

# **INVERTER INSTRUCTION MANUAL**

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## **Filterpack FR-BFP2-(H)0.4K to (H)15K**

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Thank you for choosing this Mitsubishi Electric Inverter option unit.  
 This Instruction Manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the equipment, please read this manual carefully to use the equipment to its optimum performance.  
 Please forward this Instruction Manual to the end user.


**This section is specifically about safety matters**

Do not attempt to install, operate, maintain or inspect this product until you have read through this instruction manual and appended documents carefully and can use the equipment correctly. Do not use this product until you have a full knowledge of the equipment, safety information and instructions.  
 In this instruction manual, the safety instruction levels are classified into "WARNING" and "CAUTION".



**WARNING**


Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



**CAUTION**

Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

Note that even the 




**CAUTION**

 level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personal safety.


SAFETY INSTRUCTION

1. Electric Shock Prevention




**WARNING**

- While power is ON or when the inverter is running, do not open the terminal cover of the option unit. Doing so may access the exposed high voltage terminals or the charging part of the circuitry and cause an electric shock. Otherwise, you may get an electric shock.
- Before starting wiring or inspection, switch OFF power, wait for at least 10 minutes after the power supply has been switched OFF, and check that there are no residual voltage using a tester or the like. The capacitor is charged with high voltage for some time after power OFF and it is dangerous.
- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the inverter and the option unit before wiring. Otherwise, you may get an electric shock or be injured.
- Do not touch the option unit or handle the cables with wet hands. Otherwise you may get an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise you may get an electric shock.



**CAUTION**

- Install this option unit on a nonflammable wall without holes. Mounting it to or near flammable material can cause a fire.




**CAUTION**

- Apply only the voltage specified in the instruction manual to each terminal. Otherwise, burst, damage, etc. may occur.
- Ensure that the cables are connected to the correct terminals. Otherwise, burst, damage, etc. may occur.
- Always make sure that polarity is correct to prevent damage, etc. Otherwise, burst, damage, etc. may occur.
- While power is ON or for some time after power-OFF, do not touch the option unit as they will be extremely hot. Doing so can cause burns.

4. Additional Instructions

Also note the following points to prevent an accidental failure, injury, electric shock, etc.

1) Transportation and mounting



**CAUTION**


- Transport the product using the correct method that corresponds to the weight. Failure to observe this may lead to injuries.
- Do not install or operate the option unit if it is damaged or has parts missing.
- Do not stand or rest heavy objects on the product.
- Check that the mounting orientation is correct.
- Prevent other conductive bodies such as screws and metal fragments or other flammable substance such as oil from entering the inverter.
- As this option unit is a precision instrument, do not drop or subject it to impact.
- If halogens (including fluorine, chlorine, bromine, and iodine) contained in fumigants for wood packages enter this product, the product may be damaged. Prevent the entry of fumigant residuals or use an alternative method such as heat disinfection. Note that sterilization or disinfection of wood packages should be performed before packing the product.
- Use this option unit under the following environmental conditions: Otherwise, the option unit may be damaged

Environment	Surrounding air temperature	-10°C to +50°C (non-freezing)
	Ambient humidity	90%RH maximum (non-condensing)
	Storage temperature	-20°C to +65°C *1
	Atmosphere	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
	Altitude/ vibration	Maximum 1,000m above sea level, 5.9m/s <sup>2</sup> or less at 10 to 55Hz (directions of X, Y, Z axes) *2

\*1 Temperature applicable for a short time, e.g. in transit.

\*2 When installing the Filterpack of 11K or 15K on the rear side of the inverter, do not install on moving objects or places which vibrates (exceeding 1.96m/s<sup>2</sup>).

2) Usage



**WARNING**

- Do not modify the equipment.
- Do not perform parts removal which is not instructed in this manual. Doing so may lead to fault or damage of the product.

3) Disposal



**CAUTION**

- Treat as industrial waste.

4) General instruction

All of the diagrams and drawings in this Instruction Manual show the option unit without a terminal cover, or partially open. Never operate the products in this manner. Always replace the cover and follow this Instruction Manual when operating the products.

This option is a dedicated Filterpack unit for FR-E800 series, FR-E700 series, FR-D700 series, and FR-F700PJ series, which contains a DC reactor, common mode choke and capacitive filter.

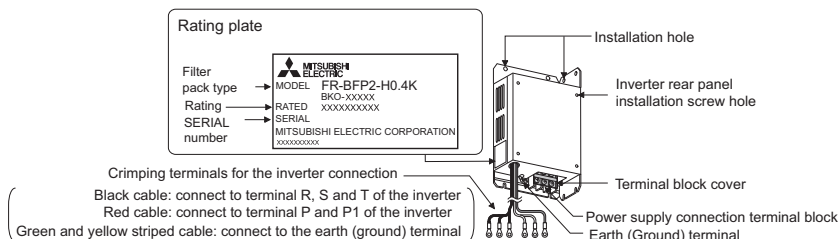
## 1. Product Checking

Unpack the option unit and confirm that the product is as you ordered and intact.

### ●Filterpack type

FR-BFP2- H <input type="checkbox"/> <input type="checkbox"/> K	
Symbol	Applicable power voltage
None	200V class
H	400V class
0.4 to 15	
Represents the applicable inverter capacity	

### ●Parts name and plate



### ●Accessories

Name	Description	Quantity	Refer to page
Screw for leakage current countermeasure and spacer	When the earth leakage breaker or earth leakage relay operates unnecessarily due to leakage current, use this screw as a countermeasure.	1 for each	6
Rear panel installation L-bracket	Included with the 5.5K or higher	1	2
Screw for inverter rear panel installation	Use these screws for installation of the Filterpack onto the inverter rear panel.	4*	2

\* The screw size differs according to capacities. ((H)7.5K or lower: M4×16, (H)11K, (H)15K: M5×20)

## 2. Applicable Inverter

Use the Filterpack along with the inverter in the following table.

Filterpack	Applicable inverter				Permissible inverter output current (A) *
	D700	F700PJ	E700	E800	
FR-BFP2-0.4K	FR-D720-0.4K	FR-F720PJ-0.4K	FR-E720-0.4K	FR-E820-0.4K	2.5
FR-BFP2-0.75K	FR-D720-0.75K	FR-F720PJ-0.75K	FR-E720-0.75K	FR-E820-0.75K	4.2
FR-BFP2-1.5K	FR-D720-1.5K	FR-F720PJ-1.5K	FR-E720-1.5K	FR-E820-1.5K	7
FR-BFP2-2.2K	FR-D720-2.2K	FR-F720PJ-2.2K	FR-E720-2.2K	FR-E820-2.2K	10
FR-BFP2-3.7K	FR-D720-3.7K	FR-F720PJ-3.7K	FR-E720-3.7K	FR-E820-3.7K	16.5
FR-BFP2-5.5K	FR-D720-5.5K	FR-F720PJ-5.5K	FR-E720-5.5K	FR-E820-5.5K	23.8
FR-BFP2-7.5K	FR-D720-7.5K	FR-F720PJ-7.5K	FR-E720-7.5K	FR-E820-7.5K	31.8
FR-BFP2-11K	FR-D720-11K	FR-F720PJ-11K	FR-E720-11K	-	45
FR-BFP2-15K	FR-D720-15K	FR-F720PJ-15K	FR-E720-15K	-	58
FR-BFP2-H0.4K	FR-D740-0.4K	FR-F740PJ-0.4K	FR-E740-0.4K	FR-E840-0.4K	1.2
FR-BFP2-H0.75K	FR-D740-0.75K	FR-F740PJ-0.75K	FR-E740-0.75K	FR-E840-0.75K	2.2
FR-BFP2-H1.5K	FR-D740-1.5K	FR-F740PJ-1.5K	FR-E740-1.5K	FR-E840-1.5K	3.7
FR-BFP2-H2.2K	FR-D740-2.2K	FR-F740PJ-2.2K	FR-E740-2.2K	FR-E840-2.2K	5
FR-BFP2-H3.7K	FR-D740-3.7K	FR-F740PJ-3.7K	FR-E740-3.7K	FR-E840-3.7K	8.1
FR-BFP2-H5.5K	FR-D740-5.5K	FR-F740PJ-5.5K	FR-E740-5.5K	FR-E840-5.5K	12
FR-BFP2-H7.5K	FR-D740-7.5K	FR-F740PJ-7.5K	FR-E740-7.5K	FR-E840-7.5K	16.3
FR-BFP2-H11K	FR-D740-11K	FR-F740PJ-11K	FR-E740-11K	-	23
FR-BFP2-H15K	FR-D740-15K	FR-F740PJ-15K	FR-E740-15K	-	29.5

\* Select the capacity to make the load current (inverter output) lower than the permissible inverter output current.

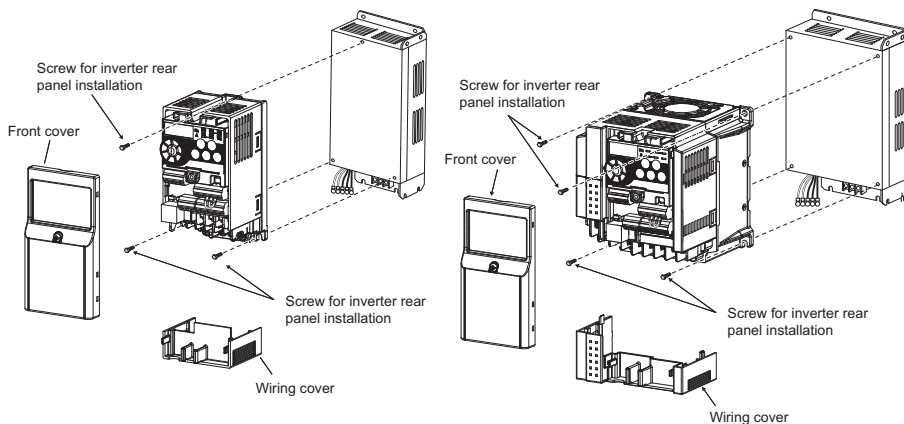
## 3. Installation

### 3.1 Inverter Installation (installation of the Filterpack)

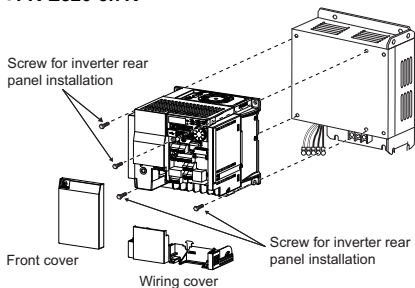
#### 3.1.1 Installation of the inverter and Filterpack (for rear panel installation)

##### ●0.4K to 3.7K (except for FR-E820-3.7K)

Remove the front cover and wiring cover to attach the inverter.



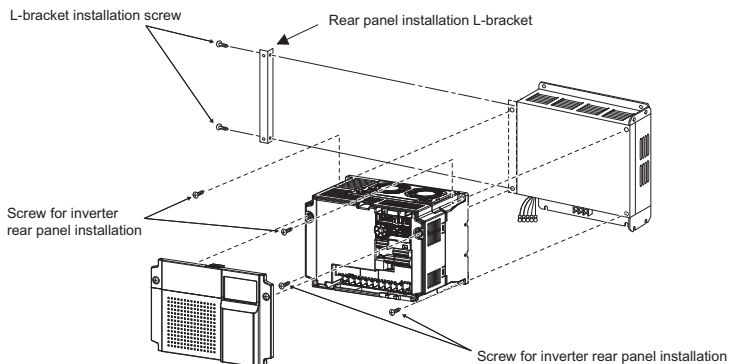
##### ●FR-E820-3.7K



### ●5.5K to 15K

Remove the L-bracket installation screws from the Filterpack (two for the 7.5K or lower, three for the 11K or higher), and attach the included L-bracket to the Filterpack with these screws.

Remove the front cover to attach the inverter.



### CAUTION

- When installing the Filterpack to the inverter, use the included installation screws for the inverter rear panel. Using a longer screw may damage the Filterpack.
- Rear panel installation is not available for FR-E720-5.5K and 7.5K, FR-E740-0.4K to 3.7K.

### 3.1.2 Installation of the Filterpack

The following installations are recommended for the Filterpack and inverter.

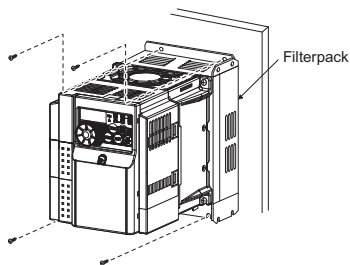
When encasing multiple inverters, install them in parallel as a cooling measure.

Install the inverter (Filterpack) vertically.

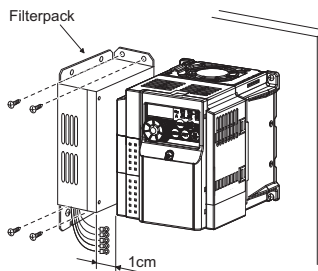
Side-by-side installation is not available for Filterpacks.

For wiring of the Filterpack and inverter, refer to *page 5*.

#### ●Rear panel installation



#### ●Side panel installation



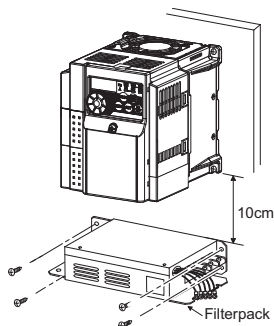
#### CAUTION

- When installing the Filterpack of 11K or 15K on the rear panel of the inverter, do not install on moving objects or places which vibrate (exceeding  $1.96\text{m/s}^2$ ).

#### CAUTION

- To release heat of the inverter and Filterpack, leave clearance of 1 cm or more when installing the inverter and Filterpack.

#### ●Underneath installation



#### CAUTION

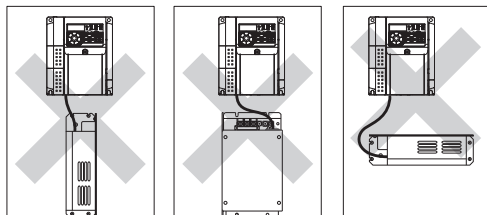
- Install the Filterpack with the wiring portion facing right.
- Underneath installation is not available for 11K and 15K.
- To release heat, leave clearance of 10cm or more between the inverter and Filterpack.

#### ●Installation of the inverter and Filterpack

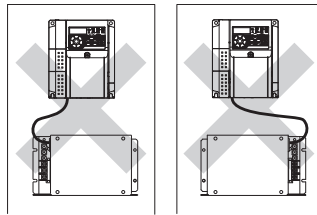
Install the Filterpack cable carefully without subjecting it to excessive stress when wiring. Also be careful not to damage the cable with sharp items such as an edge of a metal sheet.

To prevent malfunctions and damages, never perform installations in the following manner. Only install according to the recommended mounting methods.

#### ●Invert installation of the Filterpack



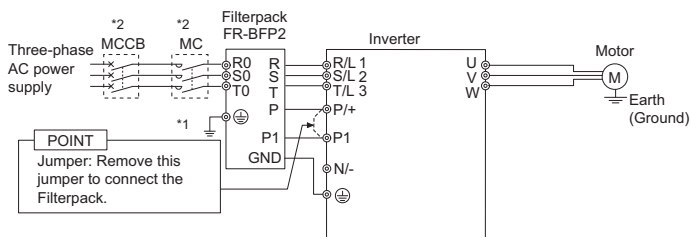
#### ●Sideway installation of the Filterpack



## 4. Wiring

Wire the Filterpack and the inverter according to the following connection diagram. Connect the Filterpack to an input side of the inverter. After wiring, attach the terminal cover of the Filterpack to the terminal block.

### ●Connection diagram



- \*1 Connect the GND cable of the Filterpack to the earth (ground) terminal of the inverter. Use the earth (ground) terminal of the Filterpack to earth (ground). The inverter is earthed (grounded) through the Filterpack.
- \*2 For cable size for MCCB, MC and Filterpack, refer to the inverter Instruction Manuals. MCCB and MC should be selected with reactor connection.

### ●Wiring of the inverter and Filterpack

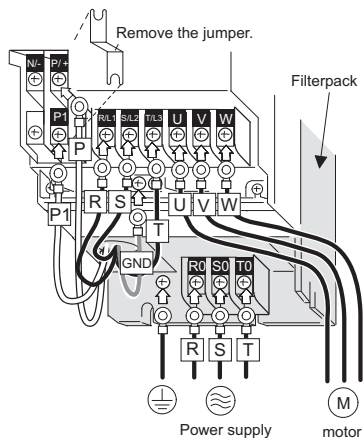
Wire the inverter to the Filterpack in the following procedure.

- (1) Connect the commercial power supply to the terminal R0, S0 and T0 of the Filterpack.
- (2) Connect the earth (ground) cable (green and yellow striped cable) of the Filterpack to the inverter earth (ground) terminal.
- (3) Connect the power supply cable (black cable) of the Filterpack to the terminal R, S and T.

#### REMARKS

Phase sequence need not be matched.


- (4) Remove the jumper across terminals P and P1 of the inverter, and connect the P and P1 cables (red cable) of the Filterpack.
- (5) Connect the motor cable to the inverter output terminals (U, V, W). (Match the phase sequence.)



#### CAUTION

- Make sure that the power cables are connected to the R0, S0 and T0 of the Filterpack. (Phase sequence need not be matched.)  
Never connect the power cable to the U, V, W of the inverter. Doing so will damage the inverter.
- When connecting the Filterpack, make sure that the jumper across the terminals P and P1 of the inverter is removed.
- Connect the Filterpack terminals P and P1 to the inverter terminals P/+ and P1, respectively. Improper connection may damage the inverter.

## 5. Main Circuit Terminal

Terminal symbol	Terminal name	Description	
R0, S0, T0*	Commercial power supply input	Connect to the commercial power supply.	
	Earth (Ground)	The Filterpack must be earthed (grounded).	
Crimping terminal symbol	Terminal name	Cable color	Description
R, S, T	Inverter power supply	Black	Connect to the R, S, T of the inverter.
P, P1	DC reactor terminal	Red	Remove the jumper across terminals P and P1, and connect to the terminals P and P1 of the inverter.
GND	Inverter earth (ground) connection	Green and yellow stripes	Connect to the earth (ground) terminal of the inverter. <i>(Refer to page 5)</i>

\* The terminal screw size is the same as that of the inverter terminal R, S and T.

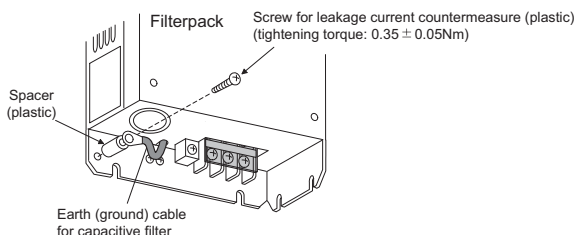
## 6. Leakage Current

When using the Filterpack, the leakage current is about 4mA (8mA for the 400V class)(for one phase of the three-phase three wire  $\Delta$  connection current).

When using the Filterpack, leakage current will be reduced by removing the earth (ground) cable of the capacitive filter, and fixing it with the included screw for leakage current countermeasure (plastic) and spacer (plastic). However, the noise reduction effect of the capacitive filter will be lost.

(Pull out the earth (ground) cable slightly to wire the capacitive filter.)

### ●Installation



### CAUTION

When the earth (ground) cable for the capacitive filter is removed, the cable is charged while power is ON or shortly after power OFF. Do not touch the earth (ground) cable as you may get an electric shock.

## 7. Rating Specifications

### ●200V class

Type FR-BFP2-□K		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
Approximate mass (kg)		1.3	1.4	2.0	2.2	2.8	3.8	4.5	6.7	7.0
Power factor improving reactor		Install the DC reactor in the DC side. 93% to 95% (94.4% *1) of power supply power factor under 100% load								
Noise filter	Common mode choke	Install a ferrite core on the input side								
	Capacitive filter	About 4mA of capacitor leakage current *								
Protective structure (JEM1030)		Open type (IP00)								

### ●400V class

Type FR-BFP2-H□K		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
Approximate mass (kg)		1.6	1.7	1.9	2.3	2.6	4.5	5.0	7.0	8.2
Power factor improving reactor		Install the DC reactor in the DC side. 93% to 95% (94.4% *1) of power supply power factor under 100% load								
Noise filter	Common mode choke	Install a ferrite core on the input side								
	Capacitive filter	About 8mA of capacitor leakage current *2								
Protective structure (JEM1030)		Open type (IP00)								

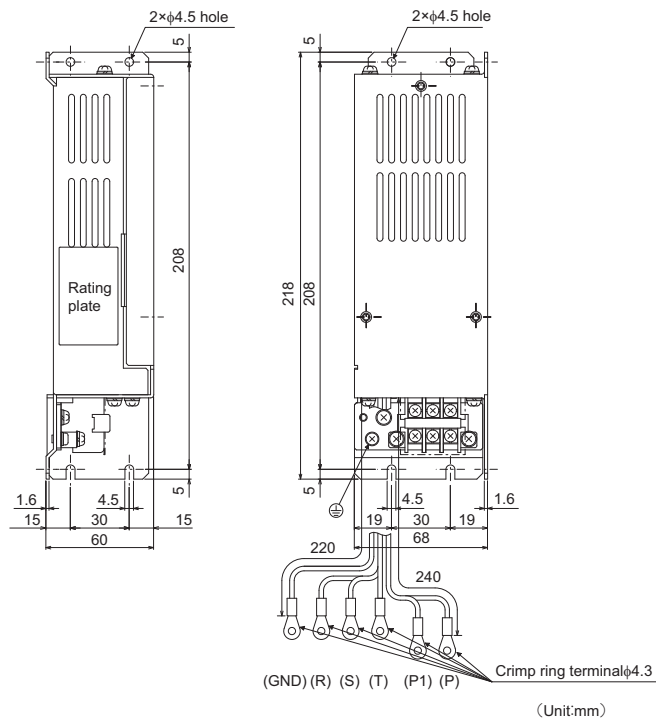
\*1 The values in parentheses are calculated by applying 1 power factor to the reference waveform in accordance with the Architectural Standard Specifications (Electrical Installation) (2010 revisions) in Japan.

\*2 \* The indicated leakage current is equivalent to one-phase of the three-phase three wire  $\Delta$  connection cable.

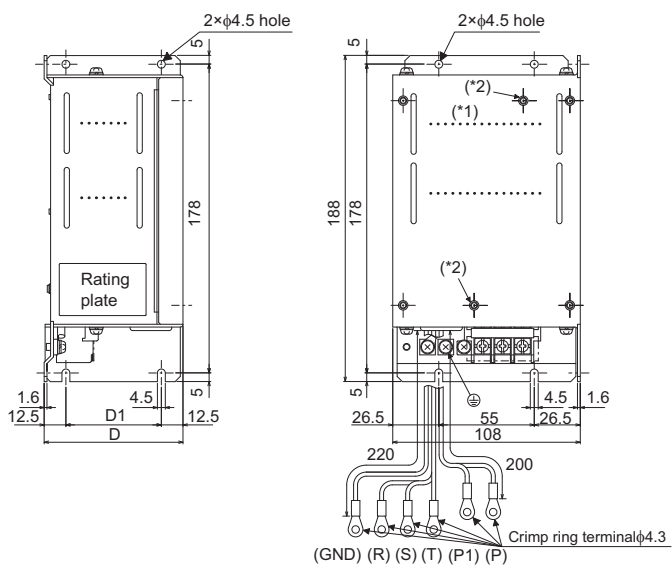


# 8. Outline Dimension

●FR-BFP2-0.4K, 0.75K



- FR-BFP2-1.5K, 2.2K
- FR-BFP2-H0.4K, H0.75K, H1.5K, H2.2K, H3.7K



●200V power supply

Capacity	D	D1
1.5K, 2.2K	80	55

(Unit: mm)

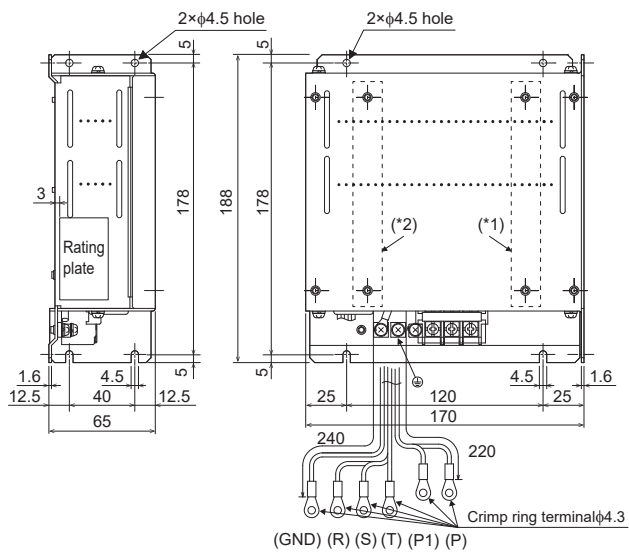
●400V power supply

Capacity	D	D1
H0.4K, H0.75K	55	30
H1.5K, H2.2K, H3.7K	80	55

(Unit: mm)

- \*1 The 400V class H0.4K and H0.75K have no slit.
- \*2 These holes are not used.

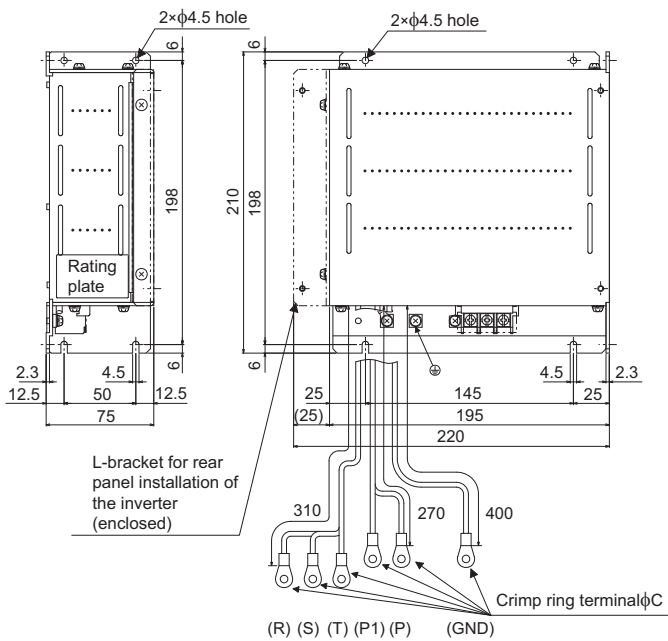
●FR-BFP2-3.7K



- \*1 Used to install the FR-E820-3.7K.  
 \*2 These holes are not used.

(Unit:mm)

- FR-BFP2-5.5K, 7.5K
- FR-BFP2-H5.5K, H7.5K



- 200V power supply

Capacity	C
5.5K, 7.5K	5.3

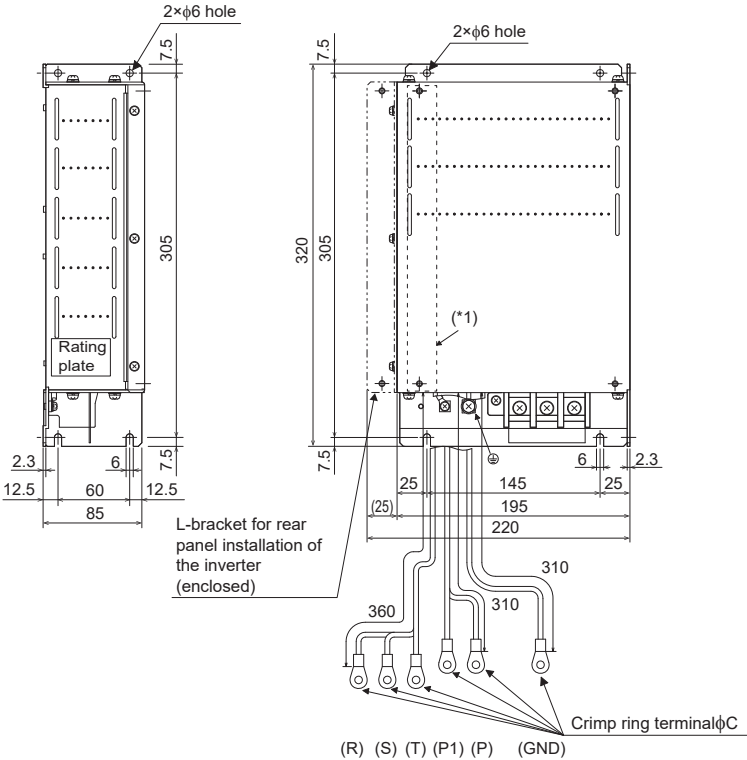
(Unit: mm)

- 400V power supply

Capacity	C
H5.5K, H7.5K	4.3

(Unit: mm)

- FR-BFP2-11K, 15K
- FR-BFP2-H11K, H15K



●200V power supply

Capacity	C
11K	5.3
15K	6.4

(Unit: mm)

●400V power supply

Capacity	C
H11K	4.3
H15K	6.4

(Unit: mm)

\*1 These holes are not used.

# Appendix

## Appendix 1 Restricted Use of Hazardous Substances in Electronic and Electrical Products

The mark of restricted use of hazardous substances in electronic and electrical products is described as follows based on the "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products" of the People's Republic of China.

电器电子产品有害物质限制使用标识要求



本产品中所含有的有害物质的名称、含量、含有部件如下表所示。

• 产品中所含有害物质的名称及含量

部件名称 <sup>*2</sup>	有害物质 <sup>*1</sup>					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件（包括印刷电路板及其构成的零部件，如电阻、电容、集成电路、连接器等）、电子部件	×	○	×	○	○	○
金属壳体、金属部件	×	○	○	○	○	○
树脂壳体、树脂部件	○	○	○	○	○	○
螺丝、电线	○	○	○	○	○	○

上表依据SJ/T11364的规定编制。

○：表示该有害物质在该部件所有均质材料中的含量均在GB/T26572规定的限量要求以下。

×：表示该有害物质在该部件的至少一种均质材料中的含量超出GB/T26572规定的限量要求。

\*1 即使表中记载为×，根据产品型号，也可能会有有害物质的含量为限制值以下的情况。

\*2 根据产品型号，一部分部件可能不包含在产品中。

## Appendix 2 Regarding Directive on Waste Electrical and Electronic Equipment

This symbol mark is for EU countries only, and is according to the directive 2012/19/ EU Article 14 Information for users and Annex IX.

This symbol mark means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from your household waste.



REVISIONS

\*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
Jan. 2009	IB(NA)-0600378ENG-A	First edition
Jun. 2011	IB(NA)-0600378ENG-B	<div>Edited</div> <ul style="list-style-type: none"><li>Earth (ground) cable (GND) length for FR-BFP2-(H)5.5K and 7.5K.</li></ul>
Jun. 2020	IB(NA)-0600378ENG-C	<div>Added</div> <ul style="list-style-type: none"><li>Combination table for FR-E800</li><li>Installation holes of FR-BFP2-3.7K</li><li>Restricted Use of Hazardous Substances in Electronic and Electrical Products</li></ul>
Aug. 2024	IB(NA)-0600378ENG-D	<div>Added</div> <ul style="list-style-type: none"><li>Regarding Directive on Waste Electrical and Electronic Equipment</li></ul> <div>Edited</div> <ul style="list-style-type: none"><li>Appearance of FR-BFP2-1.5K to 3.7K, 11K, and 15K</li><li>Appearance of FR-BFP2-H0.4K to H3.7K, H11K, and H15K</li><li>Cable length (R, S, T, P, P1, and GND) for FR-BFP2-(H)11K and H15K</li><li>Size of the screws for inverter rear panel installation (changed from M4 × 14 to M4 × 16)</li></ul>

**mitsubishi electric corporation**  
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