MITSUBISHI ELECTRIC

AIR-COOLED HEAT PUMP TYPE
PACKAGED AIR CONDITIONERS

CE
2000

TECHNICAL & SERVICE MANUAL

<Indoor unit>

Models

PEH-P8YE, PEH-P10YE

Mr.SLIM

For use with the R407C

Contents

1 PRECAUTIONS FOR DEVICES THAT USE R407C REFRIGERANT

⚠ Caution

Do not use the existing refrigerant piping.

- The old refrigerant and refrigerator oil in the existing piping contains a large amount of chlorine which may cause the refrigerator oil of the new unit to deteriorate.

Use refrigerant piping made of C1220 (CU-DHP) phosphorus deoxidized copper as specified in the *JIS H3300 "Copper and copper alloy seamless pipes and tubes". In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.

- Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.

*JIS: Japanese Industrial Standard

Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)

- If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor trouble may result.

Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections.

- The refrigerator oil will degrade if it is mixed with a large amount of mineral oil.

Use liquid refrigerant to seal the system.

- If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.

Do not use a refrigerant other than R407C.

- If another refrigerant (R22, etc.) is used, the chlorine in the refrigerant may cause the refrigerator oil to deteriorate.

Use a vacuum pump with a reverse flow check valve.

- The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate.

Do not use the following tools that have been used with conventional refrigerants.
(Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment)

- If the conventional refrigerant and refrigerator oil are mixed in the R407C, the refrigerant may deteriorated.
- If water is mixed in the R407C, the refrigerator oil may deteriorate.
- Since R407C does not contain any chlorine, gas leak detectors for conventional refrigerants will not react to it.

Do not use a charging cylinder.

- Using a charging cylinder may cause the refrigerant to deteriorate.

Be especially careful when managing the tools.

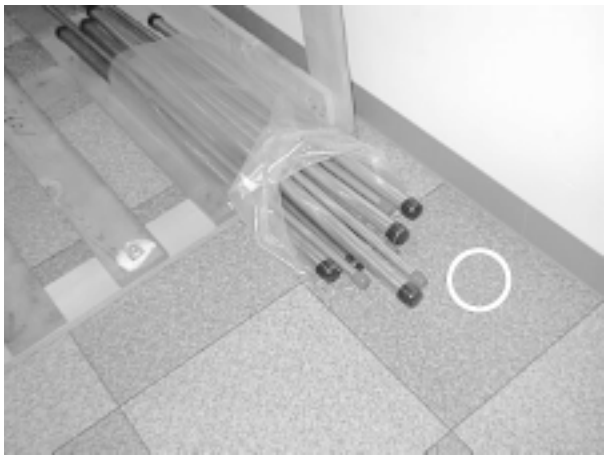
- If dust, dirt, or water gets in the refrigerant cycle, the refrigerant may deteriorate.

If the refrigerant leaks, recover the refrigerant in the refrigerant cycle, then recharge the cycle with the specified amount of the liquid refrigerant indicated on the air conditioner.

- Since R407C is a nonazeotropic refrigerant, if additionally charged when the refrigerant leaked, the composition of the refrigerant in the refrigerant cycle will change and result in a drop in performance or abnormal stopping.

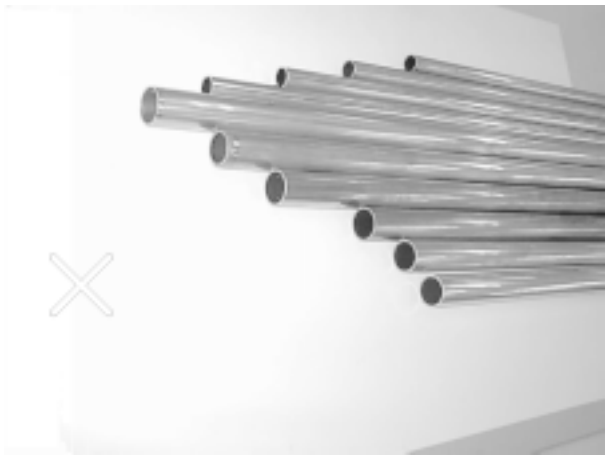
[1] Storage of Piping Material

(1) Storage location



Store the pipes to be used indoors. (Warehouse at site or owner's warehouse)
Storing them outdoors may cause dirt, waste, or water to infiltrate.

(2) Pipe sealing before storage

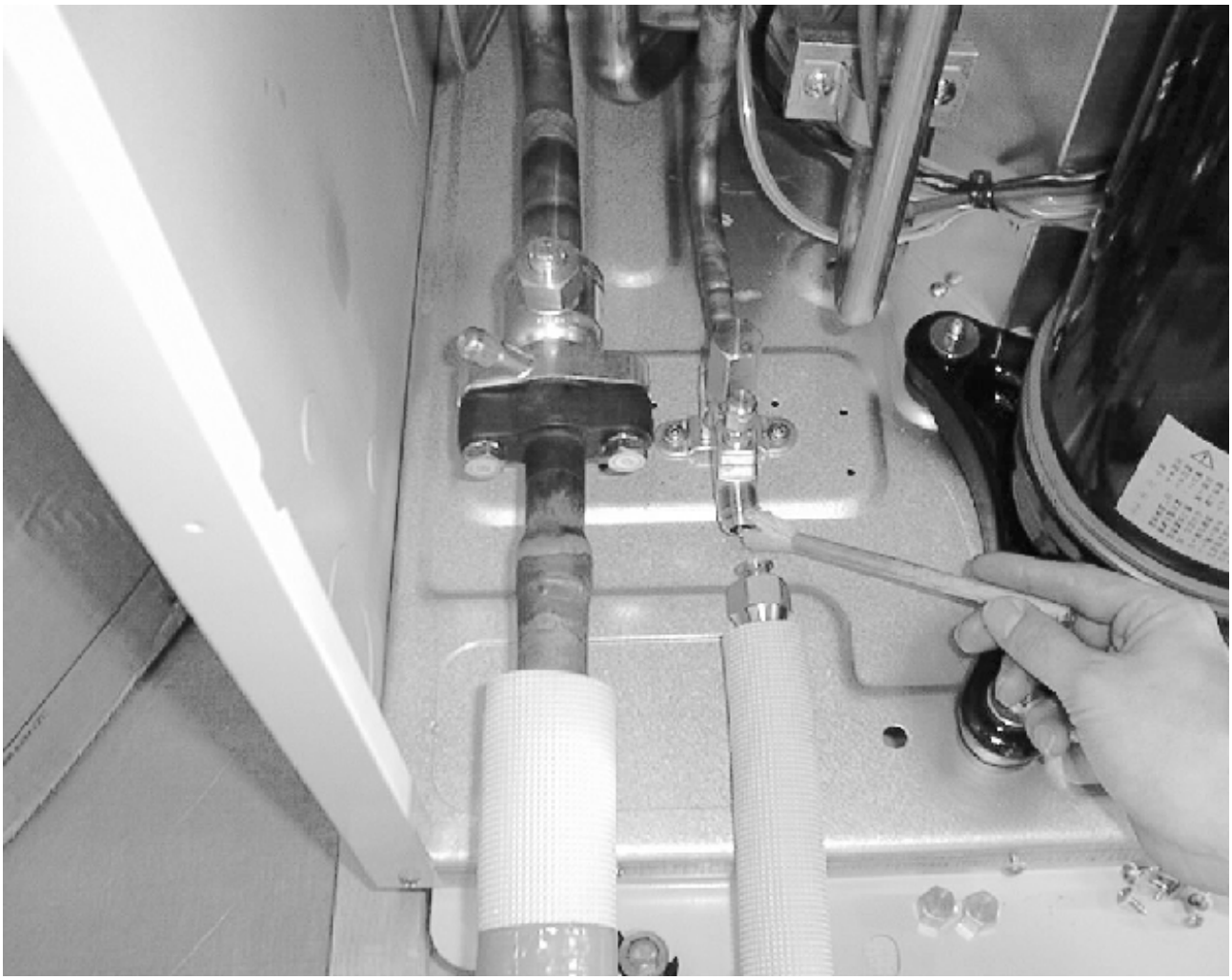


Both ends of the pipes should be sealed until immediately before brazing.
Wrap elbows and T's in plastic bags for storage.

* The new refrigerator oil is 10 times more hygroscopic than the conventional refrigerator oil (such as Suniso). Water infiltration in the refrigerant circuit may deteriorate the oil or cause a compressor failure. Piping materials must be stored with more care than with the conventional refrigerant pipes.

[2] Piping Machining

Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections.



Use only the necessary minimum quantity of oil !

Reason:

1. The refrigerator oil used for the equipment is highly hygroscopic and may introduce water inside.

Notes:

- Introducing a great quantity of mineral oil into the refrigerant circuit may also cause a compressor failure.
- Do not use oils other than ester oil, ether oil or alkylbenzene.

[3] Necessary Apparatus and Materials and Notes on Their Handling

The following tools should be marked as dedicated tools for R407C.

<<Comparison of apparatus and materials used for R407C and for R22>>

Apparatus Used	Use	R22	R407C
Gauge manifold	Evacuating, refrigerant filling	Current product	◎
Charging hose	Operation check	Current product	◎
Charging cylinder	Refrigerant charging	Current product	◎ Do not use
Gas leakage detector	Gas leakage check	Current product	◎ Shared with R134a
Refrigerant collector	Refrigerant collection	R22	◎ For R407C use only
Refrigerant cylinder	Refrigerant filling	R22	◎ Identification of dedicated use for R407C: Record refrigerant name and put brown belt on upper part of cylinder.
Vacuum pump	Vacuum drying	Current product	△ Can be used by attaching an adapter with a check valve.
Vacuum pump with a check valve		Current product	△
Flare tool	Flaring of pipes	Current product	△
Bender	Bending of pipes	Current product	△
Application oil	Applied to flared parts	Current product	◎ Ester oil or Ether oil or Alkybenzene (Small amount)
Torque wrench	Tightening of flare nuts	Current product	△
Pipe cutter	Cutting of pipes	Current product	△
Welder and nitrogen cylinder	Welding of pipes	Current product	△
Refrigerant charging meter	Refrigerant charging	Current product	△
Vacuum gauge	Checking the vacuum degree	Current product	△

Symbols: ◎ To be used for R407C only. Can also be used for conventional refrigerants.

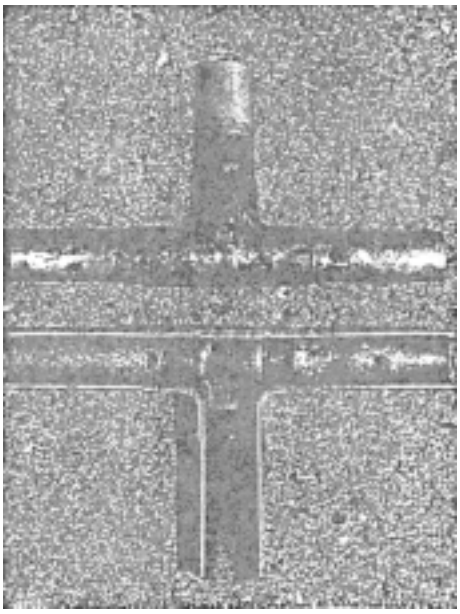
Tools for R407C must be handled with more care than those for conventional refrigerants. They must not come into contact with any water or dirt.

[4] Brazing

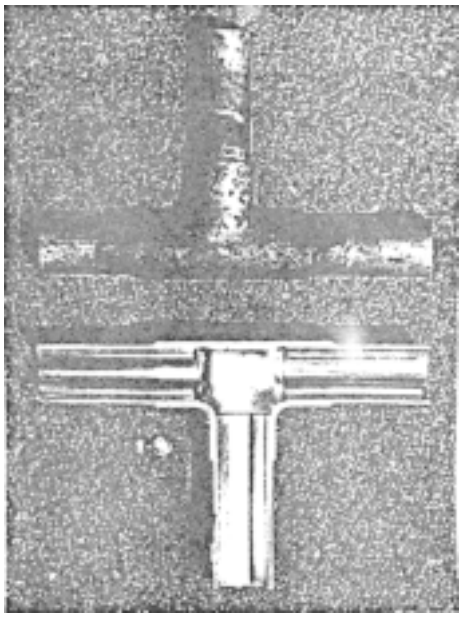
No changes from the conventional method, but special care is required so that foreign matter (ie. oxide scale, water, dirt, etc.) does not enter the refrigerant circuit.

Example: Inner state of brazed section

When non-oxide brazing was not used



When non-oxide brazing was used



Items to be strictly observed:

1. Do not conduct refrigerant piping work outdoors on a rainy day.
2. Apply non-oxide brazing.
3. Use a brazing material (Bcup-3) which requires no flux when brazing between copper pipes or between a copper pipe and copper coupling.
4. If installed refrigerant pipes are not immediately connected to the equipment, then braze and seal both ends of them.

Reasons:

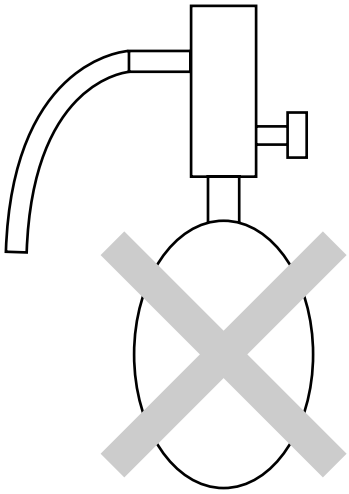
1. The new refrigerant oil is 10 times more hygroscopic than the conventional oil. The probability of a machine failure if water infiltrates is higher than with conventional refrigerant oil.
2. A flux generally contains chlorine. A residual flux in the refrigerant circuit may generate sludge.

Note:

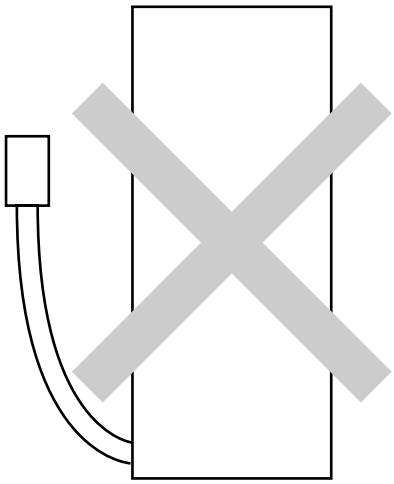
- Commercially available antioxidants may have adverse effects on the equipment due to its residue, etc. When applying non-oxide brazing, use nitrogen.

[5] Airtightness Test

No changes from the conventional method. Note that a refrigerant leakage detector for R22 cannot detect R407C leakage.



Halide torch



R22 leakage detector

Items to be strictly observed:

1. Pressurize the equipment with nitrogen up to the design pressure and then judge the equipment's airtightness, taking temperature variations into account.
2. When investigating leakage locations using a refrigerant, be sure to use R407C.
3. Ensure that R407C is in a liquid state when charging.

Reasons:

1. Use of oxygen as the pressurized gas may cause an explosion.
2. Charging with R407C gas will lead the composition of the remaining refrigerant in the cylinder to change and this refrigerant can then not be used.

Note:

- A leakage detector for R407C is sold commercially and it should be purchased.

[6] Vacuuming

1. Vacuum pump with check valve
   A vacuum pump with a check valve is required to prevent the vacuum pump oil from flowing back into the refrigerant circuit when the vacuum pump power is turned off (power failure).
   It is also possible to attach a check valve to the actual vacuum pump afterwards.

2. Standard degree of vacuum for the vacuum pump
   Use a pump which reaches 0.5 Torr (500 MICRON) or below after 5 minutes of operation.
   In addition, be sure to use a vacuum pump that has been properly maintained and oiled using the specified oil. If the vacuum pump is not properly maintained, the degree of vacuum may be too low.

3. Required accuracy of the vacuum gauge
   Use a vacuum gauge that can measure up to 5 Torr. Do not use a general gauge manifold since it cannot measure a vacuum of 5 Torr.

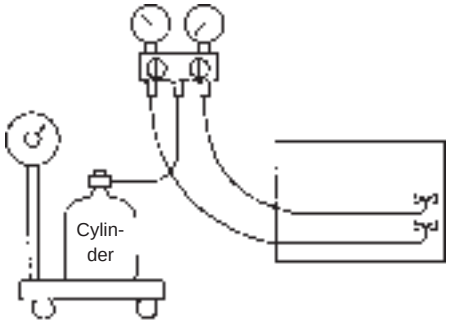
4. Evacuating time
   - Evacuate the equipment for 1 hour after –755 mmHg (5 Torr) has been reached.
   - After envacuating, leave the equipment for 1 hour and make sure the that vacuum is not lost.

5. Operating procedure when the vacuum pump is stopped
   In order to prevent a backflow of the vacuum pump oil, open the relief valve on the vacuum pump side or loosen the charge hose to drawn in air before stopping operation.
   The same operating procedure should be used when using a vacuum pump with a check valve.

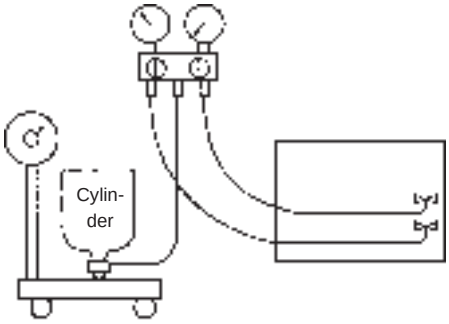
[7] Charging of Refrigerant

R407C must be in a liquid state when charging, because it is a non-azeotropic refrigerant.

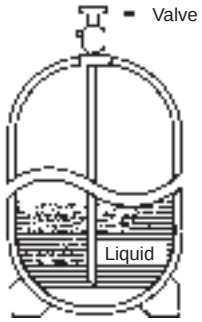
For a cylinder with a syphon attached



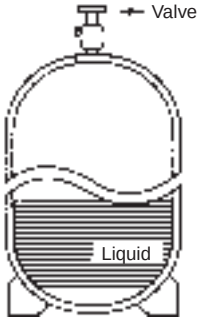
For a cylinder without a syphon attached



Cylinder color identification R407C-Gray
R410A-Pink



Charged with liquid refrigerant



Reasons:

1. R407C is a mixture of 3 refrigerants, each with a different evaporation temperature. Therefore, if the equipment is charged with R407C gas, then the refrigerant whose evaporation temperature is closest to the outside temperature is charged first while the rest of refrigerants remain in the cylinder.

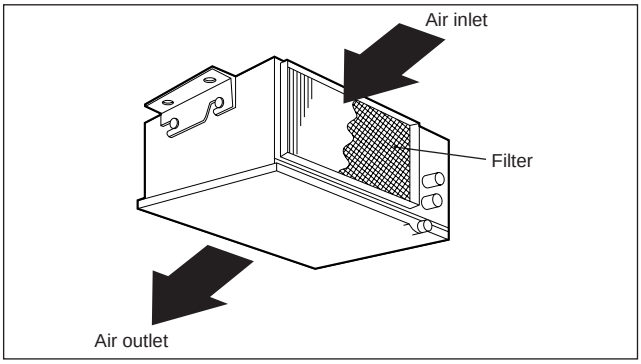
Note:

- In the case of a cylinder with a syphon, liquid R407C is charged without turning the cylinder up side down. Check the type of cylinder before charging.

2 PART NAMES AND FUNCTIONS

Indoor unit

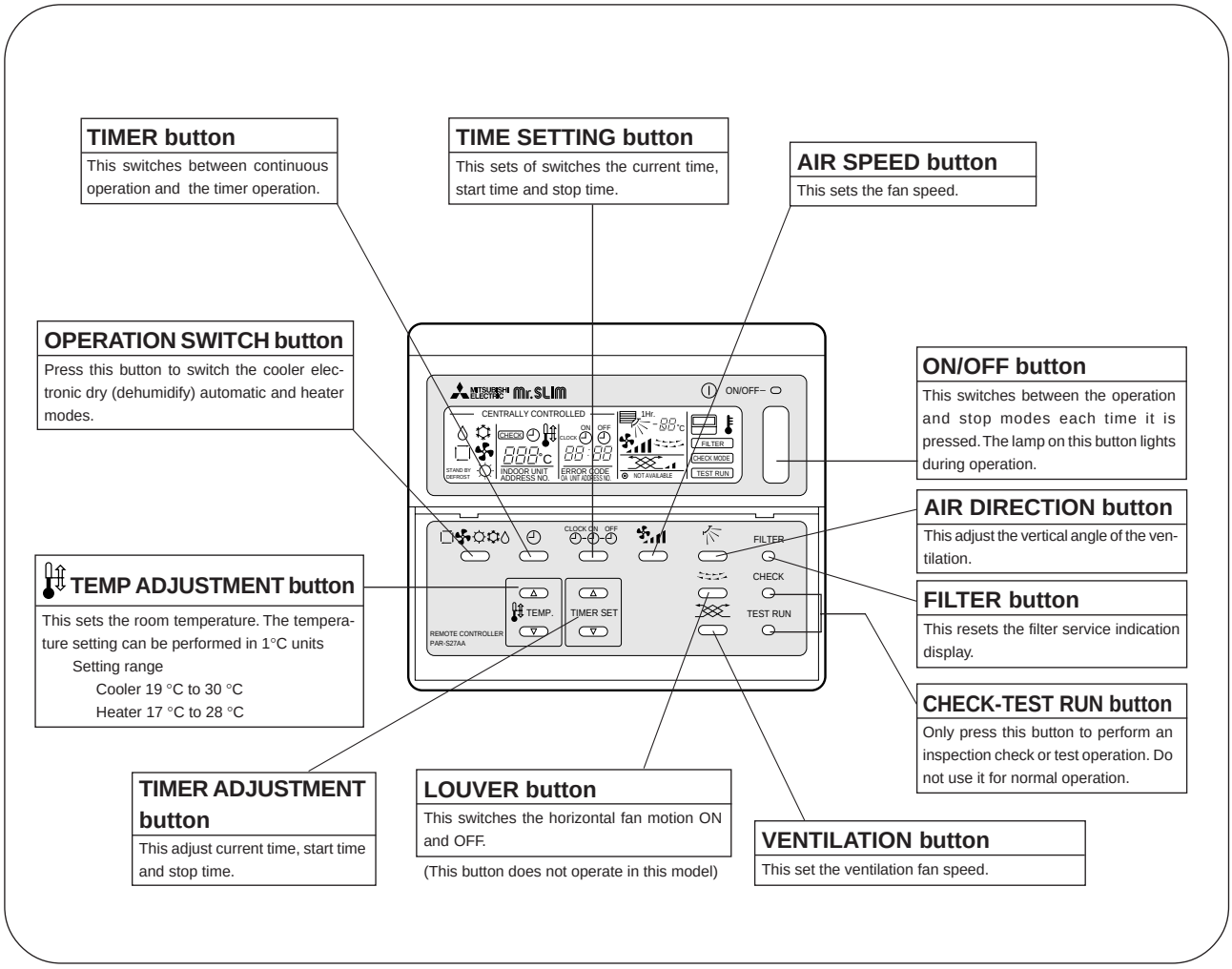
- Air inlet : Sucks the ambient air in.
- Filter : The filter bruit into the unit as standard is a simple filter to remove visible dust and dirt. If air pulification is one of the conditions required for use, consult with your dealer.
- Air outlet : Blows the air back out into the room.



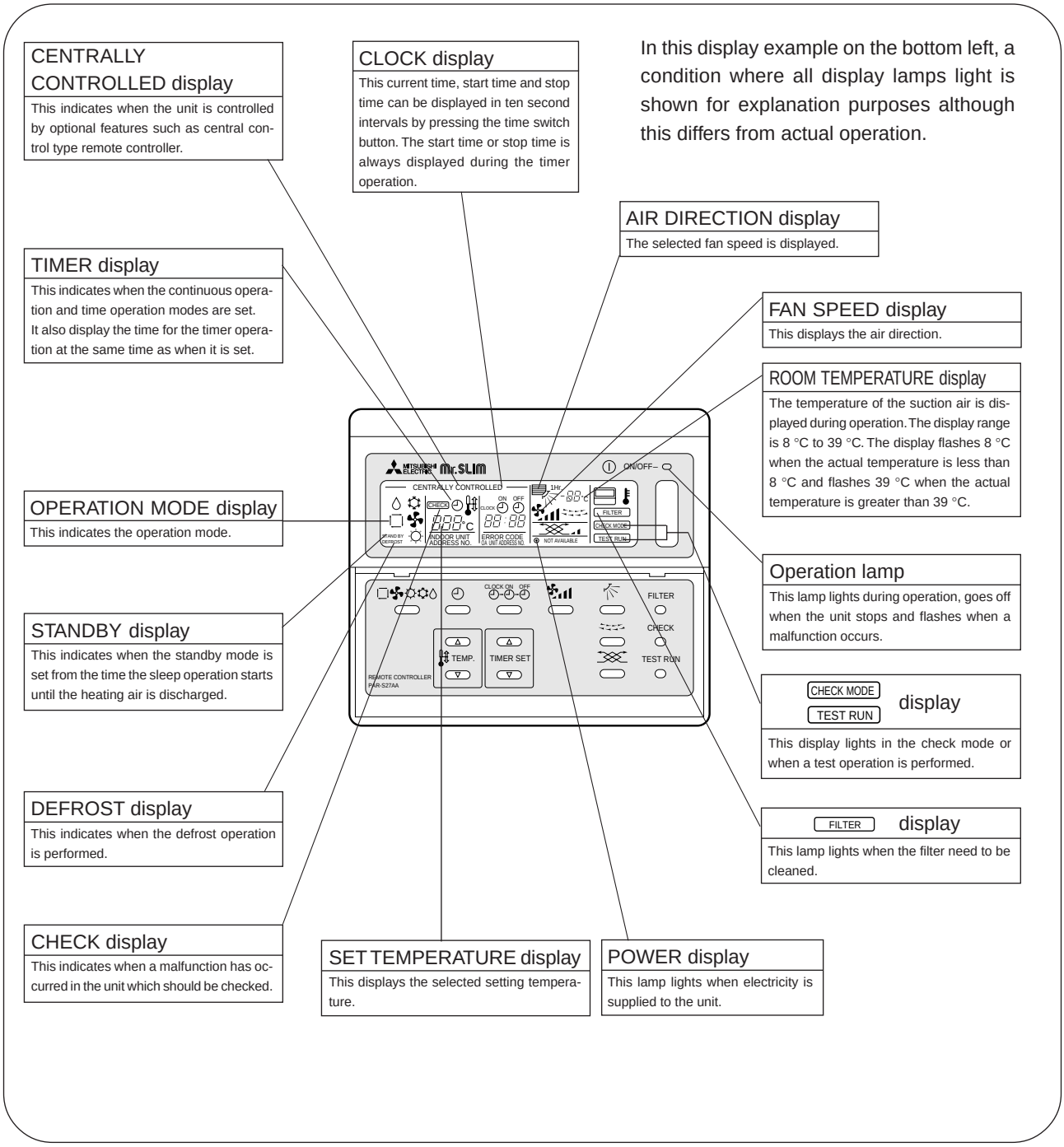
Remote controller (PAR-S27AA)

- Once the controls are set, the same operation mode can be repeated by simply pressing the ON/OFF button.

Operation buttons



Display



Caution:

- Only the Power display lights when the unit is stopped and power supplied to the unit.
- When power is turned ON for the first time the (CENTRAL CTRL) display appears to go off momentarily but this is not a malfunction.
- When the central control remote control unit, which is sold separately, is used the ON-OFF button, operation switch button and TEMP adjustment button do not operate.
- “NOT AVAILABLE” is displayed when the Air speed button are pressed. This indicates that this room unit is not equipped with the fan direction adjustment function and the louver function.
- When power is turned ON for the first time, it is normal that “H0” is displayed on the room temperature indication (For max. 2 minutes). Please wait until this “H0” indication disappear then start the operation.

3 SPECIFICATIONS

Specifications of air-source heat pump type packaged air conditioner (Ceiling concealed type indoor unit)					
Model name	**PEH-P8YE**	Quantity		Symbol	

				Cooling	Heating
Capacity			kcal/h	18,000	19,000
			kW	20.9	23.7
Air condition	Indoor side	Dry bulb temperature/wet bulb temperature		27 °C/19 °C	20 °C/–
	Outdoor side	Dry bulb temperature/wet bulb temperature		35 °C/24 °C	7 °C/6 ˚C
Power source				3N~ 380/400/415V 50Hz	
Electrical characteristics		Power consumption	kW	0.65/0.65/0.65	0.65/0.65/0.65
		Operating current	A	1.12/1.12/1.12	1.12/1.12/1.12
Remote controller temperature setting range			°C	19 ~ 30	17 ~ 28
Airflow direction control				–	
Fan		Type × Quantity		Sirrocco fan × 2	
		Airflow rate	m^3/min	60	
		External static pressure	Pa	50/150	
		Motor output	kW	0.60	
External finish				Galvanizing	
External dimension		Unit (H × W × D)	mm	455 × 1580 × 604	
		Panel (H × W × D)	mm	–	
Heat exchanger type				Cross fin	
Air filter				–	
Insulation material				Polyethylene foam	
Refrigerant piping dimension Liquid/Gas			ϕmm	12.7/25.4	
Drain piping dimension			ϕmm	1B External thread	
Noise level			dB (A)	53 (at 50 Pa)	
Net weight			kg	74	
External wiring		Minimum wire thickness		1.6 mm	
		Circuit breaker		15 A	
Composing parts		Operation control device (provided)		Remote controller: PAR-S27AA	
		Decoration panel (Option)		–	
Other mountable major options				–	
Accessories				Installation manual, Operation manual, Remote controller	
Special note, Non-standard specifications, etc.				–	

Notes:

1. The cooling and heating capacities are the maximum capacities that were obteined by operating in the above air conditions and with a refrigerant pipe of about 7.5 m.
2. The actual capacity characteristics vary with the combination of indoor and outdoor units. See the technical informaition.
3. The operating noise is the data that was obtained by measuring it 1.5 m from the unit's bottom in an anechoic room. (Noise meter A-scale value)
4. The figure of Electrical characteristic, Airflow rate, Noise level, indicates, at 50 Pa setting.

Specifications of air-source heat pump type packaged air conditioner (Ceiling concealed type indoor unit)

Model name	**PEH-P10YE**	Quantity		Symbol	

				Cooling	Heating
Capacity			kcal/h	22,400	26,200
			kW	26.0	30.5
Air condition	Indoor side	Dry bulb temperature/wet bulb temperature		27 °C/19 °C	20 °C/–
	Outdoor side	Dry bulb temperature/wet bulb temperature		35 °C/24 °C	7 °C/ 6 °C
Power source				3N~ 380/400/415V 50 Hz	
Electrical characteristics	Power consumption		kW	0.94/0.94/0.94	0.94/0.94/0.94
	Operating current		A	1.64/1.64/1.64	1.64/1.64/1.64
Remote controller temperature setting range			°C	19 ~ 30	17 ~ 28
Airflow direction control			Vertical	–	
Fan	Type × Quantity			Sirrocco fan × 2	
	Airflow rate		m^3/min	80	
	External static pressure		Pa	50/150	
	Motor output		kW	1.23	
External finish				Galvanizing	
External dimension	Unit (H × W × D)		mm	455 × 1,580 × 604	
	Panel (H × W × D)		mm	–	
Heat exchanger type				Cross fin	
Air filter				–	
Insulation material				Polyethyene foam	
Refrigerant piping size Liquid/Gas			ϕmm	12.7/28.58	
Drain piping size			ϕmm	1B External thread	
Noise level			dB (A)	57 (at 50 Pa)	
Net weight			kg	80	
External wiring	Minimum wire thickness			1.6 mm	
	Circuit breaker			15 A	
Composing parts	Operation control device (provided)			Remote controller: PAR-S27AA	
	Decoration panel (Option)			–	
Other mountable major options				–	
Accessories				Installation manual, Operation manual, Remote controller	
Special note, Non-standard specifications, etc.				–	

Notes:

1. The cooling and heating capacities are the maximum capacities that were obteined by operating in the above air conditions and with a refrigerant pipe of about 7.5 m.
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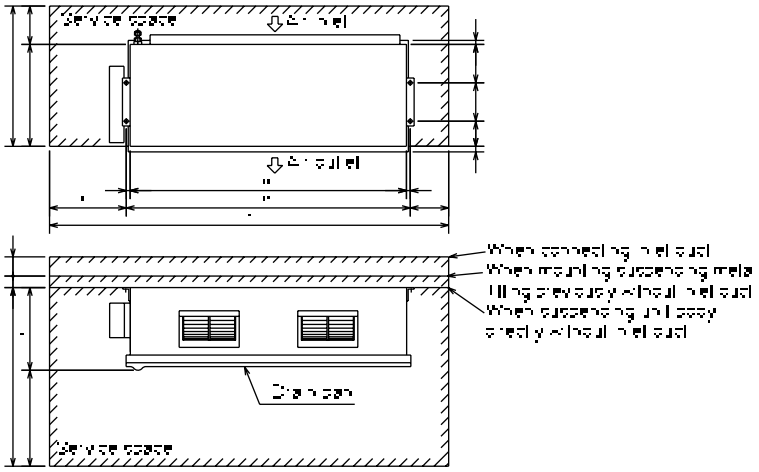
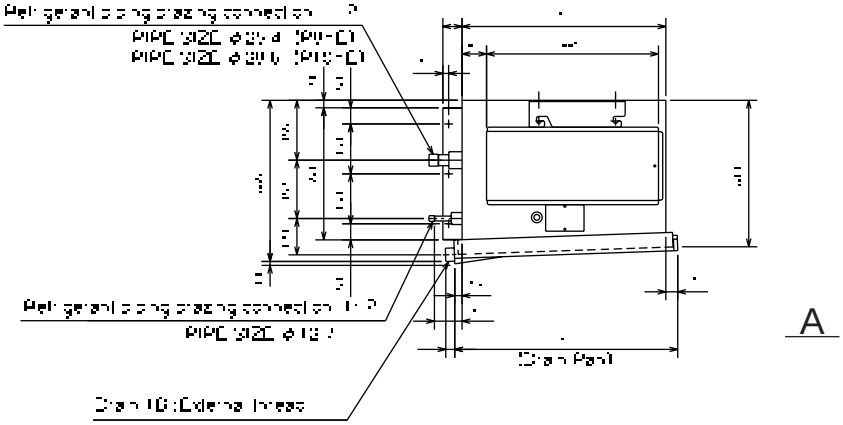
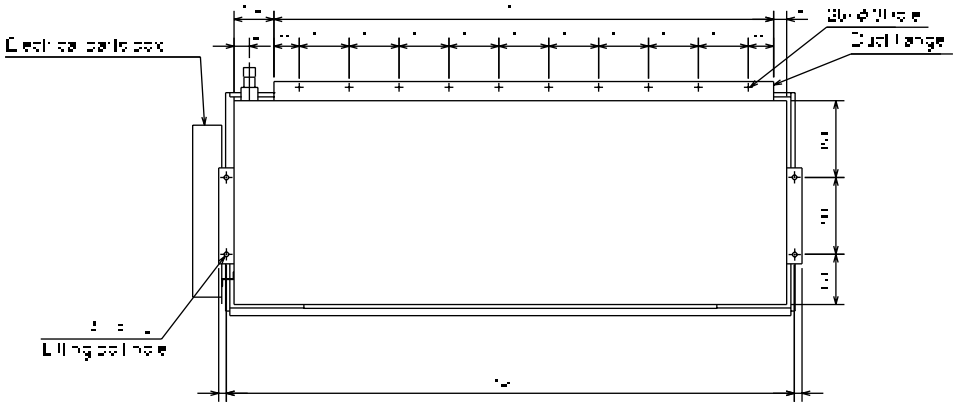
4 PART NAMES AND FUNCTIONS

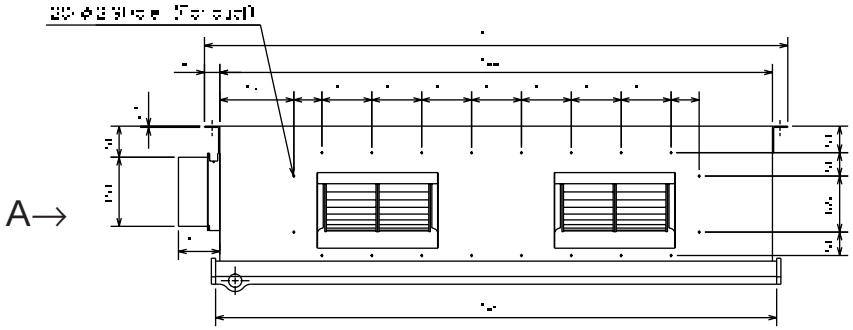
(1) Indoor Unit

• Models PEH-P8YE/P10YE





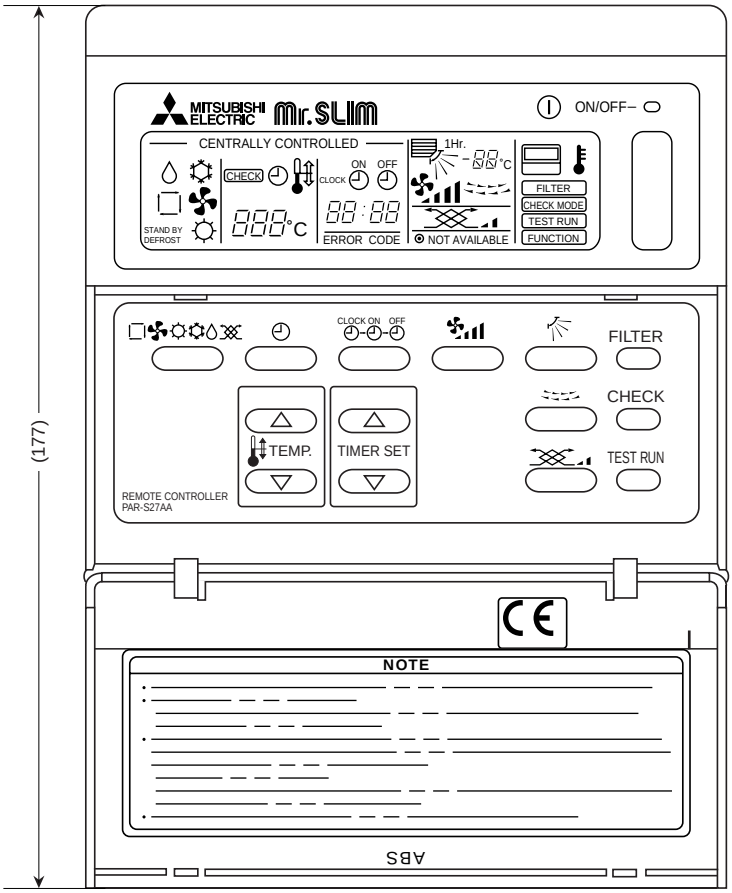


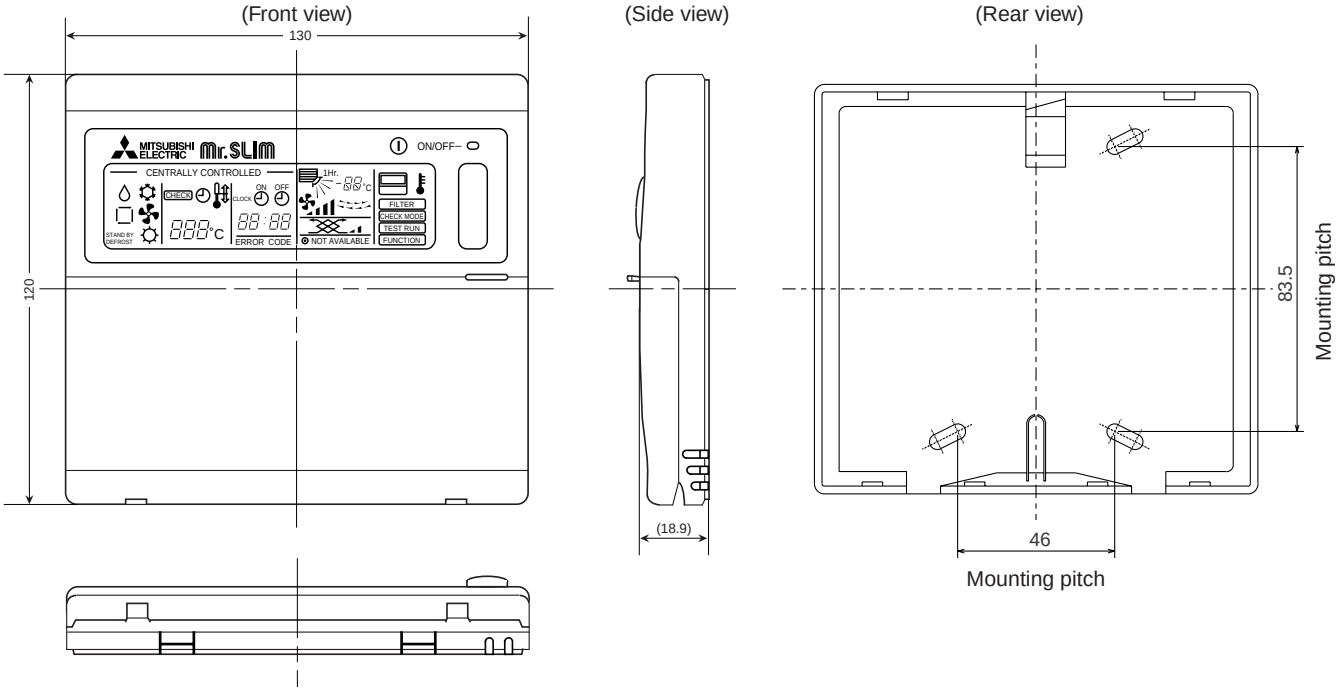


Note: When connecting duct to the inlet side, remove the air filter attached to the unit body, and mount an air filter onto the inlet duct side separately.

(2) Remote Controller

• Models PAR-S27AA

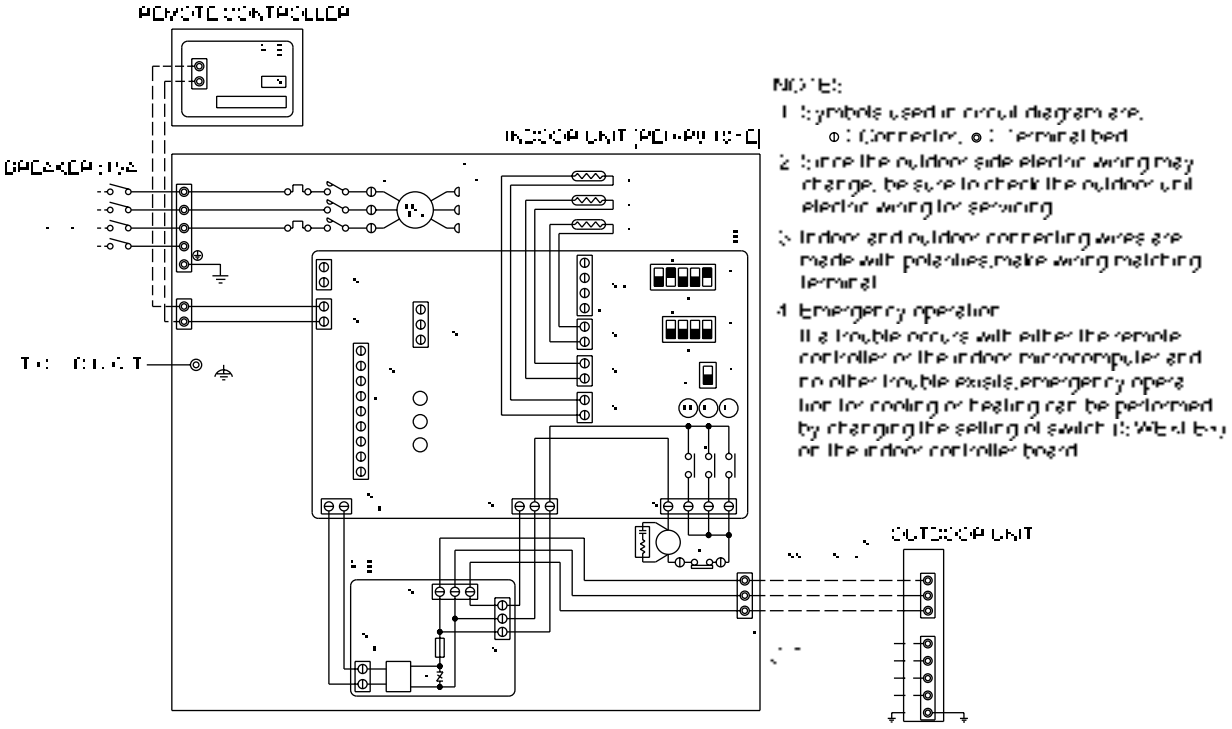




5 ELECTRICAL WIRING DIAGRAM

(1) Indoor Unit

• Models PEH-P8YE/P10YE



INDOOR UNIT

SYMBOL	NAME
MF2	Fan motor(with inner thermostat)
51F	Over current relay (fan motor)
52F	Magnetic contactor (fan motor)
49F	Inner thermostat
TB2	Terminal bed (power)
TB4	Terminal bed (indoor/outdoor connecting line)
TB5	Terminal bed (remote controller transmission line)
TH1	Thermistor (room temperature sensor 0 °C/15 kΩ.25 °C/5.4 kΩ)
TH2	Thermistor (pipe temperature sensor 0 °C/15 kΩ.25 °C/5.4 kΩ)
TH5	Thermistor (COND/EVA. temperature sensor 0 °C/15 kΩ.25 °C/5.4 kΩ)
P.B	INDOOR POWER BOARD
F1	FUSE(4A)
ZNR	VARISTOR
I.B	INDOOR CONTROLLER BOARD
X4-6	RELAY(FAN MOTOR)
SW1	SWITCH(MODEL SELECTION)
SW2	SWITCH(CAPACITY CORD)
SWE	SWITCH(EMERGENCY OPERATION)
LED1	POWER SUPPLY(I.B)
LED2	POWER SUPPLY (REMOTE CONTROLLER)
LED3	TRANSMISSION (INDOOR·OUTDOOR)
CN32	CONNECTOR (REMOTE SWITCH)
CN41	CONNECTOR (HA TERMINAL-A)
CR	CR Composite unit
TB1	Terminal bed (power)
TB3	Terminal bed (indoor/outdoor)

OUT DOOR UNIT

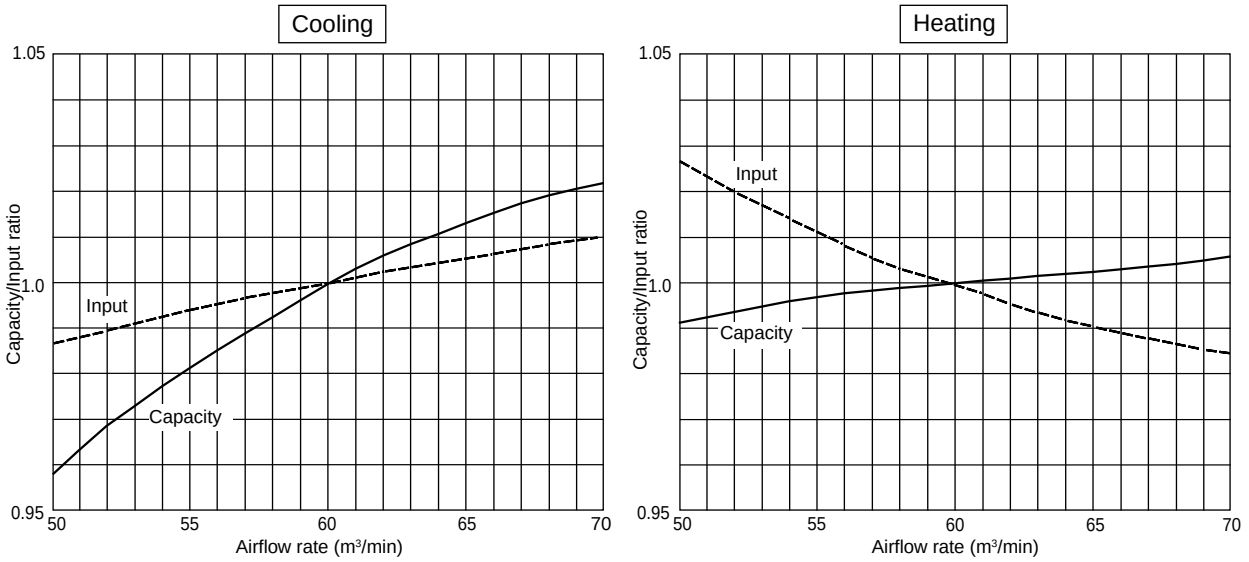
REMOTE CONTROLLER

SYMBOL	NAME
R.B	REMOTE CONTROLLER BOARD
TB6	TERMINAL BED(TO INDOOR UNIT)

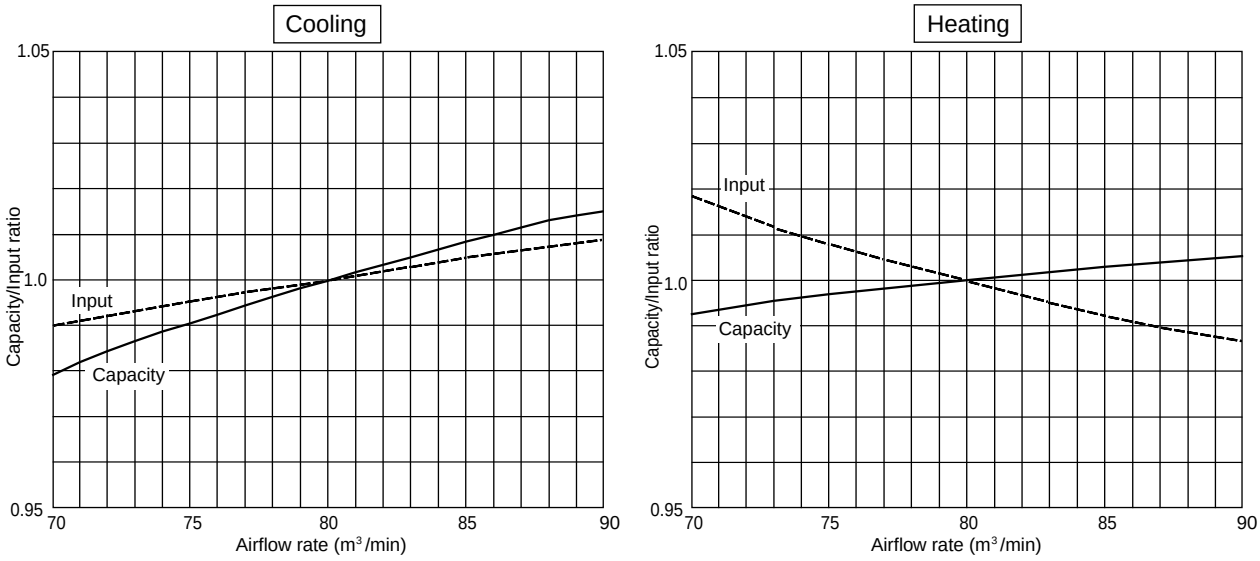
6 TECHNICAL DATA TO MEET LVD

[1] Capacity/Input Ratio against Changes in Room Airflow Rate

• Models PEH-P8YE

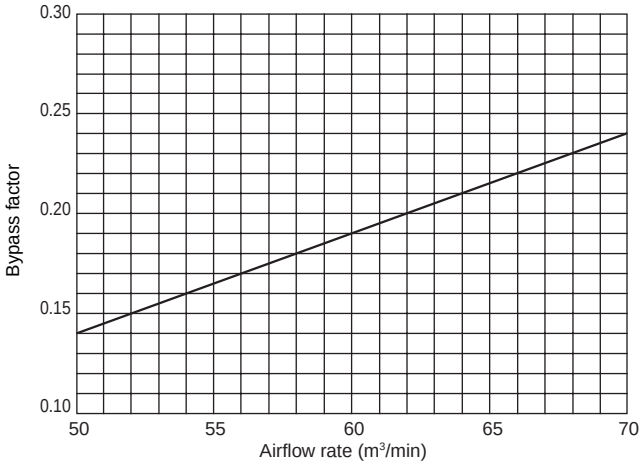


• Models PEH-P10YE

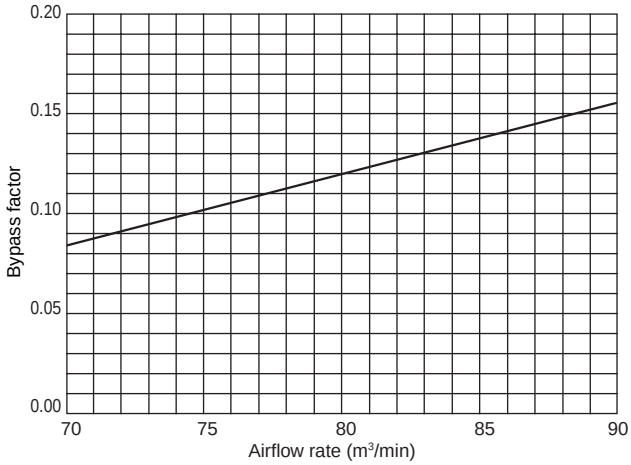


[2] Bypass Factor Curves

PEH-P8YE



PEH-P10YE



[3] Cooling Sensible Heating Capacity Table

(1) PEH-P8YE (Airflow rate 60m³/min)

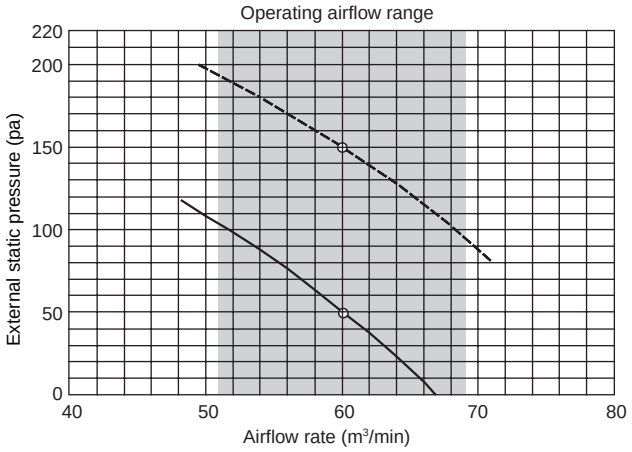
Outdoor temp. (°C)	Indoor inlet air temperature (DB/WB°C)									
	23/16		25/18		27/19		28/20		30/22	
	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC
20	18100	13700	19300	13500	20000	14400	20800	14400	21900	14200
25	17500	13400	18700	13300	19500	13700	20300	14200	21500	13900
30	16900	13100	18100	13000	18900	13500	19700	14000	20900	13700
35	16200	12800	17400	12700	18000	13100	19000	13700	20200	13500
40	15300	12500	16600	12400	17400	13000	18200	13500	19500	13300
43	14800	12400	16000	12300	16900	12900	17700	13400	19000	13200

(2) PEH-P10YE (Airflow rate 80m³/min)

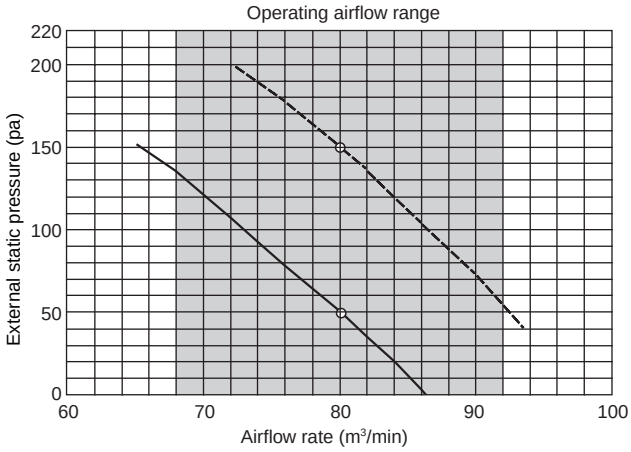
Outdoor temp. (°C)	Indoor inlet air temperature (DB/WB°C)									
	23/16		25/18		27/19		28/20		30/22	
	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC
20	22500	18100	24000	17900	24900	18500	25800	19200	27300	18800
25	21800	17800	23300	17600	24300	18300	25200	18900	26700	18600
30	21000	17500	22500	17300	23500	17900	24500	18600	26000	18300
35	20100	17100	21600	16800	22400	17400	23600	18300	25200	18100
40	19100	16800	20600	16600	21600	17400	22700	18100	24200	17900
43	18400	16600	20000	16500	21000	17300	22000	18000	23600	17800

[4] Airflow Characteristic Curves

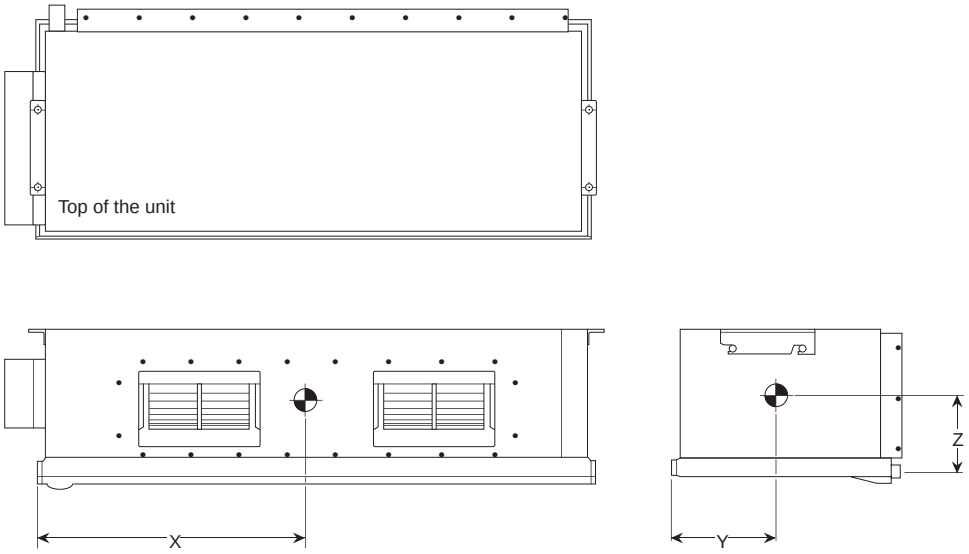
PEH-P8YE



PEH-P10YE



[5] Center of Gravity (Indoor unit)



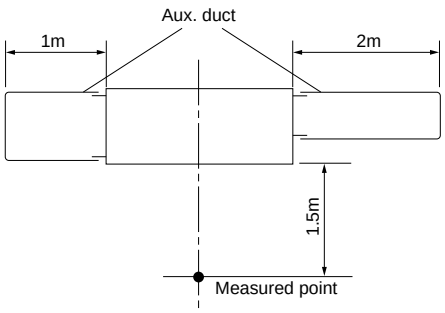
unit : (mm)

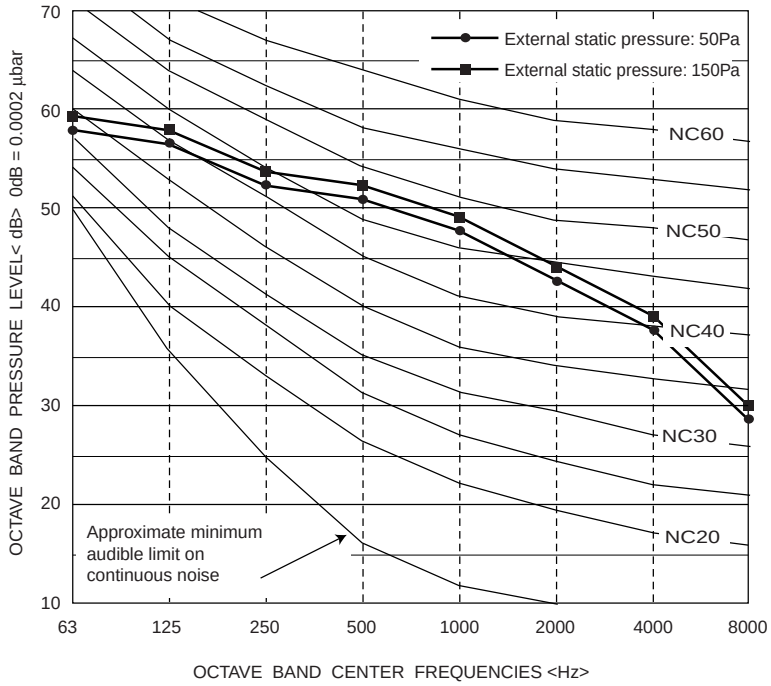
Item / Model name	Center of gravity		
	X	Y	Z
PEH-P8YE	720	260	225
PEH-P10YE	720	268	235

[6] NC Curve (Indoor unit)

PEH-P8YE

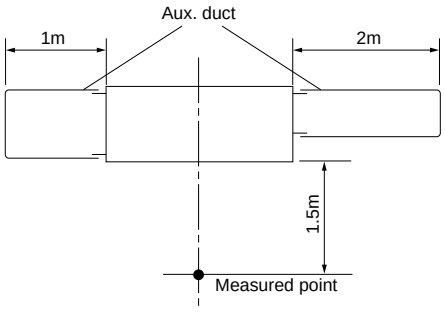
Measurement condition

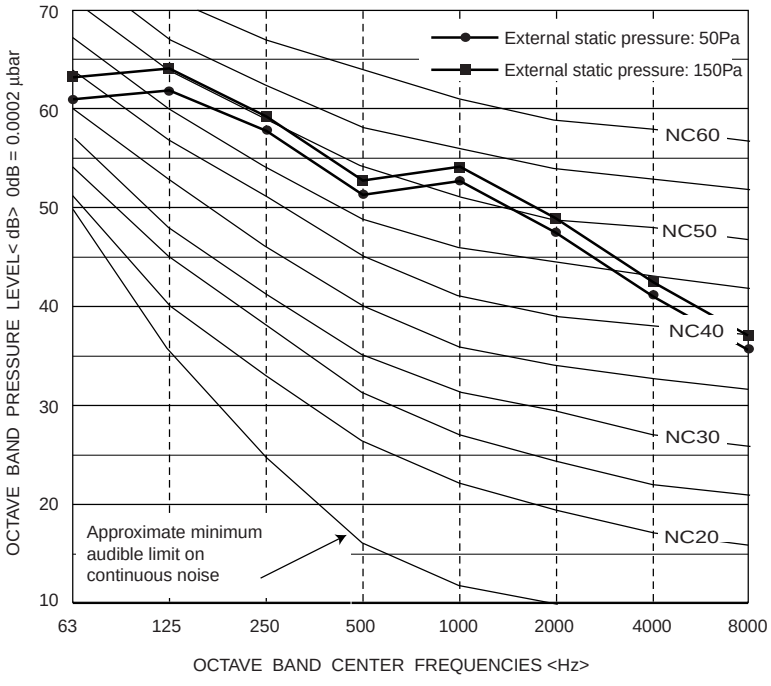




PEH-P10YE

Measurement condition

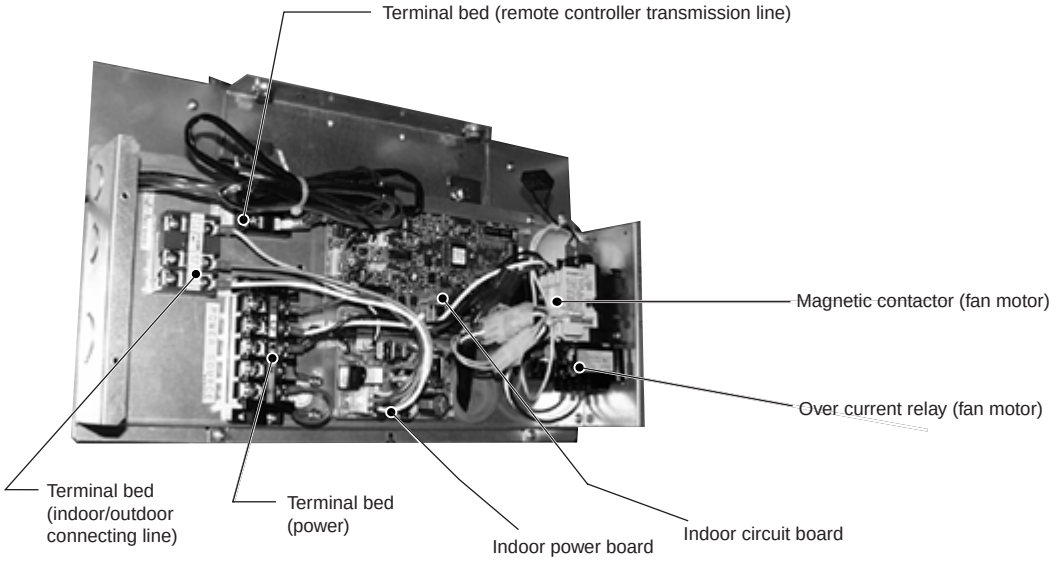




7 SERVICE DATA

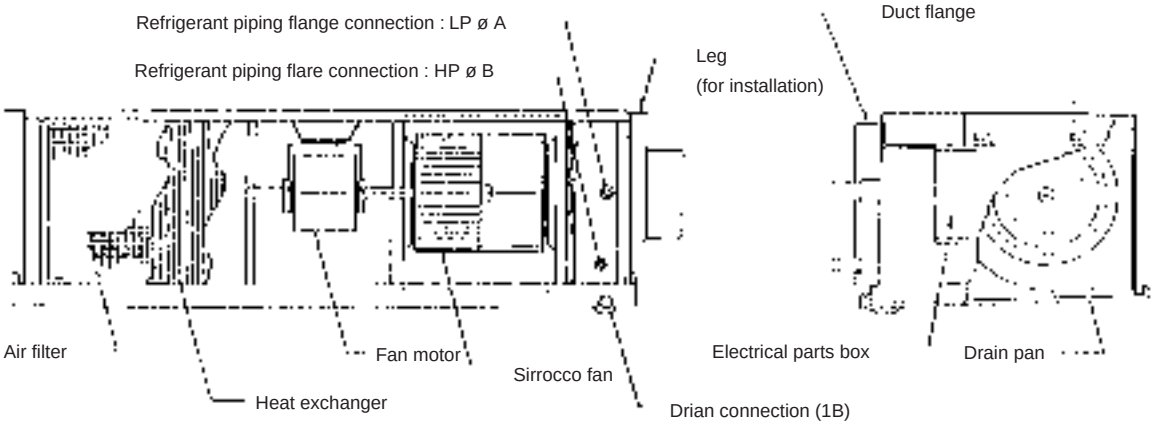
[1] Appearance of Equipment

• PEH-P8YE/P10YE Electrical Parts Box (with cover removed)

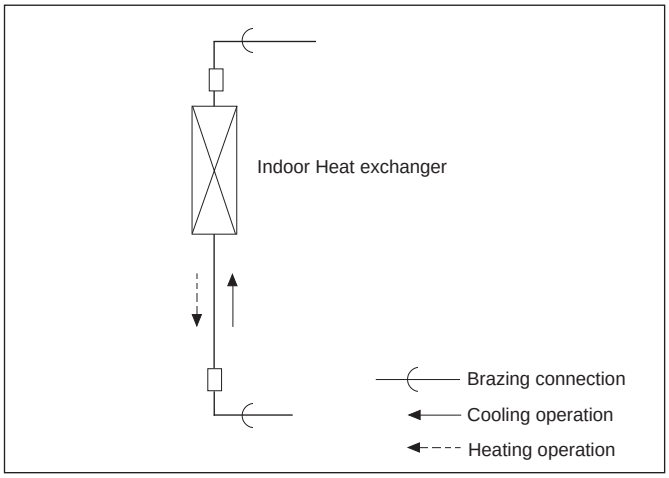


[2] Internal Construction

• PEH-P8YE/P10YE (Indoor unit)



[3] Refrigerant Circuit



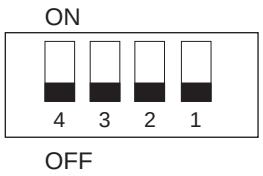
Model name	A	B
PEH-P8YE	25.4	12.7
PEH-P10YE	28.58	12.7

8 FUNCTION OF SWITCH ON INDOOR CIRCUIT BOARD

[1] DIP SW1 for model Selection (DIP SW1 has been set at factory)

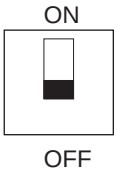
PEH-P8YE/P10YE : SW1-1, -4 ON, SW1-2, -3, -5 OFF

[2] DIP SW2 for Capacity Setting (DIP SW2 has been set at factory)



PEH-P8YE/P10YE : SW2-1, -2, -3 and, -4 OFF

[3] DIP SWE for Emergency Operation



When SWE is turned ON, FAN turns ON. Setting of emergency operation other than SWE is performed at the outdoor unit. For a description of the specific emergency operation execution method, refer to the outdoor unit (PUH-P8YE, PUH-P10YE) Technical & Service Manual.

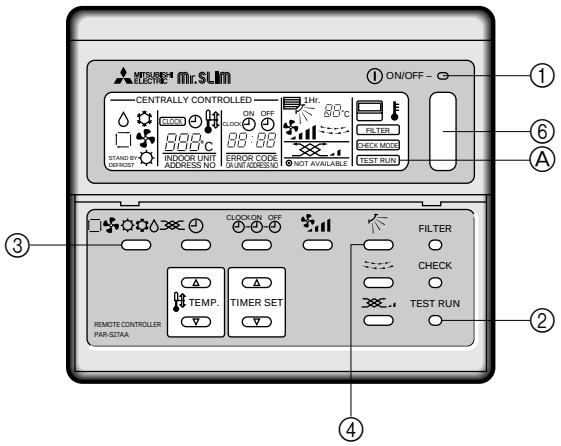
9 TEST RUN

[1] Before test run

- **After installation of indoor and outdoor units, and piping and electric wiring work, re-check that the unit is free from leaks of refrigerant, loosened connections, and incorrect polarity.**
- **Measure an impedance between the power supply terminal block on the outdoor unit and the ground with a 500 V Megger and check that it is equal to or greater than 1.0 MΩ.**
  For the heater integrated units, make the similar measurement on the heater power supply terminal block (L, N, ⏚).
  (*) Never apply any voltage to the both terminal blocks for the indoor and outdoor unit connection (S1, S2, S3) and the remote controller (1, 2).
- **For specific models requiring changing of settings for higher ceilings or selection of power supply ON/OFF capability, make proper changes referring to the description for Selection of Functions through Remote Controller.**

[2] Test run procedures

1) Indoor unit



Operating procedures

① **Turn on the main power supply**
While the room temperature display on the remote controller reads “CENTRALLY CONTROLLED”, the remote controller is disabled. Turn off the “CENTRALLY CONTROLLED” display before using the remote controller.

② **Press “TEST RUN” button twice**
Ⓐ The “TEST RUN” indicator should light up.

③ **Press button**
Cooling/drying mode: Cool air should start to blow.
Heating mode: Warm air should start to blow (after a while).

④ **Press button**
Check for correct motion of auto-vanes.

⑤ **Check the outdoor unit fan for correct running**
The outdoor unit features automatic capacity control to provide optimum fan speeds. The fan keeps running at a low speed to meet the current outside air condition unless it exceeds its available maximum power. Then, in actuality, the fan may stop or run in the reverse direction depending on the outside air, which does not mean malfunction.

⑥ **Press the “ON/OFF” button to reset the test run in progress**

- The test run will be automatically shut down after two hours in response to the AUTO STOP setting of two hours on the timer.
- During the test run, the room temperature display shows the indoor unit tubing temperatures.
- In the case of the test run, the OFF timer will activate, and the test run will automatically stop after two hours.
- The room temperature display section shows the control temperature for the indoor units during the test run.
- Check that all the indoor units are running properly for simultaneous twin and triple operation.
  Malfunctions may not be displayed even if the wiring is incorrect.

(*1)
After turning ON the power, the system will go into startup mode, and the remote controller operation lamp (red) and the room temperature display section's "H0" will flash. Also, in the case of the indoor substrata LEDs, LED 1 and LED 2 light up (when address is 0) or become dim (when address is not 0), and LED 3 flashes. In the case of the outdoor substrata LED display, [–] and [–] are displayed alternatively at 1-second intervals.

- If one of the above operations does not function correctly, the following causes should be considered, and if applicable, dealt with. (The following symptoms have been determined under test run mode. Note that "startup" in the chart means the *1 display above.)

Symptoms		Cause
Remote Controller Display	Outdoor Substrate LED Display	
Remote controller is displaying "H0", and operation is not possible.	After "startup" display, "00" is displayed (correct operation).	• After power is turned ON, system startup lasts for about 2 mins., and "H0" is displayed (correct operation).
After power is turned ON, "H0" is displayed for 3 mins., then error code is displayed.	After "startup" display, error code is displayed.	• Outdoor unit's safeguard installation connector is open. • Negative phase and open phase of outdoor unit's power terminal board (Single phase: L, N, ⏚/triple phase: L1, L2, L3, N, ⏚)
	After "startup" display, "F1" (negative phase) is displayed.	• Incorrect connection of outdoor terminal board (Single phase: L, N, ⏚/triple phase: L1, L2, L3, N, ⏚ grounding and S1, S2, S3)
Power is turned ON, and "EE" or "EF" are displayed after "H0" is displayed.	After "startup" display, "00" or "EE" is displayed ("EE" is displayed when a test run is made).	• Outdoor unit and indoor unit construction differ
Display messages do not appear even when remote controller operation switch is turned ON (operation lamp does not light up).	After "startup" display, "EA" (error for number of units) or "Eb" (unit number error) is displayed.	• Wiring for the indoor and outdoor unit is not connected correctly. (Polarity is wrong for S1, S2, S3) • Remote controller transmission wire short
	After "startup" display, "00" is displayed (correct operation).	• There is no outdoor unit for address 0 (address is something other than 0).
	After "startup" display, "00" is displayed (correct operation).	• Remote controller transmission wire burnout
Operation display appears but soon disappears even when remote controller operations are executed.	After "startup" display, "00" is displayed (correct operation).	• After cancellation of function selection, operation is not possible for about 30 secs. (correct operation).

* Press the remote controller's "CHECK" button twice consecutively to be able to run a self diagnosis. See the chart below for content of error code displays.

LCD	Nonconformity Content	LCD	Nonconformity Content	LCD	Nonconformity Content
P1	Suction sensor error	P8	Tube temperature error	E6 ~ EF	Signal error between indoor and outdoor units
P2	Tubing (liquid) sensor error	P9	Tube (2-phase tube) sensor error		
P4	Drain sensor error	U0 ~ UP	Outdoor unit nonconformity	- - - -	No error history
P5	Drain overflow safeguard operation	F1 ~ FA	Outdoor unit nonconformity	FFFF	No relevant unit
P6	Freezing/overheating safeguard operation	E0 ~ E5	Signal error between remote controller and indoor unit		

See the chart below for details of the LED displays (LED 1, 2, 3) on the indoor substrate.

LED 1 (microcomputer power supply)	Displays the ON/OFF of power for control. Check that this is lit during normal use.
LED 2 (remote controller feed)	Displays the ON/OFF of feed to wired remote controller. Is only lit for indoor unit linked to outdoor unit with address "00".
LED 3 (indoor and outdoor signals)	Displays signal between indoor and outdoor units. Check that this is flashing during normal use.

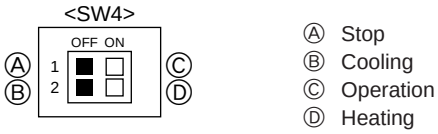
2) Outdoor unit

① Check Items

- After installation of indoor and outdoor units, and tubing and electric wiring work, check that the unit is free from leaks of refrigerant, loosened connections, and incorrect polarity.
- Check that there is no negative phase and open phase. (The F1 message for negative phase and the F2 message for open phase will flash at LED 1 on the outdoor substrate. If this happens, rewire correctly.)
- Measure the impedance between power terminals (Single phase: L, N, ⏚/triple phase: L1, L2, L3, N, ⏚) and the ground with a 500 V Megger and check that it is 1.0 MΩ or more. Do not operate the equipment if measurement is less than 1.0 MΩ. * Never conduct this operation on the outdoor connection wiring terminals (S1, S2, S3) as this causes damage.
- When there is no error at the outdoor unit.
  (If there is an error at the outdoor unit, it can be evaluated at LED 1 [digital display] of the outdoor substrate.)
- The stop valves are open both the liquid and gas sides.
  After checking the above, execute the test run in accordance with the following.

② Test run start and finish

- Operation from the indoor unit
  Execute the test run using the installation manual for the indoor unit.
- Operation from the outdoor unit
  Execute settings for test run start, finish and operation mode (cooling, heating) using the DIP switch SW 4 on the outdoor substrate.



Ⓐ Stop
Ⓑ Cooling
Ⓒ Operation
Ⓓ Heating

① Set the operation mode (cooling, heating) using SW 4-2
② Turn ON SW 4-1, The operation mode for SW 4-2 will be adhered to, and the test run will commence
③ Turn OFF SW 4-1 to finish the test run

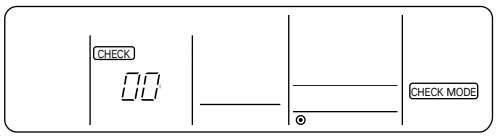
- There may be a faint knocking noise emitted from the proximity of the fan during the test run. This is torque fluctuation occurring due to control of fan revolutions. There is no problem with the product.

Note:
The SW 4-2 operation mode cannot be changed during the test run. (To change test run mode, stop the equipment with SW 4-1, change the operation mode, then restart test run with SW 4-1.)

[3] Self-diagnosis

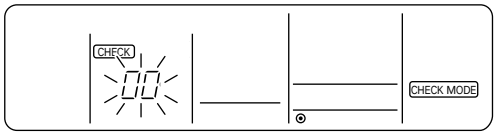
Use the remote controller to look up each units error history.

①



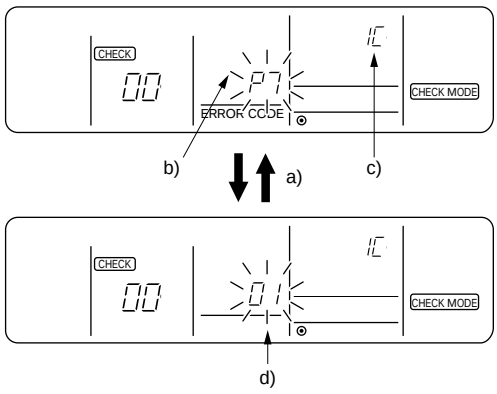
② **Change to self-diagnosis mode**
Press the CHECK button twice within three seconds to show the following display.

②



② **Select the refrigerant address number to be self-diagnosed**
Press the ▵ ▿ buttons to scroll through the refrigerant address numbers (00 to 15) and select the refrigerant address number to be self-diagnosed. After three seconds from making the change, the lit refrigerant address to be self-diagnosed will start to flash, and self-diagnosis will commence.

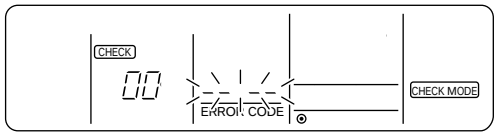
③ (1)



③ **Self-diagnosis result display**
See the above chart for details of error code contents.
(1) When there is an error history

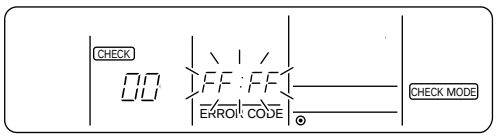
a) Alternating display
b) Error code
c) Attribute of error search
d) Unit number

(2)



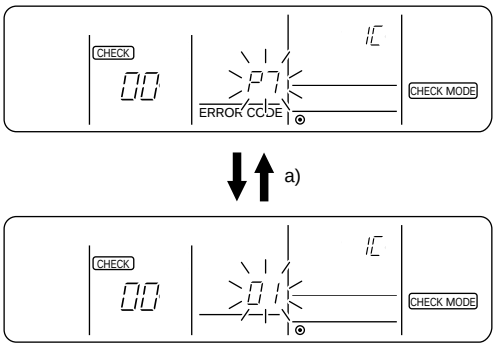
(2) When there is no error history

③ (3)



(3) When the address does not exist

④



④ Reset error history

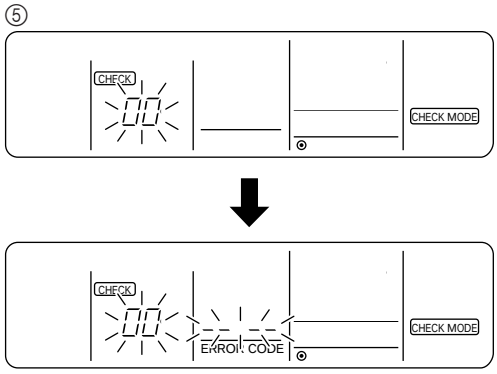
Display the error history at the self-diagnosis result display screen ③.

The address for self-diagnosis will flash when the CLOCK ON OFF button is pressed twice within three seconds.

The diagram on the left will be displayed when error history has been reset. Note that the error content will be redisplayed if error history resetting is unsuccessful.

a) Alternating display

⑤



⑤ Canceling self-diagnosis

The following two methods can be used to cancel self-diagnosis.

Press the CHECK button twice within three seconds to cancel self-diagnosis. The display screen will return to the status before self-diagnosis.

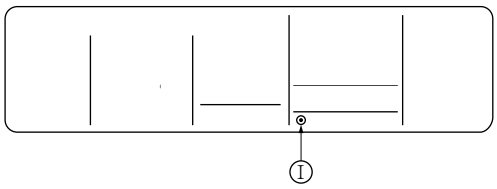
Press the I ON/OFF button to cancel self-diagnosis. The indoor unit will stop.

(This operation is ineffectual when operation is prohibited.)

[4] Remote controller diagnosis

If operation cannot be carried out from the remote controller, use this function to diagnose the remote controller.

①



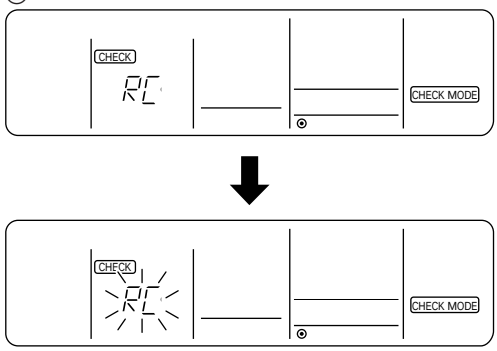
Ⓘ Electric current marker

① First, check the electricity current marker

If the correct voltage (DC 12 V) is not displayed on the remote controller, the electric current marker will be lit.

If the electricity current marker is not lit, check the remote controller wiring and the indoor units.

②

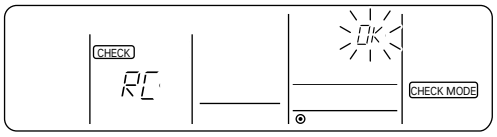


② Transfer to remote control mode

Hold down the CHECK button for five seconds or more to display the diagram on the left.

Press the FILTER button to commence diagnosis of remote controller.

③ (1)

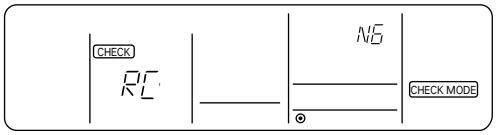


③ Remote controller diagnosis results

(1) The remote control is functioning correctly.

Check other possible causes as there are no problems with the remote controller.

(2)



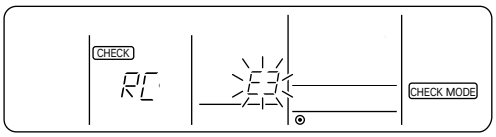
(2) The remote controller has a nonconformity.

The remote controller must be replaced.

Error display 1 (“NG”) flashes to show a nonconformity in the transmitter-receiver circuit.

Potential problems other than those diagnosed for the remote controller.

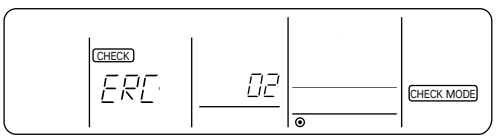
(1)



(1) Single transmission not possible if error display 2 (“E3”) flashes.

There is “noise” on the transmission line, or damage of other remote controllers for the indoor units can be considered. Check the transmission path and other controllers.

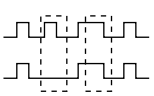
(2)



(2) Data error has occurred when error display three shows “ERC” and number of data errors.

Number of generated data errors (maximum 66 errors).

The number of generated data errors stands for the difference in the number of bits of transmitted data from the remote controller and the actual number of bits that were transmitted along the transmission path. If this error occurs, “noise”, etc., is interfering with the transmission data. Check the transmission path.



Ⓛ Remote controller transmission data
Ⓜ Transmission data at transmission path

Ⓚ When the number of data errors generated is 02

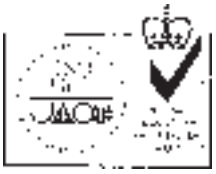
④ Cancel the remote controller diagnosis

Hold down the CHECK button for five seconds or more to cancel the remote controller diagnosis. The “H0” operation lamp will flash, and the display screen will return to the status before remote controller diagnosis in approximately 30 seconds.

Certificate Number FM33568

The Air Conditioning & Refrigeration Systems Works acquired ISO 9001 certification under Series 9000 of the International Standard Organization (ISO) based on a review of quality warranties for the production of refrigeration and air conditioning equipment.

ISO Authorization System
The ISO 9000 series is a plant authorization system relating to quality warranties as stipulated by the ISO. ISO 9001 certifies quality warranties based on the "design, development, production, installation and auxiliary services" for products built at an authorized plant.



Certificate Number EC97J1227
Registered on March 10, 1998

The Air Conditioning & Refrigeration Systems Works acquired environmental management system standard ISO 14001 certification.

The ISO 14000 series is a set of standards applying to environmental protection set by the International Standard Organization (ISO). ISO 14001 certifies the plant's environmental protection system and activities.

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