

# Air-Conditioners INDOOR UNIT

## PFFY-WL20,25,32,40,50VEM-A

### INSTALLATION MANUAL

For safe and correct use, please read this installation manual thoroughly before installing the air-conditioner unit.

### INSTALLATIONSHANDBUCH

Zum sicheren und ordnungsgemäßen Gebrauch der Klimageräte das Installationshandbuch gründlich durchlesen.

### MANUEL D'INSTALLATION

Veuillez lire le manuel d'installation en entier avant d'installer ce climatiseur pour éviter tout accident et vous assurer d'une utilisation correcte.

### INSTALLATIEHANDLEIDING

Voor een veilig en juist gebruik moet u deze installatiehandleiding grondig doorlezen voordat u de airconditioner installeert.

### MANUAL DE INSTALACIÓN

Para un uso seguro y correcto, lea detalladamente este manual de instalación antes de montar la unidad de aire acondicionado.

### MANUALE DI INSTALLAZIONE

Per un uso sicuro e corretto, leggere attentamente questo manuale di installazione prima di installare il condizionatore d'aria.

### ΕΓΧΕΙΡΙΔΙΟ ΟΔΗΓΙΩΝ ΕΓΚΑΤΑΣΤΑΣΗΣ

Για ασφάλεια και σωστή χρήση, παρακαλείσθε διαβάσετε προσεκτικά αυτό το εγχειρίδιο εγκατάστασης πριν αρχίσετε την εγκατάσταση της μονάδας κλιματισμού.

### MANUAL DE INSTALAÇÃO

Para segurança e utilização correctas, leia atentamente este manual de instalação antes de instalar a unidade de ar condicionado.

### INSTALLATIONSMANUAL

Læs venligst denne installationsmanual grundigt, før De installerer airconditionlægget, af hensyn til sikker og korrekt anvendelse.

### INSTALLATIONSHANDBOK

Läs den här installationshandboken noga innan luftkonditioneringsenheten installeras, för säker och korrekt användning.

### MONTAJ ELKİTABI

Emniyetli ve doğru biçimde nasıl kullanılacağını öğrenmek için lütfen klima cihazını monte etmeden önce bu elkitabını dikkatle okuyunuz.

### РЪКОВОДСТВО ЗА МОНТАЖ

За безопасна и правилна употреба, моля, прочетете внимателно това ръководство преди монтажа на климатизатора.

### PODRĘCZNIK INSTALACJI

W celu bezpiecznego i poprawnego korzystania należy przed zainstalowaniem klimatyzatora dokładnie zapoznać się z niniejszym podręcznikiem instalacji.

### INSTALLASJONSHÅNDBOK

For sikker og riktig bruk, skal du lese denne installasjonshåndboken nøye før du installerer klimaanlegget.

### РУКОВОДСТВО ПО УСТАНОВКЕ

Для осторожного и правильного использования прибора необходимо тщательно ознакомиться с данным руководством по установке до выполнения установки кондиционера.

### PŘÍRUČKA K INSTALACI

V zájmu bezpečného a správného používání si před instalací klimatizační jednotky důkladně pročtěte tuto příručku k instalaci.

### NÁVOD NA INŠTALÁCIU

Pre bezpečné a správne použitie si pred inštalovaním klimatizačnej jednotky, prosím, starostlivo prečítajte tento návod na inštaláciu.

### TELEPÍTÉSI KÉZIKÖNYV

A biztonságos és helyes használatához, kérjük, olvassa el alaposan ezt a telepítési kézikönyvet, mielőtt telepítené a légkondicionáló egységet.

### PRIROČNIK ZA NAMESTITEV

Za varno in pravilno uporabo pred namestitvijo klimatske naprave skrbno preberite priročnik za namestitev.

### MANUAL CU INSTRUCȚIUNI DE INSTALARE

Pentru o utilizare corectă și sigură, vă rugăm să citiți cu atenție acest manual înainte de a instala unitatea de aer condiționat.

### PRIRUČNIK ZA UGRADNJU

Radi sigurne i ispravne uporabe, temeljito pročitajte ovaj priručnik prije ugradnje klimatizacijskog uređaja.

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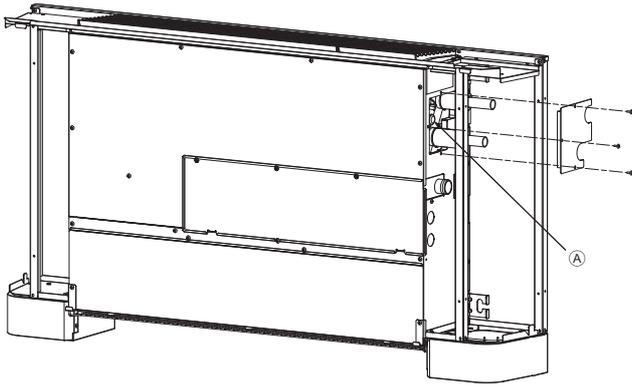
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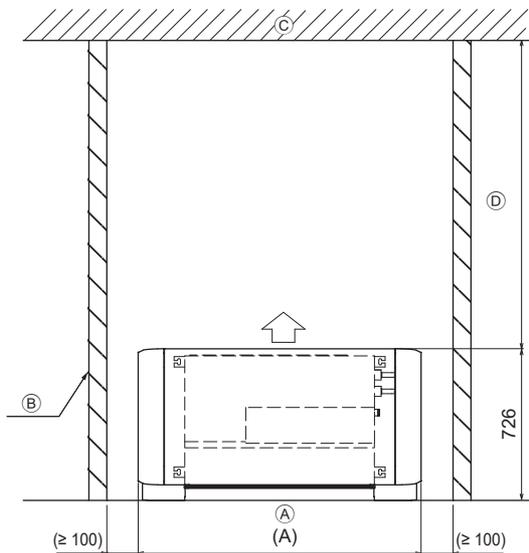
[Fig. 1.4.1]



Ⓐ Air vent valve

[Fig. 3.1.1]

(Unit: mm)



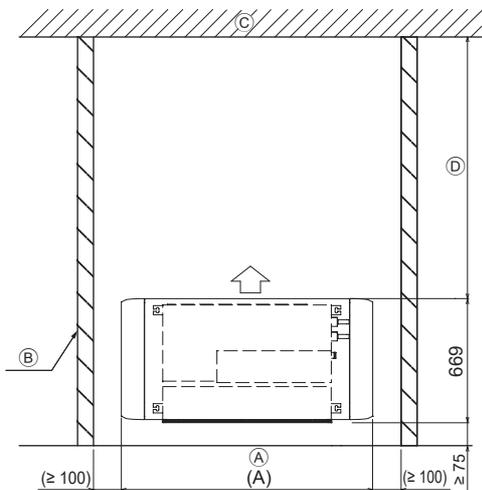
For PFFY-WL-VEM-A (mm)

Model name	(A)
20·25·32	1142
40·50	1342

- Ⓐ Floor
- Ⓑ Wall
- Ⓒ Ceiling
- Ⓓ Secure large enough space to prevent that blowout air is blocked.

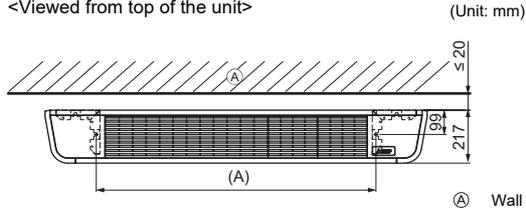
[Fig. 3.1.2]

(Unit: mm)



[Fig. 4.1.1]

For fixing on the floor  
 <Viewed from top of the unit>

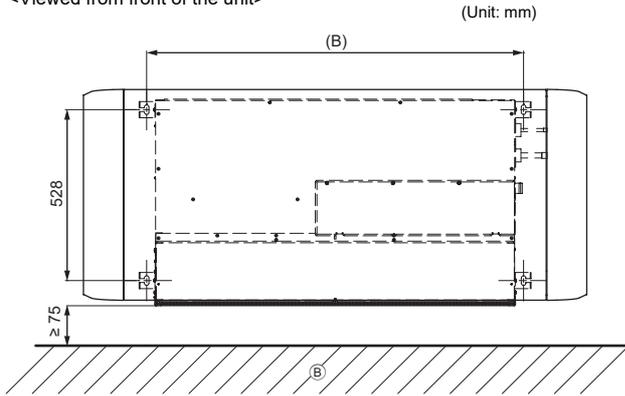


For PFFY-WL-VEM-A (mm)

Model name	(A)
20·25·32	729
40·50	929

[Fig. 4.1.2]

For fixing on the wall  
 <Viewed from front of the unit>



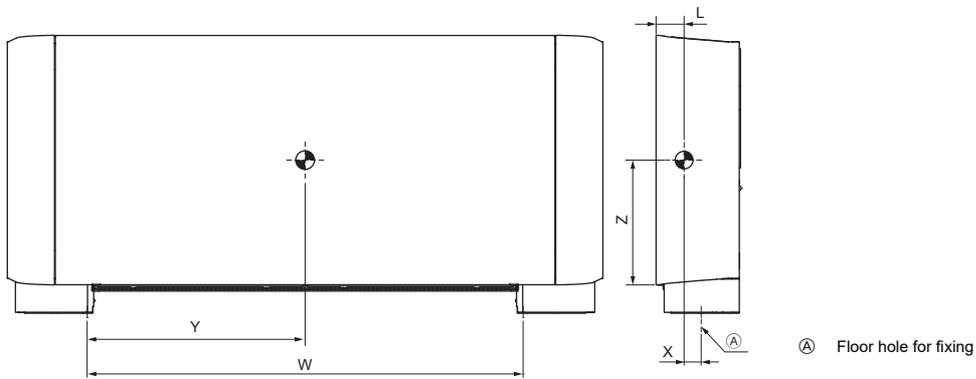
For PFFY-WL-VEM-A (mm)

Model name	(B)
20·25·32	755
40·50	955

(B) Floor

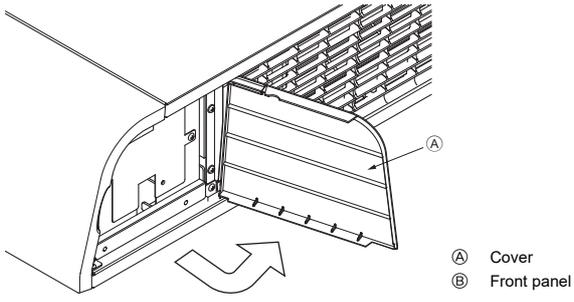
4.2

[Fig. 4.2.1]

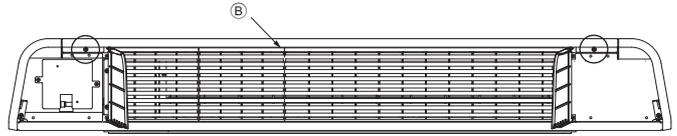


# 4.3

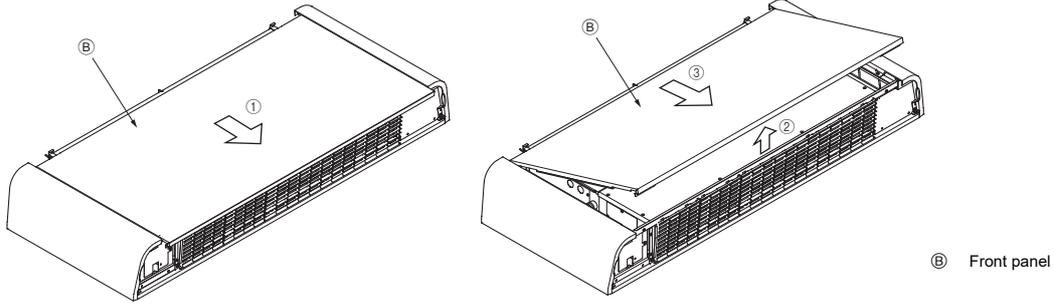
[Fig. 4.3.1]



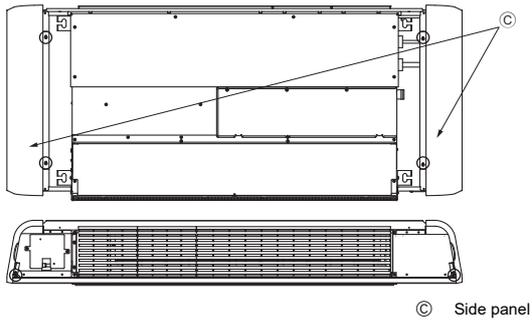
[Fig. 4.3.2]



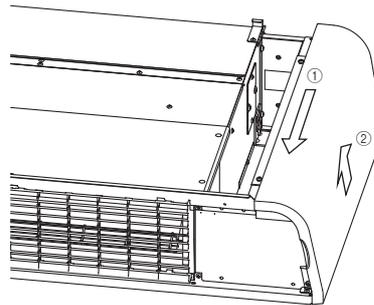
[Fig. 4.3.3]



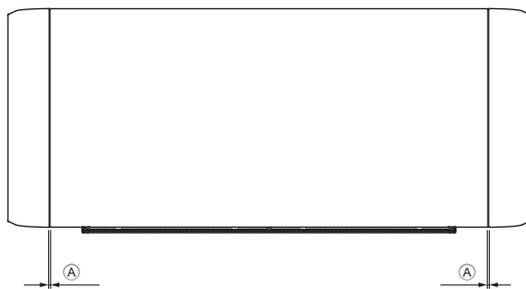
[Fig. 4.3.4]



[Fig. 4.3.5]



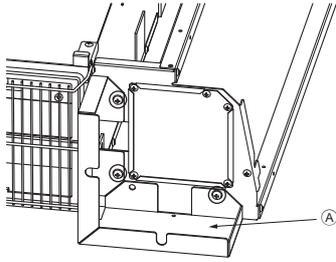
[Fig. 4.3.6]



A Leave an equal amount of clearance on the right and left.

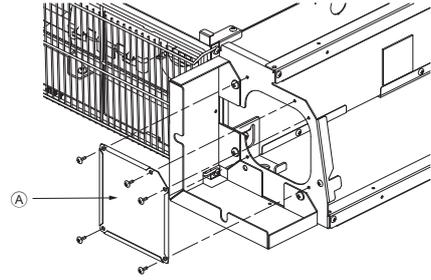
## 4.4

[Fig. 4.4.1]



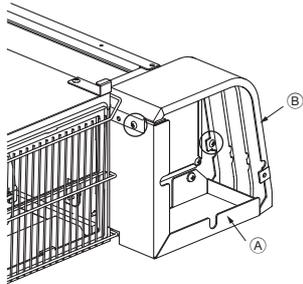
A Leg

[Fig. 4.4.3]



A Cover

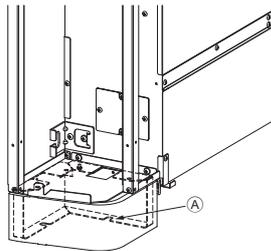
[Fig. 4.4.2]



A Leg  
B Cover for leg

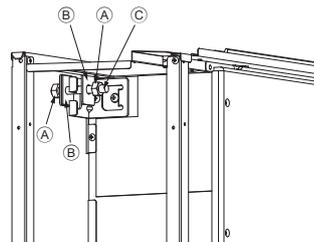
## 4.5

[Fig. 4.5.1]



A Floor hole for fixing

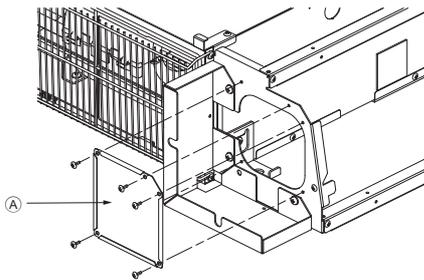
[Fig. 4.5.2]



A Nuts (field supply)  
B Washers  
C M10 hanging bolt  
(field supply)

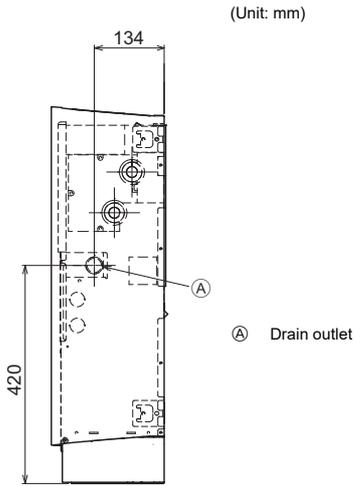
## 4.6

[Fig. 4.6.1]



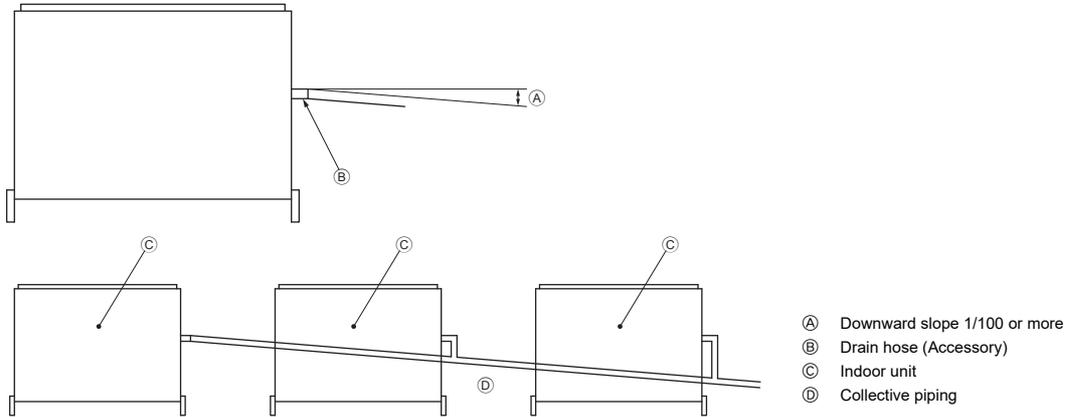
A Cover

[Fig. 5.2.1]

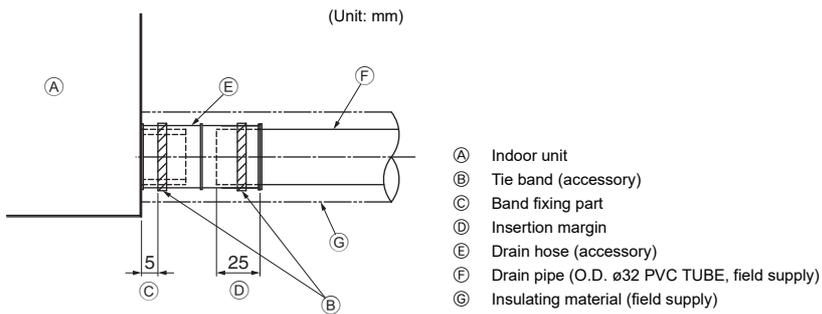


5.3

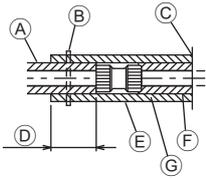
[Fig. 5.3.1]



[Fig. 5.3.2]

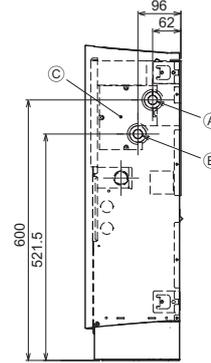


[Fig. 6.3.1]



- Ⓐ Locally procured insulating material for pipes
- Ⓑ Bind here using band or tape.
- Ⓒ Do not leave any opening.
- Ⓓ Lap margin: more than 40 mm
- Ⓔ Insulating material (field supply)
- Ⓕ Unit side insulating material
- Ⓖ There may be a gap between the pipe cover on the unit side and the joint, depending on the joint selected. If so, fill the gap with the field-supplied pipe cover.

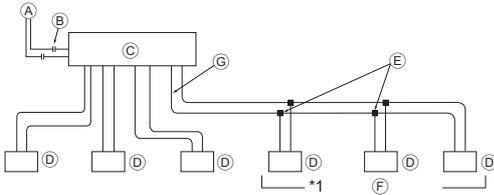
[Fig. 6.3.2]



(Unit: mm)

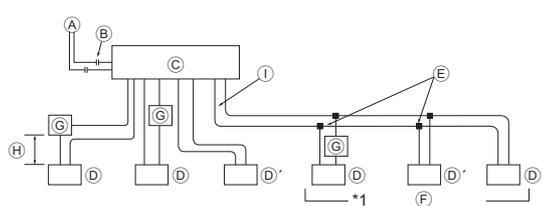
- Ⓐ Water pipe: To HBC/VALVE KIT
- Ⓑ Water pipe: From HBC/hydro unit
- Ⓒ Pipe-holding sheet metal

[Fig. 6.3.3]



- Ⓐ To outdoor unit
- Ⓑ End connection (brazing)
- Ⓒ HBC controller
- Ⓓ Indoor unit (without valve)
- Ⓔ Twinning pipe (field supply)
- Ⓕ Up to three units for 1 branch hole; total capacity: below 80 (but in same mode, cooling/heating)
- Ⓖ Water pipework is screw connections

[Fig. 6.3.4]



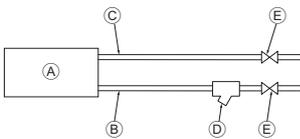
- Ⓐ To outdoor unit
- Ⓑ End connection (brazing)
- Ⓒ HBC controller
- Ⓓ Indoor unit (without valve)
- Ⓓ' Indoor unit (with valve)
- Ⓔ Twinning pipe (field supply)
- Ⓕ Up to three units for 1 branch hole; total capacity: below 80 (but in same mode, cooling/heating)
- Ⓖ Optional VALVE KIT
- Ⓖ' Pipe length between indoor unit without valve and optional VALVE KIT is less than 5 m.
- Ⓖ Water pipework is screw connections

**Note:**

**\*1. Connection of multiple indoor units with one connection (or joint pipe)**

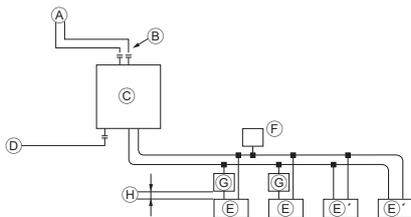
- Total capacity of connectable indoor units: Less than 80
- Number of connectable indoor units: Maximum 3 Sets
- Selection of water piping  
Select the size according to the total capacity of indoor units to be installed downstream.
- Please group units that operate on 1 branch.

[Fig. 6.3.5]



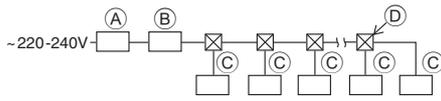
- Ⓐ Indoor unit
- Ⓑ Water pipe: From HBC/hydro unit
- Ⓒ Water pipe: To HBC/hydro unit
- Ⓓ Strainer (40 mesh or more) (field supply)
- Ⓔ Shut off valve (field supply)

[Fig. 6.3.6]



- Ⓐ To outdoor unit
- Ⓑ End connection
- Ⓒ Hydro unit
- Ⓓ To main piping
- Ⓔ Indoor unit without valve
- Ⓔ' Indoor unit with valve
- Ⓕ Auto air vent valve (Highest point on the water pipe) (supplied)
- Ⓖ Optional VALVE KIT
- Ⓖ' Pipe length between indoor unit without valve and optional VALVE KIT is less than 5 m.

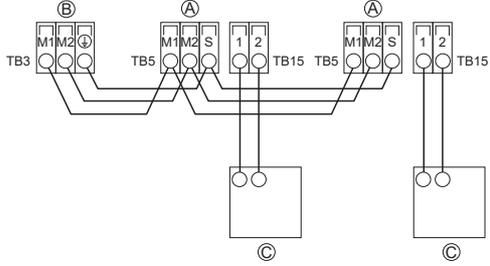
[Fig. 7.1.1]



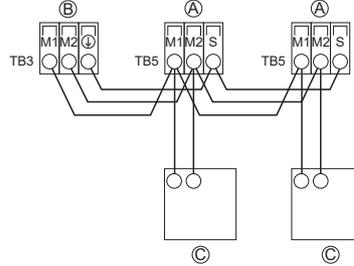
- Ⓐ Ground-fault interrupter
- Ⓑ Local switch/Wiring breaker
- Ⓒ Indoor unit
- Ⓓ Pull box

7.2

[Fig. 7.2.1]

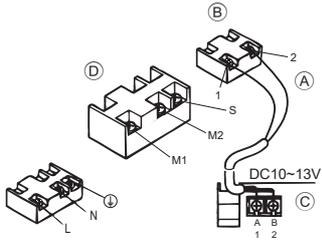


[Fig. 7.2.2]

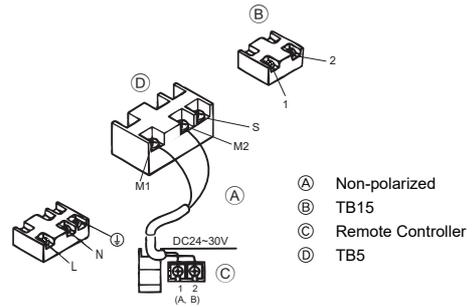


- Ⓐ Terminal block for indoor transmission cable
- Ⓑ Terminal block for outdoor transmission cable
- Ⓒ Remote controller

[Fig. 7.2.3]



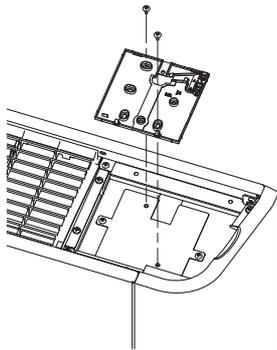
[Fig. 7.2.4]



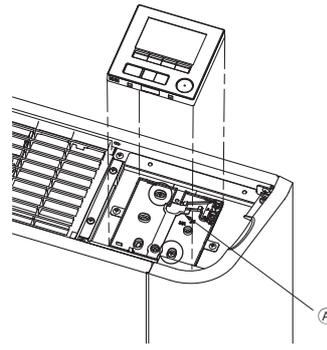
- Ⓐ Non-polarized
- Ⓑ TB15
- Ⓒ Remote Controller
- Ⓓ TB5

7.3

[Fig. 7.3.1]

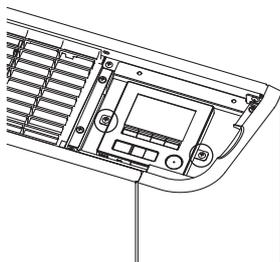


[Fig. 7.3.2]



- Ⓐ Notch for transmission line

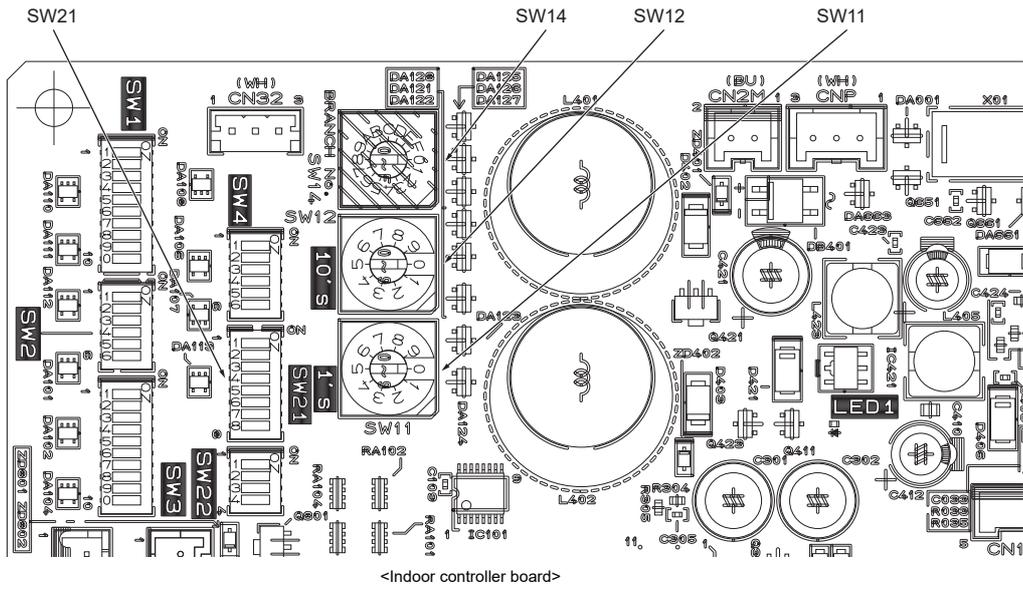
[Fig. 7.3.3]





# 7.7

[Fig. 7.7.1]



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## 1. Safety precautions

### 1.1. Before installation and electric work

- ▶ Before installing the unit, make sure you read all the "Safety precautions".
- ▶ The "Safety precautions" provide very important points regarding safety. Make sure you follow them.

#### Symbols used in the text

 **Warning:**  
Describes precautions that should be observed to prevent danger of injury or death to the user.

 **Caution:**  
Describes precautions that should be observed to prevent damage to the unit.

#### Symbols used in the illustrations

-  : Indicates an action that must be avoided.
-  : Indicates that important instructions must be followed.
-  : Indicates a part which must be grounded.
-  : Indicates that caution should be taken with rotating parts. (This symbol is displayed on the main unit label.) <Color: yellow>
-  : Beware of electric shock (This symbol is displayed on the main unit label.) <Color: yellow>

-  **Warning:**  
Carefully read the labels affixed to the main unit.

-  **Warning:**
  - **Ask the dealer or an authorized technician to install the air conditioner.**
    - Improper installation by the user may result in water leakage, electric shock, or fire.
  - **Install the air unit at a place that can withstand its weight.**
    - Inadequate strength may cause the unit to fall down, resulting in injuries.
  - **Use the specified cables for wiring. Make the connections securely so that the outside force of the cable is not applied to the terminals.**
    - Inadequate connection and fastening may generate heat and cause a fire.
  - **Prepare for typhoons and other strong winds and earthquakes and install the unit at the specified place.**
    - Improper installation may cause the unit to topple and result in injury.
  - **Always use an air cleaner, humidifier, electric heater, and other accessories specified by Mitsubishi Electric.**
    - Ask an authorized technician to install the accessories. Improper installation by the user may result in water leakage, electric shock, or fire.
  - **Never repair the unit. If the air conditioner must be repaired, consult the dealer.**
    - If the unit is repaired improperly, water leakage, electric shock, or fire may result.
  - **Do not touch the heat exchanger fins.**
    - Improper handling may result in injury.
  - **When handling this product, always wear protective equipment.**  
**EG: Gloves, full arm protection namely boiler suit, and safety glasses.**
    - Improper handling may result in injury.
  - **If refrigerant gas leaks during installation work, ventilate the room.**
    - If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
  - **Install the air conditioner according to this Installation Manual.**

- If the unit is installed improperly, water leakage, electric shock, or fire may result.
- **Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.**
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- **Keep the electric parts away from water (washing water etc.).**
  - It might result in electric shock, catching fire or smoke.
- **Securely install the outdoor unit terminal cover (panel).**
  - If the terminal cover (panel) is not installed properly, dust or water may enter the outdoor unit and fire or electric shock may result.
- **Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.**
  - Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
  - It may also be in violation of applicable laws.
  - MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit even if the refrigerant should leak.**
  - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.
- **When moving and reinstalling the air conditioner, consult the dealer or an authorized technician.**
  - If the air conditioner is installed improperly, water leakage, electric shock, or fire may result.
- **After completing installation work, make sure that refrigerant gas is not leaking.**
  - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- **Do not reconstruct or change the settings of the protection devices.**
  - If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.
- **To dispose of this product, consult your dealer.**
- **Do not use a leak detection additive.**
- **If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.**
- **This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**
- **Children should be supervised to ensure that they do not play with the appliance.**
- **The installer and system specialist shall secure safety against leakage according to local regulation or standards.**
  - The instructions in this manual may be applicable if local regulation are not available.
- **Pay a special attention to the place, such as a basement, etc. where refrigeration gas can stay, since refrigeration is heavier than the air.**
- **This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.**

## 1.2. Before getting installed

### ⚠ Caution:

- **Do not install the unit where combustible gas may leak.**
  - If the gas leaks and accumulates around the unit, an explosion may result.
- **Do not use the air conditioner where food, pets, plants, precision instruments, or artwork are kept.**
  - The quality of the food, etc. may deteriorate.
- **Do not use the air conditioner in special environments.**
  - Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.
- **When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.**
  - The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.
- **Do not install the unit on a structure that may cause leakage.**
  - When the room humidity exceeds 80% or when the drain pipe is clogged, condensation may drip from the indoor unit. Perform collective drainage work together with the outdoor unit, as required.

## 1.3. Before getting installed (moved) - electrical work

### ⚠ Caution:

- **Ground the unit.**
  - Do not connect the ground wire to gas or water pipes, lightning rods, or telephone ground lines. Improper grounding may result in electric shock.
- **Install the power cable so that tension is not applied to the cable.**
  - Tension may cause the cable to break and generate heat and cause a fire.
- **Install an leak circuit breaker, as required.**
  - If an leak circuit breaker is not installed, electric shock may result.
- **Use power line cables of sufficient current carrying capacity and rating.**
  - Cables that are too small may leak, generate heat, and cause a fire.
- **Use only a circuit breaker and fuse of the specified capacity.**
  - A fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire.
- **Do not wash the air conditioner units.**
  - Washing them may cause an electric shock.
- **Be careful that the installation base is not damaged by long use.**
  - If the damage is left uncorrected, the unit may fall and cause personal injury or property damage.

## 2. Indoor unit accessories

The unit is provided with the following accessories:

Part No.	Accessories	Qty
1	Tie band	3
2	Drain hose	1
3	Washer	8
4	Leg	2

- **Install the drain piping according to this Installation Manual to ensure proper drainage. Wrap thermal insulation around the pipes to prevent condensation.**
  - Improper drain piping may cause water leakage and damage to furniture and other possessions.
- **Be very careful about product transportation.**
  - Only one person should not carry the product if it weighs more than 20 kg.
  - Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
  - Do not touch the heat exchanger fins. Doing so may cut your fingers.
  - When transporting the outdoor unit, suspend it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.
- **Safely dispose of the packing materials.**
  - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
  - Tear apart and throw away plastic packaging bags so that children will not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

## 1.4. Before starting the test run

### ⚠ Caution:

- **Turn on the power at least 12 hours before starting operation.**
  - Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.
- **Do not touch the switches with wet fingers.**
  - Touching a switch with wet fingers can cause electric shock.
- **Do not operate the air conditioner with the panels and guards removed.**
  - Rotating, hot, or high-voltage parts can cause injuries.
- **Do not turn off the power immediately after stopping operation.**
  - Always wait at least five minutes before turning off the power. Otherwise, water leakage and trouble may occur.
- **When water has been supplied to the water pipework, purge the system of air. The details of air purging can be found separately in the water circuit maintenance manual.**
  - Details are described in section [9] "Instructions for debris removal operation" under chapter IX Troubleshooting in the Service Handbook for the HBC.
  - Refer to Fig. 1.4.1 for the position of the air vent valve on the indoor unit.

[Fig. 1.4.1] (P.2)

Ⓐ Air vent valve

- **The use of a short-shaft screwdriver is recommended when removing the cover.**

Part No.	Accessories	Qty
5	Leg cover	2
6	M5 screw	6
7	M4 screw	4

## 3. Selecting an installation site

- Select a site with sturdy fixed surface sufficiently durable against the weight of unit.
- Before installing unit, the routing to carry in unit to the installation site should be determined.
- Select a site where the unit is not affected by entering air.
- Select a site where the flow of supply and return air is not blocked.
- Select a site where water piping can easily be led to the outside.
- Select a site which allows the supply air to be distributed fully in room.
- Do not install unit at a site with oil splashing or steam in much quantity.
- Do not install unit at a site where combustible gas may generate, flow in, stagnate or leak.
- Do not install unit at a site where equipment generating high frequency waves (a high frequency wave welder for example) is provided.
- Do not install unit at a site where fire detector is located at the supply air side. (Fire detector may operate erroneously due to the heated air supplied during heating operation.)
- When special chemical product may scatter around such as site chemical plants and hospitals, full investigation is required before installing unit. (The plastic components may be damaged depending on the chemical product applied.)
- If the unit is run for long hours at high temperature/ high humidity (dew point above 26 °C), dew condensation may be produced in the indoor unit. When

operating the units in this condition, add insulation material (10-20 mm) to the entire surface of the indoor unit to avoid dew condensation.

- Direct the air away from the walls and windows to prevent condensation.

### ⚠ Warning:

**The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down causing injuries.**

## 3.1. Securing installation and service space

For PFFY-WL-VEM-A (mm)

Model name	(A)
20·25·32	1142
40·50	1342

[Fig. 3.1.1] (P.2)

[Fig. 3.1.2] (P.2)

- Ⓐ Floor
- Ⓑ Wall
- Ⓒ Ceiling
- Ⓓ Secure large enough space to prevent that blowout air is blocked.

## 3.2. Combining indoor units with outdoor units

For combining indoor units with outdoor units, refer to the outdoor unit installation manual.

## 4. Installing the unit

### 4.1. Selecting the installation method

Install the indoor unit on a load bearing floor or wall.

The unit can be fixed in place in the following ways to prevent it from falling over. Screw down the unit as specified below as necessary.

#### For fixing on the floor

##### [Fig. 4.1.1] (P.3)

- <Viewed from top of the unit>  
 Ⓐ Wall

For PFFY-WL-VEM-A (mm)

Model name	(A)
20·25·32	729
40·50	929

#### For fixing on the wall

##### [Fig. 4.1.2] (P.3)

- <Viewed from front of the unit>  
 Ⓑ Floor

For PFFY-WL-VEM-A (mm)

Model name	(B)
20·25·32	755
40·50	955

### 4.2. Center of gravity and product weight

##### [Fig. 4.2.1] (P.3)

- Ⓐ Floor hole for fixing

For PFFY-WL-VEM-A

Model name	W (mm)	L (mm)	X (mm)	Y (mm)	Z (mm)	Product weight (kg)
PFFY-WL20VEM-A	730	76	40	365	320	29.5
PFFY-WL25VEM-A	730	76	40	365	320	29.5
PFFY-WL32VEM-A	730	76	40	365	320	30
PFFY-WL40VEM-A	930	76	40	475	330	35
PFFY-WL50VEM-A	930	76	40	475	330	35

### 4.3. How to disassemble the unit

The unit needs to be disassembled before installation, piping work, and electrical work.

Perform the work with the unit being laid down sideways.

#### ⚠ Caution:

**When lifting the unit, do not hold the resin parts. Doing so may damage the resin parts.**

1. Open the right and left covers.

##### [Fig. 4.3.1] (P.4)

- Ⓐ Cover

2. Unscrew the two screws holding the front panel, and remove the right and left covers.

##### [Fig. 4.3.2] (P.4)

- Ⓑ Front panel

3. Remove the front panel.

Slide the front panel in the direction shown by ①, lift it in the direction shown by ②, and pull it out in the direction shown by ③.

##### [Fig. 4.3.3] (P.4)

- Ⓑ Front panel

4. Unscrew the six screws holding the side panel.

##### [Fig. 4.3.4] (P.4)

- Ⓒ Side panel

5. Remove the side panel.

Slide the side panel in the direction shown by ①, and lift it up in the direction shown by ②.

##### [Fig. 4.3.5] (P.4)

#### Note:

- Reinstall the panel in the reverse order as shown above.
- Install the front panel so that the clearance between the front panel and the side panel will be even at both sides.

##### [Fig. 4.3.6] (P.4)

- Ⓐ Leave an equal amount of clearance on the right and left.

#### ⚠ Caution:

**Make sure not to overtighten the resin parts. Doing so may damage the resin parts.**

### 4.4. Installing the legs for floor-standing installation

The legs are not used when installing the unit on a wall.

1. Screw down (M5 screws) the legs for floor-standing installation (three places each on the right and left).

##### [Fig. 4.4.1] (P.5)

- Ⓐ Leg

2. Screw down (M4 screws) the cover for the legs (two places each on the right and left).

##### [Fig. 4.4.2] (P.5)

- Ⓐ Leg  
 Ⓑ Cover for leg

3. Unscrew the screws from the cover to remove the cover.

##### [Fig. 4.4.3] (P.5)

- Ⓐ Cover



#### Caution:

**Make sure not to overtighten the resin parts. Doing so may damage the resin parts.**

### 4.5. Installing the unit on the base

For fixing on the floor

- Installing the unit on a sturdy floor horizontally straight.
- Screw down the unit to the floor with the screws (not supplied).

##### [Fig. 4.5.1] (P.5)

- Ⓐ Floor hole for fixing

For fixing on the wall

- To fix the indoor unit on the wall, use the hanging bolts.
- When the unit is installed on the wall, vibrations may be transmitted to the wall. Take measures against vibrations as needed at the site.

##### [Fig. 4.5.2] (P.5)

- Ⓐ Nuts (field supply)  
 Ⓑ Washers  
 Ⓒ M10 hanging bolt (field supply)

- Ensure that the hanging bolt nuts are tightened to fix the hanging bolts.
- To ensure that drain is discharged, be sure to hang the unit at level using a level.

#### ⚠ Caution:

**Install the unit in horizontal position. If the side with drain port is installed higher, water leakage may be caused.**

### 4.6. Installing the pipes under the floor when installing the unit on the wall

Unscrew the five screws and remove the right cover to install the pipes under the floor.

##### [Fig. 4.6.1] (P.5)

- Ⓐ Cover

#### Note:

- Do not remove the cover when installing the pipes on the rear of the unit.

### 4.7. Installing the back decoration panel (sold separately)

Applicable only for floor-standing installation

Install the back decoration panel (sold separately) before installing the unit on a base.

Refer to the installation manual that came with the back decoration panel (sold separately) for how to install the back decoration panel.

## 5. Connecting drain pipe

To avoid dew drops, provide sufficient antisweating and insulating work to the drain pipes.

### 5.1. Drain pipe specifications

Item	Model
Drain pipe	PFFY-WL·VEM-A
	20·25·32·40·50
Drain pipe	O.D. ø 32

### 5.2. Drain pipe

[Fig. 5.2.1] (P.6)

- Ⓐ Drain outlet

### 5.3. Drain piping work

- Ensure that the drain piping is downward (pitch of more than 1/100) to the outdoor (discharge) side. Do not provide any trap or irregularity on the way.
- Ensure that any cross-wise drain piping is less than 20 m (excluding the difference of elevation). If the drain piping is long, provide metal braces to prevent it from waving. Never provide any air vent pipe. Otherwise drain may be ejected.
- Use a hard vinyl chloride pipe VP-25 (with an external diameter of 32 mm) for drain piping.
- Ensure that collected pipes are 10 cm lower than the unit body's drain port.
- Do not provide any odor trap at the drain discharge port.

- Put the end of the drain piping in a position where no odor is generated.
- Do not put the end of the drain piping in any drain where ionic gases are generated.

[Fig. 5.3.1] (P.6)

- Ⓐ Downward slope (1/100 or more)
  - Ⓑ Drain hose (Accessory)
  - Ⓒ Indoor unit
  - Ⓓ Collective piping
1. Insert the drain hose (accessory) into the drain port (insertion margin: 25 mm). The connecting part between the indoor unit and the drain hose may be disconnected at the maintenance. Fix the part with the accessory band, not be adhered.
  2. Attach the drain pipe (O.D. ø32 PVC TUBE, field supply). (Attach the pipe with glue for the hard vinyl chloride pipe, and fix it with the band (small, accessory).)
  3. Perform insulation work on the drain pipe (O.D. ø32 PVC TUBE) and on the socket (including elbow).

[Fig. 5.3.2] (P.6)

- Ⓐ Indoor unit
- Ⓑ Tie band (accessory)
- Ⓒ Band fixing part
- Ⓓ Insertion margin
- Ⓔ Drain hose (accessory)
- Ⓕ Drain pipe (O.D. ø32 PVC TUBE, field supply)
- Ⓖ Insulating material (field supply)

## 6. Connecting water pipes

Please observe the following precautions during installation.

### 6.1. Important notes on water pipework installation for connection with HBC unit

- The water pressure resistance of the water pipes in the heat source unit is 1.0 MPa [145 psi].
- Please connect the water pipework of each indoor unit to the connect port on the HBC. Failure to do so will result in incorrect running.
- Please list the indoor units on the naming plate in the HBC unit with addresses and end connection numbers.
- If the number of indoor units are less than the number of ports on the HBC, the unused ports can be capped. Without a cap, water will leak.
- Use the reverse-return method to insure proper pipe resistance to each unit.
- Provide some joints and bulbs around inlet/outlet of each unit for easy maintenance, checkup, and replacement.
- Install a suitable air vent on the water pipe. After flowing water through the pipe, vent any excess air.
- Secure the pipes with metal fitting, positioning them in locations to protect pipes against breakage and bending.
- Do not confuse the water intake and outlet piping. Error code 5102 will appear on the remote controller if a test run is performed with the pipe-work installed incorrectly (inlet connected to outlet and vice versa).
- This unit doesn't include a heater to prevent freezing within tubes. If the water flow is stopped on low ambient, drain the water out.
- The unused knockout holes should be closed and the refrigerant pipes, water pipes, power source and transmission wires access holes should be filled with putty.
- Install water pipe so that the water flow rate will be maintained.
- Wrap sealing tape as follows.
  - ① Wrap the joint with sealing tape following the direction of the threads (clockwise), do not wrap the tape over the edge.
  - ② Overlap the sealing tape by two-thirds to three-fourths of its width on each turn. Press the tape with your fingers so that it is tight against each thread.
  - ③ Do not wrap the 1.5th through 2nd farthest threads away from the pipe end.
- Hold the pipe on the unit side in place with a spanner when installing the pipes or strainer. Tighten screws to a torque of 40 N·m.
- If there is a risk of freezing, carry out a procedure to prevent it.
- When connecting heat source unit water piping and on site water piping, apply liquid sealing material for water piping over the sealing tape before connection.
- Do not use steel pipes as water pipes.
  - Copper pipes are recommended.
- Install a strainer (40 mesh or more) on the pipe next to the valve to remove the foreign matters.
- Be sure to provide anti-dew condensation treatment on the inlet and outlet of the water pipes and on the valve. Provide an appropriate treatment on the end surface of the dew proofing material to keep condensation out.

- Leave the pipe-holding sheet metal as it is ([Fig. 6.3.2] (P.7) Ⓒ). If the pipe is connected without the sheet metal in place, undue force may be applied to the pipe, and the pipe may become deformed.
- When water has been supplied to the water pipework, purge the system of air. The details of air purging can be found separately in the water circuit maintenance manual.
- **Be sure to braze the water pipes after covering a wet cloth to the insulation pipes of the units in order to prevent them from burning and shrinking by heat.** (There are some plastic parts in indoor unit.)
- **Install the unit so that external force is not applied to the water pipes.**

### 6.2. Important notes on water pipework installation for connection with hydro unit

- Use water pipe-work with a design pressure of at least 1.0 MPa.
- When performing a water leak check, please do not allow the water pressure to go above 1.0 MPa.
- Perform a pressure test on the field-installed water pipes at a pressure equal to 1.5 times the design pressure. Before performing a pressure test, isolate the pipes from hydro unit and indoor units.
- Please connect the water pipework of each indoor unit to the connect on the hydro unit. Failure to do so will result in incorrect running.
- Provide some joints and valves around inlet/outlet of each unit for easy maintenance, checkup, and replacement.
- Install a suitable air vent on the water pipe. After flowing water through the pipe, vent any excess air.
- After the completion of test run, make sure not to reintroduce air into the pipe.
- Secure the pipes with metal fitting, positioning them in locations to protect pipes against breakage and bending.
- Do not confuse the water intake and outlet piping especially when connecting the hydro unit. (Error code 5102 will appear on the remote controller if a test run is performed with the pipe-work installed incorrectly (inlet connected to outlet and vice versa).)
- Install water pipe so that the water flow rate will be maintained.
- If there is a risk of freezing, carry out a procedure to prevent it.
- Use copper, plastic, steel, or stainless steel pipes for the water circuit. Furthermore, when using copper pipe-work, use a non-oxidative brazing method. Oxidation of the pipe-work will reduce the pump life. When using iron or stainless-steel pipework, ensure that rust from the pipework does not enter the unit.
- Connect the pipe and the unit so that the pipe does not interfere with maintenance and sufficient space is left for maintenance.
- Install a strainer (40 mesh or more) on the pipe next to the valve to remove the foreign matters.
- Be sure to provide anti-dew condensation treatment on the inlet and outlet of the water pipes and on the valve. Provide an appropriate treatment on the end surface of the dew proofing material to keep condensation out.

- Leave the pipe-holding sheet metal as it is ([Fig. 6.3.2] (P.7) ©). If the pipe is connected without the sheet metal in place, undue force may be applied to the pipe, and the pipe may become deformed.
- When water has been supplied to the water pipework, purge the system of air. The details of air purging can be found separately in the water circuit maintenance manual.
- **Be sure to braze the water pipes after covering a wet cloth to the insulation pipes of the units in order to prevent them from burning and shrinking by heat.** (There are some plastic parts in indoor unit.)
- **Install the unit so that external force is not applied to the water pipes.**

**Note:**

- Use caution not to mix up the water inlet and outlet.
- Install a coupling valve on the pipe to allow access for maintenance.
- Install a flexible joint on the pipe to keep the vibration of the unit from being transmitted to the pipe.
- Connect the pipes to the water pipes according to the local regulations.

### 6.3. Water pipe insulation for connection with HBC unit

1. Connect the water pipes of each indoor unit to the same (correct) end connection numbers as indicated on the indoor unit connection section of each HBC controller. If connected to wrong end connection numbers, there will be no normal operation.
2. List indoor unit model names in the name plate on the HBC controller control box (for identification purposes), and HBC controller end connection numbers and address numbers in the name plate on the indoor unit side. Seal unused end connections using cover caps (sold separately). Not replacing on end cap will lead to water leakage.
3. Be sure to add insulation work to water piping by covering water pipework separately with enough thickness heat-resistant polyethylene, so that no gap is observed in the joint between indoor unit and insulating material, and insulating materials themselves. When insulation work is insufficient, there is a possibility of condensation, etc. Pay special attention to insulation work in the ceiling plenum.

**[Fig. 6.3.1] (P.7)**

- Ⓐ Locally procured insulating material for pipes
- Ⓑ Bind here using band or tape.
- Ⓒ Do not leave any opening.
- Ⓓ Lap margin: more than 40 mm
- Ⓔ Insulating material (field supply)
- Ⓕ Unit side insulating material
- Ⓖ There may be a gap between the pipe cover on the unit side and the joint, depending on the joint selected. If so, fill the gap with the field-supplied pipe cover.

**[Fig. 6.3.2] (P.7)**

- Ⓐ Water pipe: To HBC/VALVE KIT
- Ⓑ Water pipe: From HBC/hydro unit
- Ⓒ Pipe-holding sheet metal

- Insulation materials for the pipes to be added on site must meet the following specifications:

HBC controller	20 mm or more
-indoor unit	

- This specification is based on copper for water piping. When using plastic pipe-work, choose a thickness based on the plastic pipe performance.
  - Installation of pipes in a high-temperature high-humidity environment, such as the top floor of a building, may require the use of insulation materials thicker than the ones specified in the chart above.
  - When certain specifications presented by the client must be met, ensure that they also meet the specifications on the chart above.
4. Expansion vessel  
Install an expansion vessel to accommodate expanded water. (circuit protection valve set pressure: 600 kPa)  
Expansion vessel selection criteria:
    - The water containment volume of the HBC.
    - The maximum water temperature is 60°C.
    - The minimum water temperature is 5°C.
    - The circuit protection valve set pressure is 370-490 kPa.
    - The circulation pump head pressure is 0.24 MPa.
  5. Leakproof the water pipework, valves and drain pipework. Leakproof all the way to, and include pipe ends so that condensation cannot enter the insulated pipe-work.
  6. Apply caulking around the ends of the insulation to prevent condensation getting between the pipework and insulation.
  7. Add a drain valve so that the unit and pipework can be drained.
  8. Ensure there are no gaps in the pipework insulation. Insulate the pipework right up to the unit.
  9. Ensure that the gradient of the drain pan pipework is such that discharge can only blow out.

### 10. HBC water pipe connection sizes

Unit model	Connection size		Pipe size		Water volume (ℓ)
	Water inlet	Water outlet	Water out	Water return	
PFFY-WL20VEM-A	O.D. 22.0 mm	O.D. 22.0 mm	I.D. ≥ 20.0 mm	I.D. ≥ 20.0 mm	0.8
PFFY-WL25VEM-A					0.8
PFFY-WL32VEM-A					1.0
PFFY-WL40VEM-A					1.3
PFFY-WL50VEM-A					1.3

**<Connection of HBC (Indoor unit without valve)>**

\* PFFY-WL·VEM Series has no valve.

**[Fig. 6.3.3] (P.7)**

- Ⓐ To outdoor unit
- Ⓑ End connection (brazing)
- Ⓒ HBC controller
- Ⓓ Indoor unit (without valve)
- Ⓔ Twinning pipe (field supply)
- Ⓕ Up to three units for 1 branch hole; total capacity: below 80 (but in same mode, cooling/heating)
- Ⓖ Water pipework is screw connections

**<Connection of HBC (Indoor unit with valve or connection VALVE KIT)>**

\* PFFY-WL·VEM Series has no valve.

**[Fig. 6.3.4] (P.7)**

- Ⓐ To outdoor unit
- Ⓑ End connection (brazing)
- Ⓒ HBC controller
- Ⓓ Indoor unit (without valve)
- Ⓓ' Indoor unit (with valve)
- Ⓔ Twinning pipe (field supply)
- Ⓕ Up to three units for 1 branch hole; total capacity: below 80 (but in same mode, cooling/heating)
- Ⓖ Optional VALVE KIT
- Ⓖ' Pipe length between indoor unit without valve and optional VALVE KIT is less than 5 m.
- Ⓖ' Water pipework is screw connections

**Note:**

**\* 1. Connection of multiple indoor units with one connection (or joint pipe)**

- Total capacity of connectable indoor units: Less than 80
  - Number of connectable indoor units: Maximum 3 Sets
  - Selection of water piping  
Select the size according to the total capacity of indoor units to be installed downstream.
  - Please group units that operate on 1 branch.
11. Please refer to the [Fig. 6.3.5] (P.7) when connecting the water supply.

**[Fig. 6.3.5] (P.7)**

- Ⓐ Indoor unit
- Ⓑ Water pipe: From HBC/hydro unit
- Ⓒ Water pipe: To HBC/hydro unit
- Ⓓ Strainer (40 mesh or more) (field supply)
- Ⓔ Shut off valve (field supply)

12. Install a shut off valve and strainer in a place that is easy to operate and makes maintenance work easy.
13. Apply insulation to the indoor unit pipework, strainer, shut off valve, and pressure reducing valve.
14. Please do not use a corrosion inhibitor in the water system.
15. Use formula  $0.1 \text{ [MPa]} < 0.01 + 0.01 \times A < 0.16 \text{ [MPa]}$  for the supply pressure range to be used.  
(A: Head pressure (m) between the hydro unit and the highest indoor unit)  
If the supply pressure is greater than 0.16 MPa, use a pressure reducing valve to keep the pressure within the range.  
If the head pressure is unknown, set it to 0.16 MPa.

### 6.4. Water pipe insulation for connection with hydro unit

1. Cold (hot) water pipes require thermal insulation to prevent condensation on the pipe surface while especially in the cooling mode as well as heat emission from and penetration into the pipes.
2. Be sure to add insulation work to water piping by covering water pipework separately with enough thickness heat-resistant polyethylene, so that no gap is observed in the joint between indoor unit and insulating material, and insulating materials themselves. When insulation work is insufficient, there is a possibility of condensation, etc. Pay special attention to insulation work in the ceiling plenum.

**[Fig. 6.3.1] (P.7)**

- Ⓐ Locally procured insulating material for pipes
- Ⓑ Bind here using band or tape.
- Ⓒ Do not leave any opening.
- Ⓓ Lap margin: more than 40 mm
- Ⓔ Insulating material (field supply)
- Ⓕ Unit side insulating material
- Ⓖ There may be a gap between the pipe cover on the unit side and the joint, depending on the joint selected. If so, fill the gap with the field-supplied pipe cover.

**[Fig. 6.3.2] (P.7)**

- Ⓐ Water pipe: To HBC/VALVE KIT
- Ⓑ Water pipe: From HBC/hydro unit
- Ⓒ Pipe-holding sheet metal

- Insulation materials for the pipes to be added on site must meet the following specifications:

Branch piping for indoor unit or VALVE KIT	20 mm or more
--	---------------

- This specification is based on copper for water piping. When using plastic pipe-work, choose a thickness based on the plastic pipe performance.
  - Thermal insulation materials should have a thickness of 20 mm or larger.
  - Install a heater on site when pipes are installed outside where a temperature is 0°C or below and when the breaker may be turned off.
  - Installation of pipes in a high-temperature high-humidity environment, such as the top floor of a building, may require the use of insulation materials thicker than the ones specified in the chart above.
  - When certain specifications presented by the client must be met, ensure that they also meet the specifications on the chart above.
3. Expansion vessel
- Connect an expansion vessel to the expansion vessel connection port of the hydro unit or to the return water pipe.
- Install an expansion vessel to accommodate expanded water.
  - The maximum water temperature is 60°C.
  - The minimum water temperature is 5°C.
  - The circuit protection valve set pressure is 0.8-0.96 MPa.
  - The circulation pump head pressure is 0.2 MPa. (CMH-WM250/350/500V-A)
4. Leakproof the water pipework, valves and drain pipework. Leakproof all the way to, and include pipe ends so that condensation cannot enter the insulated pipework.
5. Apply caulking around the ends of the insulation to prevent condensation getting between the pipework and insulation.
6. Add a drain valve so that the unit and pipework can be drained.
7. Ensure there are no gaps in the pipework insulation. Insulate the pipework right up to the unit.
8. Ensure that the gradient of the drain pan pipework is such that discharge can only blow out.
9. Hydro unit and VALVE KIT water pipe connection sizes and pipe sizes.

Unit model	Connection size		Pipe size		Water volume (l)
	Water inlet	Water outlet	Water out	Water return	
PFFY-WL20VEM-A	O.D. 22.0 mm	O.D. 22.0 mm	I.D. ≥ 20.0 mm	I.D. ≥ 20.0 mm	0.8
PFFY-WL25VEM-A					0.8
PFFY-WL32VEM-A					1.0
PFFY-WL40VEM-A					1.3
PFFY-WL50VEM-A					1.3

\* If the length of branched water piping on WL50 equals or exceeds 40 m, use pipes with an inner diameter of 30 mm or larger.

\* PFFY-WL-VEM Series has no valve.

[Fig. 6.3.6] (P.7)

- (A) To outdoor unit
- (B) End connection
- (C) Hydro unit
- (D) To main piping
- (E) Indoor unit without valve
- (E) Indoor unit with valve
- (F) Auto air vent valve (Highest point on the water pipe) (supplied)
- (G) Optional VALVE KIT
- (H) Pipe length between indoor unit without valve and optional VALVE KIT is less than 5 m.

- Please refer to the [Fig. 6.3.5] (P.7) when connecting the water supply.
- Install a shut off valve and strainer in a place that is easy to operate and makes maintenance work easy.
- Apply insulation to the indoor unit pipework, strainer, shut off valve, and pressure reducing valve.
- Please do not use a corrosion inhibitor in the water system.
- Use formula  $0.1 \text{ [MPa]} < 0.01 + 0.01 \times A < 0.16 \text{ [MPa]}$  for the supply pressure range to be used.  
(A: Head pressure (m) between the hydro unit and the highest indoor unit)  
If the supply pressure is greater than 0.16 MPa, use a pressure reducing valve to keep the pressure within the range.  
If the head pressure is unknown, set it to 0.16 MPa.

## 6.5. Water treatment and quality control

To preserve water quality, use the closed type of water circuit. When the circulating water quality is poor, the water heat exchanger can develop scales, leading to a reduction in heat-exchange power and possible corrosion. Pay careful attention to water processing and water quality control when installing the water circulation system.

- Removing of foreign objects or impurities within the pipes
  - During installation, make sure that foreign objects, such as welding fragments, sealant particles, or rust, do not enter the pipes.
- Water Quality Processing
  - Depending on the quality of the cold-temperature water used in the air conditioner, the copper piping of the heat exchanger may corrode. Regular water quality processing is recommended. If a water supply tank is installed, keep air contact to a minimum, and keep the level of dissolved oxygen in the water no higher than 1 mg/l.
  - Water quality standard

Items	Low to mid-range temperature water system		Tendency	
	Recirculating water [20<T<60°C] [68<T<140°F]	Make-up water	Corrosive	Scale-forming
pH (25°C) [77°F]	7.0 – 8.0	7.0 – 8.0	○	○
Electric conductivity (mS/m) (25°C) [77°F]	30 or less	30 or less	○	○
(μ s/cm) (25°C) [77°F]	[300 or less]	[300 or less]		
Chloride ion (mg Cl-/l)	50 or less	50 or less	○	
Sulfate ion (mg SO4 <sup>2-</sup> /l)	50 or less	50 or less	○	
Acid consumption (pH4.8) (mg CaCO <sub>3</sub> /l)	50 or less	50 or less		○
Total hardness (mg CaCO <sub>3</sub> /l)	70 or less	70 or less		○
Calcium hardness (mg CaCO <sub>3</sub> /l)	50 or less	50 or less		○
Ionic silica (mg SiO <sub>2</sub> /l)	30 or less	30 or less		○
Iron (mg Fe/l)	1.0 or less	0.3 or less	○	○
Copper (mg Cu/l)	1.0 or less	0.1 or less	○	
Sulfide ion (mg S <sup>2-</sup> /l)	not to be detected	not to be detected	○	
Ammonium ion (mg NH <sub>4</sub> <sup>+</sup> /l)	0.3 or less	0.1 or less	○	
Residual chlorine (mg Cl/l)	0.25 or less	0.3 or less	○	
Free carbon dioxide (mg CO <sub>2</sub> /l)	0.4 or less	4.0 or less	○	
Ryzner stability index	6.0 – 7.0	–	○	○

Reference: Guideline of Water Quality for Refrigeration and Air Conditioning Equipment. (JRA GL02E-1994)

- Consult with a specialist about water quality control methods and calculations before using anti-corrosive solutions.
- When replacing a previously installed air conditioning device (even when only the heat exchanger is being replaced), first conduct a water quality analysis and check for possible corrosion.  
Corrosion can occur in cold-water systems even if there has been no prior signs of corrosion.  
If the water quality level has dropped, adjust water quality before replacing the unit.

## 7. Electrical wiring

### Precautions on electrical wiring

#### ⚠ Warning:

Electrical work should be done by qualified electrical engineers in accordance with “Engineering Standards For Electrical Installation” and supplied installation manuals. Special circuits should also be used. If the power circuit lacks capacity or has an installation failure, it may cause a risk of electric shock or fire.

1. Be sure to install an earth leakage breaker to the power.
2. Install the unit to prevent that any of the control circuit cables (remote controller, transmission cables) is brought in direct contact with the power cable outside the unit.
3. Ensure that there is no slack on all wire connections.
4. Some cables (power, remote controller, transmission cables) above the ceiling may be bitten by mouses. Use as many metal pipes as possible to insert the cables into them for protection.

#### • Transmission cable

Type	2-core shielded cable CVVS, CPEVS, or MVVS
Size	1.25 mm <sup>2</sup> (AWG 16), or ø1.2 mm or above
Length	Max. 200 m (656 ft)
Remarks	The maximum allowable length of transmission cables via outdoor units (both centralized control transmission cables and indoor-outdoor transmission cables) is 500 m (1640 ft) <sup>*1</sup> . The maximum allowable length of transmission cables from the power supply unit to each outdoor unit or to the system controller is 200 m (656 ft).

\* Do not use a single multiple-core cable to connect indoor units that belong to different refrigerant systems. The use of a multiple-core cable may result in signal transmission errors and malfunctions.

\* Ensure shield continuity when extending the transmission cable.

\*1 When extending the length of the transmission cables to 1000 m (3280 ft), consult your dealer.

#### • Remote controller cable

	MA remote controller	ME remote controller
Type	2-core cable VCTF, VCTFK, CVV, VVR, VVF, or VCT	2-core shielded cable CVVS, CPEVS, or MVVS
Size	0.3 to 1.25 mm <sup>2</sup> (AWG 22 to 16) <sup>*1 *4</sup>	0.3 to 1.25 mm <sup>2</sup> (AWG 22 to 16) <sup>*1</sup>
Length	Max. 200 m (656 ft) <sup>*3</sup>	Max. 10 m (32 ft) <sup>*2</sup>

\*1 The use of cables that are smaller than 0.75 mm<sup>2</sup> (AWG 18) is recommended for easy handling.

\*2 The section of the cable that exceeds 10 m [32 ft] must be included in the maximum indoor-outdoor transmission cable distance.

\*3 Max. 70 m (229 ft) for PAR-CT01MA series

\*4 To wire PAR-CT01MA series, PAR-FS01MA series, PAR-40MA series, PAR-30MA series, or Simple MA remote controller, use a cable with a size of 0.3 mm<sup>2</sup> (AWG 22).

### 7.1. Power supply wiring

- Use dedicated power supplies for the outdoor unit and indoor unit.
- Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.
- The wire size is the minimum value for metal conduit wiring. If the voltage drops, use a wire that is one rank thicker in diameter. Make sure the power-supply voltage does not drop more than 10%.
- Specific wiring requirements should adhere to the wiring regulations of the region.
- Power supply cords of appliances shall not be lighter than design 60245 IEC 57 or 60227 IEC 57.
- A switch with at least 3 mm contact separation in each pole shall be provided by the Air conditioner installation.

#### [Fig. 7.1.1] (P.8)

- Ⓐ Ground-fault interrupter
- Ⓑ Local switch/Wiring breaker
- Ⓒ Indoor unit
- Ⓓ Pull box

Total operating current of the Indoor unit	Minimum wire thickness (mm <sup>2</sup> )			Ground-fault interrupter <sup>*1</sup>	Local switch (A)		Breaker for wiring (A) (Non-fuse breaker)
	Main cable	Branch	Ground		Capacity	Fuse	
F0 = 16 A or less <sup>*2</sup>	1.5	1.5	1.5	20 A current sensitivity <sup>*3</sup>	16	16	20
F0 = 25 A or less <sup>*2</sup>	2.5	2.5	2.5	30 A current sensitivity <sup>*3</sup>	25	25	30
F0 = 32 A or less <sup>*2</sup>	4.0	4.0	4.0	40 A current sensitivity <sup>*3</sup>	32	32	40

Apply to IEC61000-3-3 about Max. Permissive System Impedance.

5. Never connect the power cable to leads for the transmission cables. Otherwise the cables would be broken.
6. Be sure to connect control cables to the indoor unit, remote controller, and the outdoor unit.
7. Put the unit to the ground on the outdoor unit side.
8. Select control cables from the conditions given below.

#### ⚠ Caution:

- **Be sure to put the unit to the ground on the outdoor unit side. Do not connect the earth cable to any gas pipe, water pipe, lightning rod, or telephone earth cable. Incomplete grounding may cause a risk of electric shock.**
- **If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.**

\*1 The Ground-fault interrupter should support inverter circuit.  
The Ground-fault interrupter should combine using of local switch or wiring breaker.

\*2 Please take the larger of F1 or F2 as the value for F0.

F1 = Total operating maximum current of the indoor units × 1.2

F2 = {V1 × (Quantity of Type1)/C} + {V1 × (Quantity of Type2)/C} + {V1 × (Quantity of Type3)/C} + {V1 × (Quantity of Others)/C}

Indoor unit		V1	V2
Type1	PEFY-VMS, PFFY-VCM, PFFY-VEM	18.6	2.4
Type2	PEFY-VMA	38	1.6

C : Multiple of tripping current at tripping time 0.01s

Please pick up "C" from the tripping characteristic of the breaker.

<Example of "F2" calculation>

\*Condition PEFY-VMS × 4 + PEFY-VMA × 1, C = 8 (refer to right sample chart)

F2 = 18.6 × 4/8 + 38 × 1/8

= 14.05

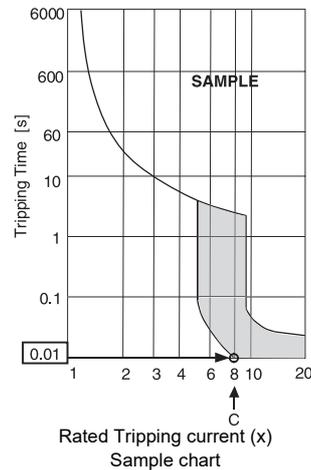
→ 16 A breaker (Tripping current = 8 × 16 A at 0.01s)

\*3 Current sensitivity is calculated using the following formula.

G1 = (V2 × Quantity of Type1) + (V3 × Wire length [km])

G1	Current sensitivity
30 or less	30 mA 0.1 sec or less
100 or less	100 mA 0.1 sec or less

Wire thickness	V3
1.5 mm <sup>2</sup>	48
2.5 mm <sup>2</sup>	56
4.0 mm <sup>2</sup>	66



### Warning:

- Be sure to use specified wires for connections and ensure no external force is imparted to terminal connections. If connections are not fixed firmly, heating or fire may result.
- Be sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.

### Caution:

- Some installation sites may require attachment of an earth leakage breaker for the inverter. If no earth leakage breaker is installed, there is a danger of electric shock.
- Do not use anything other than the correct capacity breaker and fuse. Using fuse, wire or copper wire with too large capacity may cause a risk of malfunction or fire.

### Notes:

- This device is intended for the connection to a power supply system with a maximum permissible system impedance (Refer to IEC61000-3-3.) at the interface point (power service box) of the user's supply.
- The user must ensure that this device is connected only to a power supply system which fulfils the requirement above. If necessary, the user can ask the public power supply company for the system impedance at the interface point.

## 7.2. Connecting remote controller, indoor and outdoor transmission cables

- Connect indoor unit TB5 and outdoor unit TB3. (Non-polarized 2-wire)  
The "S" on indoor unit TB5 is a shielding wire connection. For specifications about the connecting cables, refer to the outdoor unit installation manual.
- Install a remote controller following the manual supplied with the remote controller.
- Connect the "1" and "2" on indoor unit TB15 to a MA remote controller. (Non-polarized 2-wire)
- Connect the "M1" and "M2" on indoor unit TB5 to a M-NET remote controller. (Non-polarized 2-wire)
- Connect the remote controller's transmission cable within 10 m using a 0.75 mm<sup>2</sup> core cable. If the distance is more than 10 m, use a 1.25 mm<sup>2</sup> junction cable.

[Fig. 7.2.1] (P.8) MA Remote controller

[Fig. 7.2.2] (P.8) M-NET Remote controller

- Ⓐ Terminal block for indoor transmission cable
- Ⓑ Terminal block for outdoor transmission cable
- Ⓒ Remote controller

- DC 9 to 13 V between 1 and 2 (MA remote controller)
- DC 24 to 30 V between M1 and M2 (M-NET remote controller)

[Fig. 7.2.3] (P.8) MA Remote controller

[Fig. 7.2.4] (P.8) M-NET Remote controller

- Ⓐ Non-polarized
- Ⓑ TB15
- Ⓒ Remote Controller
- Ⓓ TB5

- The MA remote controller and the M-NET remote controller cannot be used at the same time or interchangeably.

### Caution:

Install wiring so that it is not tight and under tension. Wiring under tension may break, or overheat and burn.

## 7.3. How to mount remote controller

- Dismount the upper part of remote controller, and fasten the base of the controller at the indicated positions with screws provided. (Be careful not to cut the wiring inside the controller.)

[Fig. 7.3.1] (P.8)

- Connect the transmission terminal bed inside the control box and the terminal bed of the remote controller through the notch.

[Fig. 7.3.2] (P.8)

Ⓐ Notch for transmission line

- After completing the work of the above items 1 and 2, insert the upper part of remote controller into its original position.

### Note:

- Unscrew the two screws holding the base of the controller to remove the remote controller. [Fig. 7.3.3] (P.8)

## 7.4. Connecting electrical connections

Please identify the model name of the operation manual attached on the terminal box cover with that shown on the rating name plate.

1. Remove the screws holding the cover to dismount the cover.

**[Fig. 7.4.1] (P.9)**

- Ⓐ Screw holding cover (4pcs.)
- Ⓑ Cover

2. Open knockout holes  
(Recommend to use a screwdriver or the like for this work.)
3. Fix power source wiring to terminal box by using buffer bushing for tensile force. (PG connection or the like.) Connect transmission wiring to transmission terminal block through the knockout hole of terminal box using ordinary bushing.
4. Connect the power source, Earth, transmission and remote controller wiring. The dismounting of the terminal box is not needed.

**[Fig. 7.4.2] (P.9)**

- Ⓐ Terminal bed box
- Ⓑ Knockout hole
- Ⓒ Remove

**[Shield wire connection]**

**[Fig. 7.4.3] (P.9)**

- Ⓐ Use a cable tie to secure the cable.
- Ⓑ Use PG bushing to keep the weight of the cable and external force from being applied to the power supply terminal connector.
- Ⓒ Power source wiring
- Ⓓ Use ordinary bushing
- Ⓔ Power source terminal block
- Ⓕ Terminal block for indoor transmission
- Ⓖ Terminal block for remote controller
- Ⓖ To 1-phase power source
- Ⓘ Transmission line 30 VDC
- Ⓚ Transmission line to the remote controller, terminal block for indoor unit and BC controller

5. After wiring is complete, make sure again that there is no slack on the connections, and attach the cover onto the terminal box in the reverse order of removal.

**Notes:**

- Do not pinch the cables or wires when attaching the terminal box cover. Doing so may cause a risk of disconnection.
- When accommodating the terminal box, make sure that the connectors on the box side are not removed. If removed, it cannot operate normally.

## 7.5. Optional VALVE KIT electrical construction work

1. Remove the screw (4pcs) holding the cover to dismount the cover.

**[Fig. 7.4.1] (P.9)**

- Ⓐ Screw holding cover (4pcs)
- Ⓑ Cover

2. Insert the lead wire of the optional VALVE KIT into the indoor unit through the wiring insertion port.

**[Fig. 7.5.1] (P.9)**

- Ⓒ Optional VALVE KIT lead wire
- Ⓓ Cable clamp

3. Connect to the optional lead wire circuit board connector.
  - A connector is attached to CN8A, so remove it.
  - The connection destinations of the lead wire connector of the optional VALVE KIT are as follows.

**[Fig. 7.5.2] (P.9)**

- Flow control valve (8pin white): CN8A
- Pressure sensor-IN (6pin white): CNSA
- Pressure sensor-OUT (3pin black): CNSB

## 7.10. Electrical characteristics

Symbols: MCA: Max. Circuit Amps (= 1.25 x FLA) FLA: Full Load Amps  
IFM: Indoor Fan Motor Output: Fan motor rated output

Model	Power supply			IFM	
	Volts / Hz	Range +/-10%	MCA (A)	Output (kW)	FLA(A)
PFFY-WL20VEM-A	220-240 V / 50 Hz 220-240 V / 60 Hz	Max.: 264 V Min.: 198 V	0.42	0.096	0.33
PFFY-WL25VEM-A			0.54	0.096	0.43
PFFY-WL32VEM-A			0.62	0.096	0.49
PFFY-WL40VEM-A			0.65	0.096	0.52
PFFY-WL50VEM-A			0.85	0.096	0.68

Refer to Data Book for other models.

4. Install a band on the optional lead wire, and perform measures against tension.

**[Fig. 7.5.3] (P.9)**

- Ⓒ Optional VALVE KIT lead wire
- Ⓓ Cable clamp
- Ⓔ Small band (included with the optional VALVE KIT)

5. Attach the electrical box cover as it was.

## 7.6. External I/O specifications

**⚠ Caution:**

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750 V or more.

## 7.7. Setting addresses

(Be sure to operate with the main power turned OFF.)

**[Fig. 7.7.1] (P.10)**

<Indoor controller board>

- There are two types of rotary switch setting available: setting addresses 1 to 9 and over 10, and setting branch numbers.
  - ① How to set addresses  
Example: If Address is "3", remain SW12 (for over 10) at "0", and match SW11 (for 1 to 9) with "3".
  - ② How to set branch numbers SW14 (Series R2 only)  
The branch number assigned to each indoor unit is the port number of the BC controller to which the indoor unit is connected.  
Leave it to "0" on the non-R2 series of units.
- The rotary switches are all set to "0" when shipped from the factory. These switches can be used to set unit addresses and branch numbers at will.
- The determination of indoor unit addresses varies with the system at site. Set them referring to the Data Book.

## 7.8. Sensing room temperature with the built-in sensor in a remote controller

If you want to sense room temperature with the built-in sensor in a remote controller, set SW1-1 on the control board to "ON". The setting of SW1-7 and SW1-8 as necessary also makes it possible to adjust the air flow at a time when the heating thermometer is OFF.

**Note:**

To perform the auto cooling/heating operation, use the built-in sensor in a remote controller or the optional remote sensor.

## 7.9. Setting of intermittent fan control

When the unit is used in a high temperature and humidity environment, set the function setting No. 119 to "2."  
(Default setting: "1")

**⚠ Caution:**

When the setting is enabled, the stopped fan may start operating.









## AIR CONDITIONER INDOOR UNIT

MODEL \_\_\_\_\_

SERVICE REF. \_\_\_\_\_

OPERATE	<COOLING>						<HEATING>					
RATED VOLTAGE	220		230		240		220		230		240	
FREQUENCY	50	60	50	60	50	60	50	60	50	60	50	60
CAPACITY	kW											
RATED INPUT<INDOOR ONLY>	kW											
RATED CURRENT<INDOOR ONLY>	A											

ALLOWABLE VOLTAGE  $\pm 10\%$   
CONTROL RATING DC30V  
FAN MOTOR kW  
REFRIGERANT R-718(WATER)  
ALLOWABLE PRESSURE 1.0 MPa

WEIGHT kg  
PHASE ~/N IP CODE IP20

SERIAL No. \_\_\_\_\_

YEAR OF MANUFACTURE \_\_\_\_\_

### MITSUBISHI ELECTRIC CORPORATION

MITSUBISHI ELECTRIC CONSUMER PRODUCTS (THAILAND) CO., LTD.  
700/406 MOO 7, TAMBON DON HUA ROH, AMPHUR MUANG, CHONBURI 20000, THAILAND  
MADE IN THAILAND

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This product is designed and intended for use in the residential,  
commercial and light-industrial environment.

Please be sure to put the contact address/telephone number on  
this manual before handing it to the customer.

**MITSUBISHI ELECTRIC CORPORATION**

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