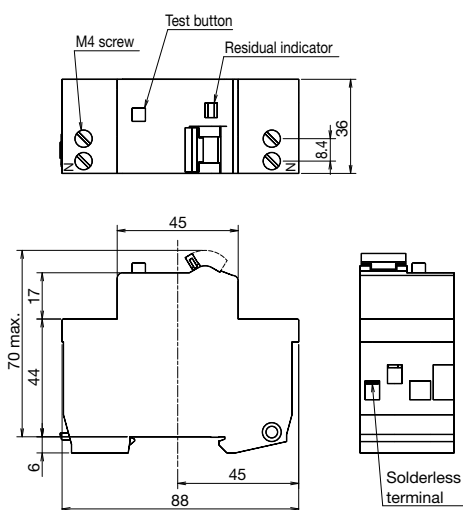
Model		BV-DN	BV-DN6
No. of poles [P]		2(1+N) <sup>*1</sup>	
Rated operational voltage $U_e$ [VAC]		230	
Rated current $I_n$ [A] at ambient temperature 30°C		6, 10, 16, 20, 25, 32, 40	3, 6, 10, 16, 20, 25, 32, 40
Instantaneous tripping		Type C	
Rated residual operating current $I_{\Delta n}$ [mA]		30, 100, 300	
Max. operating time at 5 $I_{\Delta n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Residual operation		Dependent on line voltage	
Rated short-circuit breaking capacity [kA] ( $I_{cb}$ )	IEC 61009-1 EN 61009-1 GB/T 16917.1	AC 230V	4.5
Rated residual making and breaking capacity $I_{\Delta m}$ [A]	500		

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

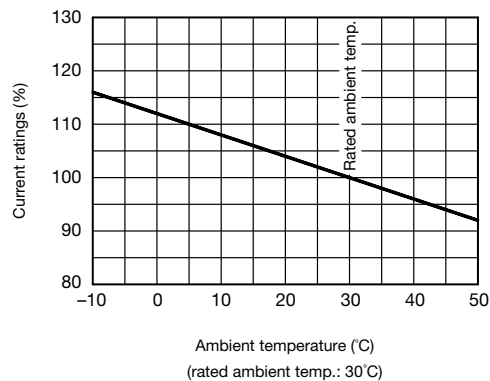
### Operating Characteristics



### Outline Drawing



### Temperature Compensation Curve



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

# Characteristics and Dimensions

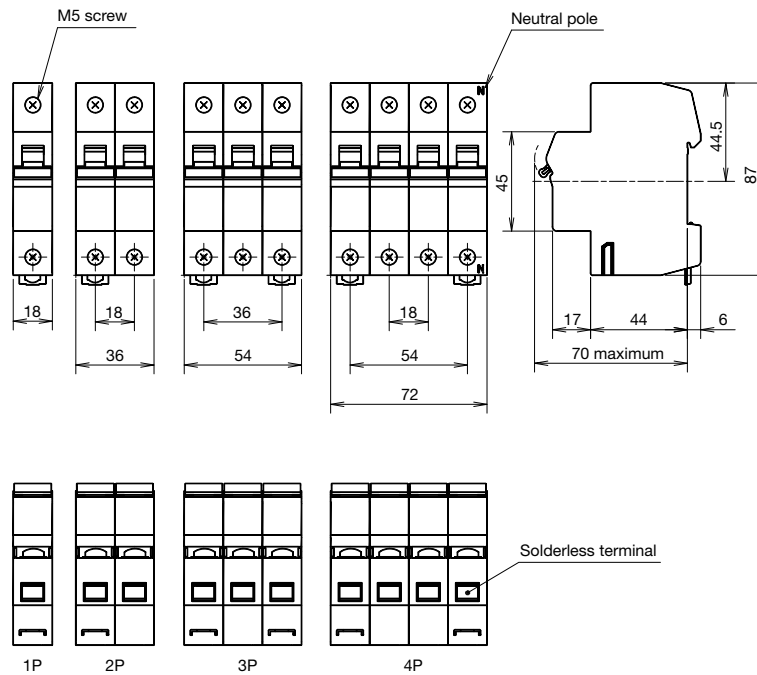
## Isolating switches

### KB-D



Model	KB-D			
No. of poles [P]	1	2	3	4(3+N)
Utilization category	AC-22A			
Rated insulation voltage $U_i$ [V]	250	440		
Rated voltage $U_e$ [VAC]	230	400		
Rated operational current $I_e$ [A] at ambient temperature 30°C	32, 63, 80			
Rated short-time withstand current $I_{cw}$ [A]	20× $I_e$ , 1s			
Rated short-circuit making current $I_{cm}$ [A]	20× $I_e$			

### Outline Drawing



# Ordering Information

Please specify items with

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

Model	Number of poles	Rated current	Instantaneous tripping	Quantity
BH-DN	1P+N	6A	Type C	12
		6, 10, 16, 20A		

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

Model	Number of poles	Rated current	Rated residual operating current	Quantity
BV-D	2P	25A	30mA	6
	2P, 4P	25, 40, 63A	30, 300mA	

Model	Number of poles	Rated current	Rated residual operating current	Instantaneous tripping	Quantity
BV-DN BV-DN6	1P+N	6A	30mA	Type C	6
		3*, 6, 10, 16, 20, 25, 32, 40A *Only BV-DN6	30, 100, 300mA		

# MINIATURE CIRCUIT BREAKERS, RESIDUAL CURRENT CIRCUIT BREAKERS & ISOLATING SWITCHES

## Sales Network

Country/Region	Corporation Name	Address	Telephone
Australia	Mitsubishi Electric Australia Pty. Ltd.	348 Victoria Road, Rydalmere, N.S.W. 2116, Australia	+61-2-9684-7777
Algeria	Mec Casa	Rue i N 125 Hay-Es-Salem, 02000, W-Chlef, Algeria	+213-27798069
Bangladesh	PROGRESSIVE TRADING CORPORATION	HAQUE TOWER,2ND FLOOR,610/11,JUBILEE ROAD, CHITTAGONG, BANGLADESH	+880-31-624307
	ELECTROMECH AUTOMATION& ENGINEERING LTD.	SHATABDI CENTER, 12TH FLOOR, SUITES: 12-B, 292, INNER CIRCULAR ROAD, FAKIRA POOL, MOTIJHEEL, DHAKA-1000, BANGLADESH	+88-02-7192826
Belarus	Technikon	Oktyabrskaya 19, Off. 705, BY-220030 Minsk, Belarus	+375 (0)17 / 210 46 26
Belgium	Mitsubishi Electric Europe B.V. Benelux Branch	Nijverheidsweg 23A, 3641 RP Mijdrecht	+31 (0)297 250 350
Brazil	Mitsubishi Electric do Brasil Comércio e Serviços Ltda.	Avenida Adelino Cardana, 293 – 21º Andar, Bethaville, Barueri, SP, Brasil, CEP 06401-147	+55-11-4689-3000
Cambodia	DHINIMEX CO.,LTD	#245, St. Tep Phan, Phnom Penh, Cambodia	+855-23-997-725
Central America	Automation International LLC	7050 W. Palmetto Park Road Suite #15 PMB #555, Boca Raton, FL 33433	+1-561-237-5228
Chile	Rhona S.A. (Main office)	Vte. Agua Santa 4211 Casilla 30-D (P.O. Box) Vina del Mar, Chile	+56-32-2-320-600
	Mitsubishi Electric Automation (China) Ltd.	Mitsubishi Electric Automation Building, No.1386 Hongqiao Road, Shanghai, China 200336	+86-21-2322-3030
China	Mitsubishi Electric Automation (China) Ltd. BeiJing	5/F,ONE INDIGO,20 Juxianqiao Road Chaoyang District,Beijing, China 100016	+86-10-6518-8830
	Mitsubishi Electric Automation (China) Ltd. ShenZhen	Level 8, Galaxy World Tower B, 1 Yabao Road, Longgang District, Shenzhen, China 518129	+86-755-2399-8272
	Mitsubishi Electric Automation (China) Ltd. GuangZhou	Rm.1006, A1 Times E-Park, No.276-282, Hanxi Road East, Zhongcun Street, Panyu Distric, Guangzhou, China 510030	+86-20-8923-6730
	Mitsubishi Electric Automation (China) Ltd. ChengDu	1501-1503,15F, Guang-hua Centre Building-C, No.98 North Guang Hua 3th Rd Chengdu, China 610000	+86-28-8446-8030
	Mitsubishi Electric Automation (Hong Kong) Ltd.	20/F,1111 King's Road, Taikoo Shing, Hong Kong	+852-2510-0555
Colombia	Proelectrico Representaciones S.A.	Carrera 42 N° 75 – 367 Bodega 109, Itagüí, Medellín, Antioquia, Colombia	+57-4-4441284
Czech Republic	AUTOCONT CONTROL SYSTEMS S.R.O	Technologická 374/6, CZ-708 00 Ostrava - Pustkovec	+420 595 691 150
Denmark	BEIJER ELECTRONICS A/S	LYKKEGARDSVEJ 17, DK-4000 ROSKILDE, Denmark	+45 (0)46/ 75 76 66
Egypt	Cairo Electrical Group	9, Rostoum St. Garden City P.O. Box 165-11516 Maglis El-Shaab,Cairo - Egypt	+20-2-27961337
France	Mitsubishi Electric Europe B.V. French Branch	FR-92741 Nanterre Cedex	+33 (0)1 55 68 57 01
Germany	Mitsubishi Electric Europe B.V.	Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany	+49 (0) 2102 4860
Greece	KALAMARAKIS - SAPOUNAS S.A.	IONIAS & NEROMILOU STR., CHAMOMILOS ACHARNES, ATHENS, 13678 Greece	+30-2102 406000
Hungary	Meltrade Ltd.	Fertő utca 14. HU-1107 Budapest, Hungary	+36 (0)1-431-9726
India	Mitsubishi Electric India Private Limited	3rd Floor, Tower A, Global Gateway, MG Road, Gurugram - 122002, Haryana, India	+91(124)673 9300
	Mitsubishi Electric India Private Limited Pune Sales Office	ICC-Devi Gaurav Technology Park, Unit no. 402, Fourth Floor, Survey no. 191-192 (P), Opp. Vallabh Nagar Bus Depot, Pune – 411018, Maharashtra, India	+91-20-68192100
	Mitsubishi Electric India Private Limited FA Center	204-209, 2nd Floor, 31FIVE, Corporate Road, Prahlanadnagar, Ahmedabad 380015, Gujarat, India	+91-79677-77888
Indonesia	PT. Sahabat Indonesia	P.O.Box 5045 Kawasan Industri Pergudangan, Jakarta, Indonesia	+62-(0)21-6610651-9
Ireland	Mitsubishi Electric Europe B.V.	Westgate Business Park, Ballymount, IRL-Dublin 24, Ireland	+353 (0)1-4198800
Israel	Gino Industries Ltd.	26, Ophir Street IL-32235 Haifa, Israel	+972 (0)4-867-0656
Italy	Mitsubishi Electric Europe B.V.	Viale Colleoni 7, I-20041 Agrate Brianza (MI), Italy	+39 039-60531
Kazakhstan	Kazpromavomatika	Ul. Zhambyla 28, KAZ - 100017 Karaganda	+7-7212-501000
Korea	Mitsubishi Electric Automation Korea Co., Ltd	9F Gangseo Hangang xi-tower A, 401 Yangcheon-ro, Gangseo-gu, Seoul 07528 Korea	+82-2-3660-9573
Laos	AROUNKIT CORPORATION IMPORT- EXPORT SOLE CO.,LTD	SAPHANMO VILLAGE. SAYSETHA DISTRICT, VIENTIANE CAPITAL, LAOS	+856-20-415899
Lebanon	Comptoir d'Electricite Generale-Liban	Cebaco Center - Block A Autostrade Dora, P.O. Box 11-2597 Beirut - Lebanon	+961-1-240445
Lithuania	Rifas UAB	Tinklu 29A, LT-5300 Panevezys, Lithuania	+370 (0)45-582-728
Malaysia	Mitric Sdn Bhd	No. 5 Jalan Pemberita U1/49, Temasya Industrial Park, Glenmarie 40150 Shah Alam, Selangor, Malaysia	+603-5569-3748
Malta	ALFTRADE LTD	99 PAOLA HILL, PAOLA PLA 1702, Malta	+356 (0)21-697-816
Marocco	SCHIELE MAROC	KM 7.2 NOUVELLE ROUTE DE RABAT AIN SEBAA, 20600 Casablanca, Marocco	+212 661 45 15 96
Myanmar	Peace Myanmar Electric Co.,Ltd.	NO137/139 Botahtaung Pagoda Road, Botahtaung Town Ship 11161, Yangon, Myanmar	+95-(0)1-202589
Nepal	Watt&Volt House	KHA 2-65, Volt House Dillibazar Post Box:2108,Kathmandu,Nepal	+977-1-4411330
Netherlands	Mitsubishi Electric Europe B.V. Benelux Branch	Nijverheidsweg 23A, 3641 RP Mijdrecht	+31 (0)297 250 350
North America	Mitsubishi Electric Automation, Inc.	500 Corporate Woods Parkway, Vernon Hills, IL 60061 USA	+847-478-2100
Norway	Scanelec AS	Leivikasen 43B, NO-5179 Godvik, Norway	+47 (0)55-506000
Mexico	Mitsubishi Electric Automation, Inc. Mexico Branch	Bldv. Miguel de Cervantes Saavedra 301, Torre Norte Piso 5, Col. Ampliación Granada, Miguel Hidalgo, Ciudad de México, CP 11520, México	+52-55-3067-7511
Middle East Arab Countries & Cyprus	Comptoir d'Electricite Generale-International-S.A.L.	Cebaco Center - Block A Autostrade Dora P.O. Box 11-1314 Beirut - Lebanon	+961-1-240430
Pakistan	Prince Electric Co.	2-P GULBERG II, LAHORE, 54600, PAKISTAN	+92-42-575232, 5753373
Peru	Rhona S.A. (Branch office)	Avenida Argentina 2201, Cercado de Lima	+51-1-464-4459
Philippines	Edison Electric Integrated, Inc.	24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines	+63-(0)2-634-8691
Poland	Mitsubishi Electric Europe B.V. Polish Branch	Krakowska 48, 32-083 Balice, Poland	+48 12 347 65 00
Republic of Moldova	Intehsis SRL	bld. Traian 23/1, MD-2060 Kishinev, Moldova	+373 (0)22-66-4242
Romania	Sirius Trading & Services SRL	RO-060841 Bucuresti, Sector 6 Aleea Lacul Morii Nr. 3	+40-(0)21-430-40-06
Russia	Mitsubishi Electric (Russia) LLC	2 bld.1, Letnikovskaya street, Moscow, 115114, Russia	+7 495 721-2070
Saudi Arabia	Center of Electrical Goods	Al-Shuwayer St. Side way of Salahuddin Al-Ayoubi St. P.O. Box 15955 Riyadh 11454 - Saudi Arabia	+966-1-4770149
Singapore	Mitsubishi Electric Asia Pte. Ltd.	307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943	+65-6473-2308
Slovakia	PROCONT, Presov	Kupelna 1/, SK - 08001 Presov, Slovakia	+421 (0)51- 7580 611
Slovakia	SIMAP	Jana Derku 1671, SK - 91101 Trencin, Slovakia	+421 (0)32 743 04 72
Slovenia	Inea RBT d.o.o.	Stegne 11, SI-1000 Ljubljana, Slovenia	+386 (0)1-513-8116
South Africa	CBI-electric: low voltage	Private Bag 2016, ZA-1600 Isando Gauteng, South Africa	+27-(0)11-9282000
Spain	Mitsubishi Electric Europe B.V. Spanish Branch	Carretera de Rubí 76-80, E-08190 Sant Cugat del Vallés (Barcelona), Spain	+34 (0)93-565-3131
Sweden	Mitsubishi Electric Europe B.V. (Scandinavia)	Hedvig Möllers gata 6, 223 55 Lund, Sweden	+46 (0)8-625-10-00
Switzerland	Euro Energy Components AB	Järnvägsgatan 36, S-434 24 Kungsbacka, Sweden	+46 (0)300-690040
Switzerland	TriElec AG	Muehlentalstrasse 136, CH-8201 Schaffhausen, Switzerland	+41-(0)52-6258425
Taiwan	Setsuyo Enterprise Co., Ltd	5th Fl., No.105, Wu Kung 3rd, Wu-Ku Hsiang, Taipei, Taiwan, R.O.C.	+886-(0)2-2298-8889
Thailand	United Trading & Import Co., Ltd.	77/12 Bamrungmuang Road,Klong Mahanak Pomprab Bangkok Thailand	+66-223-4220-3
Tunisia	MOTRA Electric	3, Résidence Imen, Avenue des Martyrs Mourouj III, 2074 - El Mourouj III Ben Arous, Tunisia	+216-71 474 599
Turkey	Mitsubishi Electric Turkey A.Ş.	Şerifali Mahallesi Kale Sokak No: 41, 34775 Ümraniye, İstanbul, Turkey	+90-216-969-2666
United Kingdom	Mitsubishi Electric Europe B.V.	Travellers Lane, UK-Hatfield, Herts. AL10 8XB, United Kingdom	+44 (0)1707-276100
Uruguay	Fierro Vignoli S.A.	Avda. Uruguay 1274 Montevideo Uruguay	+598-2-902-0808
Vietnam	Mitsubishi Electric Vietnam Co.,Ltd. Head Office	11th & 12th Floor, Viettel Tower B, 285 Cach Mang Thang 8 Street, Ward 12, District 10, Ho Chi Minh City, Vietnam	+84-28-3910-5945
	Mitsubishi Electric Vietnam Co.,Ltd. Hanoi Branch	24th Floor, Handico Tower, Pham Hung Road, khu do thi moi Me Tri Ha, Nam Tu Liem District, Hanoi City, Vietnam	+84-24-3937-8075

**For Safety :** Please read the instruction manual and handling and maintenance carefully before using the products in this catalog. Wiring and connection must be done by the person have a specialized knowledge of electric construction and wiring.

## MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN