

Earth Leakage Circuit Breakers

List of products

■ G-TWIN Standard Series (IEC/EN/GB/JIS conformed)

Line protection

• 2-pole

AC230V (Icu)	EW32	EW50	EW100
2.5kA	AAG-2P	AAG-2P	
10kA			EAG-2P

• 3-pole

AC415V (Icu)	EW32	EW50	EW63	EW100	EW125	EW160	EW250	EW400	EW630	EW800
1.5kA	EAG-3P									
2.5kA	SAG-3P	EAG-3P	EAG-3P							
7.5kA		SAG-3P	SAG-3P							
10kA		RAG-3P	RAG-3P	EAG-3P						
18kA						EAG-3P	EAG-3P			
30kA					JAG-3P	JAG-3P	JAG-3P	EAG-3P		
36kA					SAG-3P	SAG-3P	SAG-3P	SAG-3P	EAG-3P	EAG-3P
50kA					RAG-3P	RAG-3P	RAG-3P	RAG-3P	RAG-3P	RAG-3P
70kA								HAG-3P	HAG-3P	HAG-3P

• 4-pole

AC415V (Icu)	EW125	EW160	EW250	EW400
30kA	JAG-4P	JAG-4P	JAG-4P	
36kA	SAG-4P	SAG-4P	SAG-4P	
50kA	RAG-4P	RAG-4P	RAG-4P	RAG-4P
70kA				HAG-4P

Motor protection

• 3-pole

AC415V (Icu)	EW32	EW50	EW63	EW100	EW125	EW250
1.5kA	EAM-3P					
2.5kA	SAM-3P	EAM-3P	EAM-3P			
7.5kA		SAM-3P	SAM-3P			
10kA				EAM-3P		
18kA						EAM-3P
30kA					JAM-3P	JAM-3P
50kA					RAM-3P	RAM-3P

■ G-TWIN Global Series (IEC/EN/GB/JIS/UL/CSA conformed)

Line protection

• 2-pole

AC230V (Icu)	EW100
10kA	EAGU-2P

• 3-pole

AC415V (Icu)	EW50	EW100	EW125	EW250	EW400	EW630
10kA	RAGU-3P	EAGU-3P				
30kA			JAGU-3P	JAGU-3P		
36kA					SAGU-3P	
50kA			RAGU-3P	RAGU-3P	RAGU-3P	RAGU-3P
70kA					HAGU-3P	

■ HG Series

Line protection (3-pole)

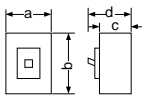
AC415V (Icu)	50AF	100AF	225AF
65kA	HG53B	HG103B	HG203B

Earth Leakage Circuit Breakers

HG series

Quick reference guide

■ HG series/Line protection

Frame		50A	100A	225A
Pole		3	3	3
Type	Instantaneous trip type	HG53B	HG103B	HG203B
	Time delay trip type	HG53BD	HG103BD	HG203BD
Phase and wire		3ø3W, 1ø3W, 1ø2W	3ø3W, 1ø3W, 1ø2W	3ø3W, 1ø3W, 1ø2W
Rated current (A)	Ambient temp.: 40°C	15, 20, 30, 40, 50	15, 20, 30, 40, 50, 60, 75, 100	125, 150, 175, 200, 225
Rated voltage (V AC)	Instantaneous trip type	100–230–440	100–230–440	100–230–440
[JIS C 8201-2-2 Ann.2]	Time delay trip type	200–440	200–440	200–440
Instantaneous trip type	Rated sensitive current (mA)	30, 100/200/500	30, 100/200/500	30, 100/200/500
	Tripping time (s)	0.1	0.1	0.1
Time delay trip type	Rated sensitive current (mA)	100/200/500	100/200/500	100/200/500
	Tripping time (s)	0.3/0.8/2	0.3/0.8/2	0.3/0.8/2
	Inertia non-tripping time (s) [2IΔn]	0.15/0.4/1	0.15/0.4/1	0.15/0.4/1
Rated breaking capacity (kA)	440V AC	65	65	65
[JIS C 8201-2-2 Ann.2]	415V AC	65	65	65
	400V AC	65	65	65
	200V AC	100	100	100
	100V AC	100	100	100
Earth leakage tripping device		Solid-state	Solid-state	Solid-state
Overcurrent tripping device		Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Dimensions (mm)		a 90 b 155 c 82 d 104	90 155 82 104	105 165 99 127
Page 07/00				
Mass (kg)	Front mounting type	2.3	2.3	3.3
Front mounting, front connection	No-mark	●	●	●
	rear connection	X ●	●	●
Flush mounting, rear connection	E	●	●	●
	top & bottom connection	Y –	–	–
Plug-in mounting	P	●	●	●
Alarm switch	K	▲	▲	▲
Auxiliary switch	W	▲	▲	▲
Undervoltage trip	R	–	–	–
Shunt trip	F	–	–	–
Test lead wire	TL	▲	▲	▲
Megger test switch	MGS	▲	▲	▲
Motor operating mechanism	M*	▲	▲	▲
Padlocking device	Q	▲	▲	▲
Mechanical interlocking device	M1	BZ-M130C-3	BZ-M130C-3	BZ-M140C
Operating handle N-type	N	BZ-N35B	BZ-N35B	BZ-N50C
Operating handle V-type	V	–	–	BZ-V50C
Operating handle G-type	G	BZ-G35C	BZ-G35C	–
Steel enclosure	C	BZ-C35B	BZ-C35B	BZ-C50B
Steel enclosure with G-type handle	CG	(CG-type BZ-CG35B)	(CG-type BZ-CG35B)	–
Terminal cover Short	TS	BZ-TS35B	BZ-TS35B	BZ-TS50B
Terminal cover Long	TB	BZ-TB35B	BZ-TB35B	BZ-TB50B
Insulation barrier Interphase	B	BZ-B35B	BZ-B35B	BZ-B50B
Insulation barrier Earth	BL	BZ-BL35B	BZ-BL35B	BZ-BL50B

Notes: • Terminal covers (Height: 5mm) are standard provided for the X and P mounting types of 50AF to 225AF.

• Time delay trip types are also available on request.

* For motor-operated breaker, sensitive current and tripping time are fixed. Specify the sensitive current and tripping time when ordering.

● Available – Not available ▲ Factory-mounted accessory

Rated voltage (V)	Operational voltage range (V)
100–200–415	80–484
200–440	160–484

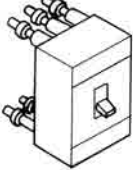
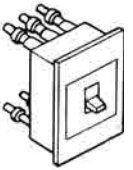
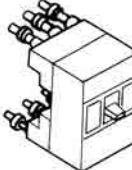
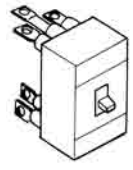
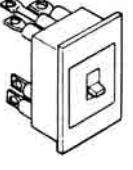
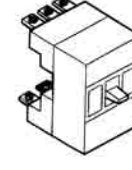
■ Mounting modifications

Standard type FUJI breakers are front mounting with front connections. The standard breaker can easily be modified to become front mounting rear connection type, flush mounting type and plug-in type. The additional parts such as insulation bases, barriers, covers and similar parts are added as required.

**Standard type
Front mounting
Front connection**



BASIC DESIGN

Additional main parts	Front mounting Rear connection (X type)	Additional main parts	Flush mounting Rear connection (E type)	Additional main parts	Plug-in mounting (P type)
Round stud terminal 	HG53B HG103B	Round stud terminal 	HG53B HG103B	Round stud terminal 	HG53B HG103B
Bar stud terminal 	HG203B Bar studs can be turned by 90°.	Bar stud terminal 	HG203B Bar studs can be turned by 90°.	Bar stud terminal 	HG203B Bar studs can be turned by 90°.

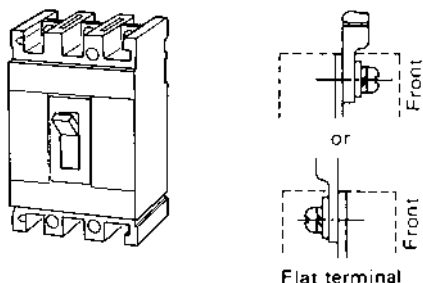
Earth Leakage Circuit Breakers



HG series

Terminal connection

■ Terminal connection

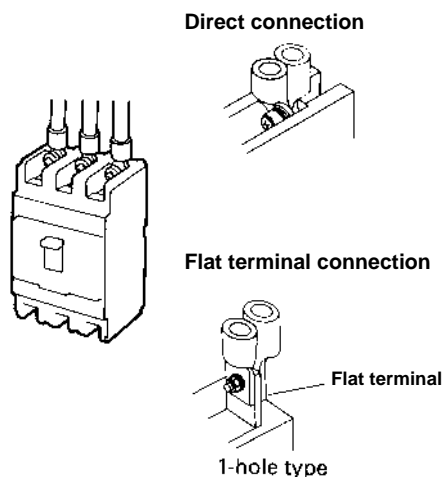
Front mounting, front connection



	Breaker type	Size
Pan head screw 	HG53B, HG103B	M8 x 14
Hexagonal socket head bolt 	HG203B	M8 x 20

■ Type of connection

Front mounting, front connection



Flat terminals/1-hole type

Breaker type	Type of flat terminal
HG53B, HG103B	BZ-S35B-1003
HG203B	BZ-S50B-2253

■ Wire size and crimp terminal

The following is the size recommendations for crimp terminals.

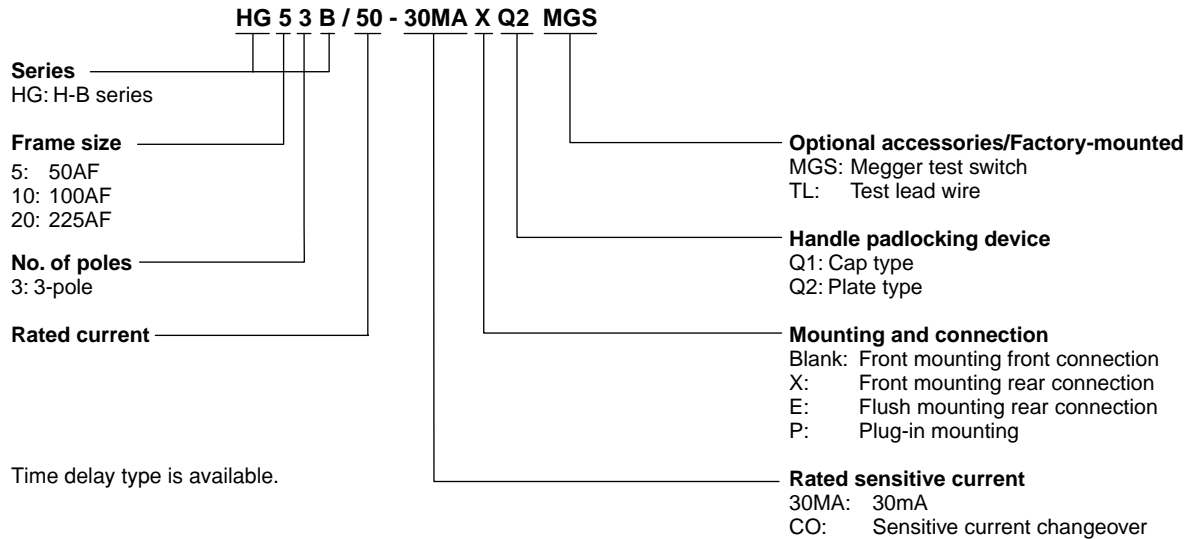
Crimp terminal R: JIS C2805
 CB: JEM-1399
 JST: Product of Japan Crimp Terminal Co., Ltd.
 F: FUJI special crimp terminal

Ampere frame	ELCB type	Wire size (mm ²)									
		1.04 2.63	2.63 6.64	6.64 10.52	10.52 16.78	16.78 26.66	26.66 42.42	42.42 60.57	60.57 96.3	96.3 117.2	117.2 152.05
50	HG53B	R2-8	R5.5-8	R8-8	R14-8	JST22-S8					
100	HG103B	R2-8	R5.5-8	R8-8	R14-8	R22-8	JST38-S8	CB60-8			
225	HG203B				R14-8	R22-8	R38-8	R60-8	CB100-8	CB150-8	

Earth Leakage Circuit Breakers

HG series

Type number nomenclature



• These ELCBs are pollution degree 2.

■ Ordering information

Specify the following:

1. Type number of ELCB including factory-mounted optional accessories
2. Type number of customer-mountable optional accessories

■ Customer-mountable optional accessories/Sold separately

Internal accessories

Auxiliary switch, alarm switch, terminal block

External accessories

Operating handles (N, V and G-type), terminal covers, insulation barrier, steel enclosures, handle locking covers, kits for mounting modification, flat terminal, mechanical interlock device

■ Factory-mounted optional accessories

External accessories

Handle padlocking devices/Q1 and Q2, motor-operating mechanism/M, megger test switch/MGS, test lead wire/TL

Further information: See pages 07/95.

Earth Leakage Circuit Breakers

HG series

Type number

Earth leakage + Overcurrent + Short-circuit protection type

■ HG series/3-pole JIS C8201-2-2 Ann2.

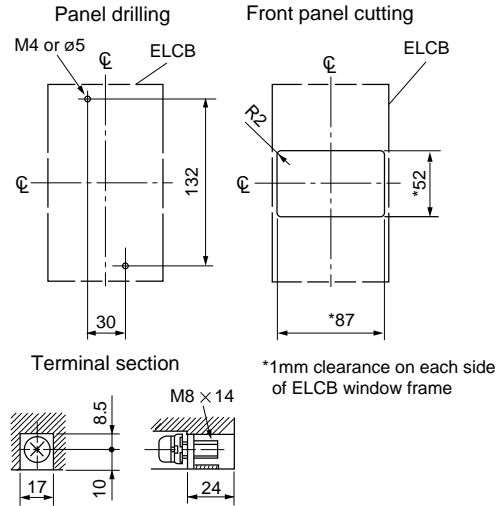
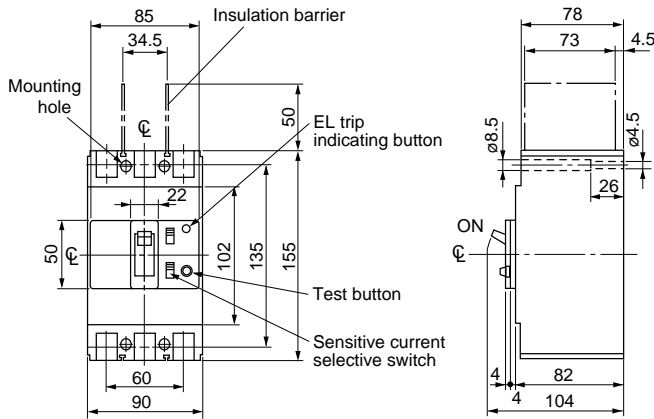
Breaker ampere frame	Rated current (A)	Sensitive current 30mA	Sensitive current 100/200/500mA selectable	<input type="checkbox"/> : Available mounting and connection
		Type	Type	
50	15	HG53B/15-30MA <input type="checkbox"/>	HG53B/15-CO <input type="checkbox"/>	Blank, X, E, P
	20	HG53B/20-30MA <input type="checkbox"/>	HG53B/20-CO <input type="checkbox"/>	
	30	HG53B/30-30MA <input type="checkbox"/>	HG53B/30-CO <input type="checkbox"/>	
	40	HG53B/40-30MA <input type="checkbox"/>	HG53B/40-CO <input type="checkbox"/>	
	50	HG53B/50-30MA <input type="checkbox"/>	HG53B/50-CO <input type="checkbox"/>	
100	15	HG103B/15-30MA <input type="checkbox"/>	HG103B/15-CO <input type="checkbox"/>	Blank, X, E, P
	20	HG103B/20-30MA <input type="checkbox"/>	HG103B/20-CO <input type="checkbox"/>	
	30	HG103B/30-30MA <input type="checkbox"/>	HG103B/30-CO <input type="checkbox"/>	
	40	HG103B/40-30MA <input type="checkbox"/>	HG103B/40-CO <input type="checkbox"/>	
	50	HG103B/50-30MA <input type="checkbox"/>	HG103B/50-CO <input type="checkbox"/>	
	60	HG103B/60-30MA <input type="checkbox"/>	HG103B/60-CO <input type="checkbox"/>	
	75	HG103B/75-30MA <input type="checkbox"/>	HG103B/75-CO <input type="checkbox"/>	
100	HG103B/100-30MA <input type="checkbox"/>	HG103B/100-CO <input type="checkbox"/>		
225	125	HG203B/125-30MA <input type="checkbox"/>	HG203B/125-CO <input type="checkbox"/>	Blank, X, E, P
	150	HG203B/150-30MA <input type="checkbox"/>	HG203B/150-CO <input type="checkbox"/>	
	175	HG203B/175-30MA <input type="checkbox"/>	HG203B/175-CO <input type="checkbox"/>	
	200	HG203B/200-30MA <input type="checkbox"/>	HG203B/200-CO <input type="checkbox"/>	
	225	HG203B/225-30MA <input type="checkbox"/>	HG203B/225-CO <input type="checkbox"/>	

Mounting	Connection	<input type="checkbox"/>
Front	Front	Blank
Front	Rear	X
Flush	Rear	E
Plug-in		P

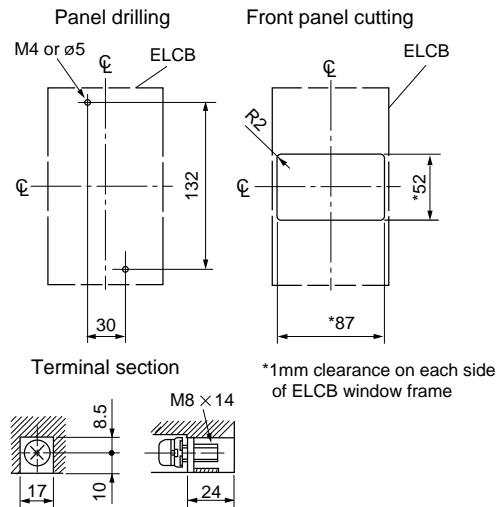
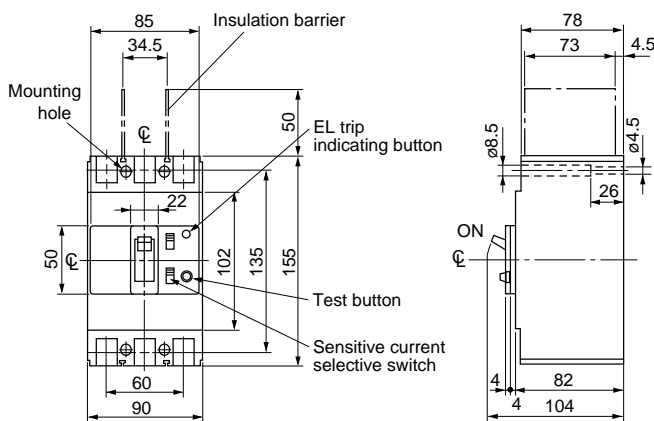
Earth Leakage Circuit Breakers HG series Dimensions

- Dimensions, mm
- Front mounting, rear connection (type X)

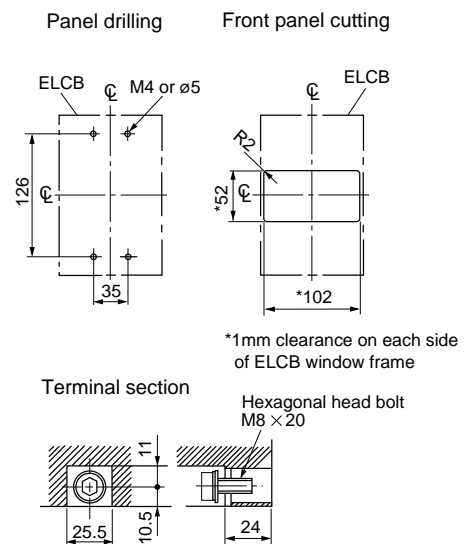
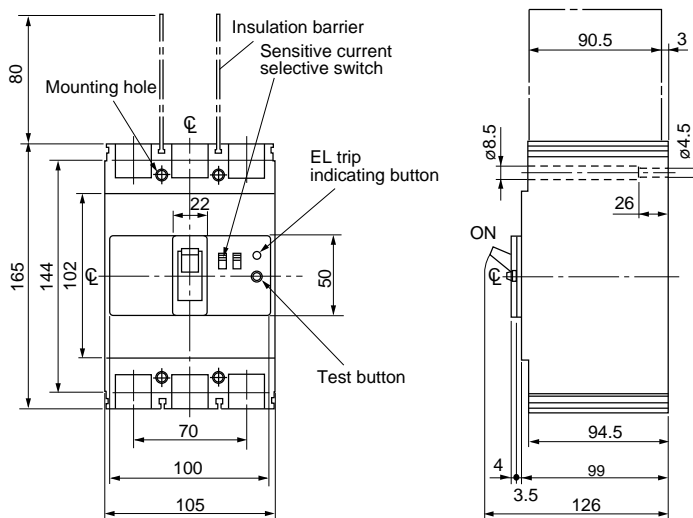
HG53B



HG103B



HG203B



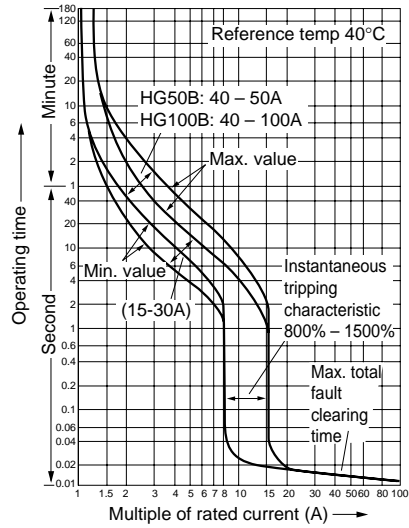
Earth Leakage Circuit Breakers

HG series

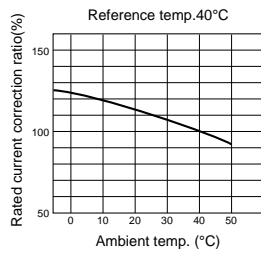
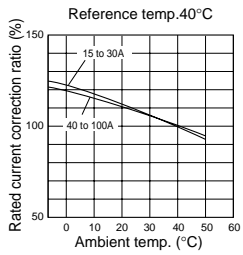
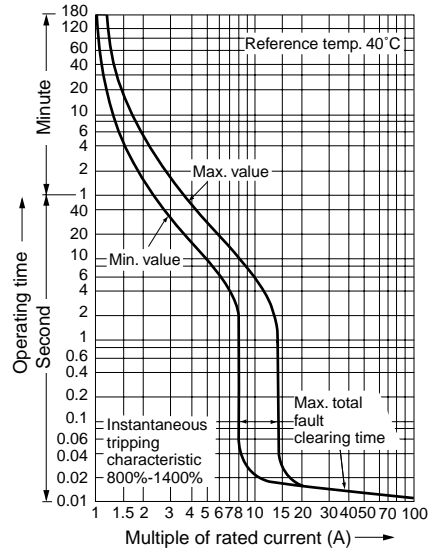
Characteristic curves

■ Characteristic curves/2, 3-pole

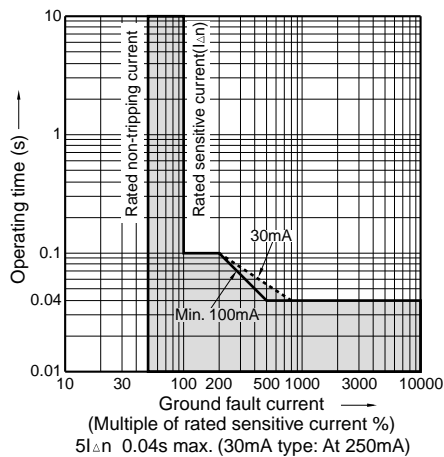
HG50B, HG100B



HG225B

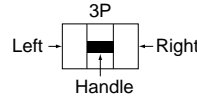


Earth leakage tripping



■ Available configurations

ELCB HG series	HG53B HG103B HG203B
Pole	3
Auxiliary switch SPDT W	
Alarm switch SPDT K	
W+K	
Megger test switch MGS	
Test lead TL	



- Auxiliary switch: W
- Alarm switch: K
- ☒ Megger test switch: MGS
- ➔ Test lead: TL

Notes: • The installation of the megger-test switch uses the space of auxiliary switch(W). Therefore, one auxiliary switch will be subtracted from the number of combinations of the above tables.

■ Operation of auxiliary switches(W) and alarm switches(K)

Accessory	Handle position	
	ON	OFF Trip
Auxiliary switch SPDT: W		
Alarm switch SPDT: K		

Note: Ring mark indication

07

■ Ratings of auxiliary switches(W) and alarm switches(K)

● Standard type

Applicable breaker type	Rated operating current (A) IEC60947-5-1, JIS C8201-5-1				Minimum load current
	AC		DC		
H and L series	Voltage (V)	AC15 Ind. load	Voltage (V)	DC14 Ind. load	
HG53B	125	2	125	0.5	5V DC 160mA
HG103B HG203B	250	1	250	0.2	30V DC 30mA

● For low level circuit

ELCB	DC		Minimum load current
HG series	Voltage (V)	Make/break current (A)	
HG53B HG103B HG203B	30	0.1 (Res. load)	5V DC 1mA 30V DC 1mA

Earth Leakage Circuit Breakers

HG series

Accessories

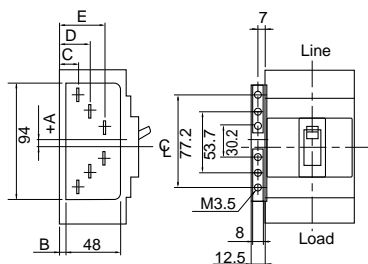
■ Lead wire specifications

HG series	Wire size	Wire length
HG53B	0.5mm ²	500mm
HG103B		
HG203B		

■ Terminal block specifications

ELCB	Terminal screw	Dimensions (mm)				
		A	B	C	D	E
HG53B	M3.5	+4.7	24.9	41.8	54.2	66.5
HG103B						
HG203B	M3.5	+0.2	34.9	51.8	64.2	76.5

Note: The applicable wire size for the lead terminal block is either $\phi 1.6$ mm solid wire or 2mm² stranded wire.



External operating handles

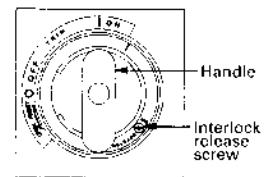
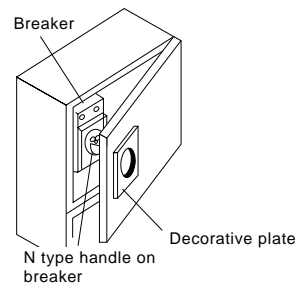
■ Description

Earth leakage circuit breaker handles are generally directly manual-operated but when mounted in motor control centers or on control panels they are sometimes required to be operated externally. To meet such applications FUJI offers the following three types of handles.

N type handle

This type has a knob handle directly attached to the breaker. It is easily fitted by cutting a hole in the panel, which is provided with a door interlock.

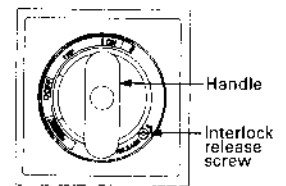
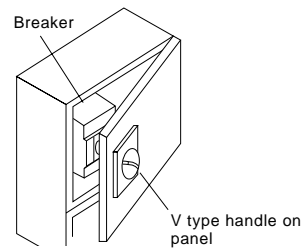
ELCB	N type handle
HG53B	BZ-N35B
HG103B	
HG203B	BZ-N50C



V type handle

The V type handle may be fitted to type HG203B. A separately sold extension shaft(BZ-VS1)provides distance adjustment between the handle and breaker. Conformed to EN60947-1 isolation function. Available for EN60204-1 power breaking device.

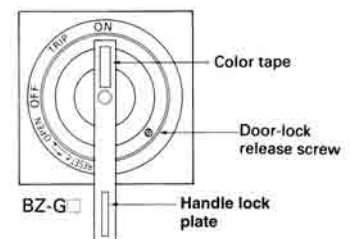
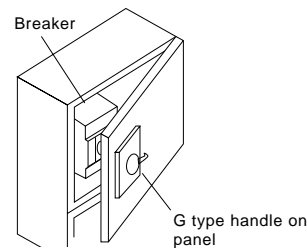
ELCB	V type handle
HG53B	—
HG103B	—
HG203B	BZ-V50C



G type handle

The G type handle is mounted on the panel, and also has a door-interlock. G type handle with a cylinder lock key is also available on request. G type handle with a padlockable handle lock plate is standard provided for HG53B and HG103B.

ELCB	G type handle	
	Standard type	Cylinder key type
HG53B	BZ-G35C	BZ-G35C-K
HG103B		
HG203B	—	—



Earth Leakage Circuit Breakers

HG series

Accessories

N type operating handles

■ Type number nomenclature

BZ - N □ C T - R

Installation
 Blank: Vertically
 R: Horizontally, right line side
 L: Horizontally, left line side

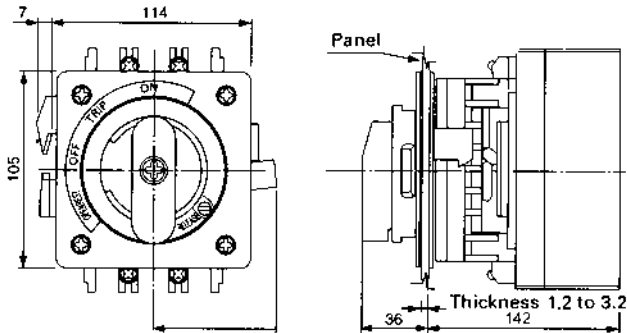
Door locking device
 Blank: Provided
 T: Not provided

Basic type

Note:
 To order an N handle for front-mounting rear connection breakers, add "-X" to the type number, for plug-in mounting breakers, add "-P" to the type number.

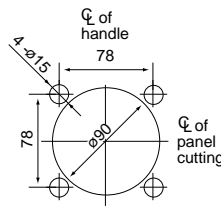
■ Dimensions, mm

BZ-N50C (Dust proof paking: BZ-NP-1C, optional)

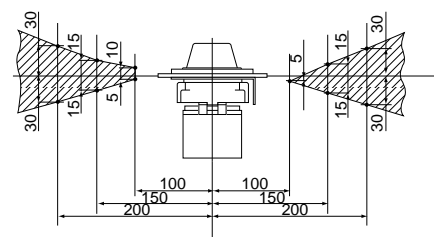


Mass: 0.62kg

Door panel cutting

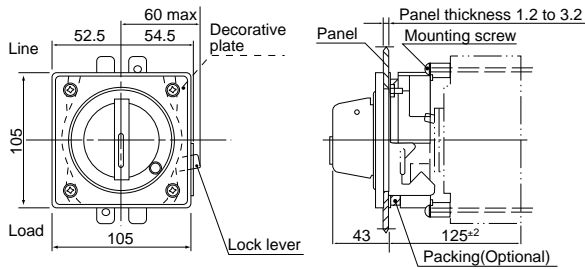


Door hinge installation area



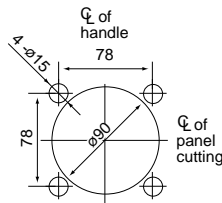
Install the door hinge in the shaded area.

BZ-N35B (Dust proof paking: BZ-NP-1, optional)

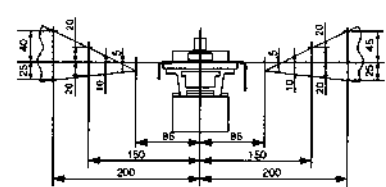


Mass: 0.45kg

Door panel cutting



Door hinge installation area

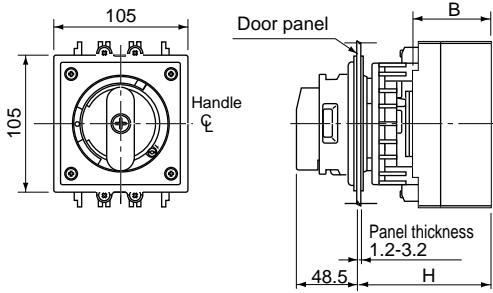


Install the door hinge in the shaded area.

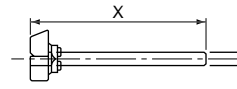
Dimensions for reference only. Confirm before construction begins.

■ Dimensions, mm

BZ-V50C

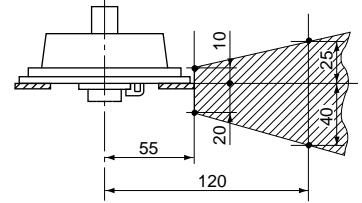


Optional shaft BZ-VS1
 $X = H - 96$



The distance between the handle and breaker can be shortened by cutting the optional shaft.

Door hinge installation area



Install the door hinge in the shaded area.

ELCB	Handle type	Standard type H	With the optional shaft (X=154)		Mounting screw	Mass (kg)	
			H	Area in which the hinge with H/B can be installed			
HG203B	BZ-V50C	144	289	181 x 289	99	M4 x 125	0.67

Notes:

- Handle protection degree IP54 (IEC60529, JIS C 0920)
- The handle cannot hold the door.

Earth Leakage Circuit Breakers

HG series

Accessories

G type operating handles

■ Operating instructions

1. ELCB operation

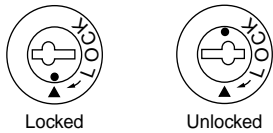
- Close the door and turn the handle to the ON position and the breaker will be positioned at ON.
- When the breaker is interrupted automatically the handle will move to the TRIP position.
- To reset move the handle to the RESET position.

2. Door panel locking

- Turn the handle to the OPEN position and the lock mechanism will be released thus allowing the door to be opened.
- The door cannot be opened when the breaker is positioned at ON.

3. Handle locking

The cylinder key can lock the handle in either the ON or OFF position. Even if it is locked at the ON position when the breaker trips, the handle will indicate TRIP.



4. Interlock release

This type is provided with an interlock release screw. Turn this screw if it is necessary to open the door at the ON position. This releases the lock and allows the door to be opened. When reclosing the door make sure the handle of the breaker coincides with the position (ON or OFF) of that of the external handle.

■ Type number nomenclature

BZ-G□C-K

Key

- Blank: Without key
- K: With cylinder key
- Q: With padlocking device

Basic type

■ Installation

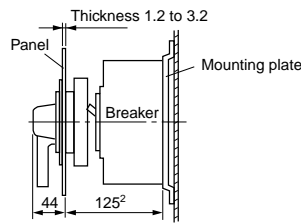
BZ-G35C

1. Drilling and cutting of the door panel

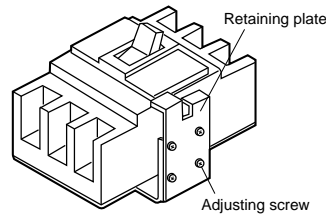
Drill and cut the door panel as shown in the drawing.

2. Mounting of the ELCB

The distance between the backside of the door panel and breaker mounting plate should be 125mm as shown in the drawing below.

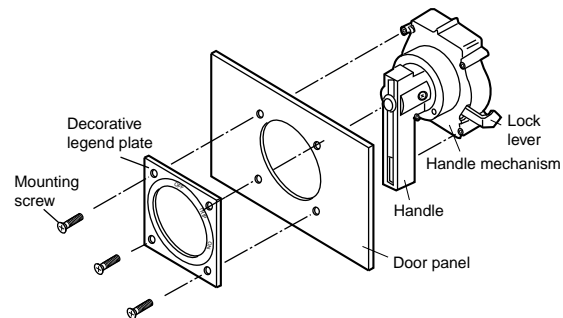


Mount the breaker and the retaining plate commonly to the panel board.



3. Fitting decorative plate and handle

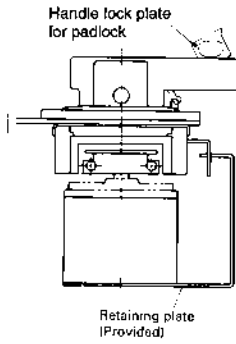
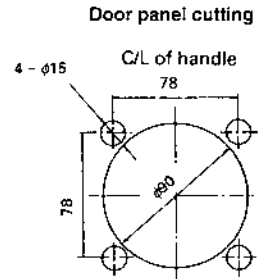
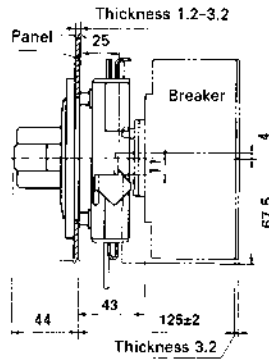
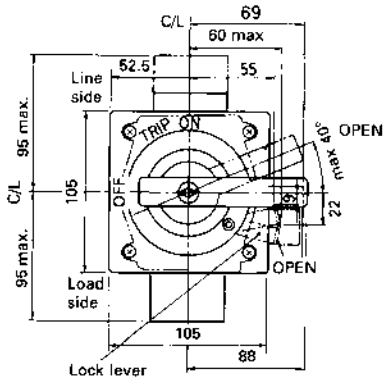
Fit the decorative plate and handle mechanism to the door panel by means of the mounting screws as shown in the illustration.



4. Adjusting the retaining plate

Adjust the height of the retaining plate by means of adjusting screws.

■ Dimensions, mm
 BZ-G35C, BZ-G35C-K



Earth Leakage Circuit Breakers

HG series

Accessories

Pressed steel enclosures

■ Type of enclosures

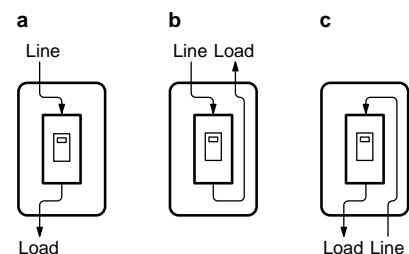
ELCB type	Enclosure (Standard)
HG53B	BZ-C35B
HG103B	BZ-C35B
HG203B	BZ-C50B

■ Ordering information

Specify the following:

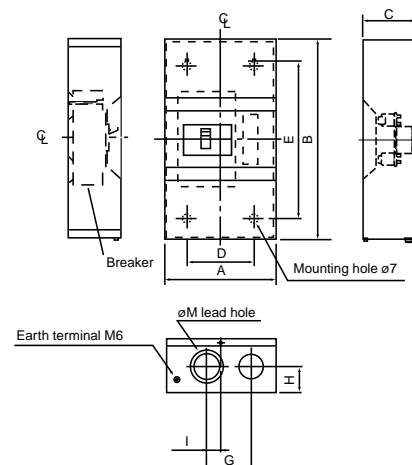
1. Type number of enclosures

■ Connection method diagrams



■ Dimensions, mm

Standard



Type	Connection	A	B	C	D	E	G	H	I	M (ø)	Mass (kg)
BZ-C35B	a, b, c	200	320	120	120	240	80	40	25	30, 45	2.7
BZ-C50B		200	360	140	120	280	80	45	25	40, 55	3.1

Terminal covers

■ Description

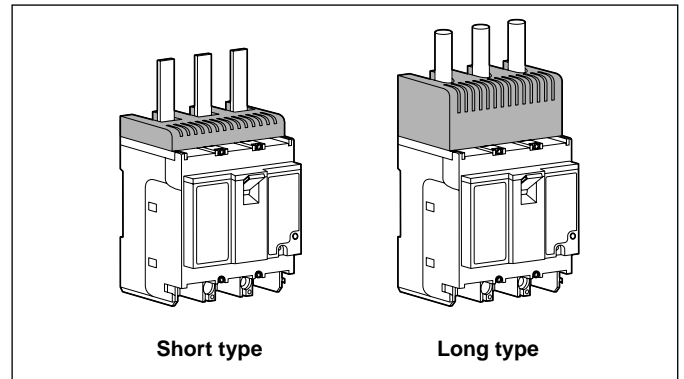
These terminal covers are used as guards to prevent accidental touch with live line terminations. These terminal covers can be fitted to either line or load side.

Short type BZ-TS

- Snap-on fitting
- Transparent, sealing possible

Long type BZ-TB

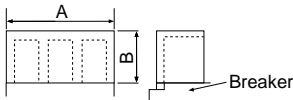
- Crimp connection use
- Transparent, sealing possible



■ Type of terminal cover

ELCB type	Terminal cover	A (mm)	B (mm)	Mass (g)	Terminal cover	A (mm)	B (mm)	Mass (g)
HG53B	Short type BZ-TS35B	90	10	60	Long type BZ-TB35B	90	40	122
HG103B								
HG203B	BZ-TS50B	105	10	76	BZ-TB50B	105	40	175

Packing quantity: 2 pcs.



Insulation barriers

■ Description

The interphase barriers are provided on frame size of 30AF to 400AF breakers for front mounting. The barriers are installed in the molded slots between terminals.

The earth barrier is used to increase the insulation with the mounting plate surface when two crimp terminals are wired. Installation of these barriers after wiring is possible even when an external accessory is installed.

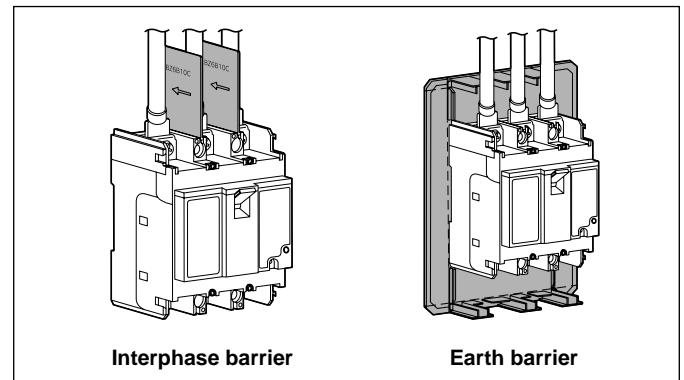
● Interphase barrier

ELCB type	Interphase barrier		Packing quantity	Mass (g)	
	Type	Dimensions, mm			
HG53B	BZ-B35B	A	B	4	38
HG103B		50	73		
HG203B	BZ-B50B	80	90.5	4	82

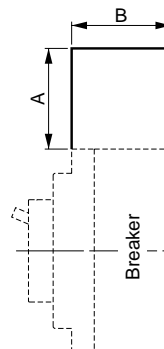
● Earth barrier

ELCB type	Interphase barrier		Packing quantity	Mass (g)	
	Type	Dimensions, mm*			
HG53B	BZ-BL35B	A	B	2	16
HG103B		(90, 110)	(40)		
HG203B	BZ-BL50B	190	100	2	48
		(105, 147)	(50, 72)		

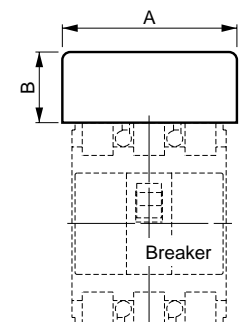
Note: * The value in parentheses is the dimensions after the barrier is cut.



Interphase barrier



Earth barrier



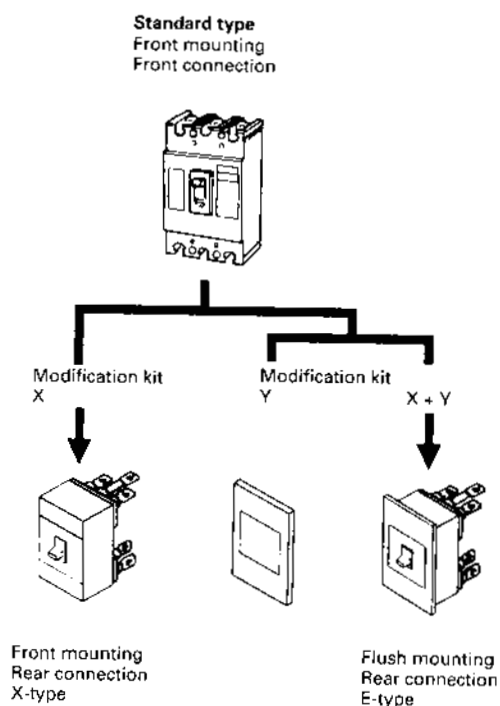
Earth Leakage Circuit Breakers

HG series

Accessories

Mounting modification kits

Standard type breakers are front mounting front connections. The standard breaker can easily be modified to become front mounting rear connection and flush mounting types by using the modification kits.



Modification kits

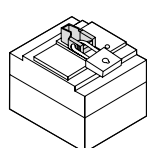
ELCB	Front mounting, front connection (Flat terminal)		Front mounting, rear connection (X type)		Flush mounting, rear connection (E type)	
	Kit type	Mass (kg)	Kit type	Mass (kg)	Kit type	Mass (kg)
HG53B	BZ-S35B-1003	0.35	BZ-X35B-1003	0.63	BZ-E35B-1003	1.11
HG103B						
HG203B	BZ-S50B-2253	0.5	BZ-X50B-2253	0.80	BZ-E50B-2253	1.27

Padlocking device

Breaker handles can be fitted with locks. The handle can be locked at either the ON or OFF position. If an overcurrent flows, the breaker trips even when the handle is kept locking. Add the suffix Q1 or Q2 to the ELCB type number to order the padlocking device (not sold separately).

Q1 : Cap type Q2 : Plate type

Applicable padlocking device



Cap type Q1

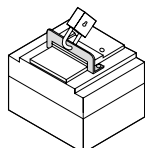
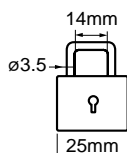


Plate type Q2

Padlock/Not supplied



Handle locking covers

For HG53B, HG103B: **BZ-L35B**
For HG203B: **BZ-L50B**