

SERVICE MANUAL

R454B
No. OCH869
REVISED EDITION-B
Outdoor unit
[Model Name]
[Service Ref.]

PUZ-AK36NL	PUZ-AK36NL-U1
PUZ-AK42NL	PUZ-AK42NL-U1
PUZ-AK48NL	PUZ-AK48NL-U1
PUZ-AK60NL	PUZ-AK60NL-U1
PUY-AK36NL	PUY-AK36NL-U1
PUY-AK42NL	PUY-AK42NL-U1
PUY-AK48NL	PUY-AK48NL-U1
PUY-AK60NL	PUY-AK60NL-U1
SUZ-AK48NL	SUZ-AK48NL-U1
SUZ-AK60NL	SUZ-AK60NL-U1

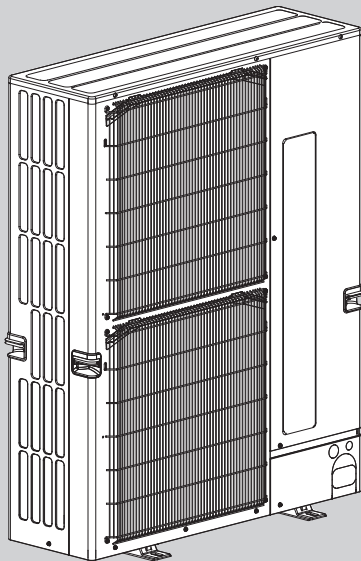
Note:

- This manual describes service data of the outdoor units only.

Revision:

- Deleted description regarding SUZ-CK48NLH-U1 and SUZ-CK60NLH-U1 in REVISED EDITION-B.

OCH869A is void.



PUZ-AK36/42/48/60NL-U1
PUY-AK36/42/48/60NL-U1
SUZ-AK48/60NL-U1

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PARTS CATALOG (OCB869)

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REFERENCE MANUAL

INDOOR UNIT

Model name	Service Ref.	Service manual No. Parts catalog No.
PLA-AE12/18/24/30/36/42/48NL	PLA-AE12/18/24/30/36/42/48NL-U1	OCH856 OCB856
PCA-AK24/30/36/42NL	PCA-AK24/30/36/42NL-U1	OCH860 OCB860
PKA-AK24/30/36NL	PKA-AK24/30/36NL-U1	OCH859 OCB859
PEAD-AA12/18/24/30/36/42NL	PEAD-AA12/18/24/30/36/42NL-U1	HWE24030 BWE024030
PAA-AA/BA/CA18/24/30/36/42NL	-	MD-2025-K010
PVA-AA12/18/24/30/36/42/48/60NL	PVA-AA12/18/24/30/36/42/48/60NL-U1	-
SVZ-AP48/60NL	SVZ-AP48/60NL-U1	-

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SAFETY PRECAUTION

MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

 	WARNING (Risk of fire)	This unit uses a flammable refrigerant. If the refrigerant leaks and comes in contact with fire or a heating part, it will create a harmful gas and there is a risk of fire.
	Read the OPERATING INSTRUCTIONS carefully before operation.	
	Service personnel are required to carefully read the OPERATING INSTRUCTIONS and INSTALLATION MANUAL before operation.	
	Further information is available in the OPERATING INSTRUCTIONS, INSTALLATION MANUAL, and the like.	

2-1. ALWAYS OBSERVE FOR SAFETY

Before obtaining access to terminal, all supply circuits must be disconnected.

Preparation before the repair service.

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the air conditioner, turn off the power-supply breaker.
- Discharge the condenser before the work involving the electric parts.

Precautions during the repair service.

- Do not perform the work involving the electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigerating cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.
- When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- This model is equipped with a fusible plug. The fusible plug operates when the temperature rises above 158°F [70°C], and there is a risk of accidents or disasters such as the ejection of molten metal or refrigerant leakage. When removing the refrigerant pipe, be careful not to expose the fusible plug to the braze torch flame or transfer heat to it.

2-2. CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R454B

Use new refrigerant pipes.

In the case of using the existing pipes for R22, R410A, be careful with the following:

- Be sure to clean the pipes and make sure that the insides of the pipes are clean.
- Change flare nut to the one provided with this product. Use a newly flared pipe.
- Avoid using thin pipes.

Make sure that the inside and outside of refrigerant piping is clean and it has no contaminants such as sulfur, oxides, dirt, shaving particles, etc. which are hazard to refrigerant cycle.
In addition, use pipes with specified thickness.

Contamination inside refrigerant piping can cause deterioration of refrigerant oil, etc.

Store the piping to be used indoors during installation and both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

The refrigerant oil applied to flare and flange connections must be ester oil, ether oil or alkylbenzene oil in a small amount.

If large amount of mineral oil enters, that can cause deterioration of refrigerant oil, etc.

Charge refrigerant from liquid phase of gas cylinder.

If the refrigerant is charged from gas phase, composition change may occur in refrigerant and the efficiency will be lowered.

Do not use refrigerant other than R454B.

If other refrigerant (R22, R410A, etc.) is used, chlorine in refrigerant can cause deterioration of refrigerant oil, etc.

Use a vacuum pump with a reverse flow check valve.

Vacuum pump oil may flow back into refrigerant cycle and that can cause deterioration of refrigerant oil, etc.

Use the following tools specifically designed for use with R454B refrigerant.

The following tools are necessary to use R454B refrigerant.

Tools for R454B	
Gauge manifold	Flaring tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adaptor
Torque wrench	Electronic refrigerant charging scale

Handle tools with care.

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Do not use a charging cylinder.

If a charging cylinder is used, the composition of refrigerant will change and the efficiency will be lowered.

Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.

Use the specified refrigerant only.

Never use any refrigerant other than that specified.
Doing so may cause a burst, an explosion, or fire when the unit is being used, serviced, or disposed of.
Correct refrigerant is specified in the manuals and on the spec labels provided with our products.
We will not be held responsible for mechanical failure, system malfunction, unit breakdown or accidents caused by failure to follow the instructions.

[1] Warning for service

- (1) Do not alter the unit.
- (2) For installation and relocation work, follow the instructions in the installation manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.
- (3) Ask a dealer or an authorized technician to install, relocate and repair the unit.
- (4) Refrigerant pipes connection shall be accessible for maintenance purposes.
- (5) If the air conditioner is installed in a small room or closed room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.
- (6) Keep gas-burning appliances, electric heaters, and other fire sources (ignition sources) away from the location where installation, repair, and other air conditioner work will be performed.
If refrigerant comes into contact with a flame, poisonous gases will be released.
- (7) When installing or relocating, or servicing the air conditioner, use only the specified refrigerant (R454B) to charge the refrigerant lines.
Do not mix it with any other refrigerant and do not allow air to remain in the lines.
If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
- (8) After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.
- (9) Do not use low temperature solder alloy in the case of brazing the refrigerant pipes.
- (10) When performing brazing work, be sure to ventilate the room sufficiently. Make sure that there are no hazardous or flammable materials nearby.
When performing the work in a closed room, small room, or similar location, make sure that there are no refrigerant leaks before performing the work.
If refrigerant leaks and accumulates, it may ignite or poisonous gases may be released.
- (11) Do not install the unit in places where refrigerant may build-up or places with poor ventilation such as a semibasement or a sunken place in outdoor: Refrigerant is heavier than air, and inclined to fall away from the leak source.
- (12) Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- (13) The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- (14) Do not pierce or burn.
- (15) Be aware that refrigerants may not contain an odour.
- (16) Pipe-work shall be protected from physical damage.
- (17) The installation of pipe-work shall be kept to a minimum.
- (18) Compliance with national gas regulations shall be observed.
- (19) All field joints shall be accessible for inspection prior to being covered or enclosed.
- (20) Keep any required ventilation openings clear of obstruction.
- (21) Servicing shall be performed only as recommended by the manufacturer.
- (22) The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- (23) Maintenance, service and repair operations shall be performed by authorized technician with required qualification.
- (24) Be sure to have appropriate ventilation in order to prevent ignition. Furthermore, be sure to carry out fire prevention measures that there are no dangerous or flammable objects in the surrounding area.

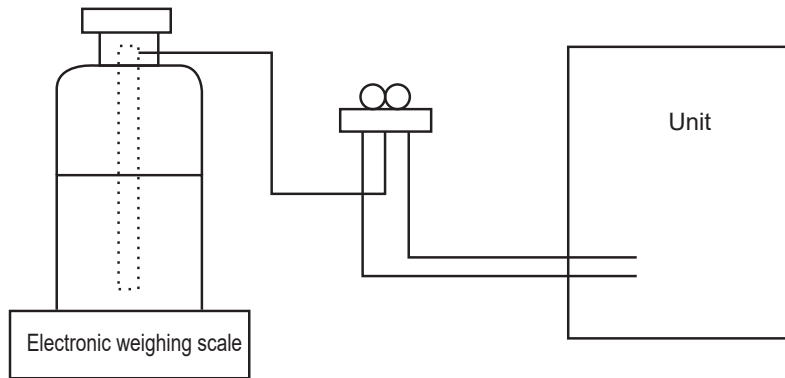
[2] Cautions for service

- (1) Perform service after recovering the refrigerant left in unit completely.
- (2) Do not release refrigerant in the air.
- (3) After completing service, charge the cycle with specified amount of refrigerant.
- (4) If moisture or foreign matter might have entered the refrigerant piping during service, ensure to remove them.

[3] Additional refrigerant charge

When charging directly from cylinder

- (1) Check that cylinder for R454B on the market is a syphon type.
- (2) Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



[4] Cautions for unit using R454B refrigerant

Basic work procedures are the same as those for conventional units using refrigerant R410A. However, pay careful attention to the following points.

(1) Information on servicing

(1-1) Checks on the Area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating systems, (1-3) to (1-7) shall be completed prior to conducting work on the systems.

(1-2) Work Procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

(1-3) General Work Area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.

Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

(1-4) Checking for Presence of Refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

(1-5) Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.

Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

(1-6) No Ignition Sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

(1-7) Ventilated Area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

(1-8) Checks on the Refrigeration Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

(1-9) Checks on Electrical Devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of ground bonding.

(2) Repairs to Sealed Components

Sealed electrical components shall be replaced.

(3) Repair to intrinsically Safe Components

Intrinsically safe components must be replaced.

(4) Cabling

Refer to 6.1 in the installation manual.

(5) Detection of Flammable Refrigerants

Refer to 4.4 in the installation manual.

(6) Removal and Evacuation

Refer to 1.2 in the installation manual.

(7) Charging Procedures

Refer to 4.4 in the installation manual.

(8) Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- a. Become familiar with the equipment and its operation.
- b. Isolate system electrically.
- c. Before attempting the procedure, ensure that:
 - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - all personal protective equipment is available and being used correctly;
 - the recovery process is supervised at all times by a competent person;
 - recovery equipment and cylinders conform to the appropriate standards.
- d. Pump down refrigerant system, if possible.
- e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f. Make sure that cylinder is situated on the scales before recovery takes place.
- g. Start the recovery machine and operate in accordance with instructions.
- h. Do not overfill cylinders (no more than 80 % volume liquid charge).
- i. Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

(9) Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

(10) Recovery

Refer to 1.2 in the installation manual.

[5] Service tools

Use the below service tools as exclusive tools for R454B refrigerant.

No.	Tool name	Specifications
①	Gauge manifold	· Only for R454B
		· Use the existing fitting specifications.
		· Use high-tension side pressure of 768.7 psig [5.3 MPa.G] or over.
②	Charge hose	· Only for R454B
		· Use pressure performance of 738.2 psig [5.09 MPa.G] or over.
③	Electronic weighing scale	—
④	Gas leak detector	· Use the detector for R134a, R407C, R410A or R454B
⑤	Adaptor for reverse flow check	· Attach on vacuum pump.
⑥	Refrigerant charge base	—
⑦	Refrigerant cylinder	· Only for R454B · Top of cylinder (Pink)
		· Cylinder with syphon
⑧	Refrigerant recovery equipment	—

2-3. CAUTIONS FOR REFRIGERANT PIPING WORK

The new refrigerant R454B is adopted for replacement inverter series. Although the refrigerant piping work for R454B is the same as for R22/R410A, exclusive tools are required to avoid mixing with different types of refrigerant. Furthermore, as the working pressure of R454B is 1.6 times higher than that of R22, their sizes of flared sections and flare nuts are different.

① Thickness of pipes

Since the working pressure of R454B is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 7/256 inch [0.7 mm] or below.)

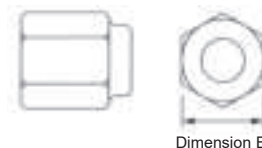
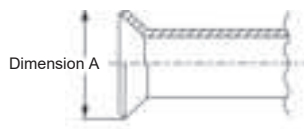
Diagram below: Piping diameter and thickness

Nominal dimensions (inch)	Outside diameter (mm)	Thickness : inch [mm]	
		R454B/R410A	R22
1/4	6.35	1/32 [0.8]	1/32 [0.8]
3/8	9.52	1/32 [0.8]	1/32 [0.8]
1/2	12.70	1/32 [0.8]	1/32 [0.8]
5/8	15.88	5/128 [1.0]	5/128 [1.0]
3/4	19.05	5/128 [1.0]	5/128 [1.0]

② Dimensions of flare cutting and flare nut

The component molecules in HFC refrigerant are smaller compared to the conventional refrigerants. In addition, R454B is a refrigerant, which has higher risk of leakage because its working pressure is higher than that of other refrigerants. Therefore, to enhance air tightness and strength, flare cutting dimension of copper pipe for R454B has been specified separately from the dimensions for other refrigerants as shown below. The dimension B of the flare nut for R454B also has partly been changed to increase strength as shown below. Set copper pipe correctly referring to copper pipe flaring dimensions for R454B below. For 1/2 and 5/8 inch pipes, the dimension B changes.

Use torque wrench corresponding to each dimension.

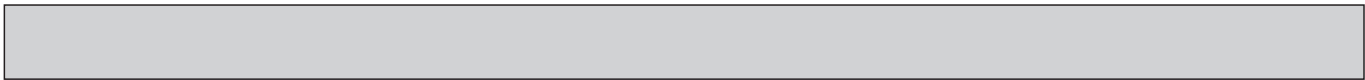


Flare cutting dimensions

Nominal dimensions (inch)	Outside diameter (mm)	Dimension A ^(+0.4) _{-0.4}	
		R454B/R410A (inch [mm])	R22 (mm)
1/4	6.35	11/32-23/64 [9.1]	9.0
3/8	9.52	1/2-33/64 [13.2]	13.0
1/2	12.70	41/64-21/32 [16.6]	16.2
5/8	15.88	49/64-25/32 [19.7]	19.4
3/4	19.05	59/64-15/16 [24.0]	23.3

Flare nut dimensions

Nominal dimensions (inch)	Outside diameter (mm)	Dimension B	
		R454B/R410A (inch [mm])	R22 (mm)
1/4	6.35	43/64 [17.0]	17.0
3/8	9.52	7/8 [22.0]	22.0
1/2	12.70	1-3/64 [26.0]	24.0
5/8	15.88	1-9/64 [29.0]	27.0
3/4	19.05	1-27/64 [36.0]	36.0



③ Tools for R454B (The following table shows whether conventional tools can be used or not.)

Tools and materials	Use	R454B tools	Can R22 tools be used?	Can R22 tools be used?
Gauge manifold	Air purge, refrigerant charge and operation check	Tool exclusive for R454B	×	○
Charge hose		Tool exclusive for R454B	×	○
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R454B	×	○
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R454B	×	×
Applied oil	Apply to flared section	Ester oil, ether oil and alkylbenzene oil (minimum amount)	×	Ester oil, ether oil: ○ Alkylbenzene oil: minimum amount
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R454B	×	○
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R454B	×	○
Vacuum pump	Vacuum dry and air purge	Tools for other refrigerants can be used if equipped with adapter for reverse flow check	△(Usable if equipped with adapter for reverse flow)	△(Usable if equipped with adapter for reverse flow)
Flaring tool*	Flaring work of piping	Tools for other refrigerants can be used by adjusting flaring dimension	△(Usable if equipped with adapter for reverse flow)	△(Usable if equipped with adapter for reverse flow)
Bender	Bend the pipes	Tools for other refrigerants can be used	○	○
Pipe cutter*	Cut the pipes	Tools for other refrigerants can be used	○	○
Welder and nitrogen gas cylinder	Weld the pipes	Tools for other refrigerants can be used	○	○
Refrigerant charging scale	Refrigerant charge	Tools for other refrigerants can be used	○	○
Vacuum gauge or thermistor vacuum gauge and vacuum valve	Check the degree of vacuum. (Vacuum valve prevents back flow of oil and refrigerant to thermistor vacuum gauge)	Tools for other refrigerants can be used	○	○
Charging cylinder	Refrigerant charge	Tool exclusive for R454B	×	×

× : Prepare a new tool. (Use the new tool as the tool exclusive for R454B.)

△ : Tools for other refrigerants can be used under certain conditions.

○ : Tools for other refrigerants can be used.

* Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.

- To deburr pipes, use a reamer or other deburring tools, not sandpaper.
- To cut pipes, use a pipe cutter, not a grinder or other tools that use abrasive materials.
- When cutting or deburring pipes, do not allow cutting chips or other foreign matters to enter the pipes.
- If cutting chips or other foreign matters enter pipes, wipe them off the inside of the pipes.

2-4. LOW AMBIENT COOLING

Precautions for low ambient cooling

- If the outdoor temperature is 23°F or lower during cooling operation, install an optional air guide to prevent wind from blowing into the outdoor unit.
- Install the outdoor unit in a location where wind will not blow onto the back of the unit or through the unit.
- To prevent damage to the parts, be sure to install the unit, turn on the main power, and perform service in an environment where the ambient temperature is 0°F or higher.
- In order to protect the compressor and electrical components, do not turn off the circuit breaker if the unit is installed in an environment where the ambient temperature is 0°F or lower.
- It needs at least 12 hr standby to operation in order to warm the electrical parts.

Note: During cooling operation under low ambient temperature, the bottom fan motor stops occasionally. This is an intended feature, not a malfunction.

2.5. Minimum installation area

■ Indoor units

When the indoor unit is installed in a room with a floor area of A_{min} or more, charge an appropriate amount of refrigerant M (factory-charged refrigerant + locally added refrigerant) according to the table below.

* For the factory-charged refrigerant amount, refer to the specification nameplate or installation manual.

For the amount to be added locally, refer to the installation manual.

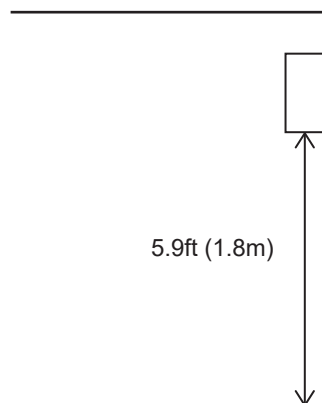
* For ducted systems to one or more rooms, first determine the system's refrigerant amount, then refer to the indoor unit installation manual for each room's restriction for minimum area.

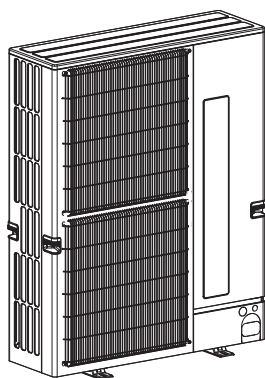
The mounting height of indoor unit shall be 5.9 ft (1.8 m) or more from the floor, excluding ceiling concealed (PEAD), multi-position air handler (PVA), and A-Coil (PAA).

* There are restrictions in installation height for each model, so read the installation manual for the particular unit.

Refrigerant Charging Table

M		A_{min}	
[kg]	[lbs, oz]	[m ²]	[ft ²]
2.0	4 6	7.5	81
2.5	5 8	9.3	101
3.0	6 9	11.2	121
3.5	7 11	13.0	140
4.0	8 13	14.9	161
4.5	9 14	16.7	180
4.6	10 2	17.1	185
4.7	10 5	17.5	189
4.8	10 9	17.8	192
4.9	10 12	18.2	196
5.0	11 0	18.6	201
5.1	11 3	18.9	204
5.2	11 7	19.3	208
5.3	11 10	19.7	213
5.4	11 14	20.0	216
5.5	12 2	20.4	220
5.6	12 5	20.8	224
5.7	12 9	21.2	229
5.8	12 12	21.5	232
5.9	13 0	21.9	236
6.0	13 3	22.3	241
6.1	13 7	22.6	244
6.2	13 10	23.0	248
6.3	13 14	23.4	252
6.4	14 1	23.8	257
6.5	14 5	24.1	260
6.6	14 8	24.5	264
6.7	14 12	24.9	269
6.8	14 15	25.2	272
6.9	15 3	25.6	276
7.0	15 6	26.0	280
7.1	15 10	26.3	284
7.2	15 13	26.7	288
7.3	16 1	27.1	292





PUZ-AK36NL-U1
PUZ-AK42NL-U1
PUZ-AK48NL-U1
PUZ-AK60NL-U1
PUY-AK36NL-U1
PUY-AK42NL-U1
PUY-AK48NL-U1
PUY-AK60NL-U1
SUZ-AK48NL-U1
SUZ-AK60NL-U1

CHARGELESS SYSTEM

PRE-CHARGED REFRIGERANT IS SUPPLIED FOR PIPING LENGTH AT SHIPMENT.

(Maximum 100 ft [30 m])

The refrigerant circuit with LEV (Linear Expansion Valve) and the accumulator always control the optimal refrigerant level regardless of the piping length. The additional refrigerant charging work during installation often causes problems. It is completely eliminated by chargeless system. This unique system improves the quality and reliability of the work performance. It also helps to speed up the installation time.

Service Ref.			PUZ-AK36NL-U1 PUY-AK36NL-U1	PUZ-AK42NL-U1 PUY-AK42NL-U1	PUZ-AK48NL-U1 PUY-AK48NL-U1 SUZ-AK48NL-U1	PUZ-AK60NL-U1 PUY-AK60NL-U1 SUZ-AK60NL-U1	
Power supply	Phase		Single				
	Frequency		60 Hz				
	Voltage		208/230 V				
Inverter Input		A	23		30		
MCA		A	34		38		
MOCP		A	56		67		
Breaker size		A	35		40		
External finish			Munsell 3Y 7.8/1.1				
Heat exchanger			Cross fin		Plate fin coil (Ring)		
Defrost method			Reverse cycle				
Crankcase heater		kW	—				
Compressor			Hermetic				
	Model		MRB36FEGMC		MRB53FEJMC-L		
	Motor output	kW	2.7		3.7		
	Starter type		Inverter				
Fan	Fan (drive) × No.		Propeller fan × 2				
	Fan motor output	kW	0.074 + 0.074		0.200 + 0.200		
		HP	0.0992 + 0.0992		0.2682 + 0.2682		
	Airflow	CFM	3910		4020		
		m³/min	111		114		
Sound pressure level	Cooling	dB	52		60		
	Heating	dB	53		62		
Protection devices			HP switch				
			Comp. shell thermo				
Dimension	W	inch	41-11/32				
	D	inch	63/64+12-63/64				
	H	inch	52-43/64				
	W	mm	1050				
	D	mm	25+330				
	H	mm	1338				
Weight		lb	224		265		
		kg	102		120		
Refrigerant			R454B				
	Charged	lb	9+14/16		11+7/16		
		kg	4.5		5.2		
	Control		Linear expansion valve				
	Oil charged	Model	Ester (RM68EH)				
		oz	45		60		
		L	1.4		1.9		
Refrigerant piping	Pipe size OD liquid	inch	3/8				
		mm	9.52				
	Pipe size OD gas	inch	5/8			3/4	
		mm	15.88			19.05	
	Connection method - Indoor		Flared				
	Connection method - Outdoor		Flared				
	Height difference IU-OU	ft	Maximum 100				
		m	Maximum 30				
	Piping length	ft	PUZ	Maximum 165		Maximum 245	
			PUY	Maximum 225		Maximum 245	
		m	PUZ	Maximum 50		Maximum 75	
			PUY	Maximum 69		Maximum 75	

5-1. REFILLING REFRIGERANT CHARGE (R454B: oz, kg)

Additional charging is not necessary if the pipe length does not exceed 30 m (100 ft) for AK36, 42 connected to the A-COIL indoor unit PAA.

Service Ref.	Piping length (one way)																								Factory charged
	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft	110 ft	120 ft	130 ft	140 ft	150 ft	160 ft	165 ft	170 ft	180 ft	190 ft	200 ft	210 ft	220 ft	225 ft	230 ft	240 ft	245 ft		
	15 m	18 m	21 m	24 m	27 m	30 m	33 m	37 m	40 m	43 m	46 m	49 m	50 m	52 m	55 m	58 m	61 m	64 m	67 m	69 m	70 m	73 m	75 m		
PUZ-AK36NL-U1	158 oz	158 oz	158 oz	158 oz	158 oz	158 oz	164 oz	170 oz	176 oz	182 oz	188 oz	194 oz	197 oz	-	-	-	-	-	-	-	-	-	-	-	158 oz
	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.7 kg	4.8 kg	5.0 kg	5.2 kg	5.4 kg	5.5 kg	5.6 kg	-	-	-	-	-	-	-	-	-	-	-	4.5 kg
PUZ-AK42NL-U1	158 oz	158 oz	158 oz	158 oz	158 oz	158 oz	164 oz	170 oz	176 oz	182 oz	188 oz	194 oz	197 oz	-	-	-	-	-	-	-	-	-	-	-	158 oz
	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.7 kg	4.8 kg	5.0 kg	5.2 kg	5.4 kg	5.5 kg	5.6 kg	-	-	-	-	-	-	-	-	-	-	-	4.5 kg
PUZ-AK48NL-U1 SUZ-AK48NL-U1	183 oz	183 oz	183 oz	183 oz	183 oz	183 oz	189 oz	195 oz	201 oz	207 oz	213 oz	219 oz	222 oz	225 oz	231 oz	237 oz	243 oz	249 oz	255 oz	257 oz	257 oz	257 oz	257 oz	257 oz	183 oz
	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.4 kg	5.5 kg	5.7 kg	5.9 kg	6.1 kg	6.2 kg	6.3 kg	6.4 kg	6.6 kg	6.7 kg	6.9 kg	7.1 kg	7.2 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	5.2 kg
PUZ-AK60NL-U1 SUZ-AK60NL-U1	183 oz	183 oz	183 oz	183 oz	183 oz	183 oz	189 oz	195 oz	201 oz	207 oz	213 oz	219 oz	222 oz	225 oz	231 oz	237 oz	243 oz	249 oz	255 oz	257 oz	257 oz	257 oz	257 oz	257 oz	183 oz
	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.4 kg	5.5 kg	5.7 kg	5.9 kg	6.1 kg	6.2 kg	6.3 kg	6.4 kg	6.6 kg	6.7 kg	6.9 kg	7.1 kg	7.2 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	5.2 kg
PUY-AK36NL-U1	158 oz	158 oz	158 oz	158 oz	158 oz	158 oz	164 oz	170 oz	176 oz	182 oz	188 oz	194 oz	197 oz	200 oz	200 oz	200 oz	200 oz	200 oz	200 oz	200 oz	200 oz	-	-	-	158 oz
	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.7 kg	4.8 kg	5.0 kg	5.2 kg	5.4 kg	5.5 kg	5.6 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	-	-	-	4.5 kg
PUY-AK42NL-U1	158 oz	158 oz	158 oz	158 oz	158 oz	158 oz	164 oz	170 oz	176 oz	182 oz	188 oz	194 oz	197 oz	200 oz	200 oz	200 oz	200 oz	200 oz	200 oz	200 oz	200 oz	-	-	-	158 oz
	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.7 kg	4.8 kg	5.0 kg	5.2 kg	5.4 kg	5.5 kg	5.6 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	5.7 kg	-	-	-	4.5 kg
PUY-AK48NL-U1	183 oz	183 oz	183 oz	183 oz	183 oz	183 oz	189 oz	195 oz	201 oz	207 oz	213 oz	219 oz	222 oz	225 oz	231 oz	237 oz	243 oz	249 oz	255 oz	257 oz	257 oz	257 oz	257 oz	257 oz	183 oz
	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.4 kg	5.5 kg	5.7 kg	5.9 kg	6.1 kg	6.2 kg	6.3 kg	6.4 kg	6.6 kg	6.7 kg	6.9 kg	7.1 kg	7.2 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	5.2 kg
PUY-AK60NL-U1	183 oz	183 oz	183 oz	183 oz	183 oz	183 oz	189 oz	195 oz	201 oz	207 oz	213 oz	219 oz	222 oz	225 oz	231 oz	237 oz	243 oz	249 oz	255 oz	257 oz	257 oz	257 oz	257 oz	257 oz	183 oz
	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.4 kg	5.5 kg	5.7 kg	5.9 kg	6.1 kg	6.2 kg	6.3 kg	6.4 kg	6.6 kg	6.7 kg	6.9 kg	7.1 kg	7.2 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	5.2 kg

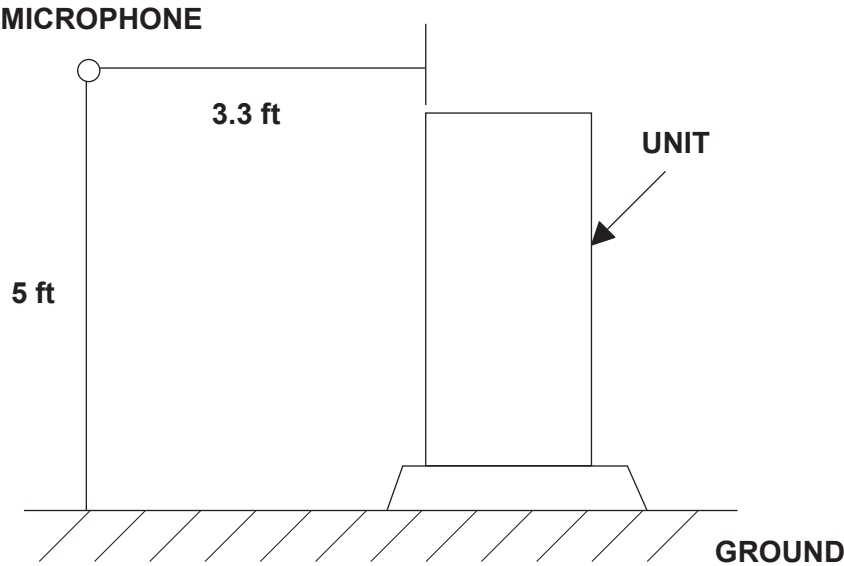
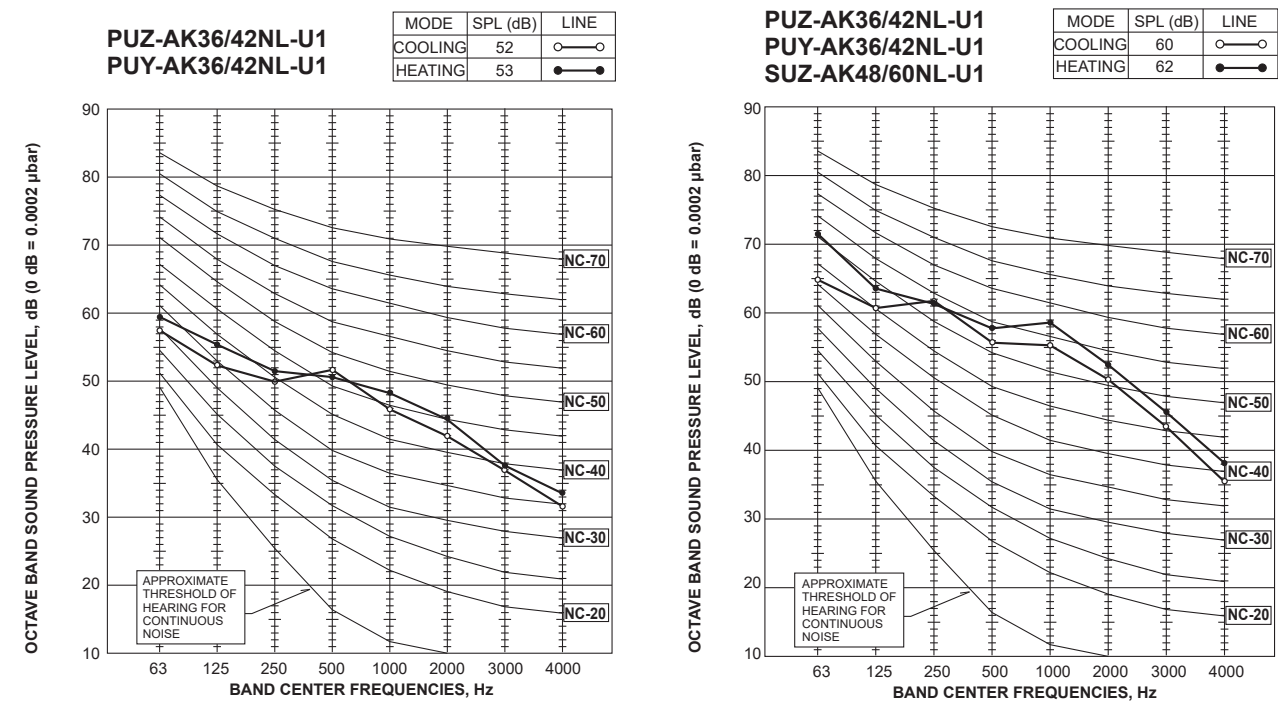
For pipes longer than 100 ft, additional charge is required.

5-2. COMPRESSOR TECHNICAL DATA

(at 68°F [20°C])

Service Ref.		PUZ-AK36NL-U1 PUY-AK36NL-U1	PUZ-AK42NL-U1 PUY-AK42NL-U1	PUZ-AK48NL-U1 PUY-AK48NL-U1 SUZ-AK48NL-U1	PUZ-AK60NL-U1 PUY-AK60NL-U1 SUZ-AK60NL-U1
Compressor model		MRB36FEGMC		MRB53FEJMC-L	
Winding resistance (Ω)	U-V	0.44		0.49	
	U-W				
	W-V				

5-3. NOISE CRITERION CURVES



5-4. STANDARD OPERATION DATA

5-4-1. Heat pump

Representative matching			PLA-AE36NL		PLA-AE42NL		PLA-AE48NL	
Mode			COOLING	HEATING	COOLING	HEATING	COOLING	HEATING
Total	Capacity	Btu/h	36,000	40,000	42,000	48,000	48,000	60,000
	Input	W	2,620	2,570	3,500	3,530	4,573	5,220
Electrical circuit	Indoor unit model		PLA-AE36NL		PLA-AE42NL		PLA-AE48NL	
	Phase		Single		Single		Single	
	Cycle		60 Hz		60 Hz		60 Hz	
	Voltage		208/230 V		208/230 V		208/230 V	
	Current		0.98 A		1.05 A		1.05 A	
	Outdoor unit model		PUZ-AK36NL		PUZ-AK42NL		PUZ-AK48NL	
	Phase		Single		Single		Single	
	Cycle		60 Hz		60 Hz		60 Hz	
	Voltage		208/230 V		208/230 V		208/230 V	
	Current		10.56 A	10.32 A	14.28 A	14.45 A	19.31 A	21.84 A
Refrigerant circuit	Discharge pressure	psig	366	335	381	359	357	395
	Suction pressure	psig	148	115	139	111	128	112
	Discharge temperature	°F	143	158	144	142	169	184
	Condensing temperature	°F	111	103	114	109	109	116
	Suction temperature	°F	52	41	53	35	55	44
	Ref. pipe length	ft	25	25	25	25	25	25
	Discharge pressure	MPa	2.52	2.31	2.63	2.48	2.46	2.72
	Suction pressure	MPa	1.02	0.80	0.96	0.76	0.88	0.78
	Discharge temperature	°C	61.7	69.9	62.4	60.9	75.9	84.7
	Condensing temperature	°C	43.8	39.7	45.6	42.7	43.0	46.6
	Suction temperature	°C	11.1	4.8	11.5	1.9	13.0	6.6
	Ref. pipe length	m	7.6	7.6	7.6	7.6	7.6	7.6
Indoor side	Intake air temperature DB	°F	80	70	80	70	80	70
	Intake air temperature WB	°F	67	60	67	60	67	60
	Discharge air temperature DB	°F	57	102	55	107	53	117
Outdoor side	Intake air temperature DB	°F	95	47	95	47	95	47
	Intake air temperature WB	°F	75	43	75	43	75	43
Indoor side	Intake air temperature DB	°C	26.7	21.1	26.7	21.1	26.7	21.1
	Intake air temperature WB	°C	19.4	15.6	19.4	15.6	19.4	15.6
	Discharge air temperature DB	°C	13.7	38.8	12.9	41.5	11.7	47.1
Outdoor side	Intake air temperature DB	°C	35.0	8.3	35.0	8.3	35.0	8.3
	Intake air temperature WB	°C	23.9	6.1	23.9	6.1	23.9	6.1
SHF			0.76	-	0.72	-	0.67	-
BF			0.10	-	0.10	-	0.17	-

5-4-2. Cooling only

Representative matching			PLA-AE36NL	PLA-AE42NL	PLA-AE48NL
Mode			COOLING	COOLING	COOLING
Total	Capacity	Btu/h	36,000	42,000	48,000
	Input	W	2,620	3,500	4,573
Electrical circuit	Indoor unit model		PLA-AE36NL	PLA-AE42NL	PLA-AE48NL
	Phase		Single	Single	Single
	Cycle		60 Hz	60 Hz	60 Hz
	Voltage		208/230 V	208/230 V	208/230 V
	Current		0.98 A	1.05 A	1.05 A
	Outdoor unit model		PUY-AK36NL	PUY-AK42NL	PUY-AK48NL
	Phase		Single	Single	Single
	Cycle		60 Hz	60 Hz	60 Hz
	Voltage		208/230 V	208/230 V	208/230 V
	Current		10.56 A	14.28 A	19.31 A
Refrigerant circuit	Discharge pressure	psig	366	381	357
	Suction pressure	psig	148	139	128
	Discharge temperature	°F	143	144	169
	Condensing temperature	°F	111	114	109
	Suction temperature	°F	52	53	55
	Ref. pipe length	ft	25	25	25
	Discharge pressure	MPa	2.52	2.63	2.46
	Suction pressure	MPa	1.02	0.96	0.88
	Discharge temperature	°C	61.7	62.4	75.9
	Condensing temperature	°C	43.8	45.6	43.0
	Suction temperature	°C	11.1	11.5	13.0
	Ref. pipe length	m	7.6	7.6	7.6
Indoor side	Intake air temperature DB	°F	80	80	80
	Intake air temperature WB	°F	67	67	67
	Discharge air temperature DB	°F	57	55	53
Outdoor side	Intake air temperature DB	°F	95	95	95
	Intake air temperature WB	°F	75	75	75
Indoor side	Intake air temperature DB	°C	26.7	26.7	26.7
	Intake air temperature WB	°C	19.4	19.4	19.4
	Discharge air temperature DB	°C	13.7	12.9	11.7
Outdoor side	Intake air temperature DB	°C	35.0	35.0	35.0
	Intake air temperature WB	°C	23.9	23.9	23.9
SHF			0.76	0.72	0.67
BF			0.10	0.10	0.17

PUZ-AK36NL-U1
PUY-AK36NL-U1

PUZ-AK42NL-U1
PUY-AK42NL-U1

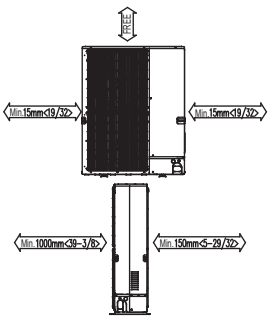
PUZ-AK48NL-U1
PUY-AK48NL-U1

SUZ-AK48NL-U1

Unit: mm<in>

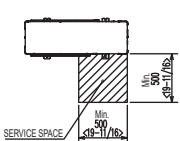
1 FREE SPACE (Around the unit)

The diagram below shows a basic example.
Explanation of particular details are given in the installation manuals etc.



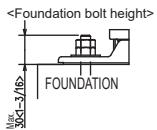
2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.



3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10<W3/8>) bolts.
(Bolts and washers must be purchased locally.)



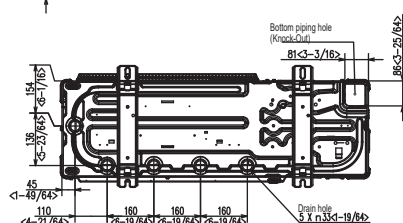
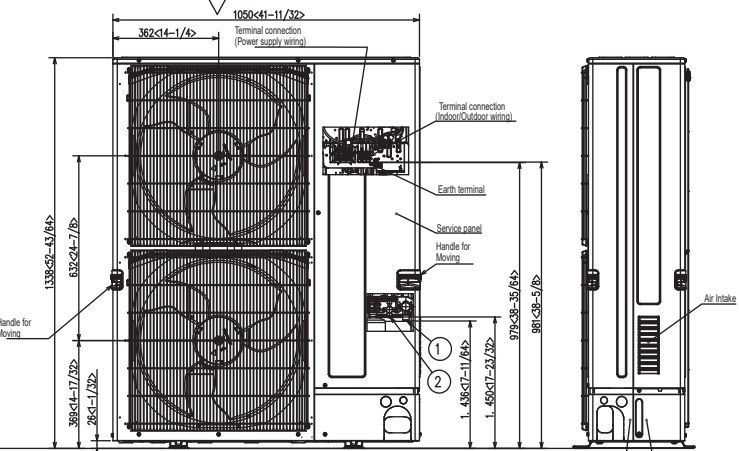
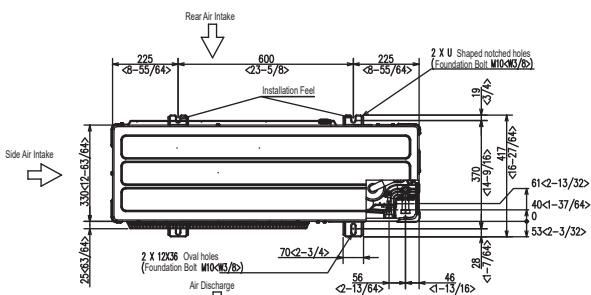
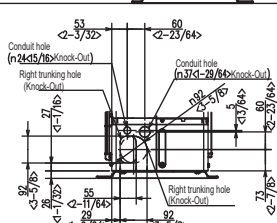
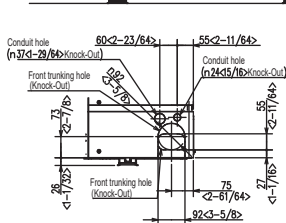
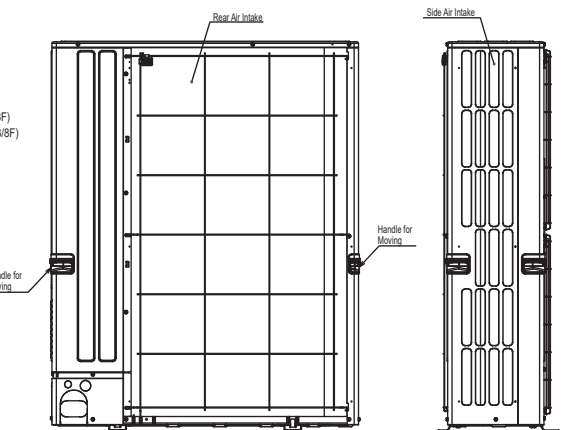
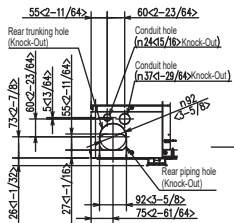
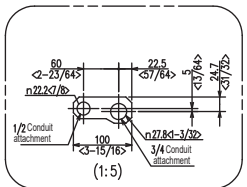
4 PIPING-WIRING DIRECTIONS

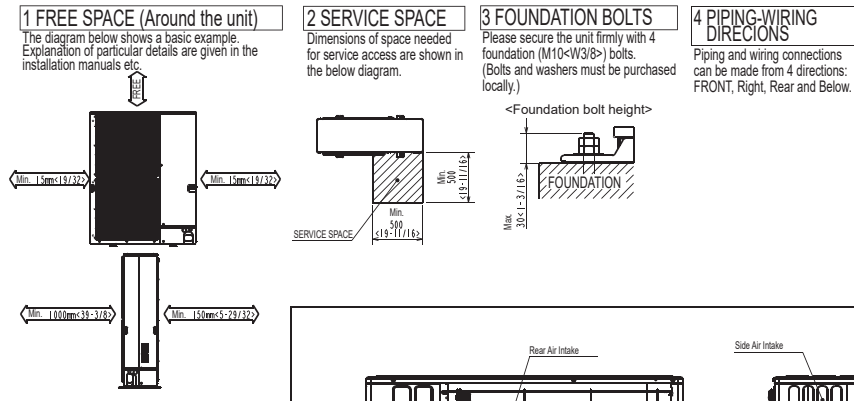
Piping and wiring connections can be made from 4 directions: FRONT, Right, Rear and Below.

Example of Notes

- ①...REFRIGERANT GAS PIPE CONNECTION (FLARE)φ15.88 (5/8")
- ②...REFRIGERANT LIQUID PIPE CONNECTION (FLARE)φ9.52 (3/8")
- *1...INDICATION OF STOP VALVE CONNECTION LOCATION

Piping Knock-Out Hole Details

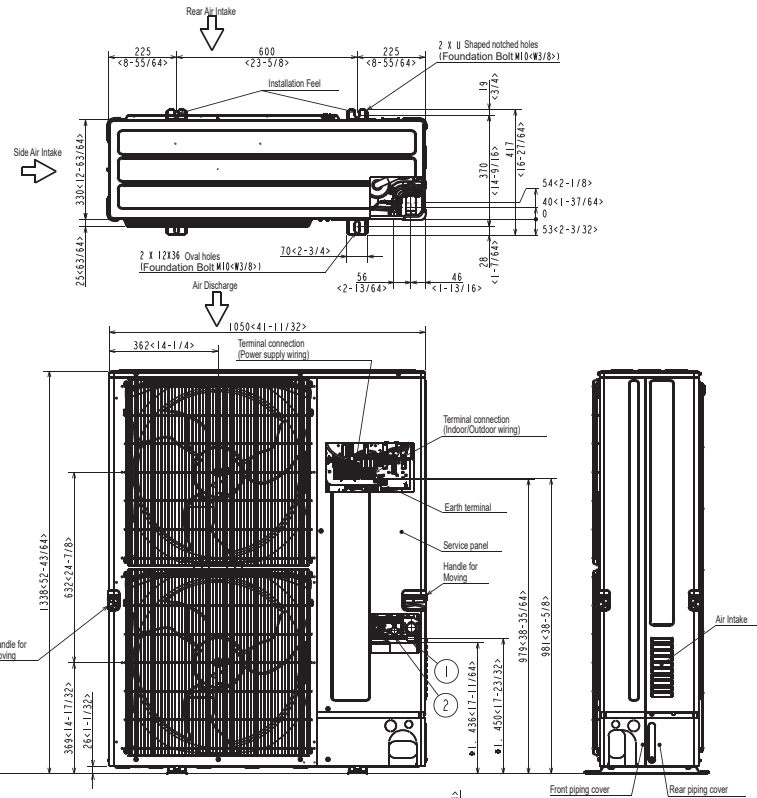
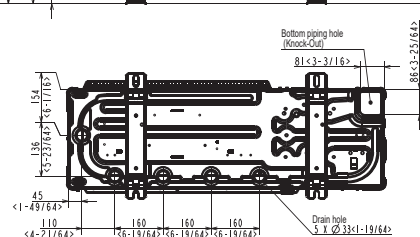
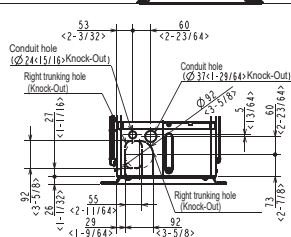
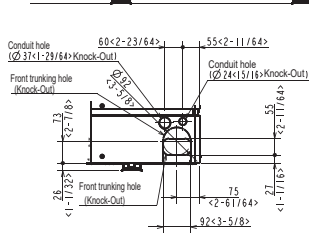
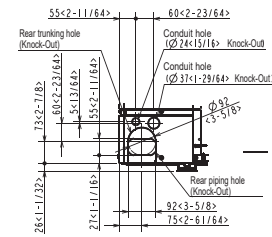
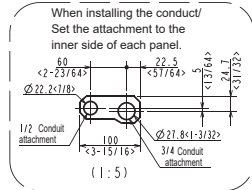




Example of Notes

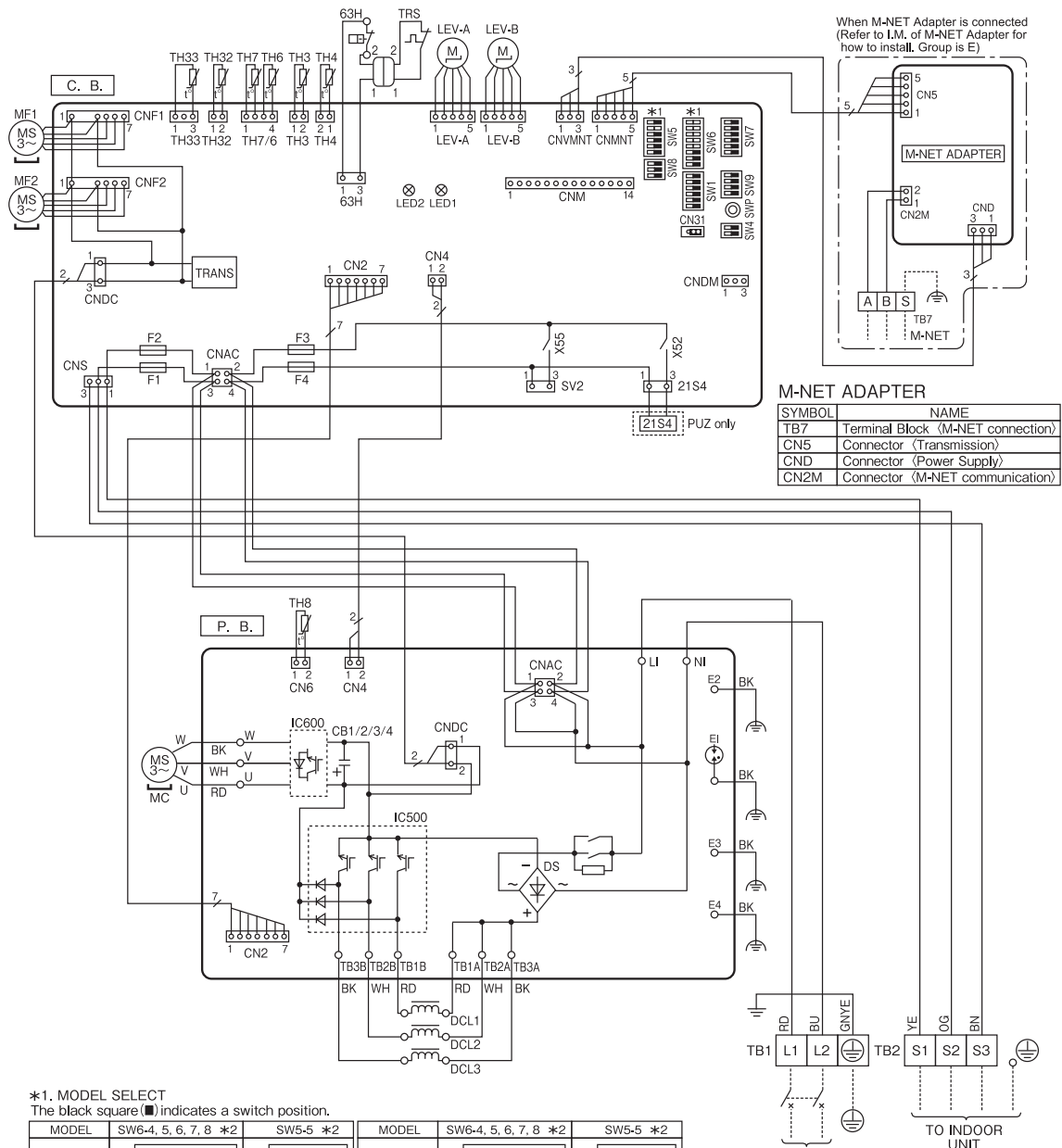
- ①...REFRIGERANT GAS PIPE CONNECTION (FLARE)φ15.88 (5/8")
②...REFRIGERANT LIQUID PIPE CONNECTION (FLARE) φ9.52 (3/8")
*1...INDICATION OF STOP VALVE CONNECTION LOCATION

Piping Knock-Out Hole Details



PUZ-AK36NL-U1
PUY-AK36NL-U1

PUZ-AK42NL-U1
PUY-AK42NL-U1



[LEGEND]

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH32	Thermistor (Suction)	SW6	Switch (Model Select)
TB2	Terminal Block (Indoor/Outdoor)	TH33	Thermistor (Comp. Surface)	SW7	Switch (Function Switch)
MC	Motor for Compressor	LEV-A, LEV-B	Linear Expansion Valve	SW8	Switch (Function Switch)
MF1, MF2	Fan Motor	DCL1, DCL2, DCL3	Reactor	SW9	Switch (Function Switch)
21S4	Solenoid Valve (4-Way Valve)	P. B.	Power Circuit Board	SWP	Switch (Pump Down)
63H	High Pressure Switch	C. B.	Controller Circuit Board	CNM	Connector (Connection for Option)
TRS	Thermal Protector	F1, F2	Fuse (T10AL250V)	CN31	Connector (Emergency Operation)
TH3	Thermistor (Liquid)	F3, F4	Fuse (T6.3AL250V)	CNDM	Connector (Connection for Option)
TH4	Thermistor (Discharge)	SW1	Switch (Manual Defrost, Defect History Record Reset, Refrigerant Address)	SV2	Base Heater
TH6	Thermistor (2-Phase Pipe)	SW4	Switch (Function Switch)	LED1, LED2	LED (Operation Inspection Indicators)
TH7	Thermistor (Ambient)	SW5	Switch (Function Switch, Model Select)		
TH8	Thermistor (Heat Sink)				