

Air-Conditioners For Building Application INDOOR UNIT

PLFY-WP-VBM-E

INSTALLATION MANUAL

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

FOR INSTALLER

INSTALLATIONSHANDBUCH

Aus Sicherheitsgründen und zur richtigen Anwendung vor Installation der Klimaanlage die vorliegende Bedienungsanleitung und das Installationshandbuch gründlich durchlesen.

FÜR INSTALLATEUR

MANUEL D'INSTALLATION

Avant d'installer le climatiseur, lire attentivement ce manuel, ainsi que le manuel d'installation de l'appareil extérieur pour une utilisation sûre et correct.

POUR L'INSTALLATEUR

INSTALLATIEHANDLEIDING

Lees deze handleiding en de installatiehandleiding van het buitenapparaat zorgvuldig door voordat u met het installeren van de airconditioner begint.

VOOR DE INSTALLATEUR

MANUAL DE INSTALACIÓN

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

PARA EL INSTALADOR

РУКОВОДСТВО ПО УСТАНОВКЕ

Для обеспечения безопасной и надлежащей эксплуатации внимательно прочтите данное руководство и руководство по установке наружного прибора перед установкой кондиционера.

ДЛЯ УСТАНОВИТЕЛЯ**English (GB)****Deutsch (D)****Français (F)****Nederlands (NL)****Español (E)****Русский (RU)**

Contents

1. Safety precautions.....	2	5. Electrical work.....	7
2. Installing the indoor unit.....	2	6. Installing the grille.....	11
3. Connecting drain pipe.....	4	7. Test run.....	14
4. Connecting water pipes.....	5		

Note:
The phrase “Wired remote controller” in this installation manual refers only to the PAR-32MAA.
If you need any information for the other remote controller, please refer to either the installation manual or initial setting manual which are included in these boxes.

1. Safety precautions

- ▶ Before installing the unit, make sure you read all the “Safety precautions”.
- ▶ Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

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

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

After installation work has been completed, explain the “Safety Precautions,” use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

- ⊘ : 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.
- ⚡ : Indicates that the main switch must be turned off before servicing.
- ⚡ : Beware of electric shock.
- ⚠ : Beware of hot surface.
- ⚡ ELV : At servicing, please shut down the power supply for both the Indoor and Outdoor Unit.

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

Caution:
Appliances not accessible to the general public.
Install the indoor unit at least 2.5 m above floor or grade level.

- Warning:**
- Ask the dealer or an authorized technician to install the air conditioner.
 - The user should never attempt to repair the unit or transfer it to another location.
 - Install the unit at a place that can withstand its weight.
 - Use only specified cables for wiring. The wiring connections must be made securely with no tension applied on the terminal connections. Also, never splice the cables for wiring (unless otherwise indicated in this document). Failure to observe these instructions may result in overheating or a fire.
 - Use only accessories authorized by Mitsubishi Electric and ask the dealer or an authorized technician to install them.

- Do not touch the heat exchanger fins.
- Install the air conditioner according to this Installation Manual.
- Have all electric work done by a licensed electrician according to local regulations.
- The appliance shall be installed in accordance with national wiring regulations.
- 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.
- The cut face punched parts may cause injury by cut, etc. The installers are requested to wear protective equipment such as gloves, etc.

- Caution:**
- Do not use the air conditioner where food, pets, plants, precision instruments, or artwork are kept.
 - Do not use the air conditioner in special environments.
 - Ground the unit.
 - Install an leak circuit breaker, as required.
 - Use power line cables of sufficient current carrying capacity and rating.
 - Use only a circuit breaker and fuse of the specified capacity.
 - Do not touch the switches with wet fingers.

- Do not operate the air conditioner with the panels and guards removed.
- Do not turn off the power immediately after stopping operation.
- If the unit is run for long hours when the air above the ceiling is at high temperature/high humidity (dew point above 26 °C), dew condensation may be produced in the indoor unit or the ceiling materials. When operating the units in this condition, add insulation material (10-20 mm) to the entire surface of the unit and ceiling materials to avoid dew condensation.

2. Installing the indoor unit

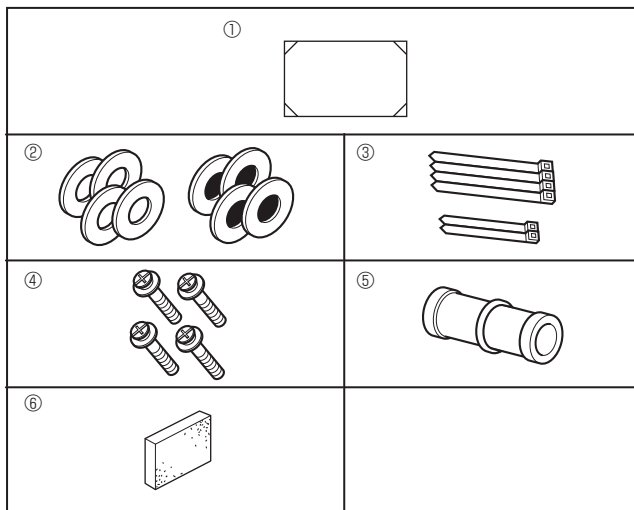


Fig. 2-1

2.1. Check the indoor unit accessories (Fig. 2-1)

The indoor unit should be supplied with the following accessories.

	Accessory name	Qty
①	Installation template	1
②	Washers (with insulation)	4
	Washers (without insulation)	4
③	Band (large)	4
	Band (small)	2
④	Screw with washer (M5 × 25) for mounting grille	4
⑤	Drain socket	1
⑥	Insulation	1

2. Installing the indoor unit

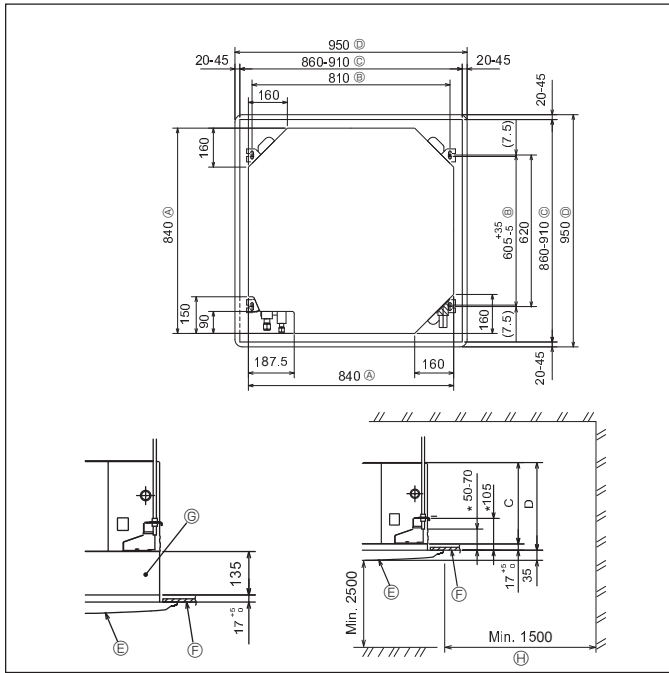


Fig. 2-2

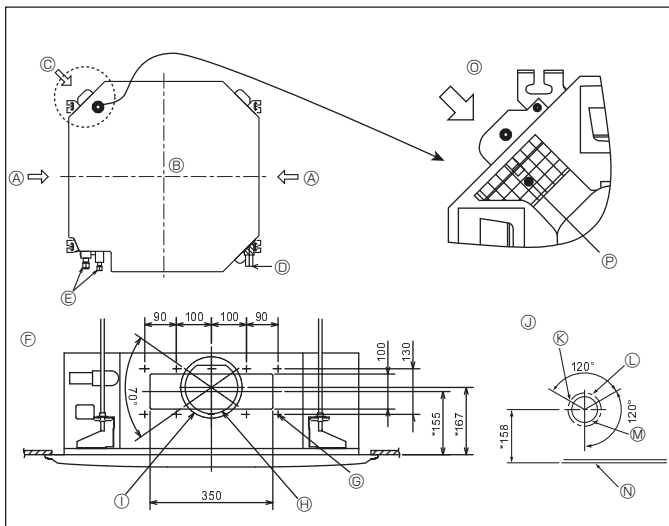


Fig. 2-3

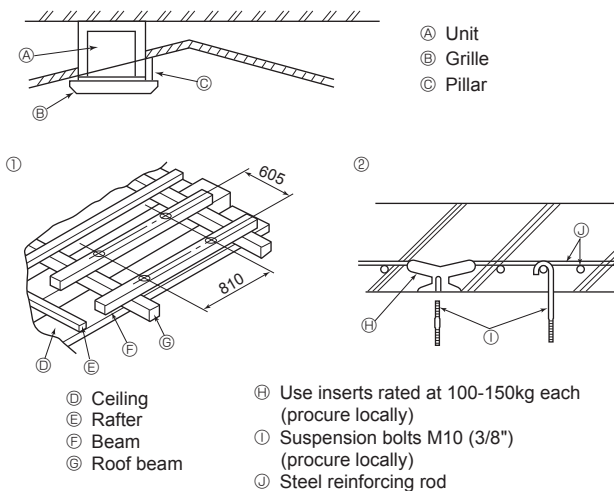


Fig. 2-4

2.2. Ceiling openings and suspension bolt installation locations (Fig. 2-2)

Caution:

Install the indoor unit at least 2.5 m above floor or grade level.

- Using the installation template (top of the package) and the gauge (supplied as an accessory with the grille), make an opening in the ceiling so that the main unit can be installed as shown in the diagram. (The method for using the template and the gauge is shown.)
 - Before using, check the dimensions of template and gauge, because they change due to fluctuations of temperature and humidity.
 - The dimensions of ceiling opening can be regulated within the range shown in Fig. 2-2; so center the main unit against the opening of ceiling, ensuring that the respective opposite sides on all sides of the clearance between them becomes identical.
- Use M10 (3/8") suspension bolts.
 - Suspension bolts are to be procured at the field.
- Install securely, ensuring that there is no clearance between the ceiling panel & grille, and between the main unit & grille.
 - (A) Outer side of main unit
 - (B) Bolt pitch
 - (C) Ceiling opening
 - (D) Outer side of Grille
 - (E) Grille
 - (F) Ceiling
 - (G) Multi function casement (option)
 - (H) Entire periphery

* Note that the space between ceiling panel of the unit and ceiling slab and etc must be 10 to 15 mm.

* When the optional multi-functional casement is installed, add 135 mm to the dimensions marked on the figure. (mm)

Models	C	D
32, 40, 50	241	258

2.3. Branch duct hole and fresh air intake hole (Fig. 2-3)

At the time of installation, use the duct holes (cut out) located at the positions shown in Fig. 2-3, as and when required.

A fresh air intake hole for the optional multi function casement can also be made.

Note:

- The figure marked with * in the drawing represent the dimensions of the main unit excluding those of the optional multi function casement.
- When installing the optional multi function casement, add 135 mm to the dimensions marked on the figure.
- When installing the branch ducts, be sure to insulate adequately. Otherwise condensation and dripping may occur.
- When installing the fresh air intake hole, be sure to remove the insulator (P) that is pasted on the indoor unit.

- (A) Branch duct hole
- (B) Indoor unit
- (C) Fresh air intake hole
- (D) Drain pipe
- (E) Water pipe
- (F) Branch duct hole diagram (view from either side)
- (G) 14-ø2.8 burring hole
- (H) ø150 cut out hole
- (I) ø175 burring hole pitch
- (J) Fresh air intake hole diagram
- (K) 3-ø2.8 burring hole
- (L) ø125 burring hole pitch
- (M) ø100 cut out hole
- (N) Ceiling
- (O) Detailed figure of removing the insulator
- (P) Insulator

2.4. Suspension structure (Give site of suspension strong structure) (Fig. 2-4)

The ceiling work differs according to the construction of the building. Building constructors and interior decorators should be consulted for details.

- Extent of ceiling removal: The ceiling must be kept completely horizontal and the ceiling foundation (framework: wooden slats and slat holders) must be reinforced in order to protect the ceiling from vibration.
- Cut and remove the ceiling foundation.
- Reinforce the ends of the ceiling foundation where it has been cut and add ceiling foundation for securing the ends of the ceiling board.
- When installing the indoor unit on a slanted ceiling, attach a pillar between the ceiling and the grille and set so that the unit is installed horizontally.

① Wooden structures

- Use tie beams (single storied houses) or second floor beams (two story houses) as reinforcing members.
- Wooden beams for suspending air conditioners must be sturdy and their sides must be at least 6 cm long if the beams are separated by not more than 90 cm and their sides must be at least 9 cm long if the beams are separated by as much as 180 cm. The size of the suspension bolts should be ø10 (3/8"). (The bolts do not come with the unit.)

② Ferro-concrete structures

- Secure the suspension bolts using the method shown, or use steel or wooden hangers, etc. to install the suspension bolts.

2. Installing the indoor unit

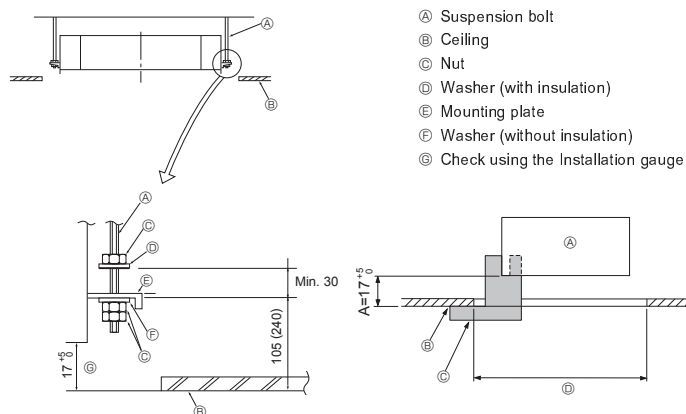
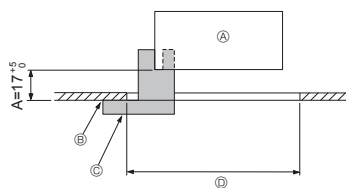


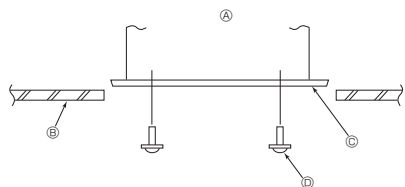
Fig. 2-5

- Ⓐ Suspension bolt
- Ⓑ Ceiling
- Ⓒ Nut
- Ⓓ Washer (with insulation)
- Ⓔ Mounting plate
- Ⓕ Washer (without insulation)
- Ⓖ Check using the Installation gauge



- Ⓐ Main unit
- Ⓑ Ceiling
- Ⓒ Gauge
- Ⓓ Ceiling opening dimensions

Fig. 2-6



- Ⓐ Main unit
- Ⓑ Ceiling
- Ⓒ Installation template (top of the package)
- Ⓓ Screw with washer (Accessory)

Fig. 2-7

3. Connecting drain pipe

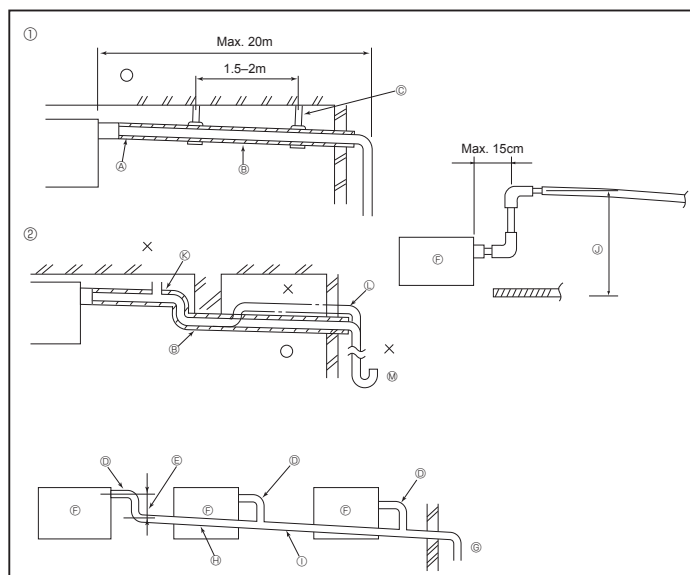


Fig. 3-1

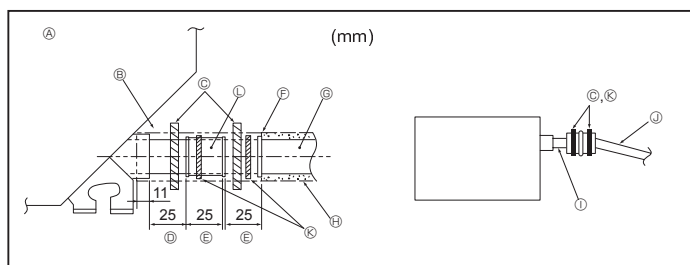


Fig. 3-2

2.5. Unit suspension procedures (Fig. 2-5)

Suspend the main unit as shown in the diagram.

Figures given in parentheses represent the dimensions in case of installing optional multi function casement.

1. In advance, set the parts onto the suspension bolts in the order of the washers (with insulation), washers (without insulation) and nuts (double).
 - Fit the washer with cushion so that the insulation faces downward.
 - In case of using upper washers to suspend the main unit, the lower washers (with insulation) and nuts (double) are to be set later.
 2. Lift the unit to the proper height of the suspension bolts to insert the mounting plate between washers and then fasten it securely.
 3. When the main unit can not be aligned against the mounting hole on the ceiling, it is adjustable owing to a slot provided on the mounting plate.
- Make sure that A is performed within 17-22 mm. Damage could result by failing to adhere to this range. (Fig. 2-6)

⚠ Caution:

Use the top half of the box as a protective cover to prevent dust or debris from getting inside the unit prior to installation of the decorative cover or when applying ceiling materials.

2.6. Confirming the position of main unit and tightening the suspension bolts (Fig. 2-7)

- Using the gauge attached to the grille, ensure that the bottom of the main unit is properly aligned with the opening of the ceiling. Be sure to confirm this, otherwise condensation may form and drip due to air leakage, etc.
- Confirm that the main unit is horizontally levelled, using a level or a vinyl tube filled with water.
- After checking the position of the main unit, tighten the nuts of the suspension bolts securely to fasten the main unit.
- The installation template (top of the package) can be used as a protective sheet to prevent dust from entering the main unit when the grilles are left unattached for a while or when the ceiling materials are to be lined after installation of the unit is finished.

* As for the details of fitting, refer to the instructions given on the Installation template.

3.1. Drainage piping work (Fig. 3-1)

- Use VP25 (O.D. $\phi 32$ (1-1/4") PVC TUBE) for drain piping and provide 1/100 or more downward slope.
- Be sure to connect the piping joints using a polyvinyl type adhesive.
- Observe the figure for piping work.
- Use the included drain hose to change the extraction direction.

- ① Correct piping
- ② Wrong piping
- Ⓐ Insulation (9 mm or more)
- Ⓑ Downward slope (1/100 or more)
- Ⓒ Support metal
- ⓧ Air bleeder
- Ⓘ Raised
- Ⓜ Odor trap

Grouped piping

- Ⓔ O. D. $\phi 32$ PVC TUBE
- Ⓕ Make it as large as possible
- Ⓖ Indoor unit
- Ⓖ Make the piping size large for grouped piping.
- Ⓗ Downward slope (1/100 or more)
- ① O. D. $\phi 38$ PVC TUBE for grouped piping. (9 mm or more insulation)
- Ⓙ Up to 85 cm

1. Connect the drain socket (supplied with the unit) to the drain port. (Fig. 3-2) (Fix the tube using PVC adhesive then secure it with a band.)
2. Install a locally purchased drain pipe (PVC pipe, O.D. $\phi 32$). (Fix the pipe using PVC adhesive then secure it with a band.)
3. Insulate the tube and pipe. (PVC pipe, O.D. $\phi 32$ and socket)
4. Check that drain flows smoothly.
5. Insulate the drain port with insulating material, then secure the material with a band. (Both insulating material and band are supplied with the unit.)

- Ⓐ Unit
- Ⓑ Insulating material
- Ⓒ Band (large)
- Ⓓ Drain port (transparent)
- Ⓔ Insertion margin
- Ⓕ Matching
- Ⓖ Drain pipe (O.D. $\phi 32$ PVC TUBE)
- Ⓗ Insulating material (purchased locally)
- ① Transparent PVC pipe
- Ⓙ O.D. $\phi 32$ PVC TUBE (Slope 1/100 or more)
- ⓧ Band (small)
- Ⓜ Drain socket

4. Connecting water pipes

Please observe the following precautions during installation.

4.1. Important notes on water pipework installation

- The water pressure resistance of the water pipes in the heat source unit is 1.0MPa [145psi].
- 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.
 - Wrap the joint with sealing tape following the direction of the threads (clockwise), do not wrap the tape over the edge.
 - 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.
 - Do not wrap the 1.5th through 2nd farthest threads away from the pipe end.

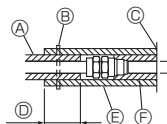


Fig. 4-1

- Ⓐ 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

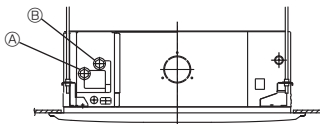


Fig. 4-2

- Ⓐ Water pipe: To HBC unit
- Ⓑ Water pipe: From HBC unit

- 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.
- 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.

4.2. Water pipe insulation

- 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.
- 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.
- 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. 4-1]

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

HBC controller	
-indoor unit	20 mm or more

- This specification is based on copper for water piping. When using plastic pipework, 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.
- 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.
- Apply caulking around the ends of the insulation to prevent condensation getting between the pipework and insulation.
- Add a drain valve so that the unit and pipework can be drained.
- Ensure there are no gaps in the pipework insulation. Insulate the pipework right up to the unit.
- Ensure that the gradient of the drain pan pipework is such that discharge can only blow out.

4. Connecting water pipes

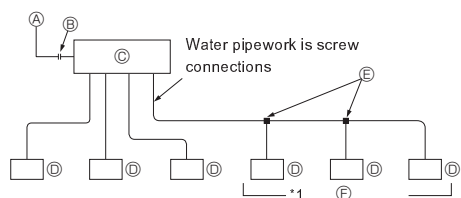


Fig. 4-3

- Ⓐ To outdoor unit
- Ⓑ End connection (brazing)
- Ⓒ HBC controller
- Ⓓ Indoor unit
- Ⓔ Twinning pipe (field supply)
- Ⓕ Up to three units for 1 branch hole; total capacity: below 80 (but in same mode, cooling/heating)

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.

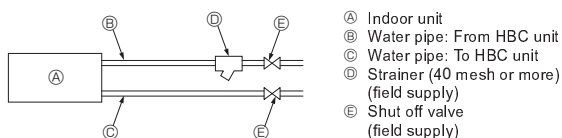


Fig. 4-4

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

9.HBC water pipe connection sizes

Unit model	Connection size		Pipe size		Water volume (ℓ)
	Water inlet	Water outlet	Water out	Water return	
PLFY-WP32VBM	Rc 3/4 screw	Rc 3/4 screw	Inner diameter ≥ 20 mm	Inner diameter ≥ 20 mm	1.5
PLFY-WP40VBM					1.5
PLFY-WP50VBM					1.5

10. Please refer to the [Fig. 4-4] when connecting the water supply.
11. Install a shut off valve and strainer in a place that is easy to operate and makes maintenance work easy.
12. Apply insulation to the indoor unit pipework, strainer, shut off valve, and pressure reducing valve.
13. Please do not use a corrosion inhibitor in the water system.

4.3. 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
 - ① 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.
 - ② 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	
Standard items	pH (25°C) [77°F]	7.0 ~ 8.0	7.0 ~ 8.0	○	○
	Electric conductivity (mS/m) (25°C) [77°F] (μs/cm) (25°C) [77°F]	30 or less [300 or less]	30 or less [300 or less]	○	○
	Chloride ion (mg Cl-/ℓ)	50 or less	50 or less	○	○
	Sulfate ion (mg SO4 ²⁻ /ℓ)	50 or less	50 or less	○	○
	Acid consumption (pH4.8) (mg CaCO ₃ /ℓ)	50 or less	50 or less		○
	Total hardness (mg CaCO ₃ /ℓ)	70 or less	70 or less		○
	Calcium hardness (mg CaCO ₃ /ℓ)	50 or less	50 or less		○
	Ionic silica (mg SiO ₂ /ℓ)	30 or less	30 or less		○
Reference items	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 ₂ -/ℓ)	not to be detected	not to be detected	○	
	Ammonium ion (mg NH ₄ ⁺ /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 ₂ /ℓ)	0.4 or less	4.0 or less	○	
Ryzner stability inde	6.0 ~ 7.0	-	○	○	

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

- ③ Consult with a specialist about water quality control methods and calculations before using anti-corrosive solutions.
- ④ 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.

5. Electrical work

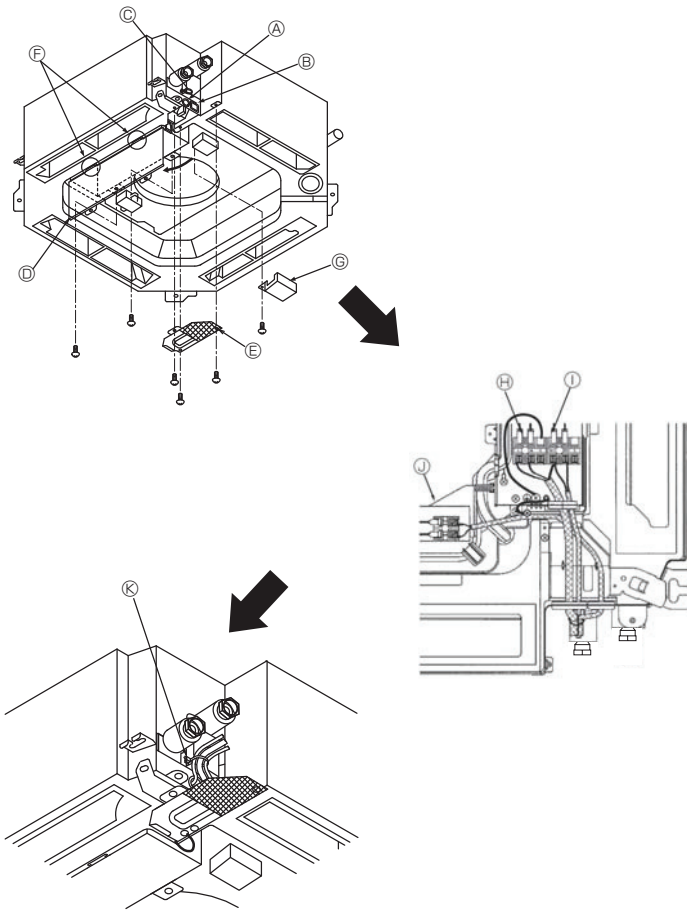


Fig. 5-1

5.1. Indoor unit (Fig. 5-1)

1. Remove the electrical wiring service panel.
 2. Remove the electrical box cover.
 3. Remove the MA Remote controller terminal cover.
 4. Wire the power cable and control cable separately through the respective wiring entries given in the diagram.
- Do not allow slackening of the terminal screws.
 - Leave excess cable so that the electrical box cover can be suspended below the unit during servicing. (Approx. 50 to 100 mm)
 - Ⓐ Entry for remote controller cable
 - Ⓑ Entry for power and control cable
 - Ⓒ Clamp
 - Ⓓ Electrical box cover
 - Ⓔ Service panel for electrical wiring
 - Ⓕ Temporary hook for electrical box cover
 - Ⓖ MA Remote controller terminal cover
 - Ⓗ Power supply terminals (with earth terminal) (L, N, ⊕)
 - Ⓚ Transmission terminals (M1, M2, S)
 - Ⓛ MA Remote controller terminal (1, 2)
 - Ⓧ Secure with the clamp

5.2. Power supply wiring

- Wiring size must comply with the applicable local and national code.
- Install an earth longer than other cables.
- Power supply codes of appliance shall not be lighter than design 60245 IEC 53 or 60227 IEC 53.
- A switch with at least 3 mm contact separation in each pole shall be provided by the air conditioner installation.

[Fig. 5-2]

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

⚠ **Warning:**

Never splice the power cable or the indoor-outdoor connection cable, otherwise it may result in a smoke, a fire or communication failure.

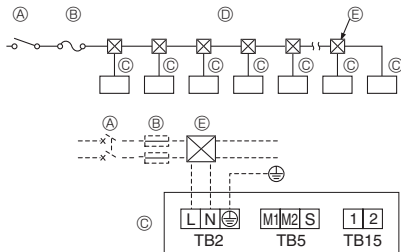


Fig. 5-2

5. Electrical work

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

Apply to IEC61000-3-3 about max. permissive system impedance.

*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
Type 1	PLFY-VBM, PEFY-VMS, PFFY-VLRMM	18.6	2.4
Type 2	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)

$$F2 = 18.6 \times 4/8 + 38 \times 1/8$$

$$= 14.05$$

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

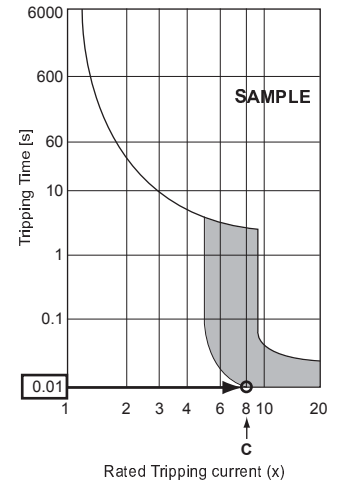
*3 Current sensitivity is calculated using the following formula.

$$G1 = V2 \times (\text{Quantity of Type1}) + V2 \times (\text{Quantity of Type2}) + V2 \times (\text{Quantity of Type3}) + V2 \times (\text{Quantity of Others}) + V3 \times (\text{Wire length[km]})$$

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

Wire thickness	V3
1.5 mm ²	48
2.5 mm ²	56
4.0 mm ²	66

Sample chart



5.3. Types of control cables

1. Wiring transmission cables

Types of transmission cable	Shielding wire CVVS or CPEVS
Cable diameter	More than 1.25 mm ²
Length	Less than 200 m

2. M-NET Remote control cables

Types of remote control cable	Shielding wire MVVS
Cable diameter	0.5 to 1.25 mm ²
Length	Add any portion in excess of 10 m to within the longest allowable transmission cable length 200 m

3. MA Remote control cables

Types of remote control cable	2-core cable (unshielded)
Cable diameter	0.3 to 1.25 mm ²
Length	Less than 200 m

5. Electrical work

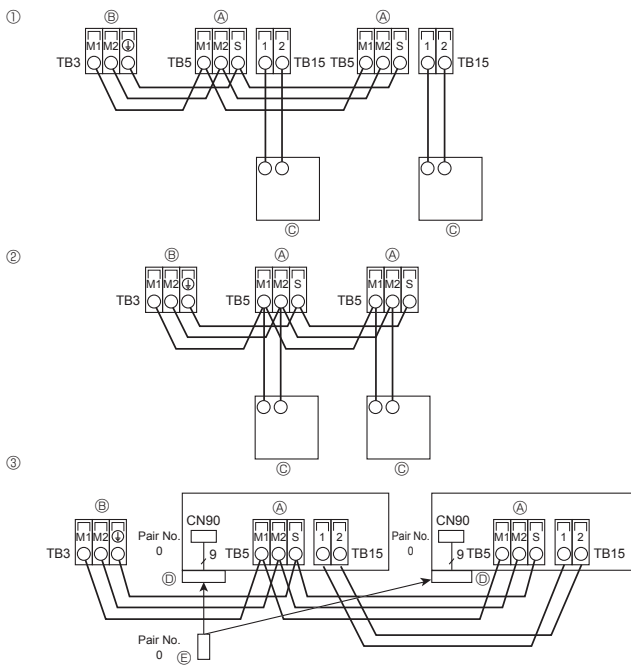


Fig. 5-3

5.4. Connecting remote controller, indoor and outdoor transmission cables (Fig. 5-3)

- 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 remote controller's transmission cable within 10 m using a 0.75 mm² core cable. If the distance is more than 10 m, use a 1.25 mm² junction cable.

- ① MA Remote controller
 - Connect the "1" and "2" on indoor unit TB15 to a MA remote controller. (Non-polarized 2-wire)
 - DC 9 to 13 V between 1 and 2 (MA remote controller)
- ② M-NET Remote controller
 - Connect the "M1" and "M2" on indoor unit TB5 to a M-NET remote controller. (Non-polarized 2-wire)
 - DC 24 to 30 V between M1 and M2 (M-NET remote controller)
- ③ Wireless remote controller (When installing wireless signal receiver)
 - Connect the wire of wireless signal receiver (9-pole cable) to CN90 of indoor controller board.
 - When more than two units are run under group control using wireless remote controller, connect TB15 each with the same number.
 - To change Pair No. setting, refer to installation manual attached to wireless remote controller. (In initial setting of indoor unit and wireless remote controller, Pair No. is 0.)

- Ⓐ Terminal block for indoor transmission cable
- Ⓑ Terminal block for outdoor transmission cable (M1(A), M2(B), ⊕ (S))
- Ⓒ Remote controller
- Ⓓ wireless signal receiver
- Ⓔ wireless remote controller

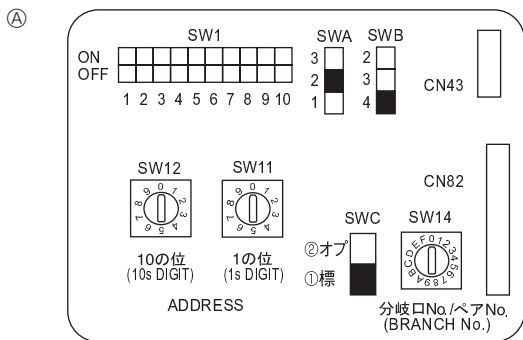


Fig. 5-4

5.5. Setting addresses (Fig. 5-4)

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

- There are 2 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
 - Match the indoor unit's water pipe with the HBC controller's end connection number.

- 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.

- Ⓐ Address board

5.6. Switch setting for high ceiling or at the time of changing the number of air outlets (Fig. 5-4)

With this unit, the air flow rate and fan speed can be adjusted by setting the SWA and SWB (slide switch). Select a suitable setting from the table below according to the installation location.

* Make sure the SWA and SWB switch are set, otherwise problems such as not getting cool/warm may occur.

■ PLFY-WP32, WP40, WP50VBM

SWA \ SWB		①	②	③
		Silent	Standard	High ceiling
④	4 direction	2.5 m	2.7 m	3.5 m
③	3 direction	2.7 m	3.0 m	3.5 m
②	2 direction	3.0 m	3.3 m	3.5 m

5.7. Sensing room temperature with the built-in sensor in a remote controller (Fig. 5-4)

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 airflow at a time when the heating thermometer is OFF.

5. Electrical work

5.8. Electrical characteristics

Symbols: MCA: Max. Circuit Amps (= 1.25×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)
PLFY-WP32VBM-E	220-240V / 50Hz	Max.: 264V Min.: 198V	0.44	0.05	0.35
PLFY-WP40VBM-E			0.44	0.05	0.35
PLFY-WP50VBM-E			0.57	0.05	0.45

5.9. How to set the fixed up/down air direction (Only for wired remote controller)

- For PLYF-BM, only the particular outlet can be fixed to certain direction with the procedures below. Once fixed, only the set outlet is fixed every time air conditioner is turned on. (Other outlets follow UP/DOWN air direction setting of the remote controller.)

■ Explanation of word

- "Address No. of indoor unit" is the number given to each air conditioner.
- "Outlet No." is the number given to each outlet of air conditioner. (Refer to the right.)
- "Up/Down air direction" is the direction (angle) to fix.

Horizontal airflow

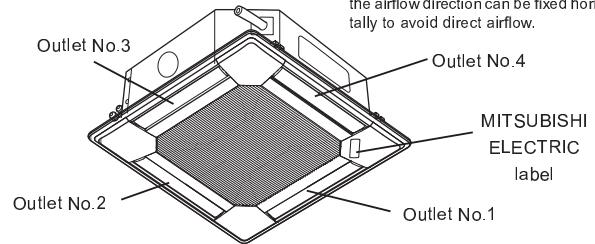


Downward

Remote controller setting
The airflow direction of this outlet is controlled by the airflow direction setting of remote controller.

Fixed setting
The airflow direction of this outlet is fixed in particular direction.

* When it is cold because of direct airflow, the airflow direction can be fixed horizontally to avoid direct airflow.



Note: "0" indicates all outlets.

■ Manual vane angle

① Select "Maintenance" from the Main menu, and press the [SELECT] button.

② Select "Manual vane angle" with the [F1] or [F2] button, and press the [SELECT] button.

③ Select the "M-NET address" for the units to whose vanes are to be fixed, with the [F2] or [F3] button, and press the [SELECT] button. Press the [F4] button to confirm the unit. The vane of only the target indoor unit is pointing downward.

■ Confirmation procedure

① Select the "M-NET address" for the units to whose vanes are to be fixed, with the [F2] or [F3] button. Press the [F4] button to confirm the unit.

② After pressing the [F4] button, wait approximately 15 seconds, and then check the current state of the air conditioner.
→ The vane is pointing downward.
→ This air conditioner is displayed on the remote controller.
→ All outlets are closed. → Press the [RETURN] button and continue the operation from the beginning.
→ The messages shown to the left are displayed. → The target device does not exist at this refrigerant address.

③ Change the "M-NET address" to the next number.
• Refer to step ① to change the "M-NET address" and continue with the confirmation.

6. Installing the grille

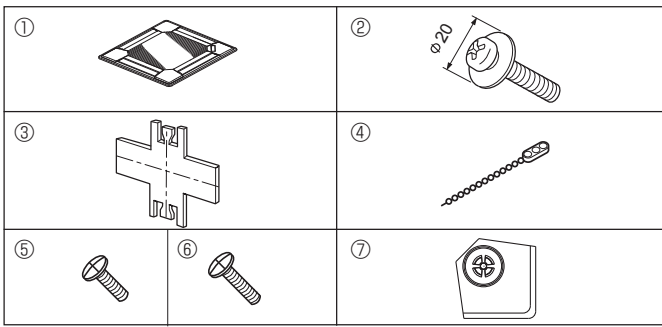


Fig. 6-1

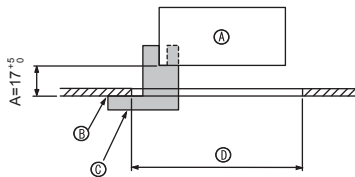


Fig. 6-2

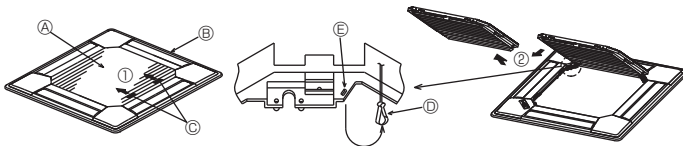


Fig. 6-3

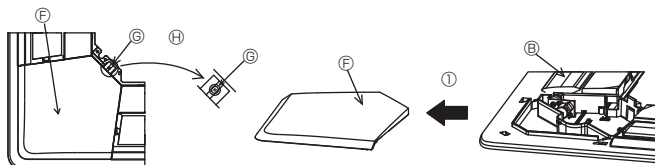


Fig. 6-4

	4-directional	3-directional
Blowout direction patterns	1 pattern: Initial setting 	4 pattern: 1 air outlet fully closed
Blowout direction patterns	2-directional 6 pattern: 2 air outlet fully closed 	

Table 1

6.1. Checking the contents (Fig. 6-1)

- This kit contains this manual and the following parts.

	Accessory name	Q'ty	Remark
①	Grille	1	950 × 950 (mm)
②	Screw with captive washer	4	M5 × 0.8 × 25
③	Gauge	1	(Divided into four parts)
④	Fastener	3	
⑤	Screw	4	4 × 8
⑥	Screw	1	4 × 12
⑦	i-see sensor corner panel	1	for PLP-6BAE

6.2. Preparing to attach the grille (Fig. 6-2)

- With the gauge ③ supplied with this kit, adjust and check the positioning of the unit relative to the ceiling. If the unit is not properly positioned relative to the ceiling, it may allow air leaks or cause condensation to collect.
- Make sure that the opening in the ceiling is within the following tolerances: 860 × 860 - 910 × 910
- Make sure that A is performed within 17-22 mm. Damage could result by failing to adhere to this range.
 - Ⓐ Main unit
 - Ⓑ Ceiling
 - Ⓒ Gauge ③ (inserted into the unit)
 - Ⓓ Ceiling opening dimensions

6.2.1. Removing the intake grille (Fig. 6-3)

- Slide the levers in the direction indicated by the arrow ① to open the intake grille.
- Unlatch the hook that secures the grille.
 - * Do not unlatch the hook for the intake grille.
- With the intake grille in the "open" position, remove the hinge of the intake grille from the grille as indicated by the arrow ②.

6.2.2. Removing the corner panel (Fig. 6-4)

- Remove the screw from the corner of the corner panel. Slide the corner panel as indicated by the arrow ① to remove the corner panel.

[Fig.6-3, 6-4]

- Ⓐ Intake grille
- Ⓑ Grille
- Ⓒ Intake grille levers
- Ⓓ Grille hook
- Ⓔ Hole for the grille's hook
- Ⓕ Corner panel
- Ⓖ Screw
- Ⓗ Detail

6.3. Selection of the air outlets

For this grille the discharge direction is available in 11 patterns. Also, by setting the remote controller to the appropriate settings, you can adjust the airflow and speed. Select the required settings from the Table 1 according to the location in which you want to install the unit.

- Decide on the discharge direction pattern.
- Be sure to set the remote controller to the appropriate settings, according to the number of air outlets and the height of the ceiling on which the unit will be installed.

Note:

For 3- and 2-directional, please use the air outlet shutter plate (option).

6. Installing the grille

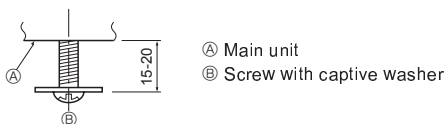


Fig. 6-5

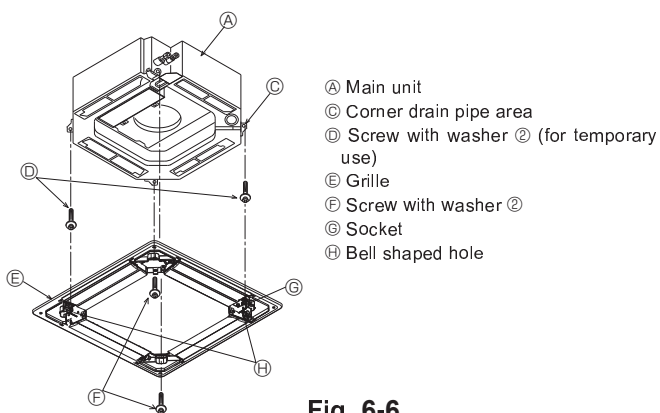


Fig. 6-6

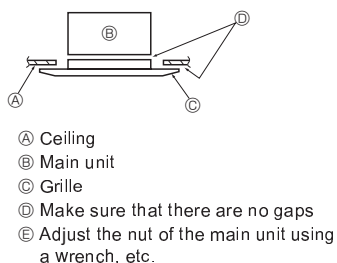
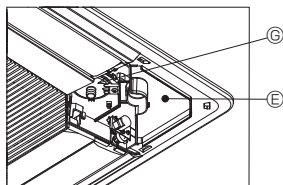


Fig. 6-7

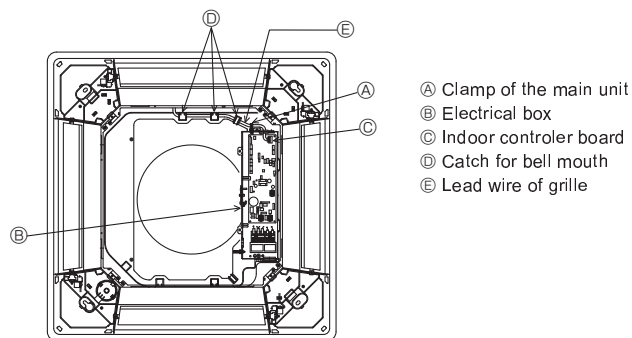


Fig. 6-8

6.4. Installing the grille

6.4.1. Preparations (Fig. 6-5)

- Install the 2 enclosed screws with washer ② in the main unit (at the corner drain pipe area and at the opposite corner) as shown in the diagram.

6.4.2. Temporary installation of the grille (Fig. 6-6)

- Temporarily secure the grille using the bell shaped holes by putting the socket of the grille marked ③ on the corner drain pipe area of the main unit.
 - * Make sure that the lead wiring of the grille does not get pinched between the grille and the main unit.

6.4.3. Securing the grille (Fig. 6-7)

- Secure the grille to the main unit by tightening the previously installed 2 screws (with captive washer) as well as the 2 remaining screws (with captive washer).
 - * Make sure that there are no gaps between the main unit and the grille or the grille and the ceiling.

Fixing gaps between the grille and the ceiling

With the grille attached, adjust the height of the main unit to close the gap.

⚠ Caution:

When tightening the screw with captive washer ②, tighten it at a torque of 4.8 N·m or less. Never use an impact screwdriver.

- It may result in parts damage.

6.4.4. Wire connection (Fig. 6-8)

- Remove the 2 screws fixing the cover of electrical branch box of the unit and open the cover.

- Be sure to connect the connector (white, 20-pole) for vane motor of the grille to CNV connector of controller board of the unit.

The lead wire of grille is passed through the catch for bell mouth of the unit perfectly. The remaining lead wire is tied with clamp of the unit and put the cover of the unit again with 2 screws.

Note:

Do not put the remaining lead wire in electrical branch box of the unit.

6. Installing the grille

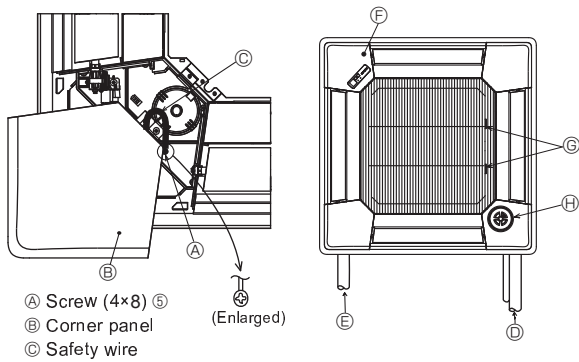


Fig. 6-9

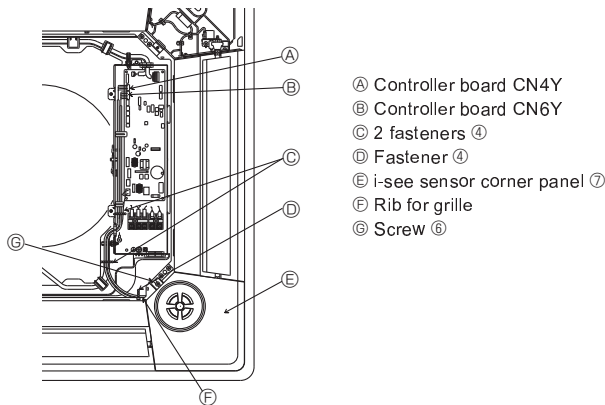


Fig. 6-10

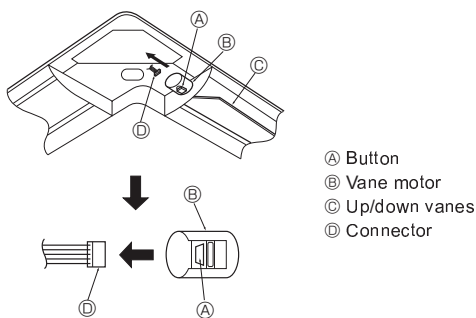


Fig. 6-11

6.5. Installing the intake grille (Fig. 6-9)

Note:

When reinstalling the corner panels (each with a safety wire attached), connect the other end of each safety wire to the grille using a screw (4 pcs, 4 × 8) as shown in the illustration.

- * If the corner panels are not attached, they may fall off while the unit is operating.
- Perform the procedure that is described in “6.2. Preparing to attach the grille” in reverse order to install the intake grille and the corner panel.
- Multiple units can be installed with grille so that the position of the logo on each corner panel is consistent with the other units regardless of the orientation of the intake grille. Align the logo on the panel according to the wishes of the customer as shown in the diagram to the left. (The position of the grille can be changed.)
- ① Water piping of the main unit
- ② Drain piping of the main unit
- ③ Initial position of the corner panel (logo attached)
- * Installation in any position is possible.
- ④ Initial position of the levers on the intake grille
- * Although the clips can be installed in any of 4 positions, the configuration shown here is recommended. (It is not necessary to remove the intake grille when maintenance is performed on the electric component box of the main unit.)
- ⑤ i-see sensor (PLP-6BAE panel)

6.6. Installation of i-see sensor corner panel (Fig. 6-10)

For PLP-6BAE panel

- Take the lead wires CN4Y (white) and CN6Y (red) of the i-see sensor corner panel ⑦ from the side of the electrical box on the unit and make sure to connect them to the connector of the controller board.
- Lead wires of the i-see sensor corner panel ⑦ should be fixed at the rib of the grille with the fastener ④ so that there is no slack.
- Lead wires should be held together with the lead wires of the unit and fixed with 2 of the fastener ④ so that there is no slack.
- Put the cover back on the electrical box with 3 screws.
- * Make sure wires are not caught in the cover of electric box. If they are caught, they will be cut.
- Adverse procedure of “6.2. Preparing to attach the grille” will be taken for installing the i-see sensor corner panel.
- * The i-see sensor corner panel should be fixed onto the grille ① with screw ⑥.

6.7. Locking the up/down airflow direction (Fig. 6-11)

The vanes of the unit can be set and locked in up or down orientations depending upon the environment of use.

- Set according to the preference of the customer.
- The operation of the fixed up/down vanes and all automatic controls cannot be performed using the remote controller. In addition, the actual position of the vanes may differ from the position indicated on the remote controller.
- ① Turn off the main power switch.
- Injuries or an electrical shock may occur while the fan of the unit is rotating.
- ② Disconnect the connector for the vane motor of the vent that you want to lock. (While pressing the button, remove the connector in the direction indicated by the arrow as shown in the diagram.) After removing the connector, insulate it with tape.
- It also can be set by remote controller. Refer to 5.7.

6.8. Check

- Make sure that there is no gap between the unit and the grille, or between the grille and the surface of the ceiling. If there is any gap between the unit and the grille, or between the grille and the surface of the ceiling, it may cause dew to collect.
- Make sure that the wires have been securely connected.
- For PLP-6BAE, check the rotating movement of the i-see sensor. If the i-see sensor does not rotate, review the procedure in “6.6. Installation of i-see sensor corner panel”.

7. Test run

7.1. Before test run

- ▶ After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and no disconnection of 1 phase in the supply.
- ▶ Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1.0 MΩ.
- ▶ Do not carry out this test on the control wiring (low voltage circuit) terminals.

⚠ Warning:

Do not use the air conditioner if the insulation resistance is less than 1.0 MΩ.

⚠ 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.

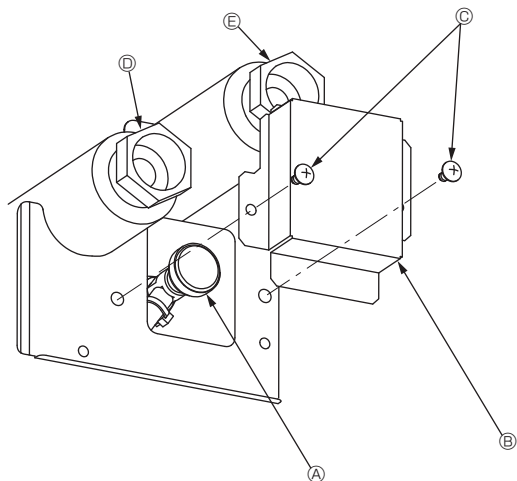


Fig. 7-1

7.2. Air purging

7.2.1. The details of air purging

As for the details of air purging, please refer to the water circuit maintenance manual included in the package of the HBC controller.

7.2.2. The air vent valve of indoor unit (Fig. 7-1)

- ① Remove the air purge valve cover.
- ② Turn the knob on the air purge valve to release the air.
- Ⓐ Air purge valve
- Ⓑ Air purge valve cover (Tightening torque: $1.3 \pm 0.3 \text{ N}\cdot\text{m}$)
- Ⓒ Screw
- Ⓓ Outlet
- Ⓔ Inlet

Controller interface

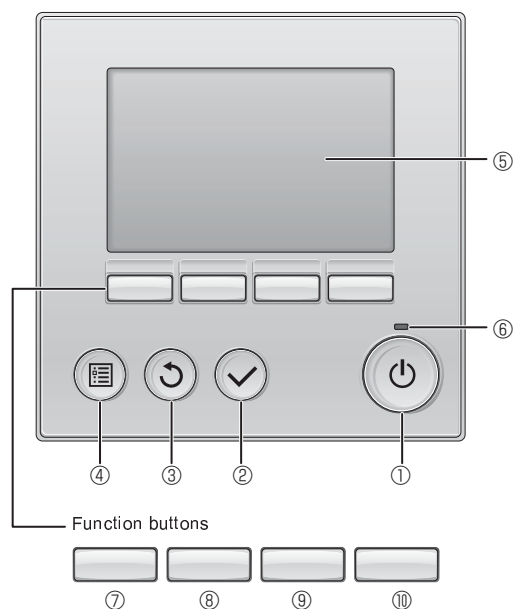


Fig. 7-2

7.3. Test run

The following 3 methods are available.

7.3.1. Using wired remote controller (Fig. 7-2)

① [ON/OFF] button

Press to turn ON/OFF the indoor unit.

② [SELECT] button

Press to save the setting.

③ [RETURN] button

Press to return to the previous screen.

④ [MENU] button

Press to bring up the Main menu.

⑤ Backlit LCD

Operation settings will appear.

When the backlight is off, pressing any button turns the backlight on and it will stay lit for a certain period of time depending on the screen.

When the backlight is off, pressing any button turns the backlight on and does not perform its function. (except for the [ON/OFF] button)

⑥ ON/OFF lamp

This lamp lights up in green while the unit is in operation. It blinks while the remote controller is starting up or when there is an error.

⑦ Function button [F1]

Main display: Press to change the operation mode.

Main menu: Press to move the cursor down.

⑧ Function button [F2]

Main display: Press to decrease temperature.

Main menu: Press to move the cursor up.

⑨ Function button [F3]

Main display: Press to increase temperature.

Main menu: Press to go to the previous page.

⑩ Function button [F4]

Main display: Press to change the fan speed.

Main menu: Press to go to the next page.

7. Test run

Step 1 Switch the remote controller to "Test run".

- ① Select "Service" from the Main menu, and press the button.
- ② When the Service menu is selected, a window will appear asking for the password. (Fig. 7-3)
To enter the current maintenance password (4 numerical digits), move the cursor to the digit you want to change with the [F1] or [F2] button, and set each number (0 through 9) with the [F3] or [F4] button. Then, press the button.

Note: The initial maintenance password is "9999". Change the default password as necessary to prevent unauthorized access. Have the password available for those who need it.

Note: If you forget your maintenance password, you can initialize the password to the default password "9999" by pressing and holding the [F1] and [F2] buttons simultaneously for three seconds on the maintenance password setting screen.

- ③ Select "Test run" with the [F1] or [F2] button, and press the button. (Fig. 7-4)
- ④ Select "Test run" with the [F1] or [F2] button, and press the button. (Fig. 7-5)

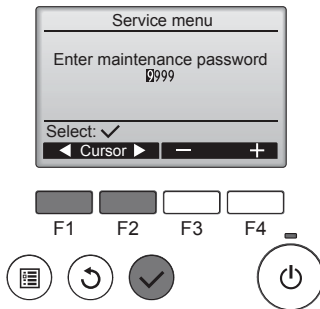


Fig. 7-3

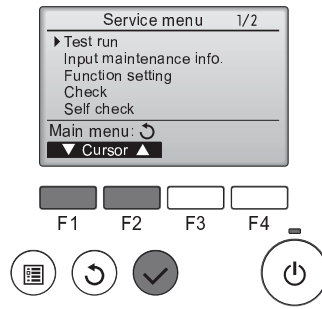


Fig. 7-4

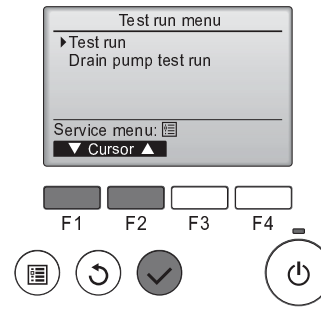


Fig. 7-5

Step 2 Perform the test run and check the airflow temperature and auto vane.

- ① Press the [F1] button to go through the operation modes in the order of "Cool" and "Heat". (Fig. 7-6)
Cool mode: Check the cold air blow off.
Heat mode: Check the heat blow off.
* Check the operation of the outdoor unit's fan.
- ② Press the button and open the Vane setting screen.

AUTO vane check

- ① Check the auto vane with the [F1] [F2] buttons. (Fig. 7-7)
- ② Press the button to return to "Test run operation".
- ③ Press the button.

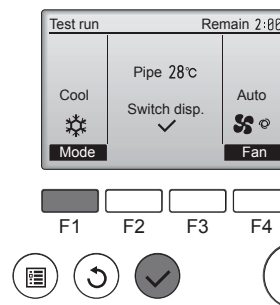


Fig. 7-6

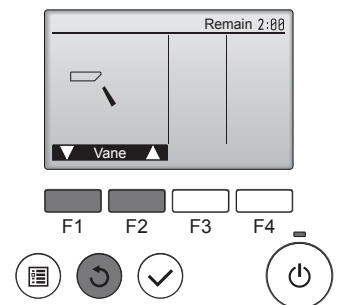


Fig. 7-7

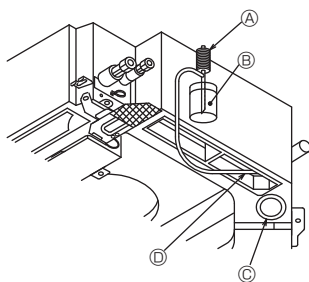


Fig. 7-8

- Ⓐ Water supply pump
- Ⓑ Water (about 1000cc)
- Ⓒ Drain plug
- Ⓓ Pour water through outlet
- Be careful not to spray water into the drain pump mechanism.

7.4. Check of drainage (Fig. 7-8)

- Ensure that the water is being properly drained out and that no water is leaking from joints.

When electric work is completed.

- Pour water during cooling operation and check.

When electric work is not completed.

- Pour water during emergency operation and check.

* Drain pan and fan are activated simultaneously when single phase 220 - 240 V is turned on to L and N on terminal block after the connector (SWE) on controller board in the electrical branch box is set to ON.

Be sure to turn it back to the former state after work.

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